CLASS 435, CHEMISTRY: MOLECULAR BIOLOGY AND MICROBIOLOGY

SECTION I - CLASS DEFINITION

STATEMENT OF CLASS SUBJECT MATTER

This class provides for the following subject matter when not provided for elsewhere:

A. A process of using a microorganism or enzyme to synthesize a chemical product.

B. A process of treating a material with a microorganism or enzyme to separate, liberate, or purify a preexisting substance.

C. An in vitro process of measuring and testing in which: (1) A microorganism or enzyme is used to determine the presence or identity of a compound or composition in a sample; (2) A microorganism is identified by propagation; (3) An enzyme is identified by its catalytic activity; (4) The presence of microorganisms is detected; (5) A live microorganism is used in an antigen antibody test as an antigen; (6) Fixed or stabilized nonliving microorganisms, cells, or tissues are involved.

D. A process of propagating a microorganism.

E. A process in which the genetic structure of a microorganism or extrachromosomal genetic structure is altered.

F. A process of organ or tissue maintenance.

G.A process of mashing or malting.

H. Apparatus claimed or solely disclosed as for A-G.

I. Microorganisms, per se, or the subcellular parts thereof.

J. Enzymes, immobilized enzymes or enzyme containing compositions not otherwise provided for and the processes for purifying enzymes or forming immobilized enzymes.

K. Compositions claimed or solely disclosed as for the propagation of microorganisms or for measuring and testing processes in C above.

L. Using microorganisms to destroy hazardous or toxic waste.

CLASSIFICATION GUIDELINES FOR THIS CLASS

APPARATUS

This class takes only apparatus claimed or solely disclosed as for fermentation or enzymology, organ, and tissue maintenance or genetic engineering not otherwise provided for. Apparatus by name only which is claimed as a collection of compounds or compositions in a kit without structure is classified as described below in Lines With Other Classes and Within This Class.

COMPOSITIONS

In general, this class will not provide for compositions other than an immobilized or insolubilized enzyme or a test or culture media.

COMPOUNDS

In general, this class does not provide for compounds other than an immobilized or insolubilized enzyme or an enzyme, per se. Production of metal or ammonium salts of a compound are classified with the production of that compound.

AMINO ACID RESIDUES

If upon hydrolysis of an unidentified product the only residues are amino acids, it should be presumed that the product is a protein or peptide. If other organic moieties are present after hydrolysis of the product then placement should be made upon the basis of the presence of such structure in the product.

PRESUMPTION

In the absence of a clearly claimed step of killing or inactivating a microorganism in an antigen-antibody test the microorganism should be treated as a living antigen.

SECTION II - LINES WITH OTHER CLASSES AND WITHIN THIS CLASS

See References to Other Classes, below, for lines with classes providing for the use of a microorganism, an enzyme and the apparatus therefor and the composition classes providing for the products of a microorganism or enzyme and for lines with other related classes.

The rules for determining Class placement of the Original Reference (OR) for claimed chemical compositions

are set forth in the Class Definition of Class 252 in the section LINES WITH OTHER CLASSES AND WITHIN THIS CLASS, subsection COMPOSITION CLASS SUPERIORITY, which includes a hierarchical ORDER OF SUPERIORITY FOR COMPOSITION CLASSES.

SECTION III - SUBCLASS REFERENCES TO THE CURRENT CLASS

SEE OR SEARCH THIS CLASS, SUBCLASS:

4+, Apparatus by name only which is claimed as a collection of compounds or compositions in a kit without structure is classified on the basis of the compositions into the subclasses 4+ area.

84+, and indented subclasses 95, 96, 98, and 99 for compounds produced by hydrolysis of larger structures with subclasses

94, reserved for the enzymatic interconversion of isomers.

97, 100 - 105 provide for building up from smaller saccharide units.

SECTION IV - REFERENCES TO OTHER CLASSES

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, provides for processes of (a) dyeing employing a microorganism or enzyme (b) treating hides or skins by use of a microorganism or enzyme with subsequent tanning of the hides or skins or subsequent operations that are preliminary and peculiar to tanning of hides or skins or peculiar to making leather.

(a) Class 435 provides for a process of using an enzyme or microorganism to treat a hide or skin particularly depilating or bating as well as treating feathers or animal tissue with a microorganism or enzyme not otherwise provided for.

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, provides for compositions for dyeing materials of any kind which may contain a microorganism or enzyme.

15, Brushing, Scrubbing, and General Cleaning, provides for dust cloths, mops, or other cleaning devices which include detergents which may contain enzymes.

34, Drying and Gas or Vapor Contact With Solids, provides for processes and apparatus for drying of a solid which may include a microorganism enzyme or media composition.

(a) Class 435 provides for processes of culture or propagation of microorganisms including the production of enzymes and media and provides for the combination of culture or production with drying or another Class 34 operation.

48, Gas: Heating and Illuminating, for gaseous compositions for heating or illuminating by combustion which may be the result of a process using a microorganism or enzyme.

47, Plant Husbandry, which provides for mushrooms or processes of or apparatus for cultivating or culturing mushrooms; sprouting or germinating seeds for planting, or testing the sprouting or germinating power of seeds; articles or compositions that include seeds and either a microorganism or enzyme and process of making such articles or compositions; processes of cultivating or culturing seed plants, or other nonfungal plants that include the use of a microorganism or enzyme, articles, compositions, or apparatus, for use in the above processes, or in making articles or compositions, that include seeds and microorganism or enzymes or processes of making articles or compositions for use in the above noted processes.

(a) Class 435 provides for materials that contain germinated seeds, for processes that include germinating seeds or for apparatus for use therein, e.g., malting grain and malting apparatus, etc., as well as processes involving propagation of unicellular algae or undifferentiated plant cells where there is no plant propagation and for the extraction of enzymes from plants or plant products. Class 435 also provides for the production of starter culture for mushrooms or for the propagation of undifferentiated plant cells as well as the culture of unicellular algae.

48, Gas: Heating and Illuminating, for fuel gas compositions when the processes of making such compositions involve a microorganism; processes of producing fuel gas compositions that include a microorganism; articles, compositions, or apparatus, for uses in such processes; or processes of making such articles or compositions for such uses.

(a) Class 435 provides for the production or purification of a gas by the use of microorganisms or enzymes if such process is not ancillary to the production of fertilizer or a Class 210 liquid purification by living organisms or directed to the production of a fuel gas by living organisms.

62, Refrigeration, for processes or apparatus for preserving an organ, microorganism, or enzyme by the removal of heat and the cooled or frozen product resulting. The process may involve the use of a composition to eliminate or minimize cooling or freezing damage, e.g., sperm preservation, etc.

(a) Class 435 provides for methods and apparatus of maintaining the viability of an animal organ tissue including blood and sperm or cells as well as the process and apparatus for the treatment or propagation of animal cells or tissue.

71, Chemistry: Fertilizers, provides for processes of producing a composition or article having utility as a fertilizer by use of a microorganism or enzyme as well as the composition containing a microorganism or enzyme.

(a) Class 435 provides for the production of microorganisms having utility for fertilizer production and microorganism containing starter compositions useful in a Class 71 process.

73, Measuring and Testing, provides for processes and apparatus for determining the physical properties of the product of fermentation or enzymology and include process and apparatus for measuring the rate of sedimentation of elements in blood.

75, Specialized Metallurgical Processes, Compositions for Use Therein, Consolidated Metal Powder Compositions, and Loose Metal Particulate Mixtures, provides for processes and compositions containing a microorganism or enzyme for use in processes of obtaining free metals from metal compounds or ores. Class 75, in particular, provides for processes of hydrometallurgy processes of beneficiating ores or recovery of elemental metal from waste in which a microorganism or enzyme is used when the reduction to elemental metal is claimed.

(a) Class 435 provides for the process of producing a microorganism or enzyme useful in ore treating and for processes of cultivating microorganisms on sulfur containing media.

99, Foods and Beverages: Apparatus, for apparatus adapted for the preparation of a beverage or beverage intermediate by carrying out primary ethyl alcoholic fermentations and apparatus for the aging, refining, and purification of alcoholic beverages.

(a) Class 435 provides for apparatus claimed or solely disclosed as used for propagating a microorganism or for use of an enzyme.

106, Compositions: Coating or Plastic, provides for processes which use an enzyme or microorganism to produce a coating or plastic composition.

(a) Class 435 provides for the use of a microorganism or enzyme to produce a product which may be a composition not otherwise provided for.

127, Sugar, Starch, and Carbohydrates, provides for the hydrolysis of carbohydrates including their conversion to sugar by chemical means or process using an enzyme or microorganism only where the hydrolysis by microorganism or enzyme is followed by steps of concentration purification or treatment (such as crystallization) to make a sugar or syrup. Additionally, Class 127 provides for the products of such processes.

(a) Class 435 provides for hydrolysis of a carbohydrate by a microorganism or enzyme when not followed by steps of concentration, purification, or treatment to make a sugar or syrup. Class 435 also provides for hydrolysis by any method when followed by treatment with a microorganism or enzyme to produce alcohol.

128, Surgery, appropriate subclasses provide for methods of blood transfusion and insemination by artificial means as well as for methods of treatment of the living body or a test which involves contact with a body and apparatus used in the inspection and treatment of diseases of the bodies of men and animals which apparatus is provided with means for connection to the living body.

(a) Class 435 provides for the maintenance of blood or sperm and viable tissue and virus cultures and the media for such processes.

131, Tobacco, for tobacco-containing articles, or compositions, or articles or compositions when tobacco is used in the making thereof, when the processes of making such articles or compositions involve the use of a microorganism or

enzyme; processes of making such articles or compositions, or treating tobacco, that include the use of a microorganism or enzyme; or articles, compositions, or apparatus, for uses in such processes, or processes of making the latter articles or compositions for uses in above noted processes.

(a) Class 435 provides for processes of growing a microorganism or using an enzyme the media for which may comprise plant material.

137, Fluid Handling, is the residual place for processes, systems, combinations, and subcombinations for fluid material handling. Lines With Other Classes and Within This Class, Automatic Control, in the class definition of Class 137 provide a guide to the automatic control provided for therein.

(a) Class 435 will provide for condition responsive control of a process with a step of microbial growth or enzymology and for condition responsive control apparatus when claimed or solely disclosed as involving a microorganism or enzyme.

159, Concentrating Evaporators, provides for the concentration of solids held in solution or suspension by evaporation of liquid and the recovery of a concentrate or a dry solid which include the treatment of a feed stream to or the treatment of a product of a microorganism or enzyme.

(a) Class 435 is superior to Class 159 and will provide for the concentration of a solid by the evaporation of liquid when combined with process or apparatus involving a microorganism or enzyme.

162, Paper Making and Fiber Liberation, provides for processes and apparatus which includes use of a microorganism or enzyme when combined with a step peculiar to Class 162 as well as the use of a microorganism or enzyme as a component of a paper or fiber pulp.

(a) Class 435 provides for fiber paper pulping and textile treatment by a microorganism or enzyme, per se. For an exhaustive listing of fiber treatment classes, see the notes immediately following the class definition of Class 162.

166, Wells, provides for processes and apparatus for treating oil or an oil bearing mineral with a microorganism or enzyme while in the ground.

204, Chemistry: Electrical and Wave Energy, provides for processes and apparatus involving electrical or wave energy. Class 204 provides for electrophoretic or electro-osmotic separation and purification of a compound or element and for other electrical separation or purification of a liquid when not provided for elsewhere, for the use of electrophoretic or electro-osmotic techniques to immobilize a compound or element where not provided for elsewhere, and for processes for use of an electrode containing a microorganism or enzyme for measuring or testing.

(a) Class 435 provides for processes and apparatus for measuring or testing in which a microorganism is cultured or an enzyme functions catalytically when a nonelectrical or nonwave energy property is measured, or when an electrical or wave energy property is measured separate and apart, but in combination with Class 435 subject matter; and for processes and apparatus for electrical or wave energy treatment of microorganisms or enzymes when the treatment is solely disclosed for use with viable microorganisms or catalytically active enzymes.

205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, appropriate subclasses for processes of measuring and testing in which the activity of a microorganism or enzyme is measured by change in electrolytic action, for electrolytic separation and purification of a compound or element when not provided for elsewhere, for the use of electrolytic techniques to immobilize a compound or element where not provided for elsewhere, and for processes of use of an electrode containing a microorganism or enzyme for measuring or testing.

(a) Class 435 provides for processes and apparatus for measuring or testing in which a microorganism is cultured or an enzyme functions catalytically when a nonelectrolytic property is measured, or when an electrolytic property is measured separate and apart, but in combination with Class 435 subject matter; and for processes and apparatus for electrical or wave energy treatment of microorganisms or enzymes when the treatment is solely disclosed for use with viable microorganisms or catalytically active enzymes.

210, Liquid Purification or Separation, provides for processes of treating impure liquids by processes including a microorganism, e.g., bacteri-

ological digestion of sewage including the use of an immobilized microorganism and the apparatus for such processes, as well as methods of physical separation of microorganisms and viruses from liquid media.

(a) Class 435, provides for the growth of a microorganism on a liquid media and the apparatus therefor as well as providing for process utilizing an immobilized microorganism, per se.

241, Solid Material Comminution or Disintegration, provides for processes and apparatus for the comminution or disintegration of solids which includes the comminution of the feed material to or the product of a microorganism or enzyme.

(a) Class 435, provides for the combination of comminution or disintegration with a process or apparatus for microorganism use or enzymology.

250, Radiant Energy, provides for all methods and apparatus for using, generating, controlling, or detecting radiant energy including radioactivity not elsewhere provided for. Class 250 provides a comprehensive guide in References to Other Classes for classes providing for similar subject matter.

(a) Class 435, provides for the use of radiant energy to alter the genetic structure of a microorganism as part of a measuring and testing process or in combination with microbial growth or enzymology.

260, Chemistry of Carbon Compounds, provides for the synthesis and liberation and purification by chemical or physical means of compounds and extracts falling within the class definition of Class 260 where such processes do not include a step of treatment by a microorganism or enzyme. Processes of making chemical compounds that include the use of a microorganism or enzyme are controlling for classification over other processes of making chemical compounds.

(a) Class 435, provides for a process of synthesis or liberation, separation, or purification of a compound utilizing a microorganism or enzyme, per se. Class 435, provides for an enzyme, per se, and the process of recovering the enzyme from a natural source or immobilizing or insolubilizing an enzyme. Class 435, provides for a process utilizing a microorganism or enzyme combined with a physical separation or purification. Class 435, will provide for preliminary chemical treatment to produce a starting material which is subjected to the action of a microorganism or enzyme or a chemical reaction simultaneously with or subsequent to the action of a microorganism or enzyme which perfects or improves the action of the microorganism or enzyme.

260, Chemistry of Carbon Compounds, provides for organic compounds, per se, and methods of synthesizing them by means other than a microorganism or enzymes.

366, provides for apparatus and processes restricted to causing fluid or particulate material to move irregularly and commingle.

(a) Class 435, provides for apparatus with agitators claimed or solely disclosed as useful for microorganism propagation or enzymology and for processes of microorganism propagation or enzymology which may include an agitation step.

423, Chemistry of Inorganic Compounds, provides for processes of purification of fermentation off gas by chemical means as well as the recovery of metal values by means other than microorganisms or enzymes.

(a) Class 435, provides for processes of synthesis of organic or inorganic compounds involving a microorganism or enzyme.

424, Drug, Bio-Affecting and Body Treating Compositions, for: compositions (A) for preventing, alleviating, treating, or curing abnormal and pathological conditions of the living body, for maintaining, increasing, decreasing, limiting, or destroying a physiologic body function, for diagnosing a physiological condition or state by an in vivo test, for controlling or protecting an environment or living body by attracting, disabling, inhibiting, killing, modifying, repelling, or retarding an animal or microorganism, (B) for deodorizing, protecting, adorning, or grooming a body, (C) for fermentates and extracts for use in A or B and not elsewhere provided for, and (D) such compositions defined in terms of specific structure; methods of making the above compositions; methods of using the class defined compositions for purposes in A and B; and methods of using compounds, per se, for purposes in A and B; subclasses 85.1+ for a lymphokine composition; subclasses 130.1+ for a bioaffecting or body-treating composition of an immunoglobulin, antiserum, antibody, or antibody fragment and

for methods of immunizing to produce antibodies for recovery, which antibodies are characterized as being useful as bioaffecting or body-treating agents (e.g., to provide passive immunity); subclasses 184.1+ for a bio-affecting or body-treating composition comprising an antigen, an epitope, or another immunospecific immunoeffector, such as an immunospecific vaccine, an immunospecific stimulator of cell-mediated immunity, an immunospecific tolerogen, or an immunospecific immunosuppressor, and for methods of immunizing to produce protective immunity in vivo (i.e., for vaccination purposes); subclasses 93.1+ for a composition including whole live microorganism or virus; and subclass 94 for a composition containing an enzyme or co-enzyme.

(a) Class 435, provides for a process of propagating a microorganism or using an enzyme to produce a drug or bio-affecting composition. Class 435 provides for virus culture and attenuation, for the virus or microorganism, per se, and their culture and propagation and for in vitro diagnostic tests involving a microorganism or enzyme and antigen antibody tests which involve a living microorganism or use of an enzyme label.

426, Food or Edible Material: Processes, Compositions, and Products, provides for fermentation processes that are solely disclosed or claimed as preparing an edible, and for mixtures of enzymes or ferments solely disclosed or claimed as edible or used in the preparation of an edible. Class 426 provides for compositions and processes of preparation relating to compositions which have the capacity to ferment and produce an edible, but which are claimed as being in an inactive state, and also provides for compositions which are undergoing a fermentation to produce an edible product. See especially subclasses 11+ for alcoholic beverages, or other beverages, milk or other alimentary articles or compositions, when the beverage or other alimentary articles contain bacteria or enzymes; processes of making the same which include microorganisms or enzymes. Processes of autolysis or microbial or enzymic destruction of yeasts or other living organisms are in Class 435, subclasses 262+, but processes of preparing foods including such autolysis are in Class 426. Processes of making vinegar by methods including use of a microorganism or enzyme are in Class 426.

(a) Class 435, provides for processes and apparatus of production of nonpotable ethanol and acetic acid and for processes and apparatus for diastatic mashing as well as fermentation other than primary fermentations. Class 435 also provides for compositions and processes of producing a microorganism containing starter culture useful in the production of an edible product. Class 435, will provide for production of protein from a single source by fermentation or enzymology even if the product is claimed as having a Class 426 utility. For an elaboration of the line regarding the placement of yeast patents, see (1) Note in subclass 255 of this class.

427, Coating Processes, provides for significant coating or impregnating processes when not involving subject matter proper for Class 435.

(a) Class 435 provides for processes having a significant or nonsignificant coating (or impregnating) step and otherwise proper for the class.

429, Chemistry: Electrical Current Producing Apparatus, Product, and Process, provides for a current producing device having a microorganism as an integral part and the process of operating the device and a process involving the device.

(a) Class 435, provides for processes of producing microorganisms in bulk, i.e., propagation of microorganisms. Class 435, Chemistry: Molecular Biology and Microbiology, provides for a photo imaging process in which an enzyme whose activity is altered upon exposure to light is used and the material therefor.

436, Chemistry: Analytical and Immunological Testing, provides for a measurement or test in which an enzyme reacts chemically, i.e., noncatalytically and antigen antibody tests for the identification of chemical species that are nondiagnostic and do not involve a living antigen.

(a) Class 435, provides for a test or measurement involving a microorganism or enzyme which functions catalytically as well as antigen antibody tests involving a living microorganism.

(1) Note. The burden of showing an enzyme is functioning noncatalytically is on Class 436, i.e., the presumption, as between Class 435 and Class 436, is that an enzyme in a test functions catalytically until rebutted.

436, Chemistry: Analytical and Immunological Testing, provides for testing compositions (a) which contain an enzyme if the enzyme participates in a chemical reaction in a noncatalytic manner; and (b) which are of use in an antigen-antibody test and do not involve a microorganism or enzyme and are not diagnostic.

(a) Class 435 provides for in vitro testing by or for a microorganism or enzyme or tests involving the propagation of a microorganism or catalytic use of an enzyme. Class 435 provides for antigen-antibody tests wherein a living antigen, i.e., a microorganism is involved or an enzyme label is present. Class 435, provides for processes and apparatus and material for measuring and testing blood which involve the propagation of a microorganism or catalytic functioning of an enzyme.

(1) Note. The burden of showing an enzyme is functioning noncatalytically is on Class 436, i.e., the presumption, as between Class 435 and Class 436, is that an enzyme in a testing composition functions catalytically until rebutted.

504, Plant Protecting and Regulating Compositions, provides for processes of producing a composition or article having plant stimulating or eradicating utility by using a microorganism or enzyme as well as the composition containing a microorganism or enzyme.

(a) Class 435, provides for the production of microorganisms having utility for plant growth regulator production and microorganism containing starter compositions useful in a Class 504 process.

Class 510, Cleaning Compositions for Solid Surfaces, Auxiliary Compositions Therefor, or Processes of Preparing the Compositions, provides for detergent compositions containing enzymes.

Class 435, provides for process of production of enzymes and enzymes, per se, and enzyme compositions not otherwise provided for.

Class 516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 113+ for compositions for or subcombination compositions for or breaking of or inhibiting of colloid systems (e.g., foam breaking, emulsion breaking, dispersion inhibiting, suspension settling, gel breaking, smoke suppressing, coagulating, flocculating), when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art. Nominal recitation of a Class 435 process (e.g., fermentation or fermentation step) combined with a process otherwise classifiable in Class 516 is proper for Class 516, while recitation of a significant Class 435 step combined with a step or composition otherwise classifiable in Class 516 is proper for Class 435 with a discretionary cross-reference to Class 516.

Class 435, provides for processes of making chemical compounds which involve microorganisms or enzymes, other processes relating to cell, organ, or tissue growth or maintenance, compositions for use in such processes, in vitro processes of testing or measuring, certain apparatus for class provided for processes.

588, Hazardous or Toxic Waste Destruction or Containment, provides for the storage to contain pathogenic organisms, e.g., virus, bacteria and medical waste, see subclass 258.

SECTION V - GLOSSARY

ACTIVITY

Rate of metabolic or anabolic action, speed or efficiency. Mere suppression of competing strains is not viewed as increasing the activity.

BIOCHEMICAL

By means of a bacteria, yeast, animal or plant cell, or virus, or the parts thereof.

CONDENSED

Bridged or fused.

DERIVATIVE

For purposes of this class derivatives included with the production of a named compound are only the inorganic anion or inorganic cation salts thereof, e.g., metal, ammonium, halogen, carbonate, etc.

DIASTACE

For purposes of this class classified as an amylase.

FERMENTATION

The use of a microorganism or enzyme to carry a molecular transformation.

HAZARDOUS WASTE

Material that when present in the environment produces for man and other living organisms a dangerous, risky, or perilous environmental situation in so for as the physiological well being of the organism is concerned (e.g., all caustic chemicals, irritants, cancer causing agents, and other tumor producing materials).

HETERO

Containing only O, N, S, Se, or Te in addition to carbon in a ring.

MEDIA

Material which supports or sustains growth of microorganisms which material may contain substances which will not support or may inhibit the growth of selected microorganisms.

MICROORGANISM

For purposes of this class, bacteria, actinomycetales, cyanobacteria (unicellular algae), fungi, protozoa, animal cells or plant cells or virus.

NUCLEIC ACID

A polynucleotide or more than two nucleotides.

TEST MEDIA

Distinguished from (propagation) media by the presence of an indicator, e.g., chromophore, etc.

TOXIC WASTE

Materials that are direct physiological poisons to living organisms (e.g., pesticides, heavy metal ion solutions, and other materials that are poisonous to life.

SUBCLASSES

1.1 DIFFERENTIATED TISSUE OR ORGAN OTHER THAN BLOOD, PER SE, OR DIFFERENTIATED TISSUE OR ORGAN MAINTAINING; COMPOSITION THEREFOR:

This subclass is indented under the class definition. Processes or compositions for the maintenance of a differentiated tissue or organ, or the differentiated tissue or organ, per se.

(1) Note. Maintenance includes keeping an organ under conditions in which it produces a product (e.g., hormone, etc.) which is later recovered.

(2) Note. Tissue is presumed to be undifferentiated in the absence of a clear showing to the contrary. The fact that a tissue continues to produce hormones, etc., is to be taken as an indication that the tissue retains its differentiation.

(3) Note. For a process to be classified in this subclass, the organ must be maintained in a viable state (e.g., in a nutrient or life sustaining media) and the tissue must contain an integral membrane. Thus, the preservation of blood plasma provided for in subclass 2 is excluded from this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

235.1+, for virus culture and treatment.

325+, for animal cells, per se, and compositions thereof; processes of propagating, maintaining, preserving, isolating, etc. animal cells or compositions; culture media therefore.

SEE OR SEARCH CLASS:

34, Drying and Gas or Vapor Contact With Solids, for methods of preserving by freeze drying.

62, Refrigeration, for methods of cooling.

623, Prosthesis (i.e., Artificial Body Members), Parts Thereof, or Aids and Accessories Therefor, appropriate subclasses for implantable living glands encapsulated in a porous membrane.

1.2 Including perfusion; composition therefor:

This subclass is indented under subclass 1.1. Processes for the maintenance of differentiated tissue or organs by continuously perfusing with

a fluid, or compositions useful in such processes.

SEE OR SEARCH THIS CLASS, SUBCLASS:
284.1, for differentiated tissue (e.g., organ) perfusion or preservation apparatus.

1.3 Including freezing; composition therefor:
This subclass is indented under subclass 1.1. Processes for the maintenance of differentiated tissue or organs by freezing, or compositions useful in such processes

2 MAINTAINING BLOOD OR SPERM IN A PHYSIOLOGICALLY ACTIVE STATE OR COMPOSITIONS THEREOF OR THEREFOR OR METHODS OF IN VITRO BLOOD CELL SEPARATION OR TREATMENT:
This subclass is indented under the class definition. Processes or compositions for the maintenance of blood or sperm in a physiologically active state or for the in vitro separation or treatment of blood cells.

(1) Note. This subclass includes methods for preserving the viability of sperm by chemical means.

(2) Note. This subclass provides for compositions for artificial insemination.

SEE OR SEARCH THIS CLASS, SUBCLASS:
235.1+, where the tissue or cell culture is concomitant with virus propagation.
243+, for culture media for propagating microorganism.

SEE OR SEARCH CLASS:
62, Refrigeration, for methods of maintaining the viability of living tissue and cells including sperm under refrigeration or in a frozen state. These processes may include the addition of chemical agents to prevent or minimize cellular damage from the refrigeration.
128, Surgery, appropriate subclasses for a method of blood transfusion or artificial insemination.
424, Drug, Bio-Affecting and Body Treating Compositions, subclasses 184.1+ for therapeutic compositions containing a living cell which functions as an antigen; and subclass 529 for therapeutic compositions containing viable blood cells and a therapeutically active ingredient. See subclass 1.17 for compositions comprising a radiolabeled cell or sub-cellular structure, including red blood cells, intended for class defined uses such as in vivo diagnosing (e.g., imaging), methods of making such compositions, and nominal methods of using such compositions.

3 CONDITION RESPONSIVE CONTROL PROCESS:
This subclass is indented under the class definition. Process in which a process parameter is measured and that or another process parameter is varied responsive to such measurement.

(1) Note. The measurement should be by a nonsubjective means, i.e., mere observation by an operator is not sufficient to constitute measurement for purposes of this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
289, and 290, for condition or time responsive control apparatus.

SEE OR SEARCH CLASS:
700, Data Processing: Generic Control Systems or Specific Applications, subclasses 266 through 274 for chemical process control or monitoring system.
702, Data Processing: Measuring, Calibrating, or Testing, subclasses 19+ for data processing in biological or biochemical applications, and subclasses 22+ for chemical analysis data processing.

4 Measuring or testing process involving enzymes or microorganisms; composition or

test strip therefore; processes of forming such composition or test strip:

This subclass is indented under the class definition. Processes in which there is a direct or indirect qualitative or quantitative measurement or test of a material which contains an enzyme or microorganism or processes in which a material containing an enzyme or microorganism is used to perform a qualitative or quantitative measurement or test and compositions therefor and the processes of making such compositions.

(1) Note. "Involving" in this and the indented subclasses includes (a) the use of a known microorganism or enzyme to detect or identify a chemical compound or composition, (b) the use of a chemical compound or composition to detect or identify a microorganism or enzyme, (c) a composition containing a microorganism or enzyme for use as in (a), and (d) a composition distinguished by the presence of an indicator for use as in (b). Thus, "involving" in this and the indented subclasses means that the steps in the measurement or test either use the designated chemical compound, microorganism, or individual plant or animal cells or enzyme or the steps in the measurement or test indicate the presence or absence of the designated chemical compound, microorganism, plant or animal cell or enzyme.

(2) Note. The enzyme herein can be free or immobilized or present in a cell, tissue, or organ.

(3) Note. Compositions herein may include inert carriers that have either a single or multiple zones or chemical agents. Included as carriers are bibilous or absorbent materials and films.

SEE OR SEARCH THIS CLASS, SUBCLASS:

174+, for immobilized enzymes, per se.
183+, for enzymes.
188, for stabilized enzymes, enzyme conjugates or compositions thereof.
235.1+, for viruses, per se.
287+, for apparatus for measuring and testing.

SEE OR SEARCH CLASS:

73, Measuring and Testing, for processes and apparatus for making a test or measurement of any kind not provided for in other classes. In general, the classes superior to 73 are 435, 422, 424, 204, 350, and 356.
128, Surgery, for methods of treatment of the living body or a test which involves contact with a body and apparatus used in the inspection and treatment of diseases of the bodies of men and animals which apparatus is provided with means for connection to the living body.
137, Fluid Handling, subclasses 2+ for processes of controlling the flow of a fluid in response to the sensing of a condition or characteristic of a fluid.
204, Chemistry: Electrical and Wave Energy, subclasses 400+ for electrolytic analysis and testing apparatus, especially subclass 403 for electrolytic analysis and testing apparatus involving biological material (e.g., microbe, enzyme, antigen, etc.).
205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 775+ for electrolytic analysis or testing processes, especially subclasses 777.5+ for electrolytic analysis or testing involving an enzyme or microorganism (e.g., animal or plant cells, bacteria, virus, etc.).
208, Minerals Oils: Processes and Products, for chemical tests claimed in association with processes for recovery or treatment of naturally occurring mineral oil.
252, Compositions, subclass 408 for testing compositions.
260, Chemistry of Carbon Compounds, for chemical tests claimed in association with processes for the treatment or modification of carbon compounds.
324, Electricity: Measuring and Testing, appropriate subclasses for methods and apparatus for testing an electrical property or condition of a material by electrical means, even though the result of the test may be used as an

indication of some other physical or chemical property or condition.

346, Recorders, subclasses 2+ for phenomenal apparatus and processes recording.

356, Optics: Measuring and Testing, especially subclass 28, 139.04 through 139.08, 141.1 through 141.5 and 152.1 through 152.3, 205+, and 218 for methods and apparatus for optical testing with a photoelectric light detector with either an indicator or structure to support or contain the specimen or sample under test. Class 356 provides for methods and apparatus for visual counting of bacteria colonies, etc., with a scale or spacer to aid the eye without an optical element or statistical analysis procedures for the sizing and counting of particles, such as bacteria colonies by visible light and the counting of particles one by one with a microscope having a graticule rather than a cross hair or reticle.

359, Optics: Systems (Including Communication) and Elements, subclasses 396+ for transparent microscope slides with means to contain and support the life functions of a microorganism.

364, Electrical Computers and Data Processing Systems, subclass 496 for data processing systems or calculating computer designed for use in chemistry, chemical engineering or other areas of engineering or for the solution of problems in these areas.

377, Electrical Pulse Counters, Pulse Dividers, or Shift Registers: Circuits and Systems, subclass 10 for sizing or counting of discrete particles such as bacteria colonies one at a time by numerical counting apparatus which registers the counts.

424, Drug, Bio-Affecting and Body Treating Compositions, subclasses 1.11+ for class defined compositions and methods comprising a radionuclide or intended radionuclide, including those for in vivo diagnosing, and subclasses 9.1+ for a composition or method of in vivo testing (diagnosing) a living body or for an in vivo method of testing or analyzing a composition of that class (424).

436, Chemistry: Analytical and Immunological Testing, subclasses 1+ for processes for analysis involving steps for causing or promoting a chemical reaction, regulating or controlling a chemical reaction. This includes tests dependent upon the chemical, i.e., proteinaceous reactivity of an enzyme as opposed to its catalytic functioning provided for in Class 435. Measurements and tests when claimed in association with chemical processes provided for in other Classes, e.g., 435, 208, 260, 423, etc., are classified in the class providing for the chemical process.

5 Involving virus or bacteriophage:

This subclass is indented under subclass 4. Subject matter where the material to be measured or tested contains a virus or bacteriophage or the agent used for the measurement or test contains a virus or bacteriophage.

6 Involving nucleic acid:

This subclass is indented under subclass 4. Subject matter where the material to be tested or the composition in which the test is conducted contains nucleic acid or the agent used for the measurement or test contains nucleic acid.

(1) Note. The tests provided for in this subclass may involve the determination of the mutagenic effect of drugs on nucleic acid containing genetic materials such as genes and chromosomes.

(2) Note. Nucleic acids for the purpose of this subclass are defined as polynucleotides of three or more nucleotides.

(3) Note. Proper for this subclass is subject matter involving the staining of microorganisms, cells, or tissues specifically for and only for nucleic acid (e.g., DNA, RNA, etc.) with stains such as Feulgen stain or acridine orange.

SEE OR SEARCH THIS CLASS, SUBCLASS:

40.5+, for subject matter involving microorganisms, cells, or tissues stained with a composition providing contrasting stains for the cell nucleus and cytoplasm (e.g., hematoxylin, eosin, etc.).

SEE OR SEARCH CLASS:

536, Organic Compounds, appropriate subclasses for saccharides, polysaccharides, nucleosides, nucleotides, and polynucleotides like RNA or DNA compounds as well as chemical methods of synthesizing such compounds. Search specifically subclasses 23.1+ for fragments of RNA or DNA which could have utility as genes in recombinant processes and subclass 24.3 for probes.

7.1 Involving antigen-antibody binding, specific binding protein assay, or specific ligand-receptor binding assay:

This subclass is indented under subclass 4. Subject matter in which a measurement or test utilizes an enzyme or microorganism or plant or animal cells in an antibody binding, specific binding protein or other specific ligand-receptor binding test or assay.

(1) Note. Cross-Reference Art Collections 960 through 975 provide for different aspects of the subject matter of this and the indented subclasses.

(2) Note. The enzyme or microorganism may function for example, as an antigen, separating agent or detection label in a test or assay.

(3) Note. Subject matter directed to identifying a specific enzyme in a microorganism or tissue is appropriate for subclass 7.4 below, however, determining an enzyme as an indirect indication of a specific microorganism being present is appropriate for the microorganism subclass.

(4) Note. Subject matter directed to determining the presence of a specific microorganism is appropriate for the specific microbial subclass below. For example, an assay for determining a bacteria in an animal tissue sample is appropriate for the bacteria subclass rather than the animal cell subclass.

(5) Note. An indirect microbial determination, such as a determination of a microbial product as an indication of the presence of the microbe, is appropriate for the microbial subclasses below. However, it is strongly suggested that a patent containing such an indirect microbial determination be cross-referenced to the subclass appropriate for the assay of the product of the microbe.

(6) Note. Terminology used in this and the indented subclasses is found at the end of this subclass definition.

SEE OR SEARCH THIS CLASS, SUBCLASS:

5, for processes in which a virus is involved, as for example, as an antigen.

174+, for immobilized enzymes.

183+, for enzymes, per se, and methods of isolating enzymes.

188, for enzyme conjugates.

SEE OR SEARCH CLASS:

424, Drug, Bio-Affecting and Body Treating Compositions, subclasses 184.1+ for methods of immunizing with an antigen to induce protective immunity in vivo. Class 424 provides for in vivo antigen-antibody tests.

436, Chemistry: Analytical and Immunological Testing, for a measurement or test involving antigen-antibody tests and other ligand-receptor binding tests for the identification of chemical species that do not involve a microorganism or enzyme.

530, Chemistry, Natural Resins or Derivatives Peptides or Proteins; Lignins or Reaction Products Thereof, subclasses 387+ for antibodies, per se, subclasses 403+ for protein antigens or the use of antigenic proteins as an immunogenic carrier for a hapten, subclass 413 for immunological separation and affinity chromatography,

cross-reference art collections 806 for antigenic peptides or protein, and 807 for hapten conjugated with peptide or protein, and 808 for monoclonal antibodies.

600, and 604, Surgery, provides for methods including the use of claimed specific structure adapted to be placed on or in the living body and further include diagnostic or therapeutic methods and apparatus when the only disclosed utility is for diagnosis or treatment of a living body.

GLOSSARY

ANALYTE

The compound or composition to be measured.

SPECIFIC LIGAND-RECEPTOR BINDING ASSAY

The interaction between a ligand material and a receptor which is specific to a class of compounds or a single compound.

EPITOPE

A single antigenic determinant portion of the antigen which combines with the antibody site.

LABEL

A member of a signal producing system which is usually bound to or incorporated in the ligand. Measurement of the label activity is an indication of the amount of unknown in the sample.

LIGAND

Any organic compound for which a receptor naturally exists or can be prepared; a linking or binding molecule.

RECEPTOR

Any compound or composition capable of recognizing a particular spatial and polar organization of a molecule, i.e., epitopic site on an antigen. The receptor material can be isolated from a cellular material from a living body such as a membrane or organ and exhibits great specificity to the species to be tested for. A cell surface molecule which binds specifically to particular proteins or peptides in the fluid phase.

7.2 Involving a microorganism or cell membrane bound antigen or cell membrane bound receptor or cell membrane bound antibody or microbial lysate:
This subclass is indented under subclass 7.1. Subject matter involving a microorganism or cell membrane bound antigen, or cell membrane bound receptor or cell membrane bound antibody, or lysate of a microorganism.

7.21 Animal cell:
This subclass is indented under subclass 7.2. Subject matter involving animal cells.

(1) Note. Though "whole blood" contains animal cells, the mere presence of a "whole blood sample" in an assay or test is not sufficient for placement in this and the indented subclasses. Since "whole blood" is a complex mixture of cells and liquid, classifying based on its presence might be inconsistent. Furthermore, the "whole blood" aspect is rarely of main importance, therefore, patents using whole blood samples are more appropriately placed based on the analyte of interest or on a reagent which is more specific, i.e., cancer cell, lymphocyte, red blood cell, enzyme label, etc., to one of the subclasses below.

(2) Note. "Animal cell" in this and the indented subclasses is also intended to include tissue.

7.22 Parasite or protozoa:
This subclass is indented under subclass 7.21. Subject matter involving a parasite or protozoa.

(1) Note. Parasite is intended to include those animals which live in or on and at the expense of a host such as certain nematodes, cestodes, trematodes (e.g., tapeworm, heartworm, Trichinella, etc.).

(2) Note. A protozoa is a single-celled animal.

SEE OR SEARCH THIS CLASS, SUBCLASS:
7.32+, for bacteria which may be parasitic.

7.23 Tumor cell or cancer cell:
Subject matter under 7.21 involving tumor or cancer cells.

7.24 Leukocyte (e.g., lymphocyte, granulocyte, monocyte, etc.):
This subclass is indented under subclass 7.21. Subject matter involving leukocytes such as lymphocytes, granulocytes, monocytes, etc.

(1) Note. The subject matter intended for this subclass includes, for example, a test wherein the leukocyte is a reagent, the leukocyte type is determined, a leukocyte surface antigen is determined, etc.

7.25 Erythrocyte:
This subclass is indented under subclass 7.21. Subject matter involving red blood cells or reticulocytes.

(1) Note. Examples of subject matter in this subclass are red blood cell carriers, red cell surface antigen testing, etc.

7.3 Flagellar-antigen or pili-antigen:
This subclass is indented under subclass 7.2. Subject matter involving flagellar-antigen (e.g., (H)-antigen, etc.) or pili-antigen, (e.g., (K)-antigen, etc.).

(1) Note. Flagellar - or pili-antigens are those which are or are part of the flagella or pili of certain motile microorganisms.

7.31 Fungi (e.g., yeast, mold, etc.):
This subclass is indented under subclass 7.2. Subject matter involving fungi such as yeast or mold.

7.32 Bacteria or actinomycetales:
This subclass is indented under subclass 7.2. Subject matter involving bacteria or actinomycetales.

7.33 Staphylococcus:
This subclass is indented under subclass 7.32. Subject matter involving bacteria of the genus Staphylococcus.

7.34 Streptococcus:
This subclass is indented under subclass 7.32. Subject matter involving bacteria of the genus Streptococcus.

7.35 Salmonella:
This subclass is indented under subclass 7.32. Subject matter involving bacteria of the genus Salmonella.

7.36 Sexually transmitted disease (e.g., chlamydia, syphilis, gonorrhea, etc.):
This subclass is indented under subclass 7.32. Subject matter involving a sexually transmitted disease caused by bacteria.

(1) Note. Common bacteria involved include Chlamydiae, Treponema pallidum, and Neisseria gonorrhoeae.

SEE OR SEARCH THIS CLASS, SUBCLASS:
5, for a sexually transmitted disease involving a virus.

7.37 Escherichia coli:
This subclass is indented under subclass 7.32. Subject matter involving Escherichia coli (E. coli.).

7.4 To identify an enzyme or isoenzyme:
This subclass is indented under subclass 7.1. Subject matter in which the measurement or test determines the identity or quantity of an enzyme or group of isoenzymes.

(1) Note. Immunological identification of enzymatic coagulation factors is proper for this subclass.

(2) Note. Determination of complement or complement components is proper for this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
7.6, for an assay or test involving a modified enzyme in a capacity other than that of being identified or quantified.
7.7, through 7.8, for an assay or test in which an enzyme is involved as a reagent.

7.8, through 7.95, for an assay or test in which an enzyme is involved as a detection label.

7.5 Involving avidin-biotin binding:
This subclass is indented under subclass 7.1. Subject matter involving the binding of avidin to biotin.

(1) Note. The binding of avidin and biotin derivatives such as streptavidin or iminobiotin is also included in this subclass.

7.6 Involving a modified enzyme (e.g., abzyme, recombinant, chemically altered, etc.):
This subclass is indented under subclass 7.1. Subject matter involving a modified enzyme which has been functionally changed through recombinant DNA techniques, chemical treatment, etc.

(1) Note. This subclass is not intended to include a mere conjugation of an enzyme to an antigen or antibody, since the function of the enzyme has not been changed.

(2) Note. An abzyme is an antibody with enzymatic activity.

SEE OR SEARCH THIS CLASS, SUBCLASS:
7.4, for a test or assay for determining the identity or quantity of a modified enzyme.

7.7 Assay in which a label present is an apoenzyme, prosthetic group, or enzyme cofactor:
This subclass is indented under subclass 7.1. Subject matter in which a label is present in the assay and is an apoenzyme, prosthetic group or enzyme cofactor.

(1) Note. See subclass 7.1 for the definition of label.

(2) Note. An enzyme cofactor is a nonprotein substance whose presence is required for an enzyme to exhibit its catalytic activity and which undergoes a chemical change during the catalytic cycle of the enzyme involved. A coenzyme is a type of enzyme cofactor which is chemically modified in the course of the reaction catalyzed by the parent enzyme. Regeneration of the original form of the cofactor requires its participation in a separate reaction that is catalyzed by an enzyme other than the parent enzyme. A prosthetic group is an enzyme cofactor which is chemically modified in the course of the reaction catalyzed by the parent enzyme and is regenerated by a second reaction catalyzed by the parent enzyme. Prosthetic groups are bound to the protein portion of the parent enzyme, such protein portion being known as the apoenzyme and the catalytically active parent enzyme being known as the holoenzyme.

(3) Note. Prosthetic groups and Holoenzymes. In the list below, the <u>prosthetic group</u> (underlined) is first, follwed by the conjugated enzyme.

(a) <u>flavine adenine</u>, glutathione;

(b) <u>dinucleotide (FAD),</u> reductase (human erythrocytes);

(c) <u>flavin mononucleotide (FMN),</u> cytochrome reductase (yeast);

(d) <u>FMN</u>, NADPH: oxidoreductase ("old yellow enzyme");

(e) <u>FAD,</u> glucose oxidase (Aspergillus niger);

(f) <u>FAD,</u> lipoamide dehydrogenase;

(g) <u>FMN</u> , pyridoxine phosphate oxidase;

(h) <u>heme</u>, peroxidase (horseradish);

(i) <u>heme</u> , cytochrome C.

7.71 Assay in which a label present is an enzyme inhibitor or functions to alter enzyme activity:
This subclass is indented under subclass 7.1. Subject matter in which a label is present in the assay and is an enzyme inhibitor or otherwise functions to alter the function of the enzyme present in the analysis.

SEE OR SEARCH THIS CLASS, SUBCLASS:
7.1, for the definition of label.

7.72 Assay in which a label present is an enzyme substrate or substrate analogue:
This subclass is indented under subclass 7.1. Subject matter in which a label is present in the assay and is an enzyme substrate or substrate analogue.

SEE OR SEARCH THIS CLASS, SUBCLASS:
7.1, for the definition of label.

7.8 Involving nonmembrane bound receptor binding or protein binding other than antigen-antibody binding:
This subclass is indented under subclass 7.1. Subject matter in which the measurement or test includes nonmembrane bound receptor binding or ligand-receptor binding other than antigen-antibody binding.

(1) Note. This subclass provides for enzyme-inhibitor binding where the inhibitor is not a label, binding to soluble or nonmembrane bound receptors or transport proteins, etc. Specific examples include thyroxine-thyroxine binding globulin, B12-intrinsic factor, cortisol-transcortin, lectin-carbohydrate, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:
7.71, for an assay where an enzyme inhibitor is present as a label.

7.9 Assay in which an enzyme present is a label:
This subclass is indented under subclass 7.1. Subject matter in which an enzyme present is a label in the assay.

SEE OR SEARCH THIS CLASS, SUBCLASS:
7.1, for the definition of label.

7.91 Enzyme produces product which is part of another reaction system (e.g., cyclic reaction, cascade reaction, etc.):
This subclass is indented under subclass 7.9. Subject matter in which the enzyme label produces a product which is part of another reaction system.

(1) Note. The reaction system may be chemical or enzymatic.

7.92 Heterogeneous or solid phase assay system (e.g., ELISA, etc.):
This subclass is indented under subclass 7.9. Subject matter in which the assay system requires at least one separation step which allows differentiation of reacted from unreacted material or requires that at least one of the immunochemicals in the system be bound to an insoluble support material.

SEE OR SEARCH THIS CLASS, SUBCLASS:
174+, for carrier-bound or immobilized enzymes.
188, for enzyme conjugates.

SEE OR SEARCH CLASS:
436, Chemistry: Analytical and Immunological Testing, subclasses 518+ for immunoassays, not including Class 435 subject matter, wherein a solid phase carrier is utilized.

7.93 Competitive assay:
This subclass is indented under subclass 7.92. Subject matter in which the heterogeneous or solid phase assay involves competitive binding of immunologically similar or identical compounds.

7.94 Sandwich assay:
This subclass is indented under subclass 7.92. Subject matter in which the heterogeneous or solid phase assay involves the binding of polyvalent analyte antigen to an antibody and a labeled antibody to obtain a measurable antibody-antigen-antibody complex; alternatively, a second unlabeled antibody and a third labeled anti-antibody can be reacted with the antigen-antibody complex to obtain a measurable result.

7.95 Indirect assay:
This subclass is indented under subclass 7.92. Subject matter in which the heterogeneous or solid phase assay involves the binding of antigen with analyte antibody and a labeled anti-antibody thereby forming a complex.

8 Involving luciferase:
This subclass is indented under subclass 4. Subject matter where the material to be measured or tested contains luciferase or the agent used for the measurement or test contains luciferase.

(1) Note. Firefly extract or firefly lantern extract contains luciferase.

9 Geomicrobiological testing (e.g., for petroleum, etc.):
This subclass is indented under subclass 4. Subject matter where the measurement or test is for the presence or absence of mineral deposits or for the presence of microorganisms which thrive in the presence of such minerals.

(1) Note. This subclass provides for detection of underground deposits of petroleum or natural gas.

SEE OR SEARCH CLASS:
73, Measuring and Testing, subclasses 152.02+ for well logging, per se, wherein the logging is not determined by making a purely electrical measurement or a purely magnetic measurement.

10 Involving uric acid:
This subclass is indented under subclass 4. Subject matter where the material to be measured or tested contains uric acid or the agent used for the measurement or test contains uric acid.

11 Involving cholesterol:
This subclass is indented under subclass 4. Subject matter where the material to be measured or tested contains cholesterol or the agent used for the measurement or test contains cholesterol.

12 Involving urea or urease:
This subclass is indented under subclass 4. Subject matter where the material to be measured or tested contains urea or urease or the agent used for the measurement or test contains urea or urease.

13 Involving blood clotting factor (e.g., involving thrombin, thromboplastin, fibrinogen, etc.):
This subclass is indented under subclass 4. Subject matter where the material to be measured or tested contains a blood clotting factor or the agent used for the measurement or test contains a blood clotting factor.

SEE OR SEARCH CLASS:
73, Measuring and Testing, subclass 64.41 for apparatus used for testing the ability of blood to clot.

14 Involving glucose or galactose:
This subclass is indented under subclass 4. Subject matter where the material to be measured or tested contains glucose or galactose or the agent used for the measurement or test contains glucose or galactose.

15 Involving transferase:
This subclass is indented under subclass 4. Subject matter where the material to be measured or tested contains a transferase or the agent used for the measurement or test contains a transferase.

16 Involving transaminase:
This subclass is indented under subclass 15. Subject matter subclass where the material to be measured or tested contains a transaminase or the agent used for the measurement or test contains a transaminase.

17 Involving creatine phosphokinase:
This subclass is indented under subclass 15. Subject matter where the material to be measured or tested contains creatine phosphokinase or the agent used for the measurement or test contains creatine phosphokinase.

(1) Note. Creatine Phosphokinase is also known as creatine kinase.

18 Involving hydrolase:
This subclass is indented under subclass 4. Subject matter where the material to be measured or tested contains a hydrolase or the agent used for the measurement or test contains a hydrolase.

19 Involving esterase:
This subclass is indented under subclass 18. Subject matter where the material to be measured or tested contains an esterase or the agent used for the measurement or test contains an esterase.

20 Involving cholinesterase:
This subclass is indented under subclass 19. Subject matter where the material to be measured or tested contains cholinesterase or acetylcholinesterase or the agent used for the measurement or tests contains cholinesterase or acetylcholinesterase.

21 Involving phosphatase:
This subclass is indented under subclass 19. Subject matter where the material to be measured or tested contains a phosphatase or the agent used for the measurement or test contains a phosphatase.

(1) Note. Phosphatase includes all of the phosphoric monoester hydrolases (ICE classification 3.1.3) including the phytases and the nucleotidases.

22 Involving amylase:
This subclass is indented under subclass 18. Subject matter where the material to be measured or tested contains amylase or the agent used for the measurement or test contains amylase.

23 Involving proteinase:
This subclass is indented under subclass 18. Subject matter where the material to be measured or tested contains proteinase (endopeptidase) or the agent used for the measurement or test contains a proteinase (endopeptidase).

(1) Note. Enzymes included in this subclass are trypsin, pepsin, ficin, bromelin, papain, renin.

(2) Note. Where the hydrolytic activity of an enzyme on a protein or polypeptide is unclear it should be presumed to be an endopeptidase, classifiable in subclass 23.

24 Involving peptidase:
This subclass is indented under subclass 18. Subject matter where the material to be measured or tested contains a peptidase (exopeptidase) or the agent used for the measurement or test contains a peptidase (exopeptidase).

25 Involving oxidoreductase:
This subclass is indented under subclass 4. Subject matter where the material to be measured or tested contains an oxidoreductase or the agent used for the measurement or test contains an oxidoreductase.

26 Involving dehydrogenase:
This subclass is indented under subclass 25. Subject matter where the material to be measured or tested contains a dehydrogenase or the agent used for the measurement or test contains a dehydrogenase.

27 Involving catalase:
This subclass is indented under subclass 25. Subject matter where the material to be measured or tested contains catalase or the agent used for the measurement or test contains catalase.

28 Involving peroxidase:
This subclass is indented under subclass 25. Subject matter where the material to be measured or tested contains peroxidase or the agent used for the measurement or test contains peroxidase.

29 Involving viable microorganism:
This subclass is indented under subclass 4. Subject matter where the material to be tested contains a microorganism or the agent used for the measurement or test contains a microorganism.

(1) Note. A microorganism for the purposes of this subclass includes actinomycetates, unicellular algae, bacteria, fungi (including yeast), plant cells, and animal cells.

(2) Note. If there is no clear disclosure as to whether the microorganism or cell is viable or nonliving, it shall be presumed to be viable and therefore appropriate for this or the indented subclasses. However, due to the uncertainty of the viability of the microorganism or cell, placement of a cross reference in the most appropriate place in this class, subclasses 40.5+ for nonliving microorganisms or cells is strongly recommended.

SEE OR SEARCH THIS CLASS, SUBCLASS:

40.5+, for measuring or testing processes involving fixed or stabilized nonliving microorganisms, cells, or tissues.

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclass 94.11 for reactive treatment of biological specimens as by a bleach or dye.

250, Radiant Energy, for methods and apparatus for detecting radiant energy.

427, Coating Processes, subclasses 2.1+ for coating a biological specimen for a medical test and when not provided for in Class 435.

30 Methods of sampling or inoculating or spreading a sample; methods of physically isolating an intact microorganism:

This subclass is indented under subclass 29. Processes in which (a) a series of sampling steps are claimed in which a sample containing a microorganism is separated or recovered from a larger body of material before or while performing a measurement or test, or (b) a sample is brought into contact with a measuring or testing media to result in a particular geometric pattern or at a particular varying flow rate.

(1) Note. This subclass provides for sampling when claimed by a series of sampling process steps, i.e., not sampling by name only.

(2) Note. This subclass provides for applying the sample in a particularly claimed varying flow rate or pattern or path other than merely a single straight line.

(3) Note. Mere nonpattern applications such as dipping or spaying is not included herein.

(4) Note. Included in this subclass is a test or measurement which includes a swab streaking procedure or centrifugal density separation step.

SEE OR SEARCH THIS CLASS, SUBCLASS:

243, for sampling, inoculating, spreading a sample or physical isolation of samples which are not claimed as part of a test.

292, for inoculation and sampling apparatus.

31 Testing for sterility condition:

This subclass is indented under subclass 29. Subject matter wherein the efficacy of a prior step intended to destroy living organisms is assessed by attempting to culture a microorganism which has been exposed to such treatment and determining subsequent growth or by exposing an enzyme to such treatment and subsequently testing for enzymatic activity.

(1) Note. Included in this subclass is the use of a living microorganism as the test agent or the use of enzymes which simulate the living microorganism's ability to survive as a test agent.

32 Testing for antimicrobial activity of a material:

This subclass is indented under subclass 29. Subject matter where the in vitro ability of a material to kill or inhibit the growth of microorganisms is determined.

(1) Note. This subclass provides for (a) a determination of the sensitivity of a microorganism to known antibiotics, and (b) determining the presence or amount of an antibiotic or toxicant in a sample.

33 Using multifield media:

This subclass is indented under subclass 32. Subject matter where the test field contains more than one zone or area.

(1) Note. Zones or areas can contain different concentrations of the same antibiotic or different antibiotics and are generally separated by an identifiable boundary.

(2) Note. Media as used in this subclass includes culture media which sustains growth and medias which kill or inhibit certain microorganisms.

34 Determining presence or kind of microorganism; use of selective media:
This subclass is indented under subclass 29. Subject matter where the presence of or identity of a microorganism is determined.

(1) Note. Included herein are test media that contains chemicals which change or remain unchanged in color or other physical appearance due to the action of or the absence of action of the microorganisms on the test media.

(2) Note. This subclass includes but is not restricted to testing of biological samples.

(3) Note. Test media includes culture media plus a chromosphere.

(4) Note. This subclass includes determining the metabolic character of a microorganism, i.e., the production or consumption of a particular metabolite.

SEE OR SEARCH THIS CLASS, SUBCLASS:
32, and 33, for similar process used to test for antimicrobial sensitivity.

35 Using radioactive material:
This subclass is indented under subclass 34. Subject matter where the test media contains an assimilable radioactive labeled compound.

36 Streptococcus; staphylococcus:
This subclass is indented under subclass 34. Subject matter where the microorganisms involved are Streptococcus or Staphylococcus or the agent is specific for indicating the presence or absence of Streptococcus or Staphylococcus.

37 Nitrate to nitrite reducing bacteria:
This subclass is indented under subclass 34. Subject matter where the microorganisms involved are nitrite forming bacteria or the agent is specific for indicating the presence or absence of nitrite forming bacteria.

(1) Note. It should be generally presumed that the presence of the nitrite is due to bacterial conversion of nitrate to nitrite.

(2) Note. Included here are detection of nitrite in materials, such as an indication of bacteria.

38 Enterobacteria:
This subclass is indented under subclass 34. Subject matter where the microorganism involved is an enterobacteria or the agent is specific for indicating the presence or absence of enterobacteria.

39 Quantitative determination:
This subclass is indented under subclass 34. Subject matter where the number or concentration of living microorganisms in the material is found.

(1) Note. The identity of the microorganism is not necessarily known.

(2) Note. Included herein are tests for the purity of water.

SEE OR SEARCH CLASS:
359, Optics: Systems (Including Communication) and Elements, for the use of an optical element such as a lens of a microscope for magnification for counting particles such as bacteria colonies one by one.

40 Using multifield media:
This subclass is indented under subclass 39. Subject matter which uses a test substrate that has more than one test zone or area.

(1) Note. Zones or areas can contain different concentrations of the same antibiotic or different antibiotic and are generally separated by an identifiable boundary.

40.5 Involving fixed or stabilized, nonliving microorganism, cell, or tissue (e.g., processes of staining, stabilizing, dehydrating, etc.; compositions used therefore, etc.):

This subclass is indented under subclass 4. Subject where the material to be tested contains fixed or stabilized, nonliving microorganisms, cells, or tissues or the agent used for the measurement or test contains fixed or stabilized, nonliving microorganisms, cells, or tissues.

(1) Note. If there is no clear disclosure as to whether the microorganism or cell is nonliving or viable, it shall be presumed to be viable and therefore appropriate for this class, subclasses 29+. However, due to the uncertainty of the viability of the microorganism or cell, placement of a cross reference in this or the indented subclasses is strongly recommended.

(2) Note. This and the indented subclasses are intended to take compositions used to aid in the microscopic study (e.g., light, scanning or transmission electron microscopy, etc.) of microorganisms, cells, and tissues such as those used for staining, clarifying, firming, fixing, or dehydrating a microorganism, cell, or tissue for microscopic examination as well as the methods for preparing the microorganisms, cells, and tissues for examination and the processes of examining them not specifically provided for elsewhere.

(3) Note. Fixation or stabilization of the microorganisms, cells, or tissues on a slide may involve merely air drying rather than a chemical fixation process.

(4) Note. Subject matter involving the staining of microorganisms, cells, or tissues specifically and only for nucleic acid (e.g., DNA or RNA, etc.) with stains such as Feulgen stain or acridine orange is proper for this class, subclass 6. Subject matter involving microorganisms, cells, or tissues stained with a composition providing contrasting stains for the cell nucleus and cytoplasm (e.g., hematoxylin, eosin, etc.) is proper for this or the indented subclasses.

SEE OR SEARCH THIS CLASS, SUBCLASS:

6, for measuring or testing processes or compositions therefore involving nucleic acid, nucleotide, or nucleoside which includes processes of staining microorganisms, cells, or tissues via in situ nucleic acid hybridization.

7.1+, for test methods or compositions therefore involving the staining of microorganisms, cells, or tissue with labelled antibodies, ligands, or receptors.

14+, for test methods or compositions therefore involving the staining of microorganisms, cells, or tissues for endogenous enzyme activity.

29+, for test methods or compositions therefore involving the staining of microorganisms, cells, or tissues with vital stains; methods or compositions involving the microscopic observation of live microorganisms or cells; methods or compositions involving the counting of intact, live microorganisms or cells not provided for elsewhere.

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclasses 94.1+ for treatment of hides, skins, feathers and animal tissues, e.g., tanning, particularly subclass 94.11 pertaining to treatment of subcutaneous or internal tissues of animals, e.g., the production of sutures, racket strings, etc., from gut and various subclasses for compositions for dying materials of any kind which may contain a microorganism or enzyme.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, appropriate subclass for a process of mounting a specimen by a lamination process which process may or may not include the step of staining, clarifying, firming or fixing the tissue; and subclass 57 for the combination of coating a biological specimen and then interposing the coated specimen between glass plates.

250, Radiant Energy, for methods and apparatus for detecting radiant energy not classified elsewhere.

356, Optics: Measuring and Testing, for methods and apparatus for analyzing light, determining the optical or non-optical properties of materials, measuring optically dimensions, determining optically spatial relations and inspecting optically for flaws and imperfections within the scope of this class and not otherwise classifiable. This includes visual counting of blood particles, etc. with a scale or spacer to aid the eye, counting and sizing particles with visible light by statistical analysis procedures rather than one by one numerical particle counting, etc.

359, Optics: Systems (Including communication) and Elements, for microscopes and microscope slides.

377, Electrical Pulse Counters, Pulse Dividers, or Shift Registers: Circuits and Systems, for a numerical counting means for counting and/or sizing discrete particles such as blood particles or bacteria colonies one at a time.

424, Drug, Bio-affecting and Body Treating Composition, subclass 75 for an embalming and undertaking composition.

427, Coating Processes, subclasses 2+ for coating processes wherein a medical or dental product is produced and subclass 4 for processes of coating a plant member or animal specimen.

434, Education and Demonstration, subclasses 295+ for method, apparatus or product related to teaching and pertinent to biology and taxidermy, including models, cells, mounting and preserving means, processes and taxidermy devices.

436, Chemistry: Molecular Biology and Microbiology, subclass 10 for particle count standards or controls such as platelet count standards; subclass 521 for fixed or stabilized red blood cells used as an insoluble carrier for immunochemicals (e.g., hemagglutination, etc.).

40.51 Involving a monolayer, smear or suspension of microorganisms or cells:

This subclass is indented under subclass 40.5. Subject where the fixed or stabilized, nonliving microorganisms or cells are in the form of a monolayer, smear, or a suspension.

(1) Note. Included in this subclass is subject matter in which the microorganisms or cells may be placed on a slide or other surface for histological or microscopic examination or may be automatically examined such as by flow cytometry.

(2) Note. Included in this subclass is subject matter involving blood cell smears; cells prepared for cytopathological analysis, e.g., analysis of cells that are spontaneously exfoliated, mechanically dislodged by irrigation, brushing, or scraping, or forcibly removed by needle aspiration (e.g., Pap smears, etc.); urine sediments, etc.

40.52 Involving tissue sections:

This subclass is indented under subclass 40.5. Subject matter wherein the fixed or stabilized, nonliving tissue is in the form of a tissue section.

(1) Note. Since tissues and organs are usually too thick for microscopic study, techniques have been developed which result in thin, translucent sections. Therefore, for the purpose of this subclass, tissue sections are tissues which have been sliced so that they may be microscopically observed.

(2) Note. Included in this subclass are all stages of tissue processing in the preparation for and examination of tissue sections, e.g., fixation, dehydration, embedding, sectioning, etc.

41 MICROORGANISM, TISSUE CELL CULTURE, OR ENZYME USING PROCESS TO SYNTHESIZE A DESIRED CHEMICAL COMPOUND OR COMPOSITION:

This subclass is indented under the class definition. Processes wherein the product is synthesized by a biochemical transformation of matter, i.e., a transformation wherein the

transforming agent is a microorganism, or an enzyme or an immobilized enzyme or an animal or plant cell culture or organelles.

(1) Note. microorganism for the purpose of this subclass includes bacteria, fungi (including yeast), virus, actinomycetales unicellular algae, plant cells, actinomycetales, and protozoa.

(2) Note. Synthesis for purposes of this subclass involves the preparation of a composition or compound which did not exist in the starting material, and does not include an ancillary operation wherein a material is chemically modified by an enzyme, cell bound free or immobilized, or microorganism or animal or plant cell so as to degrade or change the chemical structure thereof so that another material which is in initial intimate contact with the modified material can be recovered in a nonmodified form. See in particular, subclasses 262+ of this schedule for such liberation or purification processes.

(3) Note. As between Class 260 and this class (435) provide an original home for all synthesis which include action by a microorganism or enzyme.

(4) Note. Enzymes for the purpose of this subclass are polypeptides or proteins or material containing the same which are capable of chemically transforming matter, e.g., oxidation, etc., without undergoing a transformation itself.

(5) Note. Processes for producing an enzyme or microorganism are excluded herefrom and are found in subclasses 183+ and 243+.

(6) Note. Processes for the production of products in which the structure is not disclosed should be placed in this and the indented subclasses in the first appearing subclass which takes an identified constituent of the product. Should such a placement prove impossible, then placement is on the basis of the microorganism's identity.

SEE OR SEARCH CLASS:

204, Chemistry: Electrical and Wave Energy, for chemical processes including electrical or wave energy methods.

260, Chemistry of Carbon Compounds, for the synthesis of carbon compounds by means not including a microorganism or enzyme.

423, Chemistry of Inorganic Compounds, for the synthesis of inorganic compounds or elements other than metals by means not including the use of a microorganism or enzyme.

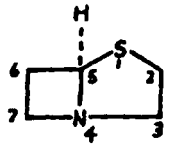
426, Food or Edible Material: Processes, Compositions, and Products, for fermentation processes that are solely disclosed or claimed in preparing an edible, and for mixtures of enzymes or ferments solely disclosed or claimed as edible or used in preparation of an edible. Class 426 provides for compositions and processes of preparation relating to compositions which have the capacity to ferment and produce an edible, but which are claimed as being in an inactive state, and also provides for compositions which are undergoing a fermentation to produce an edible product.

42 Process involving microorganisms of different genera in the same process, simultaneously:

This subclass is indented under subclass 41. Processes wherein microorganisms of different genera are simultaneously propagated on the same culture media.

43 Preparing compound having a 1- thia- 4-aza-bicyclo (3.2.0) heptane ring system (e.g., penicillin, etc.):

This subclass is indented under subclass 41. Processes wherein the product synthesized contains a 1-thia-4-aza-bicyclo (3.2.0) heptane polycyclic ring system, i.e.,



(1) Note. The media of the processes included in subclass 45 must contain the 1-thia-4-aza-bicyclo heptane ring system compound.

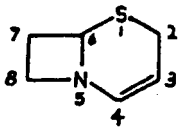
44 By desacylation of the substituent in 6-position:
This subclass is indented under subclass 43. Processes wherein the product synthesized is prepared by the hydrolysis of an acetyl group in the 6-position.

45 By acylation of the substituent in 6-position:
This subclass is indented under subclass 43. Processes wherein the product synthesized is prepared by substituting an acyl group in the 6-position.

(1) Note. The media of the processes included herein must contain the 1-thia-4-aza-bicyclo heptane ring system compound.

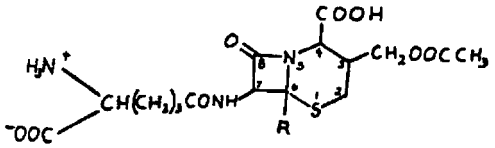
46 In presence of phenyl acetic acid or phenyl acetamide or their derivatives:
This subclass is indented under subclass 43. Processes wherein phenyl acetic acid or substituted phenyl acetic acid or salts thereof or phenyl acetamide or substituted phenyl acetamide or salts thereof is present during the synthesis.

47 Preparing compound having a 1 -thia -5-aza-bicyclo (4.2.0) octane ring system (e.g., cephalosporin, etc.):
This subclass is indented under subclass 41. Processes wherein the product synthesized contains a 1-thia-5-aza-bicyclo (4.2.0) octane polycyclic ring system, i.e.,



48 Di-substituted in 7-position:
This subclass is indented under subclass 47. Processes wherein the polycyclic ring system synthesized contains two substituents other than hydrogen in the 7-position.

49 Cephalosporin C:
This subclass is indented under subclass 47. Processes wherein the product contains 7-(D-5-amino-5-carboxy valer-amido)-3-(hydroxy methyl)-8- oxo - 1 -thia-5-aza-bicyclo (4.2.0) - oct -3 -ene -3-carboxylic acid acetate, i.e.



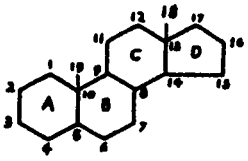
(1) Note. For purposes of this subclass, derivatives include only metal and ammonium salts.

50 By acylation of the substituent in the 7-position:
This subclass is indented under subclass 47. Processes wherein the product synthesized is prepared by amide bond formation, present with the nitrogen attached at the 7-position.

51 By desacylation of the substituent in the 7-position:
This subclass is indented under subclass 47. Processes wherein the product synthesized is prepared by cleaving the amide bond with the nitrogen attached to the 7-position.

52 Preparing compound containing a cyclopentanohydrophenanthrene nucleus; nor-,

homo-, or D-ring lactone derivatives thereof:
This subclass is indented under subclass 41. Processes wherein the product synthesized contains a cyclopentanophenanthrene ring system, i.e., or the nor or homo or D-ring lactone derivatives.



(1) Note. The phenanthrene ring system contains more hydrogen than is present in phenanthrene.

(2) Note. Common atoms of two rings are considered to belong to the rightmost ring.

(3) Note. Homo derivatives wherein the D-ring is expanded to 6-carbons such as in Hellebrin are found here.

53 Containing heterocyclic ring:
This subclass is indented under subclass 52. Processes wherein the cyclopentanophenanthrene ring system synthesized contains an additional ring which is a hetero ring.

(1) Note. The hetero ring may be fused or bridged with the cyclopentanophenanthrene ring system.

54 Acting on D-ring:
This subclass is indented under subclass 52. Processes wherein the product synthesized is formed by biochemical transformation within the D-ring.

(1) Note. The hetero ring may be fused or bridged with the cyclopentanophenanthrene ring system.

55 Acting at 17-position:
This subclass is indented under subclass 54. Processes wherein the product synthesized is formed by biochemical transformation at the 17-position.

(1) Note. This subclass includes cleavage of the 17-side chain with the formation of keto or hydroxyl groups at the cleaved position.

56 Hydroxylating at 17-position:
This subclass is indented under subclass 55. Processes wherein the product synthesized has a hydroxyl group at the 17-position and is formed by the addition of an oxygen atom to the pendant hydrogen atom.

57 Hydroxylating at 16-position:
This subclass is indented under subclass 54. Processes wherein the product synthesized has a hydroxyl group at the 16-position and is formed by the addition of oxygen to the ring pendant hydrogen atom.

58 Hydroxylating:
This subclass is indented under subclass 52. Processes wherein a carbon atom on the substrate nucleus is hydroxylated by the addition of oxygen to the ring pendant hydrogen atom.

59 At 11-position:
This subclass is indented under subclass 58. Processes wherein the product synthesized has a hydroxyl group formed at the 11-position.

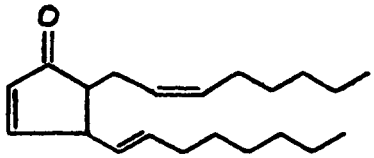
60 At 11 alpha position:
This subclass is indented under subclass 59. Processes wherein the product synthesized has a hydroxyl group formed at the 11 Alpha position.

61 Dehydrogenating; dehydroxylating:
This subclass is indented under subclass 52. Processes wherein the product synthesized is produced by the removal from the nucleus of a pair of hydrogen atoms creating an unsaturated bond or the product is synthesized by removal or addition of a hydroxyl group.

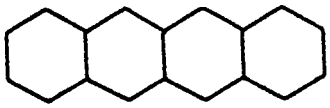
(1) Note. The mere shifting of unsaturated bonds from adjacent positions such as from the 5, 6 position to the 4, 5 position is not a dehydrogenation.

62 Forming an aryl ring from "A" ring:
This subclass is indented under subclass 61. Processes wherein the product synthesized contains an aromatic "A" ring which is formed by dehydrogenation.

63 Preparing compound containing a prostaglandin nucleus:
This subclass is indented under subclass 41. Processes wherein the product synthesized contains a five membered ring having two side-chains in ortho position to each other, and having at least one oxygen atom directly bound to the ring in ortho position to one of the side-chains, one side-chain containing, not directly bound to the ring, a carbon atom having three bonds to hetero atoms with at the most one bond to halogen, and the other side-chain having at least one oxygen atom bound in position to the ring, i.e., prostaglandins having the structure,



64 Preparing compound other than saccharide containing a tetracycline nucleus (e.g., naphthacene, etc.):
This subclass is indented under subclass 41. Processes wherein the product synthesized contains a naphthacene ring system (i.e., see figure below) and nonsaccharide ring unsaturated derivatives thereof.

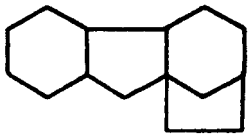


(1) Note. Tetracyclines are properly classified here.

(2) Note. Saccharide derivatives are excluded herefrom.

SEE OR SEARCH THIS CLASS, SUBCLASS:
78, for saccharide derivatives.

65 Preparing compound other than saccharide containing a gibberellin nucleus (i.e., gibbane):
This subclass is indented under subclass 41. Processes wherein the product synthesized contains other than the saccharide.

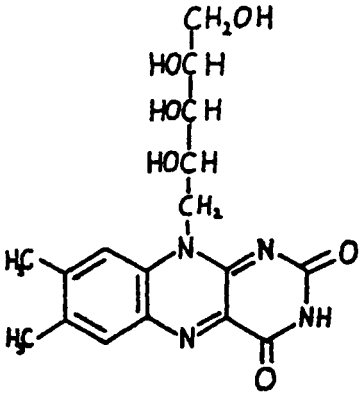


(1) Note. Gibberellic acid and gibberellins are properly classified here.

(2) Note. Saccharide derivatives are excluded herefrom.

SEE OR SEARCH THIS CLASS, SUBCLASS:
78, for saccharide derivatives.

66 Preparing compound other than saccharide containing alloxazine or isoalloxazine nucleus:
This subclass is indented under subclass 41. Processes wherein the product synthesized contains an alloxazine or isoalloxazine ring system, e.g., and is not a saccharide.

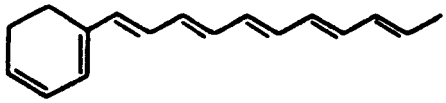


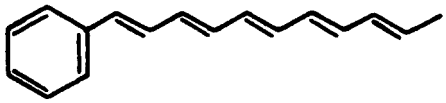
(1) Note. Riboflavin is not considered a saccharide derivative for the purpose of this subclass and is therefore provided for here.

(2) Note. Saccharide derivatives are excluded herefrom.

SEE OR SEARCH THIS CLASS, SUBCLASS:
72+, for saccharide derivatives of these compounds.

67 Preparing compound containing a carotene nucleus (i.e., carotene):
This subclass is indented under subclass 41. Processes wherein the product synthesized contains either the first or second structures below.





(1) Note. Carotenoids having a cyclic group are properly classified here.

(2) Note. Structures above can be partially hydrogenated such as Phytofluene.

SEE OR SEARCH THIS CLASS, SUBCLASS:
166, for the acyclic carotenoid, lycopene.

68.1 Enzymatic production of a protein or polypeptide (e.g., enzymatic hydrolysis, etc.):
This subclass is indented under subclass 41. Processes wherein the enzymatically produced product is a high molecular weight polypeptide of alpha amino acids or consists of two or more amino acids linked by a peptide bond.

(1) Note. This subclass provides for peptones which are the result of partial protein hydrolysis.

(2) Note. A peptide bond is defined as an amide linkage between two amino acid residues.

SEE OR SEARCH CLASS:
106, Compositions: Coating or Plastic, for protein containing coating or plastic compositions, particularly subclass 4, 31.24, 31.57, 31.82, 31.94, 124+, 645+ and indented subclasses.
426, Food or Edible Material: Processes, Compositions, and Products, appropriate subclasses, especially subclass 63, 92, 105, 211, and 212 for edible protein compositions or products and related process involving the same.
428, Stock Material or Miscellaneous Articles, subclasses 474.4+ for a non-structural stock material product in the form of a composite web or sheet including a layer comprising protein, and other appropriately titled subclasses (e.g., subclasses 435 and 458).
530, Chemistry: Natural Resins or Derivatives Peptides or Proteins, Lignins or Reaction Products Thereof, subclass 300 and 345 for peptides and reaction products thereof; subclasses 350 to 427 for proteins and the reaction products thereof; and cross-reference art collections 800 through 859 for antigenic peptides or proteins, methods of immobilizing peptides or proteins, and the source materials from which peptides or proteins are isolated.
536, Organic Compounds, appropriate subclasses, for nucleic acids and processes of chemical synthesis thereof.
930, Peptide or Protein Sequence, subclasses 10+ for peptide or protein sequence of four or more amino acids.

69.1 Recombinant DNA technique included in method of making a protein or polypeptide:
This subclass is indented under subclass 41. Processes which involve the use of recombinant DNA techniques in a process of synthesis of a protein or polypeptide.

(1) Note. An example of the subject matter in this subclass is a process of producing a polypeptide which includes the alteration of the genetic structure of a cell by use of recombinant DNA techniques.

(2) Note. See this class, subclass 68.1 for the definition of polypeptide or protein.

SEE OR SEARCH THIS CLASS, SUBCLASS:

440+, for processes using recombinant DNA techniques to alter the genetic structure of a living microorganism.

SEE OR SEARCH CLASS:

530, Chemistry: Natural Resins or Derivatives Peptides or Proteins; Lignins or Reaction Products Thereof, subclass 808 for the product produced by the processes of this subclass.

800, Multicellular Living Organisms and Unmodified Parts Thereof and Related Processes, subclasses 4+ for a method of using a living transgenic nonhuman animal to manufacture a protein which is to be isolated or extracted from the animal.

930, Peptide or Protein Sequence, subclasses 10+ for peptide or protein sequence of four or more amino acids.

69.2 Enzyme inhibitors or activators:

Processes under subclasses 69.1 wherein the product synthesized is an enzyme inhibitor or activator which is a protein or polypeptide.

(1) Note. Examples of the subject matter included in this subclass are the cloning and expression of antagonists to enzymes for amino acid biosynthesis.

SEE OR SEARCH THIS CLASS, SUBCLASS:

106, through 116 and 183-234, for enzyme inhibitors employed in the production of amino acids.

69.3 Antigens:

This subclass is indented under subclass 69.1. Processes wherein the product synthesized is claimed or solely disclosed as functioning as an antigen.

(1) Note. Examples of the subject matter included in this subclass are cloning and expression of all polypeptide antigens (e.g., viral subunit antigens).

SEE OR SEARCH THIS CLASS, SUBCLASS:

7.1+, for antigens involved in an enzyme immunoassay.

SEE OR SEARCH CLASS:

424, Drug, Bio-Affecting and Body Treating Compositions, subclasses 184.1+ for compositions of that class which contain antigens.

436, Chemistry: Analytical and Immunological Testing, subclasses 543 through 546 for antigens used as a testing material in an in vitro test.

530, Chemistry: Natural Resins or Derivatives Peptides, or Proteins; Lignins or Reaction Products Thereof, subclass 806 and 807 for the product produced by the processes of this subclass.

69.4 Hormones or fragments thereof:

This subclass is indented under subclass 69.1. Processes wherein the product synthesized is a hormone or a part of a hormone.

(1) Note. Examples of the subject matter included in this subclass are cloning and expression of polypeptide hormones (e.g., mammalion growth stimulating hormones).

SEE OR SEARCH CLASS:

530, Chemistry: Natural Resins or Derivatives Peptides or Proteins; Lignins or Reaction Products Thereof, subclass 399 for the product produced by the processes of this subclass.

69.5 Lymphokines or monokines:

This subclass is indented under subclass 69.1. Processes wherein the product synthesized is a lymphokine or monokine.

(1) Note. Examples of the subject matter included in this subclass are cloning and expression of interferon, interleukin, lymphotoxin, or tumor necrosis factor.

SEE OR SEARCH CLASS:

424, Drug, Bio-Affecting and Body Treating Compositions, subclass 85 for bioactive compositions containing interferon.

530, Chemistry: Natural Resins or Derivatives Peptides or Proteins; Lignins or Reaction Products Thereof, subclass 351 for the product produced by the processes of this subclass.

69.51 Interferons:

This subclass is indented under subclass 69.5. Processes wherein the product synthesized is an interferon.

SEE OR SEARCH CLASS:

424, Drug, Bio-Affecting and Body Treating Compositions, subclass 85 for compositions of that class containing interferon.

514, Drug, Bio-Affecting and Body Treating Compositions, subclass 21 for compositions of that class containing interferon.

530, Chemistry: Natural Resins or Derivatives Peptides or Proteins; Lignins or Reaction Products Thereof, subclass 351 for the product produced by the processes of this subclass.

69.52 Interleukins:

This subclass is indented under subclass 69.5. Processes wherein the product synthesized is an interleukin.

SEE OR SEARCH CLASS:

514, Drug, Bio-Affecting and Body Treating Compositions, subclass 21 for compositions of that class containing an interleukin.

530, Chemistry: Natural Resins or Derivatives Peptides or Proteins; Lignins or Reaction Products Thereof, subclass 351 for the product produced by the processes of this subclass.

69.6 Blood proteins:

This subclass is indented under subclass 69.1. Processes wherein the product synthesized is a blood protein.

(1) Note. Examples of the subject matter included in this subclass are cloning and expression of polypeptide of immunoglobulin origin.

SEE OR SEARCH THIS CLASS, SUBCLASS:

70.4, for processes including the culture of blood cells.

SEE OR SEARCH CLASS:

424, Drug, Bio-Affecting and Body Treating Compositions, subclasses 85.1+ for composition of that class containing a blood protein.

514, Drug, Bio-Affecting and Body Treating Compositions, subclasses 2+ for compositions of that class containing a blood protein.

530, Chemistry: Natural Resins or Derivatives Peptides or Proteins; Lignins or Reaction Products Thereof, subclasses 380 through 394 for the product produced by the processes of this subclass.

69.7 Fusion proteins or polypeptides:

This subclass is indented under subclass 69.1. Processes wherein the product synthesized is a fusion protein or fusion polypeptide.

(1) Note. Examples of the subject matter included in this subclass are the cloning and expression of a fused polypeptide (e.g., tribrid protein).

SEE OR SEARCH CLASS:

530, Chemistry: Natural Resins or Derivatives Peptides or Proteins; Lignins or Reaction Products Thereof, subclasses 300+ for the product produced by the processes of this subclass.

69.8 Signal sequence (e.g., beta-galactosidase, etc.):

This subclass is indented under subclass 69.1. Process wherein the product synthesized is a protein or polypeptide with a signal sequence such as beta-galactosidase.

SEE OR SEARCH THIS CLASS, SUBCLASS:
183, through 234, for enzymatic signal sequences.

SEE OR SEARCH CLASS:
530, Chemistry: Natural Resins or Derivatives Peptides or Proteins; Lignins or Reaction Products Thereof, subclasses 300+ for the product produced by the processes of this subclass which includes fused polypeptides.

69.9 Yeast derived:
This subclass is indented under subclass 69.8. Processes wherein the product synthesized is a protein or polypeptide with a yeast derived signal sequence.

(1) Note. Examples of the subject matter included in this subclass are cloning and expression of polypeptides attached to a yeast signal sequence (e.g., alpha-amylose).

SEE OR SEARCH THIS CLASS, SUBCLASS:
183, through 234, for enzymatic signal sequence of yeast.

SEE OR SEARCH CLASS:
530, Chemistry: Natural Resins or Derivatives Peptides or Proteins; Lignins or Reaction Products Thereof, subclasses 300+ for the product produced by the processes of this subclass which include fused polypeptides.

70.1 Using tissue cell culture to make a protein or polypeptide:
This subclass is indented under subclass 41. Processes wherein an in vitro tissue cell culture is used to produce a protein or polypeptide.

(1) Note. An example of the subject matter included in this subclass is use of a plant or animal cell culture to produce polypeptides.

(2) Note. See this class, subclass 68.1 for the definition of polypeptide or protein.

SEE OR SEARCH THIS CLASS, SUBCLASS:
325+, for the culture of animal cells absent the production of a protein or polypeptide product.

SEE OR SEARCH CLASS:
930, Peptide or Protein Sequence, subclasses 10+ for peptide or protein sequence of four or more amino acids.

70.2 Fused or hybrid cells:
This subclass is indented under subclass 70.1. Processes wherein the product is synthesized by culture of fused or hybrid cells.

(1) Note. Fused or hybrid cells include those resulting from (a) the fusion of two cells, (b) the insertion of the nucleus or chromosone of one cell into another or (c) the treatment of a cell with an immortalizing agent which results in a cell which will proliferate in long-term culture.

(2) Note. Examples of the subject matter included in this and the indented subclass are use of lymphoblastoid hybridoma cells to produce peptide hormones (e.g., insulin, calcitonin, growth hormone, etc.) or monoclonal anti-bodies or use of cells transformed with a virus or oncogene to produce a cell line which will proliferate and produce proteins or polypeptides in long term culture.

SEE OR SEARCH THIS CLASS, SUBCLASS:
326+, for fused or hybrid animal cells, per se, which express immunoglobulin, antibody, or fragment thereof.
346, for fused or hybrid cell, per se.
373, through 403, for various processes of culturing animal cells.

SEE OR SEARCH CLASS:
530, Chemistry: Natural Resins or Derivatives Peptides or Proteins; Lignins or Reaction Products Thereof, subclass 303, 307, 399, for the product produced by the processes of this subclass which includes insulin, calcitonin, and hormones.

70.21 Producing monoclonal antibody:
This subclass is indented under subclass 70.21. Processes wherein the product synthesized by the fused or hybrid cell is a monoclonal antibody.

(1) Note. Subject matter in this subclass includes production of monoclonal antibodies by hybridoma cells.

SEE OR SEARCH THIS CLASS, SUBCLASS:
7.1+, for use of monoclonal antibodies in testing methods involving a microorganism or enzyme.
326+, for fused or hybrid animal cells, per se, which express immunoglobulin, antibody, or fragment thereof. 373 through 403, for various processes of culturing animal cells.

SEE OR SEARCH CLASS:
424, Drug, Bio-Affecting and Body Treating Compositions, subclasses 131.1+ for bio-affecting compositions containing monoclonal antibodies.
436, Chemistry: Analytical and Immunological Testing, subclass 548 for monoclonal antibodies used in a process of immunoassay.
530, Chemistry: Natural Resins or Derivatives Peptides or Proteins; Lignins or Reaction Products Thereof, subclasses 387.2+ for the product produced by the processes of this subclass and subclass 413 for the process of using monoclonal antibody to separate a protein.

70.3 Animal tissue cell culture:
This subclass is indented under subclass 70.2. Processes wherein the protein or polypeptide product synthesized is derived from the culture of animal tissue cells.

(1) Note. The term tissue cells is intended to differentiate cells cultivated as a contiguous mass as opposed to individual cells or fused cells.

SEE OR SEARCH THIS CLASS, SUBCLASS:
326, through 372.3, for animal cells, per se.
373, through 403, for techniques of culturing animal cells.

SEE OR SEARCH CLASS:
424, Drug, Bio-Affecting and Body Treating Compositions, subclasses 95+ for medicinal compositions containing animal cell extracts.
514, Drug, Bio-Affecting and Body Treating Compositions, subclass 21 for medicinal compositions produced by or extracted from animal tissue containing a peptide.
530, Chemistry: Natural Resins or Derivatives Peptides or Proteins; Lignins or Reaction Products Thereof, subclasses 350+, for proteins, per se.

70.4 Blood (lymphoid) cell culture:
This subclass is indented under subclass 70.3. Processes wherein the product synthesized is produced by culture of blood cells.

(1) Note. Examples of the subject matter included in this subclass are interleukins produced by culture of blood cells.

SEE OR SEARCH THIS CLASS, SUBCLASS:
69.5, for processes of producing lymphokines or monokines through use of recombinant DNA techniques.

SEE OR SEARCH CLASS:
530, Chemistry: Natural Resins or Derivatives Peptides or Proteins; Lignins or Reaction Products Thereof, subclass 351 for the product produced by the processes of this subclass.

70.5 Producing interferons:
This subclass is indented under subclass 70.4. Processes wherein the product synthesized is an interferon.

SEE OR SEARCH THIS CLASS, SUBCLASS:
69.51, for processes of producing interferon through use of recombinant DNA techniques.

SEE OR SEARCH CLASS:
424, Drug, Bio-Affecting and Body Treating Compositions, subclass 85 for compositions of that class containing interferon.
530, Chemistry: Natural Resins or Derivatives Peptides or Proteins; Lignins or Reaction Products Thereof, subclass 351 for the product produced by the processes of this subclass.

71.1 Using a microorganism to make a protein or polypeptide:
This subclass is indented under subclass 41. Processes wherein a protein or peptide synthesized is produced by a culture of a microorganism.

(1) Note. Examples of the subject matter included in this subclass are eucaryotic antibiotics.

(2) Note. See this class subclass 68.1 for the definition of polypeptide or protein.

SEE OR SEARCH THIS CLASS, SUBCLASS:
243, through 261, for process of culturing microorganisms and for microorganisms, per se.

SEE OR SEARCH CLASS:
530, Chemistry: Natural Resins or Derivatives Peptides or Proteins; Lignins or Reaction Products Therefore, subclasses 820+ for the product produced by the process of this subclass.
930, Peptide or Protein Sequence, subclasses 10+ for peptide or protein sequence of four or more amino acids.

71.2 Procaryotic microorganism:
This subclass is indented under subclass 71.1. Processes wherein the microorganism is procaryotic.

(1) Note. Examples of the subject matter included in this subclass are bacterial antigens and periplasmic proteins.

SEE OR SEARCH THIS CLASS, SUBCLASS:
252.1+, for process of culture of bacteria and for bacteria, per se.

SEE OR SEARCH CLASS:
530, Chemistry: Natural Resins or Derivatives Peptides or Proteins; Lignins or Reaction Products Thereof, subclasses 820+ for the product produced by the processes of this subclass.

71.3 Antibiotic or toxin:
This subclass is indented under subclass 71.2. Processes wherein the product synthesized is an antibiotic or toxin.

(1) Note. Examples of the subject matter in this subclass are procaryotic antibiotics (e.g., polymyxin).

SEE OR SEARCH CLASS:
514, Drug, Bio-Affecting and Body Treating Compositions, subclasses 2+ for compositions of that class containing an antibiotic or toxin which is a protein or polypeptide.

72 Preparing compound containing saccharide radical:
This subclass is indented under subclass 41. Processes wherein the product synthesized contains a saccharide or polysaccharide, the monomeric units of which contain at least five-carbon atoms, or their reaction products wherein the carbon skeleton of the saccharide or polysaccharide of the unit is not destroyed.

(1) Note. Included herein is cellulose, derivatized cellulose, starch, derivatized starch, sugars, lignins, tannins, o-glycosides, n-glycosides, and s-glycosides.

(2) Note. Processes wherein the product synthesized is a degradation product which contains fewer than five-carbon atoms are not provided for in this subclass but are provided for in an appropriate subclass below.

SEE OR SEARCH THIS CLASS, SUBCLASS:
137, for sugar acids.

158+, for sugar alcohols.
262, for processes of liberation or purification of carbohydrates using a biochemical reaction.

SEE OR SEARCH CLASS:
127, Sugar, Starch, and Carbohydrates, for the hydrolysis of carbohydrates including their conversion to sugar by means other than a microorganism or enzyme. Class 127 will provide for such processes using an enzyme or microorganism only where the hydrolysis by microorganism or enzyme is followed by steps of concentration, purification, or treatment (such as crystallization) to make a sugar or syrup.
536, Organic Compounds, for the chemical manufacture or synthesis of sugar or carbohydrates by a process other than hydrolysis and the rearrangement of one carbohydrate to form another carbohydrate by means other than a microorganism or enzyme. Search subclasses 22.1+ for N-glycosides (e.g., nucleosides, nucleotides, polynucleotides) and more specifically subclasses 23.1+ for fragments of RNA or DNA which could have utility as genes in recombinant processes and subclasses 26.4+ for vitamin B-12 and its derivatives.

73 Preparing S-glycoside (e.g, lincomycin, etc.): This subclass is indented under subclass 72. Processes wherein the product synthesized is a thioacetal derivative of a cyclic form of sugar in which the hydrogen atom of the hemithioacetal sulfhydryl group has been replaced by an alkyl, aralkyl, or aryl group.

(1) Note. An S-glycoside is a compound having a sugar moiety connected to an aglycone moiety via a sulfur.

(2) Note. The aglycone is a nonsaccharide material, e.g., benzene, indoxyl, anthracene, etc.

(3) Note. On complete hydrolysis S-glycosides yield one or more monosaccharides, and a mono or a polyhydric thiol or thiol phenol.

(4) Note. The cyclic sugars referred to in the definitions are normally pyranoses or furanoses.

(5) Note. Gyclosides derived from aldoses are referred to as aldosides, and those from ketoses are ketosides.

74 Preparing O-glycoside (e.g, glucosides, etc.): This subclass is indented under subclass 72. Processes wherein the product synthesized is an acetal derivative of a cyclic form of sugars in which the hydrogen atom of the hemiacetal hydroxyl has been replaced by an alkyl, aralkyl, or aryl group.

(1) Note. An O-glycoside is a compound having a sugar moiety connected to an aglycone moiety via oxygen.

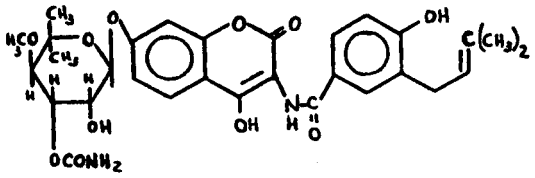
(2) Note. The aglycone is a nonsaccharide material, e.g., benzene, indoxyl, anthracene, etc.

(3) Note. On complete hydrolysis O-glycosides yield one or more monosaccharides, and a mono or polyhydric alcohol or phenol.

(4) Note. The cyclic sugars referred to in the definitions are normally pyranoses or furanoses.

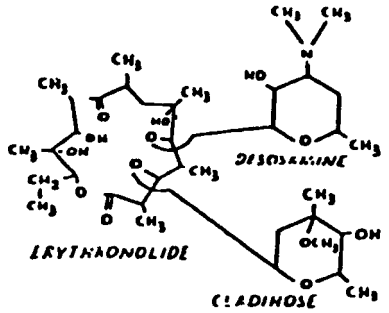
(5) Note. Glycosides derived from aldoses are referred to as aldosides, and those from ketoses are ketosides.

75 Oxygen of the saccharide radical is directly bonded to a nonsaccharide heterocyclic ring or a fused- or bridged-ring system which contains a nonsaccharide heterocyclic ring (e.g., coumermycin, novobiocin, etc.): This subclass is indented under subclass 74. Processes wherein a nonsaccharide heterocyclic ring or a fused or bridged- ring system which contains a nonsaccharide heterocyclic ring is attached to an oxygen of the saccharide radical, e.g.,



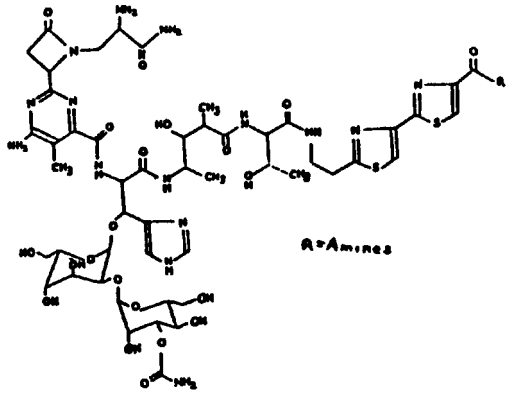
76 The hetero ring has eight or more ring members and only oxygen as ring hetero atoms (e.g., erythromycin, spiramycin, nystatin, etc.):

This subclass is indented under subclass 75. Processes wherein the nonsaccharide heterocyclic ring has eight or more ring members and only oxygen as the ring heteroatom, e.g.,



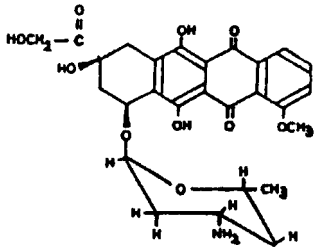
77 Oxygen atom of the saccharide radical is directly linked through only acyclic carbon atoms to a nonsaccharide heterocyclic ring (e.g., bleomycin, phleomycin, etc.):

This subclass is indented under subclass 74. Processes wherein the Heterocyclic ring is directly linked to an oxygen atom of the saccharide radical directly through only acyclic carbon atoms, e.g.,



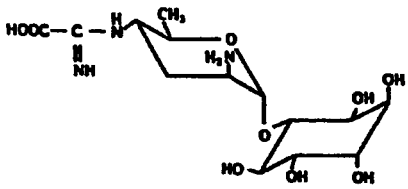
78 Oxygen atom of the saccharide radical is directly bonded to a condensed ring system having three or more carbocyclic rings (e.g., dauomycin, adriamycin, etc.):

This subclass is indented under subclass 74. Processes wherein a condensed ring system having three or more carbocyclic rings is directly bonded to an oxygen atom of the saccharide radical, e.g.,



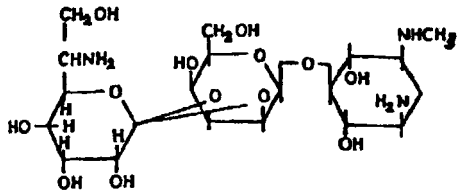
79 Oxygen atom of the saccharide radical is bonded to a cyclohexyl radical (e.g., kasugamycin, etc.):

This subclass is indented under subclass 74. Processes wherein a cyclohexyl radical is bonded to an oxygen atom of the saccharide radical, e.g.,



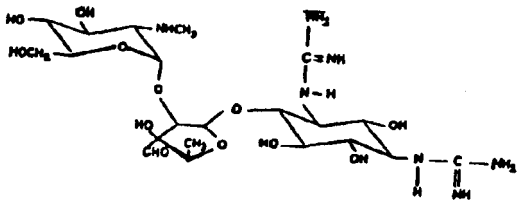
80 Cyclohexyl radical is substituted by two or more nitrogen atoms (e.g., destomycin, neamin, etc.):

This subclass is indented under subclass 79. Processes wherein two or more nitrogen atoms are attached to the cyclohexyl radical, e.g.,



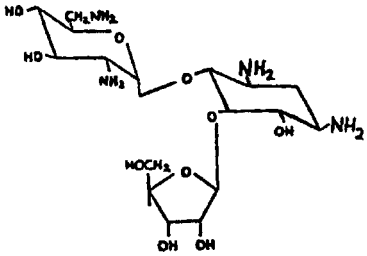
81 Cyclohexyl radical is attached directly to a nitrogen atom of two or more N-C(=N)-N radicals (e.g., streptomycin, etc.):

This subclass is indented under subclass 80. Processes wherein nitrogen atoms of two or more N-C(=N)-N radicals are bonded to the cyclohexyl radical, e.g.,



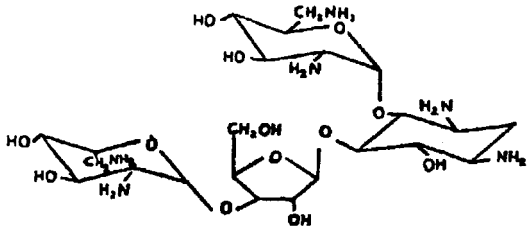
82 Having two saccharide radicals bonded through only oxygen to adjacent ring carbons of the cyclohexyl radical (e.g., ambutyrosin, ribostamycin, etc.):

This subclass is indented under subclass 80. Processes wherein the cyclohexyl radical is separately, independently bonded to two or more oxygen atoms of saccharide radicals at adjacent ring carbons, e.g.,



83 Containing three or more saccharide radicals (e.g., liquidomycin, neomycin, lividomycin, etc.):

This subclass is indented under subclass 82. Processes wherein the cyclohexyl radical is bonded directly or indirectly to three or more saccharide radicals, e.g.,



84 Preparing nitrogen-containing saccharide:

This subclass is indented under subclass 72. Processes wherein the product synthesized has a nitrogen-containing group bonded to a chain carbon of the saccharide or polysaccharide.

85 N-glycoside:

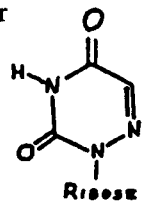
This subclass is indented under subclass 84. Processes wherein the product synthesized is a glycosidic derivative of the cyclic forms of saccharides or polysaccharides in which the aglycone portion is attached through nitrogen to the saccharide moiety by substituting it for the hemiacetal hydroxyl of the sugar.

(1) Note. The aglycone can be noncyclic.

(2) Note. N-glycosides in which the aglycone is purine or pyrimidine in which the ring structure is intact are provided for in

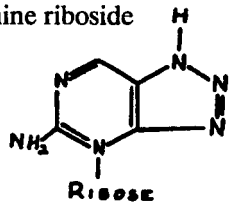
subclasses 87 and 89. Compounds such as those below are not considered to be within this meaning and thus, are here in subclass 85

6–azauracil riboside or



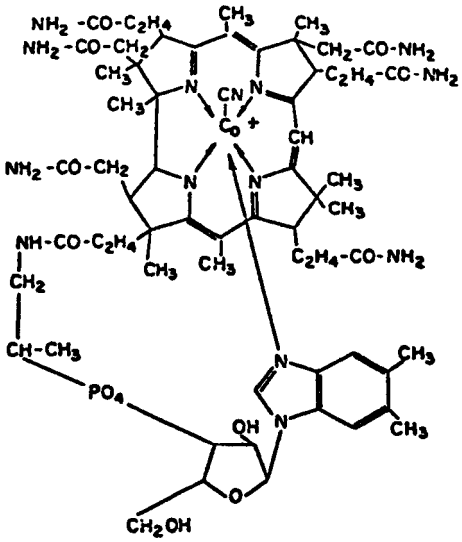
6-azauracil riboside

8–azaguanine riboside



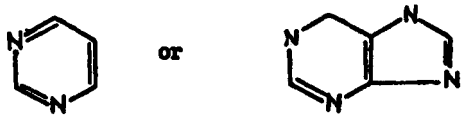
or 8-azaguanine riboside

86 Cobalamin (i.e., vitamin B_{12},LLD factor):
This subclass is indented under subclass 85. Processes wherein the product synthesized has the following structure:



87 Nucleoside:
This subclass is indented under subclass 85. Processes wherein the nitrogen is part of a purine or pyrimidine or a substituted purine or pyrimidine ring and the product synthesized does not contain phosphorus.

(1) Note. Substituted purine or pyrimidine includes only those derivatives which are substituted on rather than in the respective ring positions, (i.e., the structures below) is present in the structure. The internal ring bonding may be altered by tautomerism or by the addition of substituents without excluding a compound from this subclass.



88 Having a fused ring containing a six-membered ring having two N-atoms in the same ring (e.g., purine nucleosides, etc.):
This subclass is indented under subclass 87. Processes wherein the nitrogen is part of a purine or substituted purine ring.

(1) Note. See subclass 17, Note (1) for a definition of substituted.

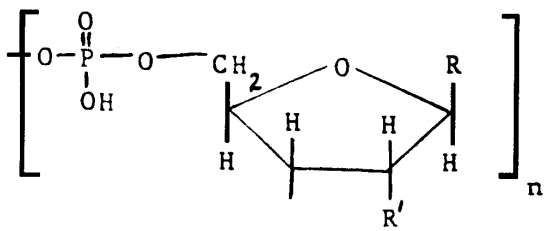
89 Nucleotide:
This subclass is indented under subclass 85. Processes wherein the nitrogen is part of a purine or pyrimidine or a substituted purine or pyrimidine ring and the compound additionally contains a phosphoric acid residue esterified to one of the hydroxyl groups of a saccharide moiety.

90 Dinucleotide (e.g., NAD, etc.):
This subclass is indented under subclass 89. Processes wherein the product contains only two nucleotides joined through esterified phosphoric acid residues.

(1) Note. See subclass 87, Note (1) for definition of the term substituted.

91.1 Polynucleotide (e.g., nucleic acid, oligonucleotide, etc.):

This subclass is indented under subclass 89. Processes wherein the product synthesized is (see image below) where "n" is a whole number greater than 2, R' is H or OH, and R is purine or pyrimidine or a substituted purine or pyrimidine.



(1) Note. The two purines, adenine and guanine, are found in both deoxyribonucleic acid (DNA) and ribonucleic acid (RNA). The pyrimidine cytosine is found in both DNA and RNA while the pyrimidine thymine is found only in DNA and the pyrimidine uracil appears only in RNA.

(2) Note. This and the indented subclasses are intended to include processes wherein the polynucleotide synthesized did not exist as such in the starting material. The synthesized material may be entirely different from the starting material, or it may have a substituted, deleted, or added nucleotide or nucleotides.

(3) Note. Substituted purine or pyrimidine includes only those derivatives which are substituted on, rather than in the respective ring positions.

(4) Note. If the disclosure is unclear as to what kind of polynucleotide is being made (i.e., RNA or DNA) the subject matter should be classified in the first appearing appropriate subclass for either RNA or DNA and cross-referenced to other appropriate subclasses for RNA or DNA. Unless the subject matter is directed to an acellular amplification process, synthesis of RNA is intended for subclasses 91.3+.

SEE OR SEARCH THIS CLASS, SUBCLASS:

91.3+, for processes wherein the product synthesized contains only ribonucleotide monomers.

270, for methods of removing nucleic acid from intact or disrupted cells by the use of an enzyme or microorganism.

SEE OR SEARCH CLASS:

536, Organic Compounds, subclasses 22.1+ for nucleic acids, per se, and for methods of making nucleic acids which do not involve use of an enzyme or microorganism in the process.

91.2 Acellular exponential or geometric amplification (e.g., PCR, etc.):

This subclass is indented under subclass 91.1. Processes which result in a geometric or exponential increase in the number of copies of a nucleotide sequence or sequences, rather than an arithmetic increase which occurs in the making of a single complementary copy of a nucleotide, wherein such processes take place without the involvement of viruses, eukaryotic cells, or prokaryotic cells.

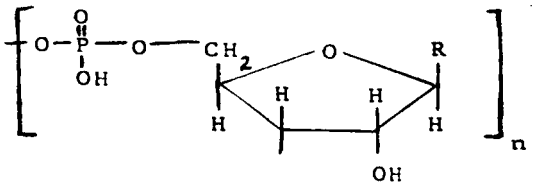
(1) Note. Included in this subclass is the polymerase chain reaction (PCR). PCR is an in vitro DNA amplification system that uses repeated cycles of oligonucleotide-directed DNA synthesis to selectively generate multiple copies of a specific DNA segment. It involves repeated cycles of (a) denaturation or strand displacement of the DNA, (b) annealing of two oligonucleotide primers that flank the DNA segment to be amplified, and (c) extension of the annealed primers with DNA polymerase.

(2) Note. Processes which result in an arithmetic increase in the number of copies of a nucleotide sequence, such as occurs in the making of a single complementary copy of a nucleotide sequence, are proper for subclasses 91.3+ if the nucleotide is a ribonucleotide and either subclass 91.1 or subclasses 91.5+, depending on the process details, if the nucleotide is other than a ribonucleotide.

91.21 Involving the making of multiple RNA copies:
This subclass is indented under subclass 91.2. Processes which result in a geometric or exponential, rather than an arithmetic increase in the number of copies of a ribonucleotide sequence or sequences.

(1) Note. Transcription amplification is included in this subclass.

91.3 Polynucleotide contains only ribonucleotide monomers:
This subclass is indented under subclass 91.1. Processes wherein the product synthesized is (see image below): where "n" is a whole number greater than 2 and R is purine or pyrimidine or a substituted purine or pyrimidine.



(1) Note. The two purines, adenine and guanine, and the two pyrimidines, cytosine and uracil, are used in ribonucleic acid (RNA) synthesis.

SEE OR SEARCH THIS CLASS, SUBCLASS:
91.51, for acellular synthesis of RNA-DNA hybrid polynucleotides.

91.31 Involving catalytic ribonucleic acid:
This subclass is indented under subclass 91.3. Processes wherein a ribonucleic acid (RNA) acting as an enzyme is involved as a reactant in, or as a product of, a process of synthesizing a polynucleotide containing only ribonucleotide monomers.

(1) Note. Catalytic RNA is also called enzymatic RNA or ribozyme.

(2) Note. Catalytic RNA is RNA which can serve as an enzyme acting on other RNA molecules in vitro as a (a) dephosphorylase, (b) ribonucleotidyl-transferase, or (c) sequence-specific endoribonuclease.

91.32 Prepared from virus, prokaryotic cell, or eukaryotic cell culturing process:
This subclass is indented under subclass 91.3. Processes wherein the desired RNA results from the culturing of a virus, prokaryote, or eukaryote.

(1) Note. A prokaryotic cell is one that lacks a defined nucleus. Generally, the cellular DNA is in the form of a single circular molecule not bounded by a membrane. The cell wall is rigid and it has few distinct organelles. Included in this group are bacteria and blue-green algae. A eukaryotic cell is one that has a nucleus defined by a nuclear membrane, which nucleus contains chromosomes that comprise the cell's genome. Eukaryotic organisms may be multicellular or single-celled and include cells from plants, animals, fungi, and algae other than blue-green algae.

(2) Note. This and the indented subclass is intended to include processes wherein the virus, prokaryote, or eukaryote is a wild type, mutant, or recombinant.

91.33 Involving virus:
This subclass is indented under subclass 91.32. Processes wherein a virus is involved in the production of the polyribonucleotide.

91.4 Modification or preparation of a recombinant DNA vector:
This subclass is indented under subclass 91.1. Processes involving the insertion, deletion, addition, or substitution of a nucleotide or nucleotides in an already existing vector or involving the creation of a new vector.

(1) Note. A vector is a DNA sequence (e.g., a plasmid, cosmid, a viral or phage DNA, etc.) which is able to replicate autonomously in a host cell.

(2) Note. Examples of processes intended for this and the indented subclasses include cleaving a plasmid followed by adding onto the plasmid a piece of nucleic acid and then ligating the plas-

mid; linearizing and then ligating two plasmids together; culturing cells and isolating vectors from them, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:
320.1, for vectors, per se.

91.41 By insertion or addition of one or more nucleotides:
This subclass is indented under subclass 91.4. Process involving the insertion of a nucleotide or a nucleotide sequence into a vector or onto the end of a vector wherein the result is a vector different from the starting vector.

91.42 Involving deletion of a nucleotide or nucleotides from a vector:
This subclass is indented under subclass 91.4. Processes involving the removal of an unwanted nucleotide or nucleotide sequence from the vector structure wherein the result is a vector different from the starting vector.

91.5 Acellular preparation of polynucleotide:
This subclass is indented under subclass 91.1. Processes wherein the polynucleotide is prepared enzymatically (with no virus, eukaryotic cell, or prokaryotic cell involvement in the preparation step) which results in a new polynucleotide or a polynucleotide different from the starting polynucleotide.

(1) Note. Viral or cellular involvement, prior to the actual polynucleotide preparation steps, is acceptable for this subclass as is cellular replication of the newly made polynucleotide, if said replication does not modify the structure of the polynucleotide product.

91.51 Involving RNA as a starting material or intermediate:
This subclass is indented under subclass 91.5. Processes wherein RNA is involved in the preparation of a polynucleotide as a template for the polynucleotide or as an intermediate in the process which results in the polynucleotide.

91.52 Involving a ligase (6.):
This subclass is indented under subclass 91.5. Processes wherein a ligase (6.) is involved in the preparation of the polynucleotide.

(1) Note. Although ligase is the most common name used, carboxylase, synthetase, and synthase are other names used.

91.53 Involving a hydrolase (3.):
This subclass is indented under subclass 91.5. Processes wherein a hydrolase (3.) is involved in the preparation of the polynucleotide.

(1) Note. While the systematic name always includes “hydrolase,” the recommended name is in most cases formed by the name of the substrate plus the suffix “ase” (e.g., nuclease, phosphatase, etc.).

92 Having a fused ring containing a six-membered ring having two N-atoms in the same ring (e.g., purine based mononucleotides, etc.):
This subclass is indented under subclass 89. Processes wherein the nitrogen atoms are part of a purine or substituted purine ring.

(1) Note. See subclass 87, Note (1) for a definition of the term substituted.

93 Mashing or wort making:
This subclass is indented under subclass 72. Processes wherein the product is mashed grain or wort which has been prepared by a biochemical reaction utilizing malt, or malt diastase, or a malt extract.

(1) Note. Malt, malt diastase, and malt extract are considered to include a mixture of alpha- and beta-amylases.

(2) Note. Diastase (as distinguished from malt diastase) is considered to be alpha-amylase.

SEE OR SEARCH THIS CLASS, SUBCLASS:
95+, for products other than mash or wort produced by malt, malt diastase, or malt extract.
99+, for producing compounds containing saccharide radials by diastase.
201, for the production of maltase.
202, for the production of diastase from microorganisms.
203, for the production of diastase from a fungal source.

204, for the production of diastase from a plant source such as barley malt.

SEE OR SEARCH CLASS:
426, Food or Edible Material: Processes, Compositions, and Products, particularly subclass 16, 28+, and 64 for processes of producing mash or wort when combined with steps for producing an edible, e.g., a beverage and the product of such processes.

94 Produced by the action of an isomerase (e.g., frutose by the action of xylose isomerase on glucose, etc.):
This subclass is indented under subclass 17. Processes wherein the product synthesized is an enzymatically isomerized polysaccharide or saccharide containing compound.

SEE OR SEARCH THIS CLASS, SUBCLASS:
174, for immobilized isomerase preparation.
233, and 234, for isomerase.

95 Produced by the action of a beta-amylase (e.g., maltose by the action of beta-amylase on amylose, etc.):
This subclass is indented under subclass 72. Processes wherein the product is produced by the successive hydrolysis of alpha-1, 4-glucan bonds in a polysaccharide from a terminal end.

(1) Note. Malt and malt diastase are considered to include a mixture of alpha- and beta-amylases. Products containing saccharide radicals (other than mash or wort) produced by malt, malt diastase, or malt extract are provided for here.

SEE OR SEARCH THIS CLASS, SUBCLASS:
174+, for immobilized beta-amylase preparations.
201, for beta-amylase type enzymes.

96 Produced by the action of an exo-1.4 alpha glucosidase (e.g., dextrose by the action of glucoamylase on starch, etc.):
This subclass is indented under subclass 72. Processes wherein the product synthesized is produced by the hydrolysis of alpha-1, 4-glucan bonds of saccharides or polysaccharides.

SEE OR SEARCH THIS CLASS, SUBCLASS:
105, for the production of dextrose by other methods.
174, for immobilized glucoamylase preparations.
205, for glucoamylase enzymes.

97 Produced by the action of a glycosyl transferase (e.g., alpha, beta, or gamma-cyclodextrins by the action of glycosyl transferase on starch, etc.):
This subclass is indented under subclass 72. Processes wherein the product synthesized is produced by the direct transfer of a glycosyl moiety from one saccharide or polysaccharide to another, e.g., cyclo-dextrins, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:
174+, for immobilized transferase preparations.
193+, for transferases.

98 Produced by the action of an alpha-1, 6-glucosidase (e.g., amylose, debranched amylopectin by action of pullulanase, etc.):
This subclass is indented under subclass 72. Processes wherein the product is produced by the hydrolysis of alpha-1, 6-glucan bonds in polysaccharides.

SEE OR SEARCH THIS CLASS, SUBCLASS:
174+, for immobilized enzyme preparations which may be used in this process.
210+, for the enzyme which may catalyze this process.

99 Produced by the action of a carbohydrase (e.g., maltose by the action of alpha amylase on starch, etc.):
This subclass is indented under subclass 72. Processes wherein the product synthesized is a saccharide or polysaccharide produced by the enzymatic hydrolysis of a polysaccharide.

SEE OR SEARCH THIS CLASS, SUBCLASS:
174, for immobilized enzyme preparations which may catalyze this process.
200, for the enzyme which may catalyze this reaction.

100 Disaccharide:
This subclass is indented under subclass 72. Processes wherein the product synthesized is a glycoside composed of only two glucan moieties.

101 Polysaccharide of more than five saccharide radicals attached to each other by glycosidic bonds:
This subclass is indented under subclass 72. Processes wherein the product synthesized contains five or more saccharide moieties bonded together.

102 Pullulan:
This subclass is indented under subclass 101. Processes wherein the polysaccharide is composed of glucose units which are joined predominantly by 1, 6-glucosidic bonds.

103 Dextran:
This subclass is indented under subclass 101. Processes wherein the polysaccharide is composed of maltotriose units which are linked by 1, 6-glucosidic bonds.

(1) Note. Dextrin and Dextrine are not variant spellings of "Dextran", instead they are respectively a starch hydrolysis product and a variant spelling of dextrin.

104 Xanthan (i.e., xanthomonas-type heteropolysaccharides):
This subclass is indented under subclass 101. Processes wherein the polysaccharide is prepared through the cultivation of a species of Xanthomonas.

105 Monosaccharide:
This subclass is indented under subclass 72. Processes wherein the product synthesized is a monosaccharide.

106 Preparing alpha or beta amino acid or substituted amino acid or salts thereof:
This subclass is indented under subclass 41. Processes wherein the product synthesized is an orgnaic compound that contains both a basic amino group and an acidic carboxyl group where a primary or secondary amino group is directly bonded to the alpha or beta carbon.

(1) Note. This subclass takes compounds such as pantothenic acid and amino acids that additionally contain heterocyclic groups.

(2) Note. This subclass provides for the salt form as well as the acid form.

107 Proline; hydroxyproline; histidine:
This subclass is indented under subclass 106. Processes wherein the product synthesized is an acid or salt form of alpha-2-pyrrolidine carboxylic acid or 4-hydroxy-2-pyrrolidine carboxylic acid or alpha-amino-4-imidazole propionic acid.

108 Tryptophan; tyrosine; phenylalanine; 3, 4, dihydroxyphenylalanine:
This subclass is indented under subclass 106. Processes wherein the product synthesized is an acid or salt form of alpha-amino-beta-phenyl-propionic acid or p-hydroxyphenylaminoacetic acid or 2-amino-3-(3, 4-dihydroxyphenyl) propanoic acid or 1-alpha-aminoindole-3-propionic acid.

109 Aspartic acid (asparaginic acid); asparagine:
This subclass is indented under subclass 106. Processes wherein the product synthesized is an acid or salt form of amino succinic acid or alpha-amino succinamic acid.

110 Glutamic acid; glutamine:
This subclass is indented under subclass 106. Processes wherein the product synthesized is an acid or salt form of 2-amino pentanedioic acid or alpha-amino-glutaric acid or 1-amino propane-1, 3-dicarboxylic acid or 2-amino glutaramic acid or glutamic acid 5-amide.

111 Utilizing biotin or its derivatives:
This subclass is indented under subclass 110. Processes wherein biotin or biotin derivative is present in the production media.

(1) Note. Biotin Derivatives include desthio-biotin, biotin-d-sulfoxide, biocytin.

(2) Note. Molases and various carbohydrate and protein hydrolyzates provide biotin.

112 Utilizing surfactant, fatty acids, or fatty acid esters (i.e., having seven or more carbon atoms):
This subclass is indented under subclass 110. Processes wherein a surfactant or a fatty acid or a fatty acid ester is present in the production media.

(1) Note. A fatty acid or its ester is defined as containing seven or more carbon atoms in a single chain.

113 Methionine; cysteine; cystine:
This subclass is indented under subclass 106. Processes wherein the product synthesized is an acid or salt form of 2-amino-4-(methyl thio) butyric acid or 2-amino-3-mercaptopropanoic acid or 3, 3'-dithiobis (2-aminopropanoic acid).

114 Citrulline; arginine; ornithine:
This subclass is indented under subclass 106. Processes wherein the product synthesized is an acid or salt form of alpha-amino-6-ureidovaleric acid or 1-amino-4-guanidovalenic acid or 2, 5 diaminopentaneic acid.

115 Lysine; diaminopimelic acid; threonine; valine:
This subclass is indented under subclass 106. Processes wherein the product synthesized is an acid or salt form of 2, 6-diaminohexanoic acid or 2, 4 diamino-1,5-pentane dicarboxylic acid or 2-amino-3-hydroxy butanoic acid or 2-amino-3-methyl butanoic acid.

116 Alanine; leucine; isoleucine; serine; homoserine:
This subclass is indented under subclass 106. Processes wherein the product synthesized is an acid or salt form of 2-aminopropanoic acid or 2-amino-4-methyl pentanoic acid or 2-amino-3-methyl pentanoic acid or 2-amino-3-hydroxypropionic acid or 2-amino-4-hydroxy butanoic acid.

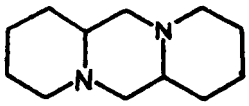
117 Preparing heterocyclic carbon compound having only O, N, S, Se, or Te as ring hetero atoms:
This subclass is indented under subclass 41. Processes wherein the product synthesized is a carbon compound which contains a ring composed of carbon and at least one element from the group consisting of nitrogen, sulfur, selenium, tellurium, or oxygen and no other atoms.

(1) Note. Processes wherein the product synthesized is an acid anhydride or lactone, or lactam are properly classified herein.

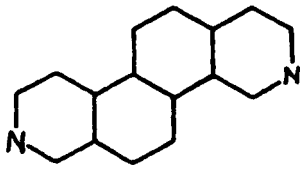
118 Containing two or more hetero rings:
This subclass is indented under subclass 117. Processes wherein the product synthesized contains at least two hetero rings.

119 Containing at least two hetero rings bridged or fused among themselves or bridged or fused with a common carbocyclic ring system (e.g., rifamycin, etc.):
This subclass is indented under subclass 118. Processes wherein the product synthesized contains at least two hetero rings which are bridged or fused among themselves or bridged or fused with a common carbocyclic ring system.

(1) Note. Ring systems containing two carbocyclic rings fused to a common heterocyclic ring where each of the carbocyclic rings share a hetero ring are included herein, e.g.,



(2) Note. A common carbocyclic ring system may contain three or more carbon atoms and may be bridged or fused, e.g.,



(3) Note. This subclass provides for compounds generally referred to as alkaloids.

120 Nitrogen or oxygen hetero atom and at least one other diverse hetero ring atom in the same ring:
This subclass is indented under subclass 117. Subject matter wherein the product synthesized contains a hetero ring which contains at least two different hetero atoms, one of which is either nitrogen or oxygen.

121 Nitrogen as only ring hetero atom:
This subclass is indented under subclass 117. Processes wherein the product synthesized contains a hetero ring having nitrogen as the only hetero atom.

122 Containing six-membered hetero ring:
This subclass is indented under subclass 117. Processes wherein the N-containing hetero ring contains six-members.

123 Oxygen as only ring hetero atom:
This subclass is indented under subclass 117. Processes wherein the product synthesized contains a hetero ring wherein oxygen is the only hetero atom.

124 Containing a hetero ring of at least seven ring members (e.g., zearalenone, macrocyclic lactones, etc.):
This subclass is indented under subclass 123. Processes wherein the product synthesized contains an O-containing hetero ring of seven or more ring members.

125 Containing six-membered hetero ring (e.g., fluorescein, etc.):
This subclass is indented under subclass 123. Processes wherein the O-containing hetero ring has only six members.

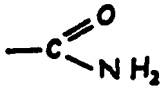
126 Containing five-membered hetero ring (e.g., griseofulvin, etc.):
This subclass is indented under subclass 123. Processes wherein the O-containing hetero ring has five members.

127 Preparing compound containing at least three carbocyclic rings:
This subclass is indented under subclass 41. Subject matter in which the product contains three carbocyclic rings.

(1) Note. The rings need not be fused or contiguous.

128 Preparing nitrogen-containing organic compound:
This subclass is indented under subclass 41. Processes wherein the product is an organic compound which contains nitrogen.

129 Amide (e.g., chloramphenicol, etc.):
This subclass is indented under subclass 128. Subject matter wherein the product has the following structural group,

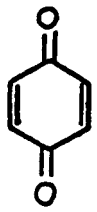


130 Preparing sulfur-containing organic compound:
This subclass is indented under subclass 41. Processes wherein the product synthesized contains sulfur.

131 Preparing organic compound containing a metal or atom other than H, N, C, O, or halogen:
This subclass is indented under subclass 41. Processes wherein the product contains an atom other than H, N, C, O, or halogen.

132 Preparing oxygen-containing organic compound:
This subclass is indented under subclass 41. Processes wherein the product is an organic compound containing oxygen.

133 Containing quinone nucleus (i.e., quinoid structure):
This subclass is indented under subclass 132. Processes wherein the product contains the following structure, i.e.,



134 Fat; fatty oil; ester-type wax; higher fatty acid (i.e., having at least seven carbon atoms in an unbroken chain bound to a carboxyl group); oxidized oil or fat:
This subclass is indented under subclass 132. Processes wherein the product synthesized is a fat or fatty oil or ester-type wax or fatty acis, oxidized oil or fat.

(1) Note. "Fats" and "fatty oils" are the glycerides of higher fatty acids having seven or more carbon atoms.

(2) Note. "Higher fatty acid" is a monocarboxylic acid containing seven or more carbon atoms bonded to a carboxyl group, e.g., lauric, palmitic stearic, oleic, ricinoleic, linoleic, and behonolic acids. Where there are several unbroken chains of carbon atoms bonded to the carboxyl group, one of the chains must contain seven or more carbon atoms.

(3) Note. Ester-type waxes and esters of a higher fatty acid having seven or more carbon atoms and a monohydric alcohol.

(4) Note. The conversion of fats, proteins, and carbohydrates to fatty acids is a step in the anaerobic digestion of sewage provided for in Class 210, subclasses 2+.

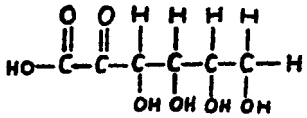
135 Carboxylic acid ester:
This subclass is indented under subclass 132. Processes wherein the product synthesized contains an ester group, i.e.,O-R wherein R=alkyl, aryl, alkenyl, alkynyl.

136 Containing a carboxyl group:
This subclass is indented under subclass 132. Processes wherein the product synthesized contains a carboxylic acid functional group, i.e.,-CH which is either in the acid or salt form.

137 Sugar acid having five or more carbon atoms (i.e., aldonic, keto-aldonic, or saccharic acids):
This subclass is indented under subclass 136. Processes wherein the product synthesized is a polyhydroxy acid having five or more carbon atoms.

(1) Note. The processes of this subclass typically involve the oxidation of a carbohydrate and include the production of aldonic, keto-aldonic and saccharic acids.

138 Alpha-ketogulonic acid (i.e., 2-ketogulonic acid):
This subclass is indented under subclass 137. Processes wherein the product synthesized is an acid or salt form of:

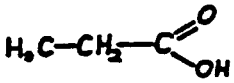


139 Lactic acid:
This subclass is indented under subclass 136. Processes wherein the product synthesized is an acid or salt form of alpha-hydroxy propanoic acid.

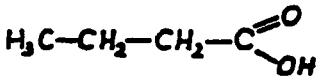
140 Acetic acid:
This subclass is indented under subclass 136. Processes wherein the product synthesized is ethanoic acid which by the nature of the process can not be readily used as a food product.

SEE OR SEARCH CLASS:
426, Food or Edible Material: Processes, Compositions, and Products, subclass 17 for fermentation of alcohol to produce vinegar. The oxidizing of alcohol to produce acetic acid as a chemical compound is subject matter for Class 435.

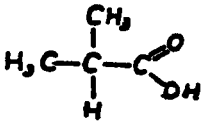
141 Propionic or butyric acid:
This subclass is indented under subclass 136. Processes wherein the product synthesized is an acid with the structure:



or



or



142 Polycarboxylic acid:
This subclass is indented under subclass 136. Processes wherein the product synthesized contains two or more carboxylic acid groups.

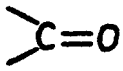
143 Having keto group (e.g., alpha-ketoglutaric acid, etc.):
This subclass is indented under subclass 142. Processes wherein the polycarboxylic acid synthesized contains a keto group.

144 Tricarboxylic acid (e.g., citric acid, etc.):
This subclass is indented under subclass 142. Processes wherein the product synthesized contains three carboxylic acid groups.

145 Dicarboxylic acid having four or less carbon atoms (e.g., fumaric, maleic, etc.):
This subclass is indented under subclass 142. Processes wherein the product synthesized contains two carboxylic acid groups and four or less carbon atoms.

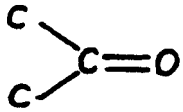
146 Hydroxy carboxylic acid:
This subclass is indented under subclass 136. Processes wherein the product synthesized contains one or more hydroxy groups.

147 Containing carbonyl group:
This subclass is indented under subclass 132. Processes wherein the product synthesized contains a carbonyl group, i.e.,



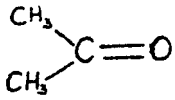
(1) Note. This subclass provides for linear carbocyclic acid anhydrides such as acetic acid anhydride.

148 Ketone:
This subclass is indented under subclass 147. Processes wherein the product synthesized contains a keto group, i.e.,



149 Cyclopentanone or cyclopentadione containing compound:
This subclass is indented under subclass 148. Processes wherein the product synthesized is cyclopentanone or cyclopentadione or a substituted cyclopentanone or cyclopentadione.

150 Acetone containing product:
This subclass is indented under subclass 148. Processes wherein the product synthesized contains acetone, i.e.,



(1) Note. Molasses is not considered a grain or cereal material for purposes of this subclass.

(2) Note. Care should be taken with the word “mash” to determine if sugar, or grain or cereal material is intended.

(3) Note. This subclass does not include dihydroxy acetone.

151 Substrate contains grain or cereal material:
This subclass is indented under subclass 150. Processes wherein acetone is prepared by biochemical transformation of farinaceous material.

(1) Note. Molasses is not considered a cereal or grain substrate.

(2) Note. Care should be taken with the word "mash" to determine if sugar or grain-cereal is intended.

152 Substrate contains protein as nitrogen source:
This subclass is indented under subclass 150. Processes wherein the production media contains a protein as the nitrogen source.

153 Substrate contains inorganic nitrogen source:
This subclass is indented under subclass 150. Processes wherein the production media contains an inorganic nitrogen source.

154 Substrate contains inorganic compound, other than water:
This subclass is indented under subclass 150. Processes wherein the production media contains an added inorganic compound other than water.

155 Containing hydroxy group:
This subclass is indented under subclass 132. Processes wherein the product contains a hydroxyl group, i.e., R-OH.

SEE OR SEARCH CLASS:
260, Chemistry of Carbon Compounds, subclass 97.5 and 124 for the treatment of source materials such as sulfite waste liquor or black liquor to derive a specific carbon compound, subclass 527 for the production of oxalic acids from waste sulfite liquor.
426, Food or Edible Material: Processes, Compositions, and Products, for fermentation to produce beverage alcohol. Class 426 also provides for methods of clarifying alcoholic beverages by fermentation.

156 Aromatic:
This subclass is indented under subclass 155. Processes wherein the product synthesized contains at least one aryl ring.

157 Acyclic:
This subclass is indented under subclass 155. Processes wherein the product synthesized is acyclic.

158 Polyhydric:
This subclass is indented under subclass 157. Processes wherein the product synthesized contains two or more hydroxyl groups.

159 Glycerol:
This subclass is indented under subclass 158. Processes wherein the product is 1, 2, 3, propanetriol.

(1) Note. Glycerine is another name for glycerol.

160 Butanol:
This subclass is indented under subclass 157. Processes wherein the product synthesized is 2-methyl-2-propanol or 1-butanol or 2-methyl-1-propanol or 2-butanol.

(1) Note. Butanol is typically produced as a product in fermentation process for producing acetone.

SEE OR SEARCH THIS CLASS, SUBCLASS:
150+, for processes for producing acetone which also produces a butanol by-product.

161 Ethanol:
This subclass is indented under subclass 157. Processes wherein the product synthesized is ethanol which is not directly suitable for food or beverage use.

162 Multiple stages of fermentation; multiple types of microorganisms or reuse of microorganisms:
This subclass is indented under subclass 161. Processes wherein ethanol is prepared by (a) two or more distinct fermentation steps, or (b) by using microorganisms of different species

sequentially, or (c) by a process wherein the microorganism is recycled and reused.

163 Produced as by-product or from waste or from cellulosic material substrate:
This subclass is indented under subclass 161. Processes wherein ethanol produced as a by-product in a process for the production of another chemical species or is prepared by the biochemical conversion of materials containing cellulose or unrefined waste materials of another process.

164 Substrate contains sulphite waste liquor or citrus waste:
This subclass is indented under subclass 163. Processes wherein ethanol is prepared by the biochemical conversion of waste sulfite liquor or citrus waste.

(1) Note. Waste sulfite liquor is the residual material obtained after the sulfurous acid treatment of paper pulp.

165 Substrate contains cellulosic material:
This subclass is indented under subclass 163. Processes wherein ethanol is prepared by the biochemical treatment of a cellulose containing material.

166 Preparing hydrocarbon:
This subclass is indented under subclass 41. Processes wherein the product synthesized is a hydrocarbon.

167 Only acyclic:
This subclass is indented under subclass 166. Processes wherein the only hydrocarbon product is acyclic.

(1) Note. This subclass is largely devoted to production of methane.

SEE OR SEARCH CLASS:

48, Gas: Heating and Illuminating, especially subclass 197 for processes of producing a fuel gas by anerobic fermentation of sewage.

71, Chemistry: Fertilizers, for processes whose primary intent is to make a product of that class which may incidentally produce a methane containing gas by-product.

210, Liquid Purification or Separation, subclass 603 for fermentative processing of liquid which may result in the production of a methane containing gas. The following criteria are determinative of placement in Class 210.

(1) Where water is the only disclosed liquid purified, the patent will be classified in Class 210.

(2) Where the disclosure includes water, mineral oils and/or other liquids, the patent will be classified: (a) In Class 210 if all the claims are broad as to the liquid. (b) In Class 210 if several species of liquid are claimed and one species includes waters. (c) In the appropriate art class if some liquid other than water is the only liquid claimed (e.g., mineral oils in Clas 208; organic compounds in Class 206). When the treatment of mineral oils and the treatment of other materials (other than water) are claimed the patent will be classified in Class 208.

168 Preparing element or inorganic compound except carbon dioxide:
This subclass is indented under subclass 41. Processes wherein the product is an element or inorganic compound.

(1) Note. The exclusion of carbon dioxide is intended to exclude carbon dioxide as a normal respiration product of microorganisms.

169 Using actinomycetales:
This subclass is indented under subclass 41. Processes wherein the product synthesized is prepared by actinomycetales.

170 Using bacteria:
This subclass is indented under subclass 41. Processes wherein the product synthesized is prepared by bacteria.

171 Using fungi:
This subclass is indented under subclass 41. Processes wherein the product synthesized is prepared by fungi.

173.1 TREATMENT OF microorganismS OR ENZYMES WITH ELECTRICAL OR WAVE ENERGY (E.G., MAGNETISM, SONIC WAVES, ETC.):
This subclass is indented under the class definition. Processes wherein a microorganism is subjected to electrical or wave energy either prior to or during propagation, or catalytically active enzymes are subjected to electrical or wave energy.

(1) Note. This subclass does not include the treatment of plant cells, tissues thereof, algae, or any microorganism with light for the photosynthetic propagation thereof. Such subject matter is provided for in Class 47 or in Class 435, subclasses 410+ for plant cells and tissues thereof, and 243+ for algae and other photosynthetic microorganisms.

(2) Note. This subclass does not include the use of electrical or wave energy for the purpose of sterilizing, etc. Such subject matter is provided for in Class 422, subclasses 20 through 24.

(3) Note. This subclass does not include the use of electrical or wave energy for the purpose of detecting or measuring microorganisms or enzymes. Such subject matter is provided for in Class 435, subclasses 4+.

SEE OR SEARCH THIS CLASS, SUBCLASS:
283.1, for subject matter including apparatus.

SEE OR SEARCH CLASS:
204, Chemistry: Electrical and Wave Energy, for processes and apparatus involving electrical and wave energy effects upon chemical compositions, compounds, and elements not provided for elsewhere.
205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclass 701 for electrolytic treatment of biological material (e.g., sterilizing, etc.).

173.2 Enzyme treated:
This subclass is indented under subclass 173.1. Processes wherein enzymes are subjected to electrical or wave energy thus affecting the catalytic activity and/or physical structure thereof.

(1) Note. This subclass does not include electrophoretic or electrofocusing processes for the separation and purification of enzymes. Such subject matter is provided for in Class 204, and in Class 435, subclasses 183+.

SEE OR SEARCH THIS CLASS, SUBCLASS:
8, through 29, for subject matter involving measuring and testing utilizing enzymes.
174+, for subject matter involving immobilization of enzymes.
183+, for subject matter involving enzyme and proenzyme compositions and other processes for preparing, activating, inhibiting, separating, or purifying enzyme or proenzyme compositions.
817, for subject matter involving enzyme electrodes.

SEE OR SEARCH CLASS:
205, Electrolysis: Processes, Compositions Used Therein, and Methods of Preparing the Compositions, subclasses 777.5+ for electrolytic analysis or testing involving an enzyme or microorganism (e.g., animal or plant cells, bacteria, virus, etc.).

173.3 Modification of viruses (e.g., attenuation, etc.):
This subclass is indented under subclass 173.1. Processes in which viruses are modified utilizing electrical or wave energy.

SEE OR SEARCH THIS CLASS, SUBCLASS:

5, for subject matter of measuring and testing utilizing a virus or bacteriophage.

235.1+, for subject matter involving a virus or bacteriophage, particularly subclass 236 which involves other processes of inactivation or attenuation.

440+, for processes wherein the genetic material is altered.

SEE OR SEARCH CLASS:

250, Radiant Energy, particularly subclass 492.1 for processes of irradiation of objects or materials.

424, Drug, Bio-Affecting, and Body Treating Compositions, particularly subclasses 159.1+ for a process involving the step of immunizing an animal with a virus to produce a protective antiserum, followed by the step of obtaining the protective antiserum from the animal; subclasses 199.1, 201.1, 202.1, and 204.1 for an immunologic composition containing a virus (e.g., vaccines, etc.); subclass 93.6 for compositions or products under the class definition which contain nongenetically modified whole, live viruses. The mere use of the word vaccine, etc., is insufficient for placement in Class 424.

173.4 Cell membrane or cell surface is target:

This subclass is indented under subclass 173.1. Processes wherein electrical or wave energy affects the membrane or surface of a microorganism.

173.5 Membrane permeability increased:

This subclass is indented under subclass 173.4. Processes wherein the permeability of a cell membrane is increased.

173.6 Electroporation:

This subclass is indented under subclass 173.5. Processes wherein the permeability of a cell membrane is increased as a result of an applied electric current.

(1) Note. The related process of electrofusion is provided for in Class 435, subclass 450.

SEE OR SEARCH THIS CLASS, SUBCLASS:

440+, for processes, including electrofusion, wherein the genetic material of a cell is altered.

SEE OR SEARCH CLASS:

204, Chemistry: Electrical and Wave Energy, subclasses 450+ for electrophoretic or electro-osmotic processes, in general. Class 435 provides for processes and apparatus using electrical or wave energy treatment of microorganisms or enzymes when the treatment is solely disclosed for use with viable microorganisms or catalytically active enzymes.

173.7 Lytic effect produced (e.g., disruption of cell membrane for release of subcellular parts; e.g., nucleic acids, etc.):

This subclass is indented under subclass 173.4. Processes wherein electrical or wave energy is utilized to disrupt a cell membrane (e.g., ultrasonic energy, etc.) for releasing the contents of the cell or for producing membrane fragments thereof.

SEE OR SEARCH THIS CLASS, SUBCLASS:

259, for subject matter involving lysis of microorganisms.

173.8 Metabolism of microorganism enhanced (e.g., growth enhancement or increased production of microbial product):

This subclass is indented under subclass 173.1. Processes wherein the metabolic activity of a microorganism is affected by electrical or wave energy.

SEE OR SEARCH THIS CLASS, SUBCLASS:

235.1+, for subject matter involving additional processes of propagation of a virus or bacteriophage.

243+, for subject matter involving additional processes of propagation of bacteria, fungi, protozoa, or single cell algae.

325+, for processes of propagation, maintenance, etc. of animal cells.
410+, for processes of propagation, maintenance, etc. of plant cells.

173.9 Concentration, separation, or purification of microorganisms:
This subclass is indented under subclass 173.1. Processes wherein electrical or wave energy (e.g. magnetism) is utilized to concentrate, separate, or purify a microorganism.

SEE OR SEARCH THIS CLASS, SUBCLASS:
235.1+, for subject matter involving other processes of purification of a virus or bacteriophage.
243+, for subject matter involving other processes of purification of bacteria, fungi, protozoa, or single cell algae.

174 CARRIER-BOUND OR IMMOBILIZED ENZYME OR MICROBIAL CELL; CARRIER-BOUND OR IMMOBILIZED CELL; PREPARATION THEREOF:
This subclass is indented under the class definition. Subject matter which is an artificially produced composition or complex or compound under the class definition containing microbial cell or enzyme or individual plant or animal cell which imparts to the enzyme or the microorganism or the individual plant or animal cell the property of physical confinement or localization during a continuous biochemical process or the property of enhanced recoverability in a batch process for repeated future use and processes for preparing the same.

(1) Note. Immobilization results from covalent bonding between an enzyme or microorganism and the carrier or an ionic bonding between an enzyme or microorganism and a carrier or sorption of an enzyme or microorganism within a carrier, or entrapment of an enzyme or microorganism within a carrier.

(2) Note. A carrier material may be either water soluble or water insoluble.

(3) Note. Reaction or ultra filtration cells, vials, or beakers which contain enzymes or microorganisms are not considered to be immobilized complexes or compositions.

(4) Note. Enzymes chemically or physically bonded to a water-insoluble matrix, enzymes contained within a polymer or gel, enzymes absorbed on a resin are examples of immobilized enzymes.

(5) Note. Proenzymes are considered to be enzymes for the purpose of this subclass.

(6) Note. When a carrier is composed of more than one material, the patent is placed in the subclass which corresponds to the material to which the enzyme is bound, e.g., a carrier which is a synthetic polymer coated metal is placed in subclass 177.

(7) Note. The carrier material or the carrier material and a covalent bond forming agent impart to the enzyme or the microbial or plant or animal cell the property of physical confinement or localization during a continuous process or the property of enhanced recoverability in a batch process which it did not possess prior to treatment with the carrier material or carrier material and a covalent bonding agent.

(8) Note. A microbial cell for purposes of this subclass includes bacteria, fungi (including yeast), actinomycetales, animal or plant cells, unicellular algae or protozoa.

(9) Note. An enzyme conjugate, enzyme ligand, enzyme adduct for the purpose of this subclass are deemed to enhance enzyme stability.

(10) Note. In documents where it is unclear whether an enzyme joined to a chemical moiety is an immobilized enzyme or is an enzyme conjugate or adduct, the following factors should be considered. A. If the document states that the product is an enzyme conjugate, adduct or ligand bound enzyme placement is proper in subclass 188.B If the ratio of nonenzyme moiety to enzyme is in the range of 0.01-100:1 placement would be indi-

cated in subclass 188. A ratio of 1-40 nonenzyme moieties per enzyme indicates placement in subclass 188. C. If the molecular weight of the nonenzyme moiety is less than about 100,000 placement would be indicated in subclass 188. D. If the intended use of the enzyme containing product is a reagent in competitive assay placement is indicated in subclass 188. If the use of the product is as a catalyst in the preparation of chemical compounds with recoverability (i.e., insolubililty) an important consideration, placement as an immoblized enzyme is indicated in subclasses 174+.

SEE OR SEARCH CLASS:

65, Glass Manufacturing, for processes of making glass articles, particularly subclasses 447+ for making a resin coated glass fiber; and subclass 22 for making a porous glass article which may find utility as an immobilization agent.

106, Compositions: Coating or Plastic, for protein containing coating or plastic compositions, particularly subclass 4, 31.24, 31.53, 31.82, 31.94, 124+, 645+, and indented subclasses.

156, Adhesive Bonding and Miscellaneous Chemical Manufacture, subclasses 77+ for pore forming in combination with a laminating step.

210, Liquid Purification or Separation, subclasses 263+ and 660+ for processes and apparatus for ion exchange or sorption of components from a liquid; and subclasses 606 and 632 for a process of use of an immobilized enzyme or microorganism to purify sewage.

260, Chemistry of Carbon Compounds, various subclasses for coenzymes or immobilized coenzymes; subclasses 112+ for proteins or polypeptides, per se.

264, Plastic and Nonmetallic Article Shaping or Treating: Processes, subclasses 41+ for significant molding processes which include the step of pore forming in situ.

362, Illumination, for cells which are propagated fixed to a surface.

424, and 514, Drug, Bio-Affecting and Body Treating Compositions, especially Class 424 subclass 19 and 31 for coated products which may contain a protein; Class 424 subclass 94.1+ for a composition containing an enzyme or coenzyme including immobilized forms; and Class 514, subclasses 2+ for a composition containing a protein.

426, Food or Edible Material: Processes, Compositions, and Products, appropriate subclasses, for edible protein compositions or products and related process involving the same.

428, Stock Material or Miscellaneous Articles, subclasses 474.1+ for a nonstructural stock material product in the form of a composite web or sheet including a layer comprising protein, and other appropriately titled subclasses, e.g., subclasses 435 and 458; and subclasses 304.4+ for a stock material in the form of a composite web or sheet embodying a component which is porous or cellular.

520, Synthetic Resins or Natural Rubbers, for resin containing a chemically combined protein or biologically active polypeptide which is other than an enzyme; see in particular, Class 525, subclases 8+ and 54.1; Class 526, subclass 238.1; and Class 527, subclasses 200+.

521, Synthetic Resins or Natural Rubbers, subclasses 25+ for an ion exchange resin and the processes of making or regenerating them; and subclasses 50+ for cellular or porous resinous bodies and the process of preparing them.

175 Multi-enzyme system:

This subclass is indented under subclass 174. Subject matter wherein two or more functionally different enzymes are immobilized on the same support material.

(1) Note. The use of a microorganism as a carrier is excluded herefrom.

(2) Note. Functionally different means possessing differing catalytic activities.

176 Enzyme or microbial cell is immobilized on or in an inorganic carrier:
This subclass is indented under subclass 174. Subject matter wherein the carrier is an inorganic compound or metal alloy.

177 Enzyme or microbial cell is immobilized on or in an organic carrier:
This subclass is indented under subclass 174. Subject matter wherein the support material is an organic compound.

178 Carrier is carbohydrate:
This subclass is indented under subclass 177. Subject Matter wherein the support material is a carbohydrate.

(1) Note. Derivatized starch, derivatized cellulose, and derivatized polysaccharides are carbohydrates within the meaning of this subclass.

179 Carbohydrate is cellulose or derivative thereof:
This subclass is indented under subclass 178. Subject matter wherein the carbohydrate is cellulose or a substituted cellulose.

(1) Note. Examples of substituted cellulose are DEAE cellulose, etc.

180 Carrier is synthetic polymer:
This subclass is indented under subclass 177. Subject matter wherein the support material is a linear or cross-linked polymer which is not naturally occurring.

181 Attached to the carrier via a bridging agent:
This subclass is indented under subclass 180. Subject matter wherein the enzyme or microbial cell is bonded to the polymeric carrier through an intermediate compound which attaches to both the enzyme and the carrier.

(1) Note. The formation of the immobilized enzyme or cell may be in a stagewise manner with a reaction between the carrier and bridging agent being completed before the enzyme is added or in a process in which the carrier, bridging agent, and enzyme are present simultaneously in which case some care should be exercised in distinguishing the process of this subclass from mere entrapment. In general, if three separate entities, i.e., enzyme and two different chemical species are present simultaneously bonding through a bridging agent should be presumed.

(2) Note. A product or process classifiable in this subclass combines a polymeric carrier with a bridging agent to provide functional groups for enzyme attachment. It should be noted that similar functional groups can be provided by formation of a polymeric carrier by copolymerization of monomers one or more of which contain the desired functional group for enzyme attachment and that such would be provided for in subclass 180.

182 Enzyme or microbial cell is entrapped within the carrier (e.g., gel, hollow fibre):
This subclass is indented under subclass 180. Subject matter wherein the enzyme or microbial cell is physically trapped in a reticulated polymer structure.

183 ENZYME (E.G., LIGASES (6.), ETC.); PROENZYMES, COMPOSITIONS THEREOF; PROCESS FOR PREPARING, ACTIVATING, INHIBITING, SEPARATING, OR PURIFYING ENZYMES:
This subclass is indented under the class definition. Enzymes, per se, compositions containing enzymes, processes for synthesizing enzymes, and preparing enzyme compositions, processes for separating enzymes from a source material, or purifying enzymes or processes under the class definition for treating enzymes.

(1) Note. Enzymes, for the purpose of this class, are defined as proteinaceous materials which cause a chemical change in a starting material without being consumed in the reaction with the remaining amount of enzyme generally, after the reaction, the same as originally present.

(2) Note. Processes wherein a microorganism is propagated and an enzyme recovered therefrom or processes wherein a microorganism is cultivated in the presence of a compound or composition

which induces or stimulates enzyme formation are included in this subclass.

(3) Note. The chemical changes catalyzed by an enzyme include oxidation-reduction, transfer of methyl or phosphate groups from one molecule to the next, hydrolysis, nonhydrolytic bond cleavage, isomerization, bond formation in the presence of a nucleotide, etc.

(4) Note. Enzymes conjugates, i.e., enzymes which are labeled with relatively small organic molecules compared to the enzyme, are included in this subclass.

(5) Note. Processes for treating enzymes include but are not limited to processes for inactivating an enzyme, processes for enhancing enzyme activity, processes for forming granular or free-flowing enzyme compositions.

(6) Note. Proenzymes or precursors of enzymes are classified with the related enzyme.

(7) Note. The bracketed numerals following the titles in this and the indented subclasses refer to the nomenclature system recommended by the Commission on Bio-chemical Nomenclature on the Nomenclature and Classification of Enzymes. The titles include the enzymes defined by the bracketed numerals but are not limited to the enzymes so classified.

SEE OR SEARCH CLASS:

424, Drug, Bio-Affecting and Body Treating Compositions, subclass 94.5 for medicinal compositions containing a ligase.

507, Earth Boring, Well Treating, and Oil Field Chemistry, subclass 101 for a composition which contains an enzyme and which is specific to earth boring and subclass 201 for a composition which contains an enzyme and which is specific to well treating.

930, Peptide or Protein Sequence, subclass 240 for enzyme or protein sequence..

184 This subclass is indented under subclass 183. Enzyme inactivation by chemical treatment: Processes wherein the enzyme is contacted with an element or chemical compound to reduce its catalytic activity.

(1) Note. Processes such as the treatment of an enzyme containing a sulfhydryl group in the active site with mercuric salts, etc., are included herein.

(2) Note. Selective inactivation by chemical treatment to obtain a greater proportion of certain enzymes is found in this subclass.

185 Malt:
This subclass is indented under subclass 183. Subject matter wherein the enzyme containing composition is green, partially dried, dried, kilned malt, or malt extract.

(1) Note. This subclass is intended to provided for documents which germinate grain to produce a mixture containing enzymes, i.e., malt rather than the use of grain as a substrate for microorganism growth, e.g., ergot on rye grain, etc. If the crude mixture is subjected to further refinement to obtain a specific enzyme, placement should be on the basis of the enzyme obtained.

SEE OR SEARCH CLASS:

127, Sugar, Starch, and Carbohydrates, for processes of hydrolysis of carbohydrates which include the action of diastase only when the hydrolysis is followed by steps of concentration, purification, or treatment, such as crystallization to make a sugar or syrup.

186 Pancreatin:
This subclass is indented under subclass 183. Subject matter wherein the product contains a mixture of amylopsin, trypsin and steapsin (lipase) obtained from a pancreas.

187 Preparing granular- or free-flowing enzyme composition:
This subclass is indented under subclass 183. Subject matter wherein an enzyme is treated to produce a solid flowable product or to produce a product in the form of small discrete particles.

188 Stabilizing an enzyme by forming a mixture, an adduct, or a composition, or formation of an adduct or enzyme conjugate:
This subclass is indented under subclass 183. Subject matter wherein (a) the enzyme is contacted with an extraneous material to impart to the enzyme a resistance to loss of activity, or (b) the enzyme is reacted with a nonenzymatic material to form a complex or a chemically modified enzymatic compound, e.g., conjugate, ligand, etc.

(1) Note. An enzyme conjugate, enzyme ligand, enzyme adduct for the purpose of this subclass are deemed to enhance enzyme stability.

(2) Note. In documents where it is unclear whether an enzyme joined to a chemical moiety is an immobilized enzyme or is an enzyme conjugate or adduct, the following factors should be considered. A. If the document states that the product is an enzyme conjugate, adduct, or ligand bound enzyme, placement is proper in subclass 188. B. If the ratio of non-enzyme moiety to enzyme is in the range of 0.01-100:1 placement would be indicated in subclass 188. A ratio of 1-40 nonenzyme moieties per enzyme indicates placement in subclass 188. C. If the molecular weight of the non-enzyme moiety is less than about 100,000, placement would be indicated in subclass 188. D. If the intended use of the enzyme containing product is a reagent in competitive assay, placement is indicated in subclass 188. If the use of the product is as a catalyst in the preparation of chemical compounds with recoverability (i.e., insolubility) an important consideration, placement as an immobililzed enzyme is indicated in subclasses 174+.

188.5 Catalytic antibody:
This subclass is indented under subclass 183. Subject matter involving an antibody that functions catalytically in a chemical reaction.

(1) Note. Synonym is abzyme, etc.

189 Oxidoreductase (1.) (e.g., luciferase):
This subclass is indented under subclass 183. Subject matter wherein the enzyme catalyzes an oxidation-reduction reaction between a donor and aceptor, e.g., $AH_2+B=A+BH_2$, etc.

(1) Note. An oxidation-reduction reaction for the purposes of this classification involves the transfer of oxygen, hydrogen, or electrons from a donor to an acceptor.

(2) Note. A water molecule is not considered to be an acceptor or a donor.

(3) Note. Oxidoreductases which catalyze a reaction between a donor and acceptor are different portions of the same molecule, i.e., an intramolecular oxidoreductase, are considered to be isomerases and are excluded herefrom.

SEE OR SEARCH THIS CLASS, SUBCLASS:
233+, for isomerases which are oxidoreductases which catalyze a reaction between a donor and acceptor on the same molecule.

SEE OR SEARCH CLASS:
424, Drug, Bio-Affecting and Body Treating Compositions, subclass 94.4 for medicinal compositions containing oxidoreductases.

190 Acting on CHOH group as donor; e.g., glucose oxidase, lactate dehydrogenase (1.1):
This subclass is indented under subclass 189. Subject matter wherein the donor is a compound containing a hydroxyl group, i.e., -C-OH.

191 Acting on nitrogen-containing compound as donor (1.2, 1.5, 1.7):
This subclass is indented under subclass 189. Subject matter wherein the donor is a nitrogen compound.

192 Acting on hydrogen peroxide as acceptor (1.11):
This subclass is indented under subclass 189. Subject matter wherein the acceptor is hydrogen peroxide.

193 Transferase other than ribonuclease (2.):
This subclass is indented under subclass 183. Subject matter wherein the enzyme catalyzes the transfer of a functional group from one molecule to another, e.g., AR + BBR + A, etc.

(1) Note. Elements, e.g., hydrogen, oxygen, etc., electrons, or water, per se, are not considered for the purposes of this subclass to be a functional group.

(2) Note. Functional groups include but are not limited to methyl, hydroxyl methyl, formyl, carboxyl, carbamoyl, amidino, acyl, amino acyl, hexosyl, pentosyl, glycosyl, amino, oximino, phosphate, sulfur, sulpho, etc.

(3) Note. Transaminases, transacetylases, and kinases that transfer phosphate from a nucleoside dior triphosphate to an acceptor are examples of transferases.

(4) Note. Ribonuclease is excluded herefrom.

(5) Note. A transferase which catalyzes the cleavage of a functional group from one part of a molecule and its transfer to another part of the same molecule, i.e., an intramolecular transferase, is considered an isomerase and is excluded herefrom.

SEE OR SEARCH THIS CLASS, SUBCLASS:
199, for ribonucleases.
233, for transferases which catalyze the cleavage of a functional group from one part of a molecule and the transfer to another part of the same molecule.

SEE OR SEARCH CLASS:
424, Drug, Bio-Affecting and Body Treating Compositions, subclass 94.5 for medicinal compositions containing transferases.

194 Transferring phosphorus containing group; e.g., kineases, etc., (2.7):
This subclass is indented under subclass 193. Subject matter wherein the functional group transferred contains phosophorus.

195 Hydrolase (3.):
This subclass is indented under subclass 183. Subject matter wherein the enzyme catalyzes the followingreaction; AB + H_2O AOH + BH.

(1) Note. The compounds hydrolyzed are usually carboxylic esters, thiolesters, phosphoric esters, sulfuric esters, glycosides, ethers, peptides, amides, amidines, nitriles, acid anhydrides, organis halides, etc.

(2) Note. Peptidases, esterases, glycosidases, and phosphatases are examples of hydrolases.

SEE OR SEARCH CLASS:
424, Drug, Bio-Affecting and Body Treating Compositions, subclass for medicinal compositions containing a hydrolase.

196 Acting on ester bond (3.1):
This subclass is indented under subclass 195. Subject matter wherein the enzyme catalyzes the hydrolysis of an ester bond.

197 Carboxylic ester hydrolase (3.1.1):
This subclass is indented under subclass 196. Subject matter wherein the ester bond which is hydrolyzed was formed by a carboxylic acid and an alcohol, i.e., OR.

198 Triglyceride splitting; e.g., lipase, etc. (3.1.1.3):
This subclass is indented under subclass 197. Subject matter wherein the enzyme catalyzes the hydrolysis of the ester bond in triglyceride fats.

199 Ribonuclease (3.1.4):
This subclass is indented under subclass 196. Subject matter wherein the enzymes are phosphoric diester hydrolases that act on nucleotides and nucleic acids.

200 Acting on glycosyl compound (3.2):
This subclass is indented under subclass 195. Subject matter wherein the enzyme catalyzes the hydrolysis of O-glycosyl bonds or N-glycosyl bonds or S-glycosyl bonds.

(1) Note. Enzymes which hydrolyze mucin are classifiable in this subclass.

201 Acting on alpha-1, 4-glucosidic bond; e.g., hyaluronidase, invertase, amylase, etc., (some 3.2.1):
This subclass is indented under subclass 200. Subject matter wherein the enzyme catalyzes the hydrolysis of an alpha-1, 4-glucosidic bond.

(1) Note. Amylase from Bacillus macerans characterized by its ability to degrade starch in part to crystalline nonreducing substances known as Schardinger dextrins is included in this subclass.

(2) Note. In the absence of a clear showing to the contrary the recitation of "amylase" is presumed to mean alpha-amylase.

202 Alpha-amylase, microbial source:
This subclass is indented under subclass 201. Subject matter wherein the source of alpha-1, 4-glucano-4-glucanohydrolase obtained is a microorganism.

(1) Note. In the absence of a clear showing to the contrary, a recitation of "amylase" is presumptively alpha-amylase.

203 Fungal source:
This subclass is indented under subclass 202. Subject matter wherein the source of alpha-1, 4-glucan-4- glucanohydrolase is a fungi.

(1) Note. Takediastase, koji, and taka-koji are classifiable in this subclass.

204 Alpha-amylase, plant source (3.2.1.1):
This subclass is indented under subclass 201. Subject matter wherein the source of alpha-1, 4-glucan-4- glucanohydrolase is a nonmicrobial plant.

(1) Note. An alpha-1, 4-glucan-4- glucohydrolace is an enzyme that catalyzes in a random fashion the hydrolysis of the alpha-1, 4-glucan bonds in carbohyrates that contain three or more alpha-1, 4-linked-D- glucose units and does not hydrolyze alpha-1, 6-bonds connecting D-glucose units.

(2) Note. In the absence of a clear showing to the contrary, a recitation of amylase is presumptively alpha-amylase.

SEE OR SEARCH THIS CLASS, SUBCLASS:
205, for hydrolases capable of hydrolyzing both alpha-1,4 and and alpha-1,6 glucan bonds.

205 Glucomylase (3.2.1.3):
This subclass is indented under subclass 201. Subject matter wherein the enzyme obtained is an alpha-1, 4-glucanglucohydrolase.

(1) Note. Alpha-1, 4-glucanglucohydrolase for the purpose of this subclass is defined as an enzyme which hydrolyzes alpha-1,4-glucan bonds and alpha-1,6-glucan bonds in carbohydrates removing successive glucose units from the ends of carbohydrate chains.

206 Acting on beta-1, 4 link between N-acetylmuramic acid and 2-acetylamino 2-deoxy-D-glucose (e.g., lysozyme, etc.):
This subclass is indented under subclass 200. Subject matter wherein the enzyme hydrolyzes a beta-1,4 glycoside bond between N-acetylmuramic acid and 2-acetyl amino 2-deoxy-D-glucose moieties.

(1) Note. The hydrolysis of this subclass is usually of a mucopolysaccharide, mucopolypeptide, or chitin.

(2) Note. Lysozyme is an example of an enzyme appropriate for this subclass.

(3) Note. Cell lytic, bacteriolytic, lytic enzymes are presumptively included in this subclass unless the document indicates that the lysis (hydrolysis) is not of the bond specified.

207 Acting on beta-galatose-glycoside bond (e.g., beta-galactosidase, etc.):
This subclass is indented under subclass 200. Subject matter wherein the enzyme catalyzes the hydrolysis of beta-galactose-glycoside bonds.

208 Acting on alpha-galatose-glycoside bond (e.g., alpha-galactosidase, etc.):
This subclass is indented under subclass 200. Subject matter wherein the enzyme catalyzes the hydrolysis of alpha-galactose-glycoside bonds.

209 Acting on beta-1,4-glucosidic bond (e.g., cellulase, etc.(3.2.1.4)):
This subclass is indented under subclass 200. Subject matter wherein the enzyme catalyzes the hydrolysis of beta-1, 4-glucan bonds in polysaccharides.

210 Acting on alpha-1,6-glucosidic bond (e.g., isoamylase, pullulanase, etc.):
This subclass is indented under subclass 200. Subject matter wherein the enzyme catalyzes the hydrolysis of an alpha-1,6-glucosidic bonds of a polysaccharide.

(1) Note. Dextranase and isoamylase are examples of enzymes appropriate for this subclass.

211 Dextranase (3.2.1.11):
This subclass is indented under subclass 210. Subject matter wherein the enzyme is alpha-1,6-glucan-6-glucanohydrolase.

(1) Note. Alpha-1,6-glucan-6- glucanohydrolase is defined as an enzyme which hydrolizes dextran to oligosaccharides of various lengths and upon complete hydrolysis of dextran yields isomaltose and trace amounts of glucose.

212 Acting on peptide bond (e.g., thromboplastin, leucine amino-peptidase, etc. (3.4)):
This subclass is indented under subclass 195. Subject matter wherein the enzyme catalyzes the hydrolysis of amide bonds in proteins or peptides.

(1) Note. Exopeptidases (peptidases which hydrolyze single amino acids from the terminus of peptide chains) and enzymes having both exo- and endo-peptidase-activities are examples of enzymes for this subclass.

(2) Note. Where the peptide hydrolase activity is unclear or undisclosed and not ascertainable the activity is presumptively that of an endopeptidase.

SEE OR SEARCH THIS CLASS, SUBCLASS:
227, for enzymes which hydrolyze the amide bond in compounds other than proteins or peptides.

SEE OR SEARCH CLASS:
424, Drug, Bio-Affecting and Body Treating Compositions, subclass for medicinal compositions containing a hydrolase.

213 Trypsin; chymotrypsin:
This subclass is indented under subclass 212. Subject matter wherein the enzyme catalyse the hydrolysis of the amide bond connecting the carboxyl group of alpha-arginine and alpha-lysine or an aromatic alpha-amino acid with another amino acid or peptide.

214 Thrombin:
This subclass is indented under subclass 212. Subject matter wherein the enzyme catalyzes the hydrolysis of fibrinogen to fibrin.

215 Urokinase:
This subclass is indented under subclass 212. Subject matter wherein the source of the enzyme which converts plasminogen to plasmin is mammalian blood or urine.

216 Streptokinase:
This subclass is indented under subclass 212. Subject matter wherein the source of the enzyme which catalyzes the hydrolysis of amide bonds and converts plasminogen to plasmin in hemolytic streptococci.

217 Plasmin (i.e., fibrinolysin):
This subclass is indented under subclass 212. Subject matter wherein the enzyme catalyzes the hydrolysis of amide bonds which connect alpha-arginine or alpha-lysine to another amino acid or peptide and converts fibrin to water soluble products.

218 Elastase:
This subclass is indented under subclass 212. Subject matter wherein the enzyme catalyzes the hydrolysis of amide bonds connecting a neutral amino acid to another amino acid or peptide.

219 Proteinase:
This subclass is indented under subclass 212. Subject matter wherein the enzyme catalyzes the hydrolysis of amide bonds within a polypeptide chain, i.e., the amide bonds of non-terminal amino acids.

(1) Note. Endopeptidases are examples of enzymes for this subclass, e.g., ficin, bromelin, etc.

(2) Note. Where the peptide hydrolase activity is unclear (e.g., if it can not be determined whether exopeptidase oendopeptidase activity is involved), enzyme activity within the means of this subclass is presumed.

(3) Note. Exopeptidase and enzymes having both exo- and endo-peptidase activity are to be found in subclass 212.

220 Derived from bacteria:
This subclass is indented under subclass 219. Subject matter wherein the source of the enzyme is a bacteria.

221 Bacteria is bacillus:
This subclass is indented under subclass 220. Subject matter wherein the bacteria is a species of bacillus.

222 Bacillus subtilus or bacillus lichenoformis:
This subclass is indented under subclass 221. Subject matter wherein the species of bacillus is Bacillus subtilus or Bacillus lichenofomis.

223 Derived from fungi:
This subclass is indented under subclass 219. Subject matter wherein the source of the enzyme is fungi.

224 From yeast:
This subclass is indented under subclass 223. Subject matter wherein the source of the enzyme is yeast.

225 From aspergillus:
This subclass is indented under subclass 223. Subject matter wherein the fungi is a species of aspergillus.

226 Derived from animal tissue (e.g., rennin, etc.):
This subclass is indented under subclass 219. Subject matter wherein the source of the enzyme is animal tissue, glands, etc.

227 Acting on carbon to nitrogen bond other than peptide bond (3.5):
This subclass is indented under subclass 195. Subject matter wherein the enzyme catalyzes the hydrolysis of a carbon-nitrogen bond.

228 Acting on a linear amide linkage in linear amide:
This subclass is indented under subclass 227. Subject matter wherein the enzyme catalyzes the hydrolysis of a linear amide bond which is not part of a cyclic ring.

(1) Note. Acylases, such as cephalosporin amidase, which can also act as deacylases by hydrolysis of a linear amide bond are included in this subclass.

229 Asparaginase:
This subclass is indented under subclass 228. Subject matter wherein the enzyme catalyzes the hydrolysis of alpha-asparagine forming alpha-aspartate and ammonia.

230 Penicillin amidase:
This subclass is indented under subclass 228. Subject matter wherein the enzyme catalyzes the hydrolysis of pencillin forming a carboxylic acid anion and penicin.

(1) Note. Penicillin amidase (acylase) also acts in the reverse direction producing penicillins from 6-aminopenicillanic acid and a appropriate side chain.

SEE OR SEARCH THIS CLASS, SUBCLASS:
228, for acylases and amidases which attack the 7-position in cephalosporins.

231 Acting on amide linkage in cyclic amides (e.g., penicillinase, etc. (3.5.2)):
This subclass is indented under subclass 227. Subject matter wherein the enzyme catalyzes the hydrolysis of an amide bond which is part of a ring structure.

232 Lyase (4.):
This subclass is indented under subclass 183. Subject matter wherein the enzyme catalyzes the nonhydrolytic cleavage of bonds, e.g., AB A + B, etc.

(1) Note. Decarboxylases, aldolases, deaminases are examples of subject matter included in this subclass.

SEE OR SEARCH CLASS:
424, Drug, Bio-Affecting and Body Treating Compositions, subclass 94.5 for medicinal compositions containing lyases.

233 Isomerase (5.):
This subclass is indented under subclass 183. Subject matter wherein the enzyme catalyzes an isomerization reaction, e.g., AB BA.

(1) Note. This subclass includes racemases, epimerases, cis-trans isomerases, intramolecular oxide reductases, intrmolecular transferases, etc.

SEE OR SEARCH CLASS:
424, Drug, Bio-Affecting and Body Treating Compositions, subclass 94.5 for medicinal compositions containing an isomerase.

234 Glucose isomerase:
This subclass is indented under subclass 233. Subject matter wherein the enzyme catalyzes the conversion of xylose to xylulose or glucose to fructose or glucose -6- phosphate to fructose -6- phosphate.

235.1 VIRUS OR BACTERIOPHAGE, EXCEPT FOR VIRAL VECTOR OR BACTERIOPHAGE VECTOR; COMPOSITION THEREOF; PREPARATION OR PURIFICATION THEREOF; PRODUCTION OF VIRAL SUBUNITS; MEDIA FOR PROPAGATING:
This subclass is indented under the class definition. Subject matter excluding viral and bacteria-phage vectors, but including a virus or bacteriophage which is a microorganism that (a) consists of a protein shell around a nucleic acid core of either ribonucleic acid or deoxyribonucleic acid, and (b) is capable of independently entering a host microorganism, and (c) requires a host microorganism, having both ribonucleic acid and deoxyribonucleic acid, to replicate, compositions thereof under the class definition not elsewhere provided for, processes of preparation or propagation, media for propagating, processes of purifying the microorganism and processes of producing viral subunits.

(1) Note. Propagation is limited to processes concerned with the multiplication of viruses and not with processes concerned with the artificial alteration of genetic material involving changes in the genotype of the virus. Such processes of artificial alteration of genetic material are intended for this class, subclasses 440+.

(2) Note. This subclass provides for processes involving viruses of all types, i.e., animal, plant, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

1, for process of maintaining tissue in a viable state or media therefor.

2, for process of maintaining blood or sperm in a physiologically active state.

284+, for tissue or virus culture apparatus.

320.1, for vector, e.g., viral, phage, etc., where vector is intended to encompass a virus or phage which is used in the transformation or transfection of a cell. Transformation is the acquisition of new genetic material by incorporation of exogenous DNA and transfection is the transfer of genetic information to a cell using isolated DNA or RNA.

325+, for animal cells, per se, and culture processes therefore.

440+, for processes in which the genetic material of a microorganism is altered.

SEE OR SEARCH CLASS:

424, Drug, Bio-Affecting and Body Treating Compositions, subclasses 159.1+ for a process involving the step of immunizing an animal with a virus to produce a protective antiserum, followed by the step of obtaining the protective antiserum from the animal. See subclasses 199.1, 201.1, 202.1, and 204.1+ for an immunogenic composition that contains a virus, which composition induces protective immunity. Where there is doubt as to whether or not virus propagation takes place in preparing a vaccine, the process should be classified in Class 424 in the subclass providing for the corresponding viral vaccine. The mere use of the word vaccine is insufficient basis for placement in Class 424. See subclass 93.6, for compositions under the class definition containing a whole live virus.

930, Peptide or Protein Sequence, subclasses 220 through 224 for sequence of peptides or protein homologous to a virus.

236 Inactivation or attenuation; producing viral subunits:

This subclass is indented under subclass 235.1. Subject matter in which the virulence of the virus is decreased or the virus is reduced to its component parts.

(1) Note. This subclass includes methods of attenuation by physical means, e.g., freezing, etc.

(2) Note. Viral subunits include the virus protein coat, viral nucleic acid and viral enzymes.

SEE OR SEARCH CLASS:

424, Drug, Bio-Affecting and Body Treating Compositions, subclasses 204.1+ for immunologic compositions prepared by the irradiation of a virus.

237 By serial passage of virus:

This subclass is indented under subclass 236. Subject matter which involves attenuation of a virus by serial passage by transferring a virus containing body fluid through a series of animals or transfer of supernatant culture fluid through a series of cultures.

238 By chemical treatment:

This subclass is indented under subclass 236. Subject matter which involves attenuation of a virus by chemical means.

239 Recovery or purification:

This subclass is indented under subclass 235.1. Subject matter which involves the purification or recovery of a virus in a purified or uncontaminated state.

242 SPORE FORMING OR ISOLATING PROCESS:

This subclass is indented under the class definition. Processes of inducing the formation of spores or their recovery.

243 MICROORGANISM, PER SE; E.G., PROTOZOA, ETC., COMPOSITIONS THEREOF; PROCESS OF PROPAGATING, MAINTAINING, OR PRESERVING MICROORGANISMS OR COMPOSITIONS THEREOF; PROCESS OF PREPARING OR ISOLATING A

COMPOSITION CONTAINING A MICROORGANISM; CULTURE MEDIA THEREFOR:

This subclass is indented under the class definition. Subject matter including microorganisms, compositions containing, processes under the class definition for propagating, processes under the class definition for preserving or maintaining, processes under the class definition for isolating, processes under the class definition for preparing compositions containing and, compositions under the class definition for use in propagation of microorganisms.

(1) Note. microorganisms for the purpose of this subclass include actinomycetales, unicellular algae, bacteria, fungi (yeast and molds), and protozoa. virus propagation is provided for in subclass 235 and animal or plant cell cultivation in subclasses 410+.

(2) Note. The mere propagation of a microorganism to produce a recoverable chemical product is excluded herefrom.

(2) Note. Subcellular parts of a microorganism are not appropriate for this and the indented subclasses.

SEE OR SEARCH THIS CLASS, SUBCLASS:

29+, for measuring or testing processes which involve viable microorganisms and the use of selective media to identify a particular microorganism.

41+, for propagation processes which produce a recoverable chemical product.

42, for the symbiotic propagation of genetically dissimilar microorganisms to produce a product.

173.1+, for the use of magnetic or wave energy to enhance mictrobial growth or product production.

283.1+, for apparatus used in the cultivation, propagation, or innoculation of microorganisms.

317.1, for subcellular parts of microorganisms such as organelles.

320.1, for vector, e.g., plasmid, cosmid, etc.

SEE OR SEARCH CLASS:

71, Chemistry: Fertilizers, appropriate subclasses and in particularly subclasses 6+ for a fertilizer containing a microorganism.

424, Drug, Bio-Affecting and Body Treating Compositions, appropriate subclasses for a composition of that class and in particular, subclasses 93.1+ which may contain a microorganism.

426, Food or Edible Material: Processes, Compositions, and Products, appropriate subclasses for a product containing a microorganism and in particularly subclasses 7+, 61+, 531+, 656, and 800+.

504, Plant Protecting and Regulating Compositions, subclass 117 for a plant regulator composition containing a microorganism.

507, Earth Boring, Well Treating, and Oil Field Chemistry, subclass 101 for a composition which contains a living microorganism and which is specific to earth boring and subclass 201 for a composition which contains a living microorganism and which is specific to well treating.

244 Chemical stimulation of growth or activity by addition of chemical compound which is not an essential growth factor; stimulation of growth by removal of a chemical compound:

This subclass is indented under subclass 243. Subject matter wherein the growth rate of a microorganism or its metabolic activity is stimulated or enhanced by the addition or removal of a particular element or compound which is not required for the microorganism's growth or the control of the pH of the propagation media.

SEE OR SEARCH THIS CLASS, SUBCLASS:

41+, for processes in which the synthesis of compounds is enhanced by methods including the addition of stimulants, etc., to the culture media.

173, for the use of magnetic or wave energy to alter microbial growth or activity.

245 Adaptation or attenuation of cells:
This subclass is indented under subclass 243. Processes wherein the virulence of a microorganism is reduced or a microorganism's ability to propagate on a given substrate is increased or growth requirements are altered by a series of sequential cultivation steps.

(1) Note. The dividing line between adaptation and mutation is that an adapted microorganism will not retain its ability to flourish in a hostile media when cultured in a normal growth media and returned to the hostile media.

SEE OR SEARCH THIS CLASS, SUBCLASS:
172, for mutation and genetic engineering.

246 Foam culture:
This subclass is indented under subclass 243. Subject matter wherein media of the process is in the form of a foam.

SEE OR SEARCH CLASS:
516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 10+ for foam colloid systems or agents for such systems or making or stabilizing such systems or agents; subclasses 115+ for compositions for or subcombination compositions for or breaking of or inhibiting of foam colloid systems; in each instance, when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art.

247 Utilizing media containing lower alkanols (i.e., having one to six carbon atoms):
This subclass is indented under subclass 243. Subject matter wherein a microorganism is propagated on a media containing an alkanol having six or less carbon atoms or the media, per se.

248 Utilizing media containing hydrocarbon:
This subclass is indented under subclass 243. Subject matter wherein the microorganism is propagated on a media containing a hydrocarbon or the media, per se.

SEE OR SEARCH THIS CLASS, SUBCLASS:
281, for processes of growing microorganisms on petroleum oil containing media.
282, for processes in which microorganisms are grown in a petroleum oil to remove sulfur.

SEE OR SEARCH CLASS:
426, Foods or Edible Material: Processes, Compositions, and Products, subclass 62 for growing yeast on a hydrocarbon feed-stock which is claimed as edible yeast.

249 Aliphatic:
This subclass is indented under subclass 248. Subject matter wherein the hydrocarbon is aliphatic.

250 Having five or less carbon atoms:
This subclass is indented under subclass 249. Subject matter wherein the aliphatic hydrocarbon contains five or less carbon atoms.

251 Utilizing media containing waste sulphite liquor:
This subclass is indented under subclass 243. Subject matter wherein the media contains waste liquid from the sulfurous acid treatment of cellulose containing material, e.g., paper pulp, etc.

252 Utilizing media containing cellulose or hydrolysates thereof:
This subclass is indented under subclass 243. Subject matter wherein the microorganism is propagated on a media which contains cellulose or cellulose hydrolysates or the media, per se.

(1) Note. Media containing only glucose prepared by the hydrolysis of cellulose are excluded herefrom.

SEE OR SEARCH THIS CLASS, SUBCLASS:
252.1+, 254+ and 257, for a media for bacteria or yeast, or fungi, or protozoa or unicellular algae which contains glucose.

252.1 Bacteria or actinomycetales; media therefor:
This subclass is indented under subclass 243. Subject matter including microorganisms which are bacteria or actinomycetales, media for the propagation or maintenance of bacteria or actinomycetales, compositions containing, processes for propagating or maintaining, and processes for preparing media for and compositions containing bacteria or actinomycetales.

SEE OR SEARCH CLASS:
930, Peptide or Protein Sequence, subclasses 220 through 224 for sequence of peptides or protein homologous to a virus.

252.2 Rhizobium or agrobacterium:
This subclass is indented under subclass 252.1. Subject matter wherein the microorganisms is a species of Rhizobium or Agrobacterium.

(1) Note. These microorganisms may be wild-type, mutated, transformed, etc.

252.3 Transformants (e.g., recombinant DNA or vector or foreign or exogenous gene containing, fused bacteria, etc.):
This subclass is indented under subclass 252.1. Subject matter wherein the genotype of the microorganism is a product of recombination or transformation with a vector or foreign or exogenous gene, or the result of bacterial cell fusion, etc.

(1) Note. Products of bacterial conjugation and natural or spontaneous recombination events are not included in this subclass. See subclasses 252.1 and 252.4+ which contain nontransformant bacteria, for such products.

SEE OR SEARCH THIS CLASS, SUBCLASS:
41+, for methods of using a transformant to produce a desired compound.
440+, 471+, for processes of producing the microorganisms of subclass 252.3.

252.31 Bacillus (e.g., B. subtilis, B. thuringiensis, etc.):
This subclass is indented under subclass 252.3. Subject matter wherein the altered microorganism is a species of Bacillus.

252.32 Brevibacterium or corynebacterium:
This subclass is indented under subclass 252.3. Subject matter wherein the altered microorganism is a species of Brevibacterium or Corynebacterium.

252.33 Escherichia (e.g., E. coli, etc.):
This subclass is indented under subclass 252.3. Subject matter wherein the altered microorganism is a species of Escherichia.

252.34 Pseudomonas:
This subclass is indented under subclass 252.3. Subject matter wherein the altered microorganism is a species of Pseudomonas.

252.35 Streptomyces:
This subclass is indented under subclass 252.3. Subject matter wherein the altered microorganism is a species of streptomyces.

252.4 Mixed culture:
This subclass is indented under subclass 252.1. Subject matter wherein the bacteria are in a mixed culture of at least two different genera of microorganisms one of which is a bacteria.

SEE OR SEARCH CLASS:
71, Chemistry: Fertilizers, subclass 6 for fertilizer compositions containing microorganisms.
426, Food or Edible Material: Processes, Compositions, and Products appropriate subclasses, for mixed cultures solely disclosed or claimed as edible or to be used in the preparation of an edible material.

252.5 Bacillus (e.g., B. subtilis, B. thuringiensis, etc.):
This subclass is indented under subclass 252.1. Subject matter wherein the microorganism is a species of Bacillus.

252.6 Actinoplanes:
This subclass is indented under subclass 252.1. Subject matter wherein the microorganism is a species of Actinoplanes.

252.7 Clostridium:
This subclass is indented under subclass 252.1. Subject matter wherein the microorganism is a species of Clostridium.

252.8 Escherichia (e.g., E. coli, etc.) or salmonella:
This subclass is indented under subclass 252.1. Subject matter wherein the microorganism is a species of Escherichia or Salmonella.

252.9 Lactobacillus, pediococcus, or leuconostoc:
This subclass is indented under subclass 252.1. Subject matter wherein the microorganism is a species of Lactobacillus, Pediococcus, or Leuconostoc.

253.1 Mycobacterium:
This subclass is indented under subclass 252.1. Subject matter wherein the microorganism is a species of Mycobacterium.

253.2 Nocardia:
This subclass is indented under subclass 252.1. Subject matter wherein the microorganism is a species of Nocardia.

253.3 Pseudomonas:
This subclass is indented under subclass 252.1. Subject matter wherein the microorganism is a species of Pseudomonas.

253.4 Streptococcus:
This subclass is indented under subclass 252.1. Subject matter wherein the microorganism is a species of streptococcus.

253.5 Streptomyces:
This subclass is indented under subclass 252.1. Subject matter wherein the microorganisms is a species of Streptomyces.

253.6 Culture media, per se:
This subclass is indented under subclass 252.1. Subject matter directed to a composition having utility as a bacterial culture medium (i.e., media for maintenance, growth, production, etc.).

254.1 Fungi:
This subclass is indented under subclass 243. Subject matter including microorganisms which are fungi, compositions containing fungi, processes for propagating or maintaining fungi, and processes for preparing compositions containing fungi.

(1) Note. Fungi includes yeast and molds.

SEE OR SEARCH THIS CLASS, SUBCLASS:
7.31, for measuring and testing processes involving fungi.
171, for processes wherein the product synthesized is prepared by a fungi.
203, for subject matter wherein the source of alpha-1,4-glucan-4-glucanohydrolase is a fungi.
223, for subject matter wherein the source of a proteinase enzyme is a fungi.
804, for subject matter wherein the suitability of a microorganism (e.g., a fungi) to supply palatable protein is disclosed.
911+, for specific fungi cross-reference collections.

SEE OR SEARCH CLASS:
47, Plant Husbandry, subclass 1.1 for the cultivation of multicellular mushrooms, per se.
210, Liquid Purification or Separation, subclasses 601+ for processes of liquid purification using a living organism (e.g., a fungi).
530, Chemistry: Natural Resins or Derivatives; Peptides or Proteins; Lignins or Reaction Products Thereof, subclass 371 and 823 for proteins derived from fungi (e.g., yeast, molds, etc.).

254.11 Transformants:
This subclass is indented under subclass 254.1. Subject matter involving a fungi which is 1) a product of recombination or transformation with (a) a vector, or (b) a foreign or exogenous gene, or 2) a product of homologous recombination if it is directed rather than spontaneous, or 3) a product of fused cell formation.

(1) Note. Fused cells are cells of which the cellular matter of two or more individual

cells is combined producing a single cell which initially contains the genes of all the combined cells.

(2) Note. Excluded from this subclass are products of unidentified or noninduced mutations, and products of natural, spontaneous, or arbitrary recombination events. These are not considered genetically modified for this subclass and therefor will be classified as unmodified fungi (subclasses 254.1, and 255.1 through 256.8).

SEE OR SEARCH THIS CLASS, SUBCLASS:
440+, for processes of mutation or genetic engineering wherein the genetic mate rial of a microorganism (e.g. a fungi) is altered.

254.2 Yeast; media therefor:
This subclass is indented under subclass 254.11. Subject matter wherein the altered fungus is a yeast, and media and processes for preparing media for the propagation, maintenance, or preservation of transformed yeast.

(1) Note. Disposition of yeast patents claimed or disclosed (a) as an edible, (b) as a component in an edible, or (c) as a single source material for producing protein useful in making an edible: (a) Yeast with a claimed or solely disclosed utility as a foodstuff in the form it is produced by a Class 435 process is classifiable in Class 426; (b) Yeast claimed or disclosed as a component of an edible is classifiable in Class 426 if the claim or disclosure is that the yeast is a food supplement and is not medicative (i.e., used to alleviate a disease) in which case placement in Class 424 is proper; (c) Refined or crude yeast protein is not classifiable in Class 426 solely on the basis of a Class 426 utility. Refined yeast protein is classifiable in Class 530. Crude yeast is usually disposed of on the basis of utility.

SEE OR SEARCH THIS CLASS, SUBCLASS:
69.9, for processes wherein the product synthesized is a protein or polypeptide with a yeast derived signal sequence.
224, for subject matter wherein the source of a proteinase enzyme is a yeast.

254.21 Saccharomyces:
This subclass is indented under subclass 254.2. Subject matter wherein the altered yeast is a species of Saccharomyces.

(1) Note. Included herein are bakers, brewers, compressed, and pressed yeast, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:
940+, for specific Saccharomyces cross-reference collections.

254.22 Candida:
This subclass is indented under subclass 254.2. Subject matter wherein the altered yeast is a species of Candida.

SEE OR SEARCH THIS CLASS, SUBCLASS:
921+, for specific Candida cross-reference collections.

254.23 Pichia:
This subclass is indented under subclass 254.2. Subject matter wherein the altered yeast is a species of Pichia.

SEE OR SEARCH THIS CLASS, SUBCLASS:
938, for specific Pichia cross-reference collections.

254.3 Aspergillus:
This subclass is indented under subclass 254.11. Subject matter wherein the altered fungus is a species of Aspergillus.

SEE OR SEARCH THIS CLASS, SUBCLASS:
225, for subject matter wherein the source of a proteinase enzyme is a species of Aspergillus.
913+, for specific Aspergillus cross-reference collections.

254.4 Neurospora:
This subclass is indented under subclass 254.11. Subject matter wherein the altered fungus is a species of Neurospora.

254.5 Penicillium:
This subclass is indented under subclass 254.11. Subject matter wherein the altered fungus is a species of Penicillium.

SEE OR SEARCH THIS CLASS, SUBCLASS:
933+, for specific Penicillium cross-reference collections.

254.6 Trichoderma:
This subclass is indented under subclass 254.11. Subject matter wherein the altered fungus is a species of Trichoderma.

SEE OR SEARCH THIS CLASS, SUBCLASS:
945, for specific Trichoderma cross-reference collections.

254.7 Fusarium:
This subclass is indented under subclass 254.11. Subject matter wherein the altered fungus is a species of Fusarium.

SEE OR SEARCH THIS CLASS, SUBCLASS:
929, for specific Fusarium cross-reference collections.

254.8 Mucor:
This subclass is indented under subclass 254.11. Subject matter wherein the altered fungus is a species of Mucor.

SEE OR SEARCH THIS CLASS, SUBCLASS:
931, for specific Mucor cross-reference collections.

254.9 Rhizopus:
This subclass is indented under subclass 254.11. Subject matter wherein the altered fungus is a species of Rhizopus.

SEE OR SEARCH THIS CLASS, SUBCLASS:
939, for specific Rhizopus cross-reference collections.

255.1 Yeast:
This subclass is indented under subclass 254.1. Subject matter wherein the fungus is a yeast.

(1) Note. Disposition of yeast patents claimed or disclosed (a) as an edible, (b) as a component in an edible, or (c) as a single source material for producing protein useful in making an edible: (a) Yeast with a claimed or solely disclosed utility as a foodstuff in the form it is produced by a Class 435 process is classifiable in Class 426; (b) Yeast claimed or disclosed as a component of an edible is classifiable in Class 426 if the claim or disclosure is that the yeast is a food supplement and is not medicative (i.e., used to alleviate a disease) in which case placement in Class 424 is proper; (c) Refined or crude yeast protein is not classifiable in Class 426 solely on the basis of a Class 426 utility. Refined yeast protein is classifiable in Class 530. Crude yeast is usually disposed of on the basis of utility.

SEE OR SEARCH THIS CLASS, SUBCLASS:
224, for subject matter wherein the source of a proteinase enzyme is a yeast.

255.2 Saccharomyces:
This subclass is indented under subclass 255.1. Subject matter wherein the yeast is a species of Saccharomyces.

(1) Note. Included herein are bakers, brewers, compressed, and pressed yeast, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:
940+, for specific Saccharomyces cross-reference collections.

255.21 Culture media, per se, or technique:
This subclass is indented under subclass 255.2. Subject matter directed to a composition having utility as a Saccharomyces culture medium

(i.e., media for maintenance, growth, production, etc.) or a technique for preparing and using the same.

255.3 Cryptococcus:
This subclass is indented under subclass 255.1. Subject matter wherein the yeast is a species of Cryptococcus.

255.4 Candida or torulopsis:
This subclass is indented under subclass 255.1. Subject matter wherein the yeast is a species of Candida or Torulopsis.

SEE OR SEARCH THIS CLASS, SUBCLASS:
921+, for specific Candida cross-reference collections.
944, for specific Torulopsis cross-reference collections.

255.5 Pichia:
This subclass is indented under subclass 255.1. Subject matter wherein the yeast is a species of Pichia.

SEE OR SEARCH THIS CLASS, SUBCLASS:
938, for specific Pichia cross-reference collections.

255.6 Hansenula:
This subclass is indented under subclass 255.1. Subject matter wherein the yeast is a species of Hansenula.

SEE OR SEARCH THIS CLASS, SUBCLASS:
930, for specific Hansenula cross-reference collections.

255.7 Culture media, per se, or technique:
This subclass is indented under subclass 255.1. Subject matter directed to a composition having utility as a yeast culture medium (i.e., media for maintenance, growth, production, etc.) or a technique for preparing and using the same.

256.1 Aspergillus:
This subclass is indented under subclass 254.1. Subject matter wherein the fungus is a species of Aspergillus.

SEE OR SEARCH THIS CLASS, SUBCLASS:
225, for subject matter wherein the source of a proteinase enzyme is a species of Aspergillus.
913+, for specific Aspergillus cross-reference collections.

256.2 Mucor:
This subclass is indented under subclass 254.1. Subject matter wherein the fungus is a species of Mucor.

SEE OR SEARCH THIS CLASS, SUBCLASS:
931, for specific Mucor cross-reference collections.

256.3 Penicillium:
This subclass is indented under subclass 254.1. Subject matter wherein the fungus is a species of Penicillium.

SEE OR SEARCH THIS CLASS, SUBCLASS:
933+, for specific Penicillium cross-reference collections.

256.4 Cephalosporium or acremonium:
This subclass is indented under subclass 254.1. Subject matter wherein the fungus is a species of Cephalosporium or Acremonium.

SEE OR SEARCH THIS CLASS, SUBCLASS:
925+, for specific Cephalosporium cross-reference collections.

256.5 Fusarium:
This subclass is indented under subclass 254.1. Subject matter wherein the fungus is a species of Fusarium.

SEE OR SEARCH THIS CLASS, SUBCLASS:
929, for specific Fusarium cross-reference collections.

256.6 Rhizopus:
This subclass is indented under subclass 254.1. Subject matter wherein the fungus is a species of Rhizopus.

SEE OR SEARCH THIS CLASS, SUBCLASS:
939, for specific Rhizopus cross-reference collections.

256.7 Trichoderma:
This subclass is indented under subclass 254.1. Subject matter wherein the fungus is a species of Trichoderma.

SEE OR SEARCH THIS CLASS, SUBCLASS:
945, for specific Trichoderma cross-reference collections.

256.8 Culture media, per se, or technique:
This subclass is indented under subclass 254.1. Subject matter directed to a composition having utility as a fungal culture medium (i.e., media for maintenance, growth, production, etc.) or a technique for preparing and using the same.

257.1 Algae, media therefor:
This subclass is indented under subclass 243. Subject matter wherein the microorganism propagated or treated is a unicellular algae, or the media useful for the propagation of unicellular algae, or a composition containing unicellular algae, or methods of preparing said compositions or media.

(1) Note. Edible compositions containing unicellular algae are excluded herefrom.

(2) Note. Multicellular algae are excluded herefrom. Algae are presumed to be multicellular in the absence of a clear showing to the contrary.

(3) Note. Unicellular algae in this subclass include both eukaryotic and prokaryotic algae. Examples of eukaryotes include Chlorophyta (green algae, such as Chlorella, Scenedesmus, etc.), Euglenophyta (Euglena), Rhodophyta (red algae), etc. Examples of prokaryotes include Cyanobacteria (blue-green algae, such as Anacystis, Anabaena, etc.).

(4) Note. microorganisms of the genera Euglena and Chlamydomonas are currently classified in both algal (Bold and Wynne) and protozoan (Levine) taxonomic systems due to their photosynthetic and motility systems. For classification purposes, these genera are placed under algae unless the reference specifically eludes to the "protozoan" nature of the microorganism.

SEE OR SEARCH THIS CLASS, SUBCLASS:
804, for subject matter wherein the suitability of a microorganism (e.g., an algae) to supply palatable protein is disclosed.
946, for specific algae cross-reference collections.

SEE OR SEARCH CLASS:
47, Plant Husbandry, subclass 1.4 for the cultivation of multicellular algae, per se.
210, Liquid Purification or Separation, subclasses 601+ for processes of liquid purification using a living organism (e.g., an algae).
504, Plant Protecting and Regulating Compositions, subclasses 150+ for subject matter involving algicides.
530, Chemistry: Natural Resins or Derivatives; Peptides or Proteins; Lignins or Reaction Products Thereof, subclass 370 for proteins derived from plants (e.g., algae).

257.2 Transformants:
This subclass is indented under subclass 257.1. Subject matter involving an algae which is 1) a product of recombination or transformation with (a) a vector, or (b) a foreign or exogenous gene, or 2) a product of homologous recombination if it is directed rather than spontaneous, or 3) a product of fused cell formation.

(1) Note. Fused cells are cells of which the cellular matter of two or more individual cells is combined producing a singlecell which initially contains the genes of all the combined cells.

(2) Note. Excluded from this subclass are products of unidentified or noninduced mutations, and products of natural, spontaneous, or arbitrary recombination events. These are not considered geneti-

cally modified for this subclass and therefor will be classified as unmodified algae (subclasses 257.1, and 257.3 through 257.6).

SEE OR SEARCH THIS CLASS, SUBCLASS:

440+, for processes of mutation or genetic engineering wherein the genetic mate rial of a microorganism (e.g. an algae) is altered.

257.3 Chlorella:
This subclass is indented under subclass 257.1. Subject matter wherein the algae is a species of Chlorella.

257.4 Euglena:
This subclass is indented under subclass 257.1. Subject matter wherein the algae is a species of Euglena.

(1) Note. microorganisms of the genus Euglena are currently classified in both algal (Bold and Wynne) and protozoan (Levine) taxonomic systems due to their photosynthetic and motility systems. For classification purposes, this genus is placed under algae unless the reference specifically eludes to the "protozoan" nature of the microorganism.

257.5 Scenedesmus:
This subclass is indented under subclass 257.1. Subject matter wherein the algae is a species of Scenedesmus.

257.6 Chlamydomonas:
This subclass is indented under subclass 257.1. Subject matter wherein the algae is a species of Chlamydomonas.

(1) Note. microorganisms of the genus Chlamydomonas are currently classified in both algal (Bold and Wynne) and protozoan (Levine) taxonomic systems due to their photosynthetic and motility systems. For classification purposes, this Genus is placed under algae unless the reference specifically eludes to the "protozoan" nature of the microorganism.

258.1 Protozoa, media therefor:
This subclass is indented under subclass 243. Subject matter wherein the microorganism propagated or treated is a protozoa, or media useful for the propagation of protozoa, or a composition containing protozoa, or methods of preparing said composition or media.

(1) Note. microorganisms of the genera Euglena and Chlamydomonas are currently classified in both algal (Bold and Wynne) and protozoan (Levine) taxonomic systems due to their photosynthetic and motility systems. For classification purposes, these genera are placed under algae unless the reference specifically eludes to the "protozoan" nature of the microorganism.

SEE OR SEARCH THIS CLASS, SUBCLASS:

7.22, for measuring and testing processes involving protozoa.

947, for specific protozoa cross-reference collections.

SEE OR SEARCH CLASS:

530, Chemistry: Natural Resins or Derivatives; Peptides or Proteins; Lignins or Reaction Products Thereof, subclass 822 for proteins derived from protozoa.

258.2 Plasmodium:
This subclass is indented under subclass 258.1. Subject matter wherein the protozoa is a species of Plasmodium.

258.3 Leishmania:
This subclass is indented under subclass 258.1. Subject matter wherein the protozoa is a species of Leishmania.

258.4 Eimeria:
This subclass is indented under subclass 258.1. Subject matter wherein the protozoa is a species of Eimeria.

259 Lysis of microorganism:
This subclass is indented under subclass 243. Processes wherein the microorganism is ruptured by added material or mechanical means.

(1) Note. This subclass does not provide for autolysis which is generally part of the processes included in subclasses 262+.

SEE OR SEARCH CLASS:
241, Solid Material Comminution or Disintegration, particularly subclass 2 for methods of and apparatus for the comminution of microorganisms or tissues.

260 Preserving or maintaining microorganism:
This subclass is indented under subclass 243. Processes wherein a viable microorganism is rendered reversibly dormant.

(1) Note. This subclass includes preparing solvent dried and freeze dried cells.

SEE OR SEARCH THIS CLASS, SUBCLASS:
1, for processes of maintaining differentiated tissue or an organ in a viable state.
2, for processes or media for maintaining blood or sperm in a physiologically active state.

SEE OR SEARCH CLASS:
241, Solid Material Comminution or Disintegration, particularly subclass 2 for methods of and apparatus for the comminution of microorganisms or tissues.

261 Separation of microorganism from culture media:
This subclass is indented under subclass 243. Processes where a microorganism is recovered from culture media.

262 PROCESS OF UTILIZING AN ENZYME OR MICROORGANISM TO DESTROY HAZARDOUS OR TOXIC WASTE, LIBERATE, SEPARATE, OR PURIFY A PREEXISTING COMPOUND OR COMPOSITION THEREFORE; CLEANING OBJECTS OR TEXTILES:
This subclass is indented under the class definition. Processes wherein a preexisting material or compound, which may include a hazardous or toxic waste, present in a composition or material containing a preexisting material, is contacted with an enzyme or immobilized enzyme microorganism or plant or animal cells to isolate or recover the preexisting material which is chemically unchanged by the process and the hazardous or toxic waste is destroyed.

(1) Note. Liberation or purification of a preexisting substance is usually accomplished by breaking down or otherwise physically or chemically altering the substance regarded as a contaminant by means of an enzyme or microorganism.

(2) Note. The amount of the preexisting compound or material is not increased by the microbial or enzymatic treatment.

(3) Note. Resolution of optical isomers or their salts is considered purification or separation of a preexisting compound.

(4) Note. Composition includes oil shale deposits, oil, hides, etc.

(5) Note. The hydrolysis of starch or proteins to liberate glucose or amino acids, respectively, is not included in this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:
68.1, for the hydrolysis of proteins.
94, for the hydrolysis of starch.

SEE OR SEARCH CLASS:
34, Drying and Gas or Vapor Contact With Solids, provides for processes of separating liquids from solids or slurries, i.e., drying as well as the contact of solids with either, or both, gases and vapors. If the starting material is in the form of a liquid suspension or solution even of the process is continued to the point of complete dryness, Class 159, Concentrating Evaporators, will take the process.
62, Refrigeration, includes processes which include removing heat by refrigeration from a substance whether solid, liquid, or vapor. In particular, Class 62, subclasses will take processes of making a solidified or liquefied gaseous product provided the gas has a normal boiling point

below 32° (methane, ethane, propane) and Class 62, subclasses 532+ will take processes wherein a solution or mixture is cooled to solidify a constituent which is then removed from the mixture.

95, Gas Separation: Processes, for physical processes involving steps resulting in separation of a gas from a fluid mixture comprising (a) a gas and solid or liquid particles entrained therein, (b) a liquid and gas entrained therein, or (c) a plurality of gases. The separation is not done by chemical reaction.

127, Sugar, Starch, and Carbohydrates, for processes wholly peculiar to processes of extracting or purifying natural starch, natural sucrose, or other natural carbohydrates except cellulose, processes of hydrolyzing carbohydrates or processes of purifying the products of such hydrolysis. The chemical manufacture or synthesis of sugar or of carbohydrates by any other process than that of hydrolysis is not included in Class 127. Molecular rearrangement of one carbohydrate to form any other carbohydrate is excluded. Such processes are provided for in Class 260.

159, Concentrating Evaporators, provides for processes peculiar to the concentration of solids held in solution or suspension by evaporation of the liquid containing them and the recovery of the concentrate. If the starting material is a solid or slurry placement in Class 34, Drying and Gas or Vapor Contact With Solids, would be indicated. Class 159 will take concentration to the point of crystallization or to dryness, however, removal of water of crystallization is considered to be a chemical reaction and placement would not be proper in Class 159. Evaporating with subsequent vapor condensation is excluded from Class 159 and in such case, placement in Class 203, Distillation: Processes, Separatory, would be proper.

201, Distillation: Processes, Thermolytic, provides for processes of thermolytic distillation wherein a solid carbonaceous material is heated to vaporize a volatile portion and to cause chemical decomposition of the heated material to form different chemical substances at least some of which are volatile and leave behind a solid carbonaceous material.

203, Distillation: Processes, Separatory, provides for processes for separating a liquid mixture by vaporizing and condensing a portion thereof to isolate in the condensed liquid or the unvaporized portion a relatively pure compound which was present in the original mixture. The original mixture may be in a solid form so long as it melts to form a liquid before it vaporizes. A solid original mixture which undergoes chemical decomposition leaving a carbonaceous residue would be classifiable in Class 201, Distillation: Processes, Thermolytic, which is superior to Class 203. Processes including a chemical reaction and a separatory distillation operation are classified in Class 203 only when the chemical reaction merely facilitates the isolation by the separatory distillation operation of a preexisting substance in the distilland. See Class 260, Chemistry of Carbon Compounds, or Class 423, Chemistry of Inorganic Compounds, for a process of preparing a compound and isolating it by a separatory distillation process.

210, Liquid Purification or Separation, includes processes for the separation or purification of a constituent from a flowable liquid mixture by dialysis, sorption, ion exchange, liquid extraction, gravitational separation, or filtration, as well as purification of a liquid mixture by destruction or conversion of a constituent. Processes directed to the purification of a particular compound or composition (including solutions of either the compound or composition in water), are classified with the particular compound or composition. Insofar as the treatment of liquids with ion exchange or sorption materials are concerned, the following lines will be maintained: (1) Where water is the only disclosed liquid puri-

fied, the patent will be classified in this class (210); (2) Where the disclosure includes water, hydrocarbons and/or other liquids the patent will be classified: (a) In Class 210 if all claims are broad as to the liquid; (b) In Class 210 if several species of liquid are claimed and one species includes water; and (c) In the appropriate art class if some liquid other than water is the only liquid claimed (e.g., mineral oils in Class 208, organic compounds in Class 260); (3) Purification or separation of liquids by flocculation only are classified in Class 210; (4) Processes wherein all claims are limited to the deposition of specific materials on ion-exchangers or sorbents with subsequent recovery of the specific materials are classified with materials so operated upon. Class 210 is superior to Class 95 and takes separating processes, per se, generally disclosed or claimed as fluid separation, or if the disclosure or a claim is restricted to liquid separation.

260, Chemistry of Carbon Compounds, provides for the liberation and purification by chemical or physical means of compounds and extracts falling within the class definition of Class 260. Generally, the physical processes included are of two types (a) a purification process prior or subsequent to a chemical reaction producing a Class 260 product, (b) a purification process directed to the purification of a Class 260 compound by a combination of physical separation techniques the classes for which do not provide for or exclude the combination claimed. Chemical purification processes are generally provided for with each product produced.

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 113+ for compositions for or subcombination compositions for or breaking of or inhibiting of colloid systems (e.g., foam breaking, emulsion breaking, dispersion inhibiting, suspension settling, gel breaking, smoke suppressing, coagulating, flocculating), when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art. Nominal recitation of a Class 435 process (e.g., fermentation or fermentation step) combined with a process otherwise classifiable in Class 516 is proper for Class 516, while recitation of a significant Class 435 step combined with a step or composition otherwise classifiable in Class 516 is proper for Class 435 with a discretionary cross-reference to Class 516.

262.5 Destruction of hazardous or toxic waste:
This subclass is indented under subclass 262. Process wherein hazardous or toxic waste is destroyed or converted into an environmentally safe substance.

SEE OR SEARCH CLASS:

423, Chemistry of Inorganic Compounds, subclasses 1 through 209 and Digest 17 for the use of microorganisms in the leaching of ores.

588, Hazardous or Toxic Waste Destruction or Containment, subclasses 250+ for the use of containment in the treatment of hazardous or toxic waste.

263 Textile treating:
This subclass is indented under subclass 262. Processes wherein the preexisting material is an organic fiber material, per se, or the fiber is spun or woven into fabric.

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, for chemical modification and fluid treatment of fibers and textiles, not otherwise provided for; and subclass 138 for non-enzymatic removal of natural sericin or other naturally occurring gum or wax or an artificially applied size or gum from textile fibers.

19, Textiles: Fiber Preparation, for the mechanical treatment of fibers to put them in condition for use.

162, Paper Making and Fiber Liberation, particularly subclass 2 for the freeing of silk from a cocoon.

264 Cleaning using a microorganism or enzyme: Processes under subclasses 262 wherein the preexisting material is a solid macroscopic material not obtained from a natural source and is recovered from an undesired extraneous material originally contained in the macroscopic material's surface.

(1) Note. This subclass includes processes of using a microorganism or enzyme, per se, to remove adherent matter from an object.

SEE OR SEARCH CLASS:

8, Bleaching, and Dyeing; Fluid Treatment and Chemical Modification, for process of cleaning and laundering textile fabrics and fibers, including a fluid or chemical treatment. Includes also combinations and aftertreatments incidental to such operation not elsewhere classifiable.

134, Cleaning and Liquid Contact With Solids, for processes of cleaning textiles and fibers not involving chemical or fluid treatment and including the mechanical cleaning of textiles and fibers and cleaning by a gas blast or suction (which is not considered a fluid treatment for Class 8).

510, Cleaning Compositions for Solid Surfaces, Auxiliary Compositions Therefor, or Processes of Preparing the Compositions, subclasses 108+ for detergent compositions containing enzymes classified according to substrate intended to be cleaned; subclass 530 for compositions which include an enzyme component and are specialized and designed for incorporation with other components of a cleaning composition, the enzymes usually facilitate cleaning by degrading specific types of soil, such as protein, oil, or grease.

265 Depilating hides, bating, or hide treating using enzyme or microorganism: This subclass is indented under subclass 262. Processes wherein the preexisting material treated is a hide or a skin of an animal.

SEE OR SEARCH CLASS:

8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclass 401 for a dyeing process employing fermentation or an enzyme; subclasses 94.1+ for processes of tanning hides or skins by fermentation with subsequent tanning of the hides or skins or subsequent operations that are preliminary and peculiar to making leather. Class 435 provides for a fermentation process, per se, of treating a hide or skin, e.g., depilating, bating, etc.

71, Chemistry: Fertilizers, subclass 18 for compositions of matter including hides, skins, feathers, or animal tissues such as compost.

266 Treating gas, emulsion, or foam: This subclass is indented under subclass 262. Processes wherein the preexisting material is a gas or is initially a component of an emulsion or foam.

SEE OR SEARCH CLASS:

95, Gas Separation: Processes, for physical processes involving steps resulting in separation of a gas from a fluid mixture comprising (a) a gas and solid or liquid particles entrained therein, (b) a liquid and gas entrained therein, or (c) a plurality of gases. The separation is not done by chemical reaction. See particularly subclass 155 for processes of gas separation involving contacting with a liquid that contains a defoaming or antifoaming agent, subclass 157 for processes of gas separation involving liquid contacting and defoaming the liquid, and subclass 242 for defoaming a liquid.

137, Fluid Handling, subclasses 107+ for apparatus for controlling the degree of foaming in a gas charged liquid.

201, Distillation: Processes, Thermolytic, subclass 9 for a process of surface treating the solid particles of the charge to inhibit, reduce, or prevent foaming during distillation.

202, Distillation: Apparatus, subclass 264 for distillation apparatus intended to break foam or inhibit foaming.

203, Distillation: Processes, Separatory, subclass 20 for processes of defoaming or inhibition of the formation of foam combined with distillation.

261, Gas and Liquid Contact Apparatus, appropriate subclasses for gas-liquid scrubbing devices.

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 113+ for compositions for or subcombination compositions for or breaking of or inhibiting of colloid systems (e.g., foam breaking, emulsion breaking, dispersion inhibiting, suspension settling, gel breaking, smoke suppressing, coagulating, flocculating), when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art. Nominal recitation of a Class 435 process (e.g., fermentation or fermentation step) combined with a process otherwise classifiable in Class 516 is proper for Class 516, while recitation of a significant Class 435 step combined with a step or composition otherwise classifiable in Class 516 is proper for Class 435 with a discretionary cross-reference to Class 516.

267 Treating animal or plant material or microorganism:

This subclass is indented under subclass 262. Processes wherein the preexisting material is obtained directly from an animal or plant source or microorganism.

(1) Note. Included herein are processes of isolating a hormone from an organ or a compound from a fruit by means of an enzyme or microorganism.

SEE OR SEARCH THIS CLASS, SUBCLASS:

239, for treatment of animal tissue or organs to recover a virus.

268 Treating organ or animal secretion:

This subclass is indented under subclass 267. Processes wherein the preexisting material is an organ or animal secretion.

(1) Note. Animal secretion includes blood, urine, feces, hormones, etc.

269 Treating blood fraction:

This subclass is indented under subclass 267. Processes wherein the preexisting material is blood or a blood fraction.

(1) Note. A blood fraction is considered to include plasma, red blood cells, white blood cells, nonenzymatic proteins, serum.

SEE OR SEARCH THIS CLASS, SUBCLASS:

2, for processes of treating blood cells in vitro to alter some cellular property while maintaining cell viability.

SEE OR SEARCH CLASS:

424, Drug, Bio-Affecting and Body Treating Compositions, subclass 1.17 for the class defined compositions and methods comprising radiolabeled cells and subcellular structures, including red blood cells and platelets.

270 Removing nucleic acid from intact or disrupted cell:

This subclass is indented under subclass 267. Processes wherein an intact or disrupted cell's nucleic acid content is reduced by the use of an enzyme or microorganism.

SEE OR SEARCH CLASS:

71, Chemistry: Fertilizers, for the production of substances having a nutrient action on plant growth and the product of such processes including methods of utilizing microorganisms to produce a fertilizer, e.g., compositing as well as the microorganism containing fertilizer so produced.

504, Plant Protecting and Regulating Compositions, for the production of substances having a stimulating, inhibiting, or regulating action on plant growth and the product of such processes including methods of utilizing microorganisms to produce a plant growth stimulator, inhibitor, or regulator as well the microorganism con-

taining plant growth regulator so produced.

271 Glyceridic oil, fat, ester-type wax or higher fatty acid recovered or purified:
This subclass is indented under subclass 267. Processes wherein the preexisting material is a fat, ester-type wax, higher fatty acid, or glyceride oil.

(1) Note. Fats and fatty oils are the glycerides of higher fatty acids, including naturally occurring mixtures thereof present in a single oil or fat.

(2) Note. Ester-type waxes are waxes which are essentially esters in chemical structure, e.g., beeswax, montan wax, carnauba wax, and spermaceti.

(3) Note. Higher fatty acid is a monocarboxylic acid containing an unbroken chain of more than seven carbon atoms bonded to a carboxylic group, e.g., lauric, palmitic, stearic, oleic, ricinoleic, linoleic acid, etc. Where there are several unbroken chains of carbon atoms bonded to the carboxyl group, one of the chains must contain a chain of seven or more carbon atoms.

272 Proteinaceous material recovered or purified:
This subclass is indented under subclass 267. Processes wherein the preexisting material is a proteinaceous material.

SEE OR SEARCH THIS CLASS, SUBCLASS:
239, for methods of separating virus and protein contaminants by various methods, e.g., sorption, precipitation, etc.

SEE OR SEARCH CLASS:
8, Bleaching, and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, subclasses 94.1+ for fluid or chemical treatment of hides, skins, feathers, and animal tissues, not otherwise provided for; subclass 127.5 for processes of chemically modifying proteinaceous fibers; and subclass 138 for processes for fluid or chemical treatment of silk for the removal of sericin, or other naturally occurring gum or wax. Processes classifiable in this subclass (2) generally include the production of a fiber pulp from a raw proteinaceous fibrous material (e.g., leather).
134, Cleaning and Liquid Contact With Solids, for processes of chemically removing coatings, such as wax, from a paper base without otherwise affecting the base, where the coating is not recovered.
260, Chemistry of Carbon Compounds, subclass 112 for proteins and their reaction products and, in particular, subclass 123.7 for chemical treatment of natural protein containing material.

273 Collagen or gelatin:
This subclass is indented under subclass 272. Processes wherein the preexisting material is collagen or gelatin.

274 Carbohydrate material recovered or purified:
This subclass is indented under subclass 267. Processes wherein the preexisting material is a carbohydrate.

SEE OR SEARCH CLASS:
127, Sugar, Starch, and Carbohydrates, for the hydrolysis of carbohydrates including their conversion to sugar by means other than a microorganism or enzyme. Class 127 provides for processes using an enzyme or microorganism only where the hydrolysis by microorganism or enzyme is followed by steps of concentration purification or treatment (such as crystallization) to make a sugar or syrup.
260, Chemistry of Carbon Compounds, for the chemical manufacture or synthesis of sugar or carbohydrates by a process other than hydrolysis and the rearrangement of one carbohydrate to form another carbohydrate by means other than a microorganism or enzyme.

275 Pectin or starch:
This subclass is indented under subclass 274. Processes wherein the preexisting material is a pectin or a starch.

276 Sugar (e.g., molasses treatment, etc.):
This subclass is indented under subclass 274. Processes wherein the preexisting material is a monosaccharide or a polysaccharide which has predominately alpha-1, 4 linkages between the glucose units.

277 Cellulose (e.g., plant fibers, etc.):
This subclass is indented under subclass 274. Processes wherein the preexisting material is a polysaccharide which has predominately beta-1, 4 linkages between the glucose units.

SEE OR SEARCH CLASS:
8, Bleaching and Dyeing; Fluid Treatment and Chemical Modification of Textiles and Fibers, for chemical modification and fluid treatment of fibers and textiles, not otherwise provided for.
162, Paper Making and Fiber Liberation, for processes of liberation, recovery or purification of cellulose or animal fibers as individual fibers or fibrous pulp by the use of a reagent which exerts some solvent or chemical action upon fibrous material and the reagent compositions employed in such processes.
260, Chemistry of Carbon Compounds, particularly subclasses 212+ for processes of chemically modifying cellulose in which its fibrous nature is destroyed, e.g., in the production of cellulose esters.

278 Producing paper pulp:
This subclass is indented under subclass 277. Processes wherein the material which is liberated is paper pulp.

SEE OR SEARCH CLASS:
162, Paper Making and Fiber Liberation, for processes of making a paper pulp by chemical action.

279 Hemp or flax treating:
This subclass is indented under subclass 277. Processes wherein the preexisiting material which is liberated is hemp or flax.

SEE OR SEARCH CLASS:
19, Textiles: Fiber Preparation, for the mechanical treatment of fibers to put them in condition for use.

280 Resolution of optical isomers or purification of organic compounds or composition containing same:
This subclass is indented under subclass 262. Processes wherein a racemic mixture is treated to liberate an optically active mixture or compound or a mixture is otherwise purified by a microorganism or enzyme to obtain a specified organic compound.

(1) Note. It should be noted that biological, i.e., microbial or enzymatic reactions are generally steriospecific so that a search, to be complete, should also include a search of the synthesis subclass, i.e., subclasses 41+ of this class which provides for the transformation of the "contaminant" if it is chemically identifiable.

281 Petroleum oil or shale oil treating:
This subclass is indented under subclass 262. Processes wherein the preexisting material which is liberated or purified is petroleum or shale oil.

SEE OR SEARCH THIS CLASS, SUBCLASS:
9, for processes of prospecting for minerals including petroleum oils.

SEE OR SEARCH CLASS:
166, Wells, appropriate subclasses for processes and apparatus for treating oil or an oil bearing mineral with a microorganism or enzyme while in the ground.
196, Mineral Oils: Apparatus, for apparatus for treating, refining, or recovering mineral oils such as petroleum, tar, pitch asphalt, or related products not otherwise provided for.

204, Chemistry: Electrical and Wave Energy, appropriate subclass for apparatus for treating mineral oils involving more than the mere thermal effects of the electrical or wave energy.

208, Mineral Oils: Processes and Products, for processes of treating and preparing mineral oils including their separation from sands, coal, or shales.

210, Liquid Purification or Separation, for processes and apparatus for separating liquids including mineral oils involving no chemical treatment of the mineral oil.

299, Mining or In Situ Disintegration of Hard Material, for a process or apparatus for treating oil or oil bearing minerals while in situ in a tunnel or excavation.

423, Chemistry of Inorganic Compounds, subclass 41 for the recovery of metal containing compounds without the reduction of the compound to pure metal.

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 135+ for compositions for or subcombination compositions for or breaking of or inhibiting of emulsion colloid systems, when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art, including petroleum emulsions where there is no additional treatment of the oil. Nominal recitation of a Class 435 process (e.g., fermentation or fermentation step) combined with a process otherwise classifiable in Class 516 is proper for Class 516, while recitation of a significant Class 435 step combined with a step or composition otherwise classifiable in Class 516 is proper for Class 435 with a discretionary cross-reference to Class 516.

282 Desulfurizing:

This subclass is indented under subclass 281. Processes wherein sulfur or sulfur containing compounds are removed from petroleum or shale oil.

283.1 APPARATUS:

This subclass is indented under the class definition. Apparatus .

(1) Note. Excluded herefrom are kits that are claimed as kits which have no claimed structure, but instead recite the ingredients of the kit. Such subject matter should be considered test media and classified in this class, subclasses 4+.

(2) Note. Class 435 is the residual class for enzyme and microorganism apparatus.

SEE OR SEARCH CLASS:

29, Metal Working, subclasses 400.1+ for methods of assembling the apparatus provided for in this class.

47, Plant Husbandry, particularly subclass 1.1 for processes and apparatus for growing a mushroom or edible fungi (excluding yeast) and subclass 1.4 for processes and apparatus for growing multicellular algae.

53, Package Making, various subclasses for processes of packaging and package making.

71, Chemistry: Fertilizers, particularly subclasses 6+ for processes of using a microorganism or enzyme to produce a fertilizer.

73, Measuring and Testing, subclass 64.41 for apparatus used for testing the ability of blood to clot.

99, Foods and Beverages: Apparatus, subclasses 275+ for apparatus adapted for the preparation of a beverage or beverage intermediate by carrying out primary ethyl alcoholic fermentations, and apparatus for aging, refining, and purifying alcoholic beverages.

128, Surgery, for methods of treatment of the living body and for apparatus used in the inspection and treatment of diseases of the bodies of humans and lower animals which apparatus is provided with means for connection to the living body.

206, Special Receptacle or Package, subclasses 223+ for a test kit of general utility.

215, Bottles and Jars, for bottles and jars of general utility and the closures therefor.

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, for apparatus for chemical analysis and chemical reactors of general utility.

284.1 Differentiated tissue (e.g., organ) perfusion or preservation apparatus:
This subclass is indented under subclass 283.1. Apparatus with means adapted for maintaining a differentiated tissue or animal organ in vitro in a viable state.

SEE OR SEARCH THIS CLASS, SUBCLASS:

1.2, for processes of differentiated tissue or organ other than blood, per se, or differentiated tissue or organ maintaining by perfusion.

297.2, for bioreactors including perfusion means.

307.1, for apparatus for preserving, storing, or transporting microorganisms.

SEE OR SEARCH CLASS:

62, Refrigeration, for process of and apparatus for cooling and freezing materials.

137, Fluid Handling, subclass 560 for systems including pulsating pumps useful for forcing perfusate through organs.

210, Liquid Purification or Separation, subclasses 321.6+ for dialysis devices adapted for gas and mass transfer (e.g., artificial kidneys).

261, Gas and Liquid Contact Apparatus, for gas liquid contact means of general utility.

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclasses 44+ for blood oxygenating devices and other blood treatment devices.

604, Surgery, subclass 4.01, 5.01-5.04, 6.01-6.09, 6.01, 6.11-6.16 for extra corporeal blood treating devices connected to or having specific means for connection to a living body.

285.1 Mutation or genetic engineering apparatus:
This subclass is indented under subclass 283.1. Apparatus for producing a known stable change in the genotype of a microorganism by artificially inducing a structural change in a gene or by the incorporation of genetic material from an external source.

SEE OR SEARCH THIS CLASS, SUBCLASS:

440+, for processes of mutation or genetic engineering.

285.2 With means for applying an electric current or charge (e.g., electrofusion, electroporation, etc.):
This subclass is indented under subclass 285.1. Apparatus for producing a known stable change in the genotype of a microorganism by the use of an applied electric current or charge.

(1) Note. Electrofusion is the combining of the entire genetic material of two separate cells, while electroporation is the incorporation of subcellular parts (i.e., plasmids) into a cell.

SEE OR SEARCH THIS CLASS, SUBCLASS:

173.6, for processes of electroporation.

450, for processes of electrofusion.

285.3 Including projectile means:
This subclass is indented under subclass 285.1. Apparatus wherein a projectile means is utilized to incorporate foreign genetic material into a cell.

286.1 Including condition or time responsive control means:
This subclass is indented under subclass 283.1. Apparatus with means to sense a process parameter which actuates means to alter a process parameter, or with timing means which actuates means which alters a process parameter.

(1) Note. Included herein is the mere use of a programmed computer and associated detection and actuation devices for process control.

SEE OR SEARCH CLASS:

73, Measuring and Testing, for apparatus for making tests and measurements not otherwise provided for.

137, Fluid Handling, subclasses 88+ for systems for controlling the mixture of a plurality of fluids in response to the sensing of a condition or characteristic of the mixture, note particularly subclass 93 in which the control is in response to a sensing of a chemical property.

196, Mineral Oils: Apparatus, subclass 132 and 141 for combinations of apparatus for making a test or measurement and means for controlling a reaction provided for in that class.

346, Recorders, for recording apparatus, per se.

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, for apparatus for (a) determining qualitatively or quantitatively the presence of one or more chemical constituents of a material which involve a chemical reaction, and (b) combinations of a test or measurement and means for regulating a chemical reaction.

700, Data Processing: Generic Control Systems or Specific Applications, subclasses 266 through 274 for chemical process control or monitoring systems and subclass 306 for control based on an elapsed time.

702, Data Processing: Measuring, Calibrating, or Testing, subclasses 19+ for data processing in biological or biochemical applications, subclasses 22+ for chemical analysis data processing, and subclasses 176+ for time duration or rate data processing for measurements.

286.2 Including position control:
This subclass is indented under subclass 286.1. Apparatus with means to control the position of a component (e.g., a sample container, dispensing means, etc.).

286.3 Plater, streaker, or spreader:
This subclass is indented under subclass 286.2. Apparatus with means to control inoculation of microorganisms on a solid surface so as to isolate individual cells or colonies, or to completely cover the solid surface with a mat or lawn of cells.

286.4 Including liquid dispenser means:
This subclass is indented under subclass 286.2. Apparatus with means to control dispensing of a liquid (e.g., reagents, samples, etc.).

286.5 Including liquid flow, level, or volume control:
This subclass is indented under subclass 286.1. Apparatus with means to control the volume, level, or flow of a liquid.

286.6 Including gas flow or pressure control:
This subclass is indented under subclass 286.1. Apparatus with means to control pressure or gas flow.

286.7 Including mixing or agitation control:
This subclass is indented under subclass 286.1. Apparatus with means to control mixing or agitation.

287.1 Including measuring or testing:
This subclass is indented under subclass 283.1. Apparatus with means to test or measure a condition or property in a sample.

(1) Note. This subclass excludes mere means for measuring temperature or pH in combination with bioreactor structures. See this class, subclasses 289.1+ for this subject matter.

SEE OR SEARCH CLASS:

73, Measuring and Testing, for apparatus for making tests and measurements not otherwise provided for.

137, Fluid Handling, subclasses 88+ for systems for controlling the mixture of a plurality of fluids in response to the sensing of a condition or characteristic of the mixture.

196, Mineral Oils: Apparatus, subclass 132 and 141 for combinations of apparatus for making a test or measurement and

means for controlling a reaction provided for in that class.

204, Chemistry: Electrical and Wave Energy, subclasses 400+ for apparatus specialized for analysis and testing of electrolytic reactions.

324, Electricity: Measuring and Testing, appropriate subclasses for apparatus for testing an electrical property or condition of a material by electrical means, even though the result of the test may be used as an indication of some other physical or chemical property or condition.

346, Recorders, for recording apparatus, per se.

374, Thermal Measuring and Testing, subclasses 31+ for calorimetry.

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, particularly subclasses 50+ for apparatus for (a) determining qualitatively or quantitatively the presence of one or more chemical constituents of a material, and (b) combinations of a test or measurement and means for regulating a chemical reaction.

287.2 Measuring or testing for antibody or nucleic acid, or measuring or testing using antibody or nucleic acid:

This subclass is indented under subclass 287.1. Apparatus with means for the measuring or testing of antibodies or nucleic acids, or with means for using an antibody or nucleic acid agent to measure or test a sample.

287.3 With sample or reagent mechanical transport means:

This subclass is indented under subclass 287.1. Apparatus having means to transport a sample to be measured or a reagent involved in a measurement by mechanical means.

SEE OR SEARCH CLASS:

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, particularly subclasses 63+ for automated analytical apparatus having sample mechanical transport means.

287.4 Sterility testing means:

This subclass is indented under subclass 287.1. Apparatus with means to test for sterility.

(1) Note. Included herein are means for attempting to culture a microorganism which has been exposed to a prior step intended to destroy living organisms, or by exposing an enzyme to such treatment and subsequently testing for enzymatic activity.

287.5 Means for measuring gas pressure or gas volume of gas evolved from or consumed in an enzymatic or microbial reaction:

This subclass is indented under subclass 287.1. Apparatus with means to measure gas pressure or gas volume that is either evolved from or consumed in an enzymatic or microbial reaction.

287.6 Including frangible means for introducing a sample or reagent:

This subclass is indented under subclass 287.1. Apparatus containing a frangible element which, when broken, releases a reagent or a sample to a reaction container.

287.7 Including bibulous or absorbent layer:

This subclass is indented under subclass 287.1. Apparatus wherein a reagent or sample is contained or placed in an absorbent or bibulous carrier or substrate (e.g., a dip-stick, test paper, wick, etc.).

SEE OR SEARCH CLASS:

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, particularly subclasses 55+ for visual or optical indicators, including subclasses 56 and 57 which include absorbent or coated layers.

287.8 Including multiple, stacked layers:

This subclass is indented under subclass 287.7. Apparatus wherein a reagent or sample is contained or placed in or on an element containing multiple stacked layers of an absorbent or bibulous carrier or substrate.

287.9 Including a coated reagent or sample layer:
This subclass is indented under subclass 287.1. Apparatus wherein a reagent or sample is coated on the surface of a carrier or substrate.

SEE OR SEARCH CLASS:
422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, particularly subclasses 55+ for visual or optical indicators, including subclasses 56 and 57 which include absorbent or coated layers.

288.1 Including a bottle, tube, flask, or jar:
This subclass is indented under subclass 287.1. Apparatus which includes a bottle, tube, flask, or jar.

SEE OR SEARCH THIS CLASS, SUBCLASS:
304.1, for bottles, tubes, flasks, and jars of general use for the growth, propagation, or maintenance of a microorganism or enzyme, or for the synthesis of a composition or compound using a microorganism or enzyme.

SEE OR SEARCH CLASS:
206, Special Receptacle or Package, subclasses 223+ for a test kit of general utility.
215, Bottles and Jars, for bottles and jars of general utility and the closures therefor.
422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, particularly subclass 102 for miscellaneous laboratory containers.

288.2 Including multiple internal compartments or baffles:
This subclass is indented under subclass 288.1. Apparatus wherein a bottle, tube, flask, or jar contains multiple internal compartments or baffles.

SEE OR SEARCH THIS CLASS, SUBCLASS:
299.2, for bottles, tubes, flasks, and jars containing a solid extended reaction surface.
304.2, for bottles, tubes, flasks, and jars including multiple internal compartments or baffles of general use involving the growth, or propagation of a microorganism or enzyme, or for the synthesis of a composition or compound using a microorganism or enzyme.

288.3 Including a dish, plate, slide, or tray:
This subclass is indented under subclass 287.1. Apparatus which includes a dish, plate, slide, or tray.

SEE OR SEARCH THIS CLASS, SUBCLASS:
297.5, for a dish, plate, or tray of general use involving the growth or propagation of a microorganism or enzyme, or for the synthesis of a composition or compound using a microorganism or enzyme in combination with a semipermeable membrane or filter.
305.1+, for a dish, plate, or tray of general use involving the growth or propagation of a microorganism or enzyme, or for the synthesis of a composition or compound using a microorganism or enzyme.

SEE OR SEARCH CLASS:
422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, particularly subclass 102 for miscellaneous laboratory containers.

288.4 Including multiple compartments (e.g., wells, etc.):
This subclass is indented under subclass 288.3. Apparatus including two or more separate compartments.

SEE OR SEARCH THIS CLASS, SUBCLASS:
305.2+, for a multi-welled dish, plate, or tray of general use involving the growth or propagation of a microorganism or enzyme, or for the synthesis of a composition or compound using a microorganism or enzyme.

288.5 Including means for fluid passage between compartments (e.g., between wells, etc.):
This subclass is indented under subclass 288.4. Apparatus with means providing fluid passage between compartments.

288.6 Including column separation means:
This subclass is indented under subclass 287.1. Apparatus including a column separation means in addition to measuring or testing means.

288.7 Including optical measuring or testing means:
This subclass is indented under subclass 287.1. Apparatus having means for measuring or testing an optical property of the material to be analyzed.

SEE OR SEARCH CLASS:
422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, particularly subclasses 82.05+ for analytical apparatus which measures optical properties of a chemical reaction.

289.1 Bioreactor:
This subclass is indented under subclass 283.1. Apparatus adapted for the growth or propagation of a microorganism or enzyme, or for the synthesis of a composition or compound using a microorganism or enzyme.

SEE OR SEARCH THIS CLASS, SUBCLASS:
307.1, for apparatus for maintaining a microorganism in a viable state.

SEE OR SEARCH CLASS:
156, Adhesive Bonding and Miscellaneous Chemical Manufacture, appropriate subclasses for chemical manufacturing apparatus not elsewhere provided for producing articles of manufacture, and see especially sub 345.1-345.55 for differential etching apparatus.
196, Mineral Oils: Apparatus, appropriate subclasses for apparatus for treating mineral oils. Catalytic apparatus, even though employed for carrying out a catalytic-cracking process provided for in Class 208, Mineral Oils: Processes and Products, is classified in Class 422.
204, Chemistry: Electrical and Wave Energy, subclasses 193+ for apparatus employed in carrying out a process provided for in that class, which apparatus is not provided for in any other class.
210, Liquid Purification or Separation, for reactors utilized in purifying liquids.
250, Radiant Energy, subclass 255 for apparatus for testing earth material samples involving, and in name only, chemical or physical separation and an invisible radiation test of the separated material; subclass 281 for ionic separation or analysis apparatus; subclasses 306+ for the inspection of solids or liquids by charged particles and the detection of the particles modified by the solids or liquids; and subclasses 336.1+ for apparatus for analyzing material.
401, Coating Implements With Material Supply, subclasses 40+ and 44+ (particularly subclass 47) for a coating implement by means of which diverse materials are applied to a work surface.
422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, particularly subclasses 129+ for chemical reactors of a general nature.
423, Chemistry of Inorganic Compounds, for inorganic compound and nonmetallic elements and processes for their manufacture involving chemical reaction.

290.1 Composting apparatus:
This subclass is indented under subclass 289.1. Apparatus for the treatment of organic waste material by the action of microorganisms or enzymes.

290.2 Including agitation means:
This subclass is indented under subclass 290.1. Apparatus wherein an agitator is utilized to mix the organic material being composted.

SEE OR SEARCH CLASS:
366, Agitating, for mixing devices of general utility.

290.3 Compostor is rotatably mounted:
This subclass is indented under subclass 290.2. Apparatus wherein the agitation means includes a rotating compostor.

SEE OR SEARCH THIS CLASS, SUBCLASS:
291.8, for a rotatably mounted malting or mashing apparatus.
298.2, for a rotatably mounted bioreactor of general utility.

SEE OR SEARCH CLASS:
210, Liquid Purification or Separation, for rotatably mounted devices.
422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, particularly subclass 209 for chemical reactors including means for rotating a reaction chamber during use.

290.4 Including solid or liquid transport means into or out of a compostor:
This subclass is indented under subclass 290.1. Apparatus incorporating means to transport solids or liquids into or out of the compostor (e.g., conveyors, etc.).

291.1 Malting or mashing apparatus:
This subclass is indented under subclass 289.1. Apparatus with means to effect the sprouting of grain by heat and humidity.

291.2 Movable floor to facilitate maintenance (e.g., cleaning):
This subclass is indented under subclass 291.1. Apparatus wherein the bioreactor includes movable floors, whereby maintenance such as cleaning is facilitated.

291.3 Vertically spaced stages, levels, or floors:
This subclass is indented under subclass 291.1. Apparatus wherein the bioreactor includes a series of vertically spaced stages, levels, or floors.

291.4 Cascading:
This subclass is indented under subclass 291.3. Apparatus wherein the composition of an upper stage, level, or floor spills over into a lower stage, level, or floor.

SEE OR SEARCH THIS CLASS, SUBCLASS:
294.1, for vessels or trays in series.

291.5 With agitator or mash turner:
This subclass is indented under subclass 291.1. Apparatus including means for mixing or stirring the mash.

SEE OR SEARCH CLASS:
366, Agitating, for mixing devices of general utility.

291.6 With vertical axis of rotation:
This subclass is indented under subclass 291.5. Apparatus in which the axis of the mixing means is vertical.

(1) Note. This subclass includes eccentrically moving mixing devices in which the rotating mixing means revolve in turn about an axis.

291.7 With horizontal axis of rotation:
This subclass is indented under subclass 291.5. Apparatus in which the axis of the mixing means is horizontal.

291.8 Rotating vessel:
This subclass is indented under subclass 291.7. Apparatus which includes a horizontally disposed vessel and means for rotating the vessel about its central axis.

SEE OR SEARCH THIS CLASS, SUBCLASS:
290.3, for a rotatably mounted composting apparatus.
298.2, for a rotatably mounted bioreactor of general utility.

SEE OR SEARCH CLASS:
210, Liquid Purification or Separation, for rotatably mounted devices.

422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, particularly subclass 209 for chemical reactors including means for rotating a reaction chamber during use.

292.1 Including means to transmit light into a bioreactor to facilitate photo-bioreaction (e.g., photosynthesis):
This subclass is indented under subclass 289.1. Apparatus wherein the bioreactor includes means to facilitate photoreactions (e.g., light sources, transparent barriers, etc.) for the growth of photosynthetic microorganisms or for the treatment of microorganisms or enzymes.

(1) Note. This subclass is not intended to provide for means of simply viewing or detecting the level or presence of the contents of a reactor.

293.1 Tubular or plug flow bioreactor:
This subclass is indented under subclass 289.1. Apparatus wherein fluid or fluidized reagents are continuously pumped through substantially tubular structures.

(1) Note. This form of reactor typically creates unequal conditions between two separated points in the reactor. For example, the concentrations of reactants at the inlet of such a reactor change as the reactants flow through the tubular member.

293.2 Radial or spiral flow bioreactor:
This subclass is indented under subclass 293.1. Apparatus wherein fluid flow in the tubular or plug flow bioreactor is in a radial or spiral direction.

294.1 Vessels or trays in series:
This subclass is indented under subclass 289.1. Apparatus including vessels or trays in series.

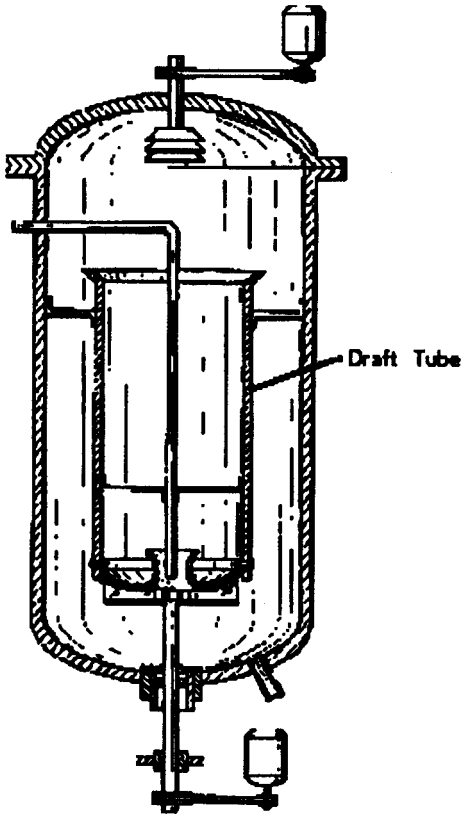
SEE OR SEARCH THIS CLASS, SUBCLASS:
291.4, for cascading malting devices.

SEE OR SEARCH CLASS:
422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, particularly subclasses 188+ for chemical reactors including plural reaction stages of general use.

295.1 Including a draft tube for agitation:
This subclass is indented under subclass 289.1. Apparatus including a tubular element extending from a lower to a higher level in a vessel to provide for internal mixing.

(1) Note. Draft tubes are used to facilitate circulation of a fluid within a bioreactor for the purpose of mixing. Separate means, such as an impeller or gas bubbles, are required to drive the fluid.

(2) Note. An example of structures provided for herein is:



SEE OR SEARCH CLASS:
422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, particularly subclass 227 for chemical reactors including a draft tube.

295.2 Airlift bioreactor:
This subclass is indented under subclass 295.1. Apparatus whereby the driving means to circulate fluid in a bioreactor with a draft tube is a gas which is sparged through a lower, usually bottom, portion of the bioreactor.

295.3 Including a semipermeable membrane or filter:
This subclass is indented under subclass 295.1. Apparatus wherein the bioreaction chamber includes at least one semiporous membrane or filter that is designed for holding or excluding a solid or dissolved reactant.

SEE OR SEARCH THIS CLASS, SUBCLASS:
297.1, for semipermeable membrane or filter containing reactors which do not include a draft tube.

296.1 Bubble bioreactor:
This subclass is indented under subclass 289.1. Apparatus whereby the means to agitate fluid in a reactor is limited to sparging or bubbling gas in the bottom or lower portions of the reactor.

297.1 Including semipermeable membrane or filter:
This subclass is indented under subclass 289.1. Apparatus wherein the reaction chamber includes at least one semi-porous membrane or filter that is designed for holding or excluding a solid or dissolved reactant.

SEE OR SEARCH THIS CLASS, SUBCLASS:
295.3, for semi-permeable membrane or filter containing reactors in combination with a draft tube.

297.2 Including perfusion means:
This subclass is indented under subclass 297.1. Apparatus with means to cause fluid to flow through the semipermeable membrane or filter.

SEE OR SEARCH THIS CLASS, SUBCLASS:
284.1, for differentiated tissue (e.g., organ) perfusion or preservation apparatus.

297.3 Including a spinning semipermeable membrane or filter:
This subclass is indented under subclass 297.2. Apparatus wherein a semipermeable membrane or filter rotates or spins about an axis.

SEE OR SEARCH CLASS:
210, Liquid Purification or Separation, particularly subclasses 359+ for apparatus using movable filters.

297.4 Including hollow fiber or capillary:
This subclass is indented under subclass 297.2. Apparatus wherein the semipermeable membrane or filter consists of hollow fibers or capillary membranes.

(1) Note: Hollow fibers and capillary membranes are small diameter open ended tubes, the walls of which are semipermeable.

SEE OR SEARCH CLASS:
210, Liquid Purification or Separation, particularly subclasses 500.23+ for hollow fiber or cylinder material.

297.5 In combination with a dish, plate, or tray:
This subclass is indented under subclass 297.1. Apparatus wherein the semipermeable membrane or filter is in combination with a dish, plate, or tray.

SEE OR SEARCH THIS CLASS, SUBCLASS:
288.3, for a dish, plate, slide, or tray used for measuring or testing.
305.1+, for a dish, plate, or tray of general use involving the growth, or propagation, of a microorganism or enzyme, or for the synthesis of a composition or compound using a microorganism or enzyme not in combination with a semipermeable membrane.

298.1 Cylindrical reaction tank or vessel horizontally disposed with respect to its central axis:
This subclass is indented under subclass 289.1. Apparatus wherein a substantially cylindrical tank or vessel is horizontally disposed with respect to its central axis.

298.2 With a rotatably mounted tank or vessel:
This subclass is indented under subclass 298.1. Apparatus including means providing for motion of the tank or vessel about its central axis.

SEE OR SEARCH THIS CLASS, SUBCLASS:
290.3, for a rotatably mounted composting apparatus.
291.8, for a rotatably mounted malting or mashing apparatus.

SEE OR SEARCH CLASS:
210, Liquid Purification or Separation, for rotatably mounted devices.
422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, particularly subclass 209 for chemical reactors including means for rotating a reaction chamber during use.

299.1 Including solid extended fluid contact reaction surface:
This subclass is indented under subclass 289.1. Apparatus including a solid extended surface fluid contact reaction means.

(1) Note. Included herein are means providing a relatively large solid contact surface area within the reaction zone wherein a large surface area presents multiple reaction sites for contact by the reaction mixture and, thereby, enhance the rate and/or the completeness of the reaction (e.g., inert Raschig rings, particulate absorbent, pleated surfaces, etc.).

SEE OR SEARCH CLASS:
422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, particularly subclasses 211+ for chemical reactors of general use including solid extended surface fluid contact reaction means.

299.2 Including a bottle, tube, jar, or flask:
This subclass is indented under subclass 299.1. Apparatus wherein a solid extended fluid contact reaction surface is in conjunction with a bottle, tube, jar, or flask.

(1) Note. For bottles,tubes, jars, or flasks with solid partition walls for mere separation or compartmentalizing, see this class, subclass 304.2.

SEE OR SEARCH THIS CLASS, SUBCLASS:
288.1+, for bottles, tubes, jars, or flasks specifically adapted to perform measuring or testing.
304.1+, for bottles, tubes, jars, or flasks of general utility, particularly 304.2 which includes multiple internal compartments or baffles.

SEE OR SEARCH CLASS:
215, Bottles and Jars, for bottles and jars of general utility and the closures therefor.

300.1 Including off-gas trapping means:
This subclass is indented under subclass 289.1. Apparatus with means to trap gas evolved from the action of a microorganism or enzyme reaction.

301.1 Including foam breaking means:
This subclass is indented under subclass 289.1. Apparatus with means to separate the liquid and gas components of foam.

(1) Note. Examples of such foam are those generated from the action of microorganisms or enzymes, or those generated from sparging a fluid containing active microorganisms or enzymes with a gas.

SEE OR SEARCH CLASS:
516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 115+ for compositions for or subcombination compositions for or breaking of or inhibiting of foam colloid systems, when generically claimed or when there is no hierarchically superior pro-

vision in the USPC for the specifically claimed art. Nominal recitation of a Class 435 process (e.g., fermentation or fermentation step) combined with a process otherwise classifiable in Class 516 is proper for Class 516, while recitation of a significant Class 435 step combined with a step or composition otherwise classifiable in Class 516 is proper for Class 435 with a discretionary cross-reference to Class 516.

302.1 Including magnetically coupled agitation means:
This subclass is indented under subclass 289.1. Apparatus including magnetically coupled agitation means.

(1) Note. A magnetically coupled agitator requires a substantially closed container with an internal magnet, an external magnet held in close proximity to a wall of the container such that the internal and external magnets are coupled by their magnetic flux, and a means to rotate the external magnet.

(2) Note. This subclass is not intended to include magnetically driven motors coupled to an agitation means.

303.1 Incubator:
This subclass is indented under subclass 289.1. Apparatus including a housing for supporting or maintaining a reaction container in a desired relationship with other structures, including maintaining a proper environment (e.g., temperature, humidity, etc.) for microorganisms to grow or enzymes to react.

303.2 Specifically adapted for an anaerobic microorganism or enzyme (e.g., anaerobe jars):
This subclass is indented under subclass 303.1. Apparatus with means specifically adapted for the growth of anaerobic microorganisms or for the activity of anaerobic enzymes.

303.3 Including an agitator:
This subclass is indented under subclass 303.1. Apparatus which includes an agitation means.

304.1 Bottle, tube, jar, or flask:
This subclass is indented under subclass 289.1. Apparatus which is a bottle, tube, jar, or flask.

(1) Note. Included in this definition are test tubes and capillary tubes.

SEE OR SEARCH THIS CLASS, SUBCLASS:
288.1+, for bottles or flasks specifically adapted to perform measuring or testing.
299.2, for bottles and flasks containing a solid extended reaction surface.

SEE OR SEARCH CLASS:
215, Bottles and Jars, for bottles and jars of general utility and the closures therefor.

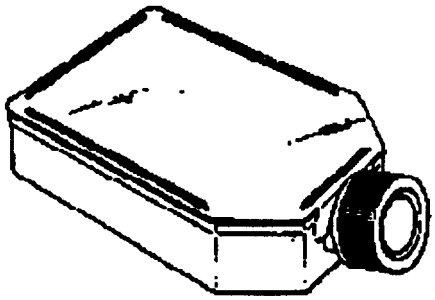
304.2 Including multiple internal compartments or baffles:
This subclass is indented under subclass 304.1. Apparatus wherein the bottle, tube, jar, or flask contains multiple internal compartments or baffles.

SEE OR SEARCH THIS CLASS, SUBCLASS:
288.2, for bottles or flasks including multiple internal compartments or baffles specifically adapted to perform measuring or testing.

304.3 Flat culture flask:
This subclass is indented under subclass 304.1. Apparatus having a substantially flat profile.

(1) Note. Such flasks typically have a primary opening protruding from a side wall.

(2) Note. An example of structures provided for herein is:



305.1 Dish, plate, or tray:
This subclass is indented under subclass 289.1. Apparatus including a dish, plate, or tray.

SEE OR SEARCH THIS CLASS, SUBCLASS:
288.3+, for a dish, plate, slide, or tray used for measuring or testing.
297.5, for a dish, plate, or tray of general use involving the growth or propagation of a microorganism or enzyme, or for the synthesis of a composition or compound using a microorganism or enzyme in combination with a semipermeable membrane or filter.

305.2 Multicompartmented:
This subclass is indented under subclass 305.1. Apparatus including two or more separate media areas, or areas adapted to contain the same or different media (e.g., wells, etc.).

SEE OR SEARCH THIS CLASS, SUBCLASS:
288.4, for a dish, plate, or tray including multiple internal compartments or baffles specifically adapted for measuring and testing.

305.3 Including cover seal:
This subclass is indented under subclass 305.2. Apparatus which includes a means, separate and apart from the internal compartments, to prevent the passage of material to or from the interior of a multicompartmented dish, plate, or tray.

305.4 Including cover seal:
This subclass is indented under subclass 305.1. Apparatus which includes a means to prevent the passage of material to or from the interior of a dish, plate, or tray.

306.1 Involving lysis of a microorganism by means other than comminution:
This subclass is indented under subclass 283.1. Apparatus with means to lyse or rupture microorganisms by addition of material or by mechanical means other than comminution.

SEE OR SEARCH THIS CLASS, SUBCLASS:
259, for associated processes of lysing cells.

SEE OR SEARCH CLASS:
241, Solid Material Comminution or Disintegration, particularly subclass 2 for methods of and apparatus for the comminution of microorganisms or tissues.

307.1 microorganism preservation, storage, or transport apparatus:
This subclass is indented under subclass 283.1. Apparatus for preserving, storing, or transporting a microorganism.

SEE OR SEARCH THIS CLASS, SUBCLASS:
1, for processes of maintaining differentiated tissue or an organ in a viable state.
2, for processes or media for maintaining blood or sperm in a physiologically active state.
260, for associated processes of preserving or maintaining a microorganism, per se, in a viable state.
284.1, for a differentiated tissue (e.g., organ) perfusion or preservation apparatus.

308.1 Means for separation or recovery of a microorganism from culture media:
This subclass is indented under subclass 283.1. Apparatus with means to separate or recover a microorganism from culture media.

SEE OR SEARCH THIS CLASS, SUBCLASS:
261, for associated processes of separation of microorganisms from culture media.

SEE OR SEARCH CLASS:
210, Liquid Purification or Separation, for separation apparatus of general utility.

309.1 Inoculator, streaker, or sampler:
This subclass is indented under subclass 283.1. Apparatus including means for effecting physical contact between a sample and a media or

means for physically removing material as a sample.

SEE OR SEARCH THIS CLASS, SUBCLASS:
286.3, for an automatically controlled plater, streaker, or spreader apparatus.

309.2 Means for inoculation or sampling of a closed vessel:
This subclass is indented under subclass 309.1. Apparatus including means to penetrate a closed vessel for the purpose of inoculation or sampling.

309.3 Loop or wire streaker:
This subclass is indented under subclass 309.1. Apparatus of wire or plastic material specifically adapted to pick-up and move colonies of microorganisms or small amounts of liquid containing microorganisms.

309.4 Replica plate:
This subclass is indented under subclass 309.1. Apparatus including a means specifically adapted to sample from a first plate, and transfer and inoculate to a second plate so that an identical pattern of colonies forms on the second plate.

317.1 MISCELLANEOUS (E.G., SUBCELLULAR PARTS OF microorganismS, ETC.):
This subclass is indented under the class definition. Subject matter not otherwise provided for and including subcellular parts of microorganisms such as organelles, i.e., mitochondria, microsomes, chloroplasts, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:
1, for apparatus for maintaining a tissue or organ in a viable state.
284+, for apparatus for the propagation of tissue.
820, for subcellular parts of microorganisms.

SEE OR SEARCH CLASS:
422, Chemical Apparatus and Process Disinfecting, Deodorizing, Preserving, or Sterilizing, subclass 105 for control elements responsive to a sensed operating condition; subclasses 150+ for chemical analytical apparatus; subclass 162 for automatic analytical monitor and control of chemical processes; and subclasses 163+ for chemical analytical apparatus with continuous sample movement.
536, Organic Compounds, subclass 27 for DNA fragments, genes, etc.

320.1 VECTOR, PER SE (E.G., PLASMID, HYBRID PLASMID, COSMID, VIRAL VECTOR, BACTERIOPHAGE VECTOR, ETC.):
This subclass is indented under the class definition. Subject matter directed to self-replicating nucleic acid molecules which may be employed to introduce a nucleic acid sequence or gene into a cell; such nucleic acid molecules are designated as vectors and may be in the form of a plasmid, hybrid plasmid, cosmid, viral vector, bacteriophage vector, etc.

(1) Note. Vectors or vehicles may be used in the transformation or transfection of a cell. Transformation is the acquisition of new genetic material by incorporation of exogenous DNA. Transfection is the transfer of genetic information to a cell using isolated DNA or RNA.

(2) Note. A plasmid is an autonomously replicating circular extrachromosomal DNA element. A hybrid plasmid is a plasmid which has been broken open, has had DNA from another organism spliced into it, and has been resealed. A cosmid is a plasmid into which phage lambda “cos” sites have been inserted.

(3) Note. A viral vector (e.g., SV40, etc.) is a plant or animal virus which is specifically used to introduce exogenous DNA into host cells. A bacteriophage vector (e.g., phage lambda, etc.) is a bacterial virus which is specifically used to introduce exogenous DNA into host cells.

SEE OR SEARCH CLASS:
536, Organic Compounds, subclass 27 for DNA fragments, genes, etc.

325 ANIMAL CELL, PER SE (E.G., CELL LINES, ETC.); COMPOSITION THEREOF; PROCESS OF PROPAGATING, MAINTAINING OR PRESERVING

AN ANIMAL CELL OR COMPOSITION THEREOF; PROCESS OF ISOLATING OR SEPARATING AN ANIMAL CELL OR COMPOSITION THEREOF; PROCESS OF PREPARING A COMPOSITION CONTAINING AN ANIMAL CELL; CULTURE MEDIA THEREFORE:

This subclass is indented under the class definition. Subject matter including animal cells, per se; compositions containing animal cells; processes of in vitro propagation of animal cells or groups of cells that are not organized tissues; processes of maintaining or preserving animal cells or compositions thereof; processes of isolating or separating an animal cell or composition thereof; processes of preparing a composition containing animal cells; culture media therefore.

(1) Note. Where the tissue is first cultured and then destroyed by subsequent extraction, for example to extract compound or composition from the tissue, the process is not included in this subclass. Such subject matter is provided for in subclasses 41+ of this class.

(2) Note. This subclass provides for the culture of skin cells for a purpose such as transplantation.

SEE OR SEARCH THIS CLASS, SUBCLASS:

317.1, for subcellular parts of microorganisms

SEE OR SEARCH CLASS:

424, Drug, Bio-affecting and Body Treating Compositions, subclasses 93.1+ for bio-affecting or body treating compositions which contain whole live microorganisms, cells, or viruses and subclasses 520+ for bio-affecting or body treating compositions containing extracts, body fluids, or cellular material of undetermined constitution derived from animal.

800, Multicellular Living Organisms and Unmodified Parts Thereof and Related Processes, subclasses 8+ for nonhuman animals, per se, and subclasses 21+ for methods of making a nonhuman animal.

326 Animal cell, per se, expressing immunoglobulin, antibody, or fragment thereof:

This subclass is indented under subclass 325. Subject matter wherein the animal cells produce immunoglobulin, antibody, or a fragment thereof.

(1) Note. This subclass includes cells producing immunoglobulins or gamma globulins, whether or not the binding specificities are disclosed.

(2) Note. Mixtures of cells of the same origin; i.e., species, tissue, etc., encoding different antibodies; e.g., in a library, etc., are encompassed by this subclass.

(3) Note. The major classes of immunoglobulins are IgG, IgM, IgA, IgD, and IgE. Subclasses of immunoglobulins include IgG1, IgG2a, IgG2b, IgG3, and IgG4 subclasses which comprise the IgG class. IgY, which is similar to IgG, is found only in birds.

(4) Note. Synonyms include immune globulin, gamma globulin, Ig, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:

4+, for the use of antibodies in immunological testing involving a microorganism or enzyme. See particularly subclasses 7.1+.

69.1+, for making antibodies involving an enzyme or microorganism.

188, for antibodies conjugated to enzymes

188.5, for catalytic antibodies

SEE OR SEARCH CLASS:

424, Drug, Bio-Affecting and Body Treating Compositions, for antibody containing bio-affecting or body treating compositions and nominal methods of using said compositions according to the Class 424 definitions. See subclasses 1.49+ for compositions comprising radiolabelled antibody, or antibody fragment, or immunoglobulin, subclasses 9.3+ and 9.4+ for nonradioactive in vivo testing compositions, and subclasses 130.1+ for body treating compositions containing an

immunoglobulin, an antiserum, an antibody, or an antibody fragment.

436, Chemistry: Analytical and Immunological Testing, subclasses 500+ for immunoassays and binding assays including thyroid hormone tests, biospecific ligand binding assays, etc. Subclasses 543 through 548 include methods of modifying antigens and antibodies as part of a testing procedure.

525, Synthetic Resins or Natural Rubbers, subclass 54.1 for proteins or biologically active polypeptides chemically bound to synthetic resins.

530, Chemistry: Natural Resins or Derivatives; Peptides or Proteins; Lignins or Reaction Products Thereof, subclasses 387.1+, for antibodies or antisera or fragments, other than those which are conjugated or adsorbed to other substances; subclasses 391.1+, for antibodies or antisera or fragments thereof that are conjugated or adsorbed to other substances; subclass 829, for blood proteins including immunoglobulins; subclass 830, for plasma or serum proteins including immunoglobulins; subclass 831, for immunoglobulins and other proteins isolated via the Cohn fractionation method; subclass 832, for immunoglobulins isolated from milk or colostrum; subclass 833, for immunoglobulins isolated from whey; and subclass 851, for immunoglobulins isolated from placental extracts.

327 Immunoglobulin or antibody is anti-idiotypic:

This subclass is indented under subclass 326. Subject matter involving an animal cell which produces an antibody or antibody fragment that binds another antibody at one of its idiotopes.

(1) Note. An idiotope is an antigenic determinant in the variable region of the antibody.

(2) Note. An idiotype is that set of idiotopes characteristic of a particular antibody.

(3) Note. Included in this subclass are "internal image" antibodies which are a subset of anti-idiotypic antibodies that mimic the antigen in their ability to elicit antibodies that bind said antigen.

(4) Note. It is suggested that the patents in this subclass be cross-referenced to Class 530, in the appropriate subclasses, 387.1 through 389.8, that provide for the binding specificity of the antibodies bound by the anti-idiotypic antibodies, if disclosed.

328 Immunoglobulin or antibody is chimeric, mutated, or a recombined hybrid (e.g., bifunctional, bispecific, rodent-human chimeric, single chain, rFv, immunoglobulin fusion protein, etc.):

This subclass is indented under subclass 326. Subject matter involving an animal cell which produces an antibody or antibody fragment altered with respect to its amino acid sequence; with respect to its composition of heavy and light chains or immunoglobulin domains; or with respect to its glycosylation, as compared with that found in nature; or involving an antibody or antibody fragment fused to a nonimmunoglobulin amino acid sequence.

(1) Note. Chimeric and recombined hybrid antibodies comprise amino acid sequences derived from two or more nonidentical immunoglobulin molecules; e.g., interspecies combinations, etc.

(2) Note. It is suggested that the patents in this subclass be cross-referenced to Class 530, in the appropriate subclasses, 387.1 through 389.8, that provide for the binding specificity of the antibodies employed herein, if disclosed.

329 Immunoglobulin or antibody binds an oligosaccharide structure other than nucleic acid:

This subclass is indented under subclass 326. Subject matter involving an animal cell which produces an antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an oligosaccharide structure, other than a nucleic acid, that is either free, a component of a glycoprotein, or a component of a glycolipid.

(1) Note. The oligosaccharide structure can be one that is schematically illustrated in the disclosure or one that is known in the art, such as the carbohydrate component of ganglioside GD3.

(2) Note. Some of the oligosaccharide structures disclosed by the patents of this subclass are expressed on the surfaces of cancer cells as components of glycoproteins or glycolipids and are related to the A, B, Le, or H blood-group antigens.

(3) Note. It is suggested that the patents in this subclass be cross-referenced to Class 530, in the appropriate subclasses, 388.2 through 389.8, that provide for the binding specificity of the antibodies that bind the microorganism(s) upon which the oligosaccharide structure is expressed, if such disclosure is present.

SEE OR SEARCH THIS CLASS, SUBCLASS:

333, for an animal cell producing a monoclonal antibody which binds to a nucleic acid or derivative or component thereof.

344.1, for an animal cell producing a monoclonal antibody which binds to an antigen characterized by name or molecular weight (e.g., CEA, NCA, CC glycoprotein, melanoma gp 150 antigen, etc.).

330 Immunoglobulin or antibody binds an expression product of a cancer related gene or fragment thereof (e.g., oncogene, proto-oncogene, etc.):

This subclass is indented under subclass 326. Subject matter involving an animal cell which produces an antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an expression product or fragment thereof of a cancer related gene, such as an oncogene or proto-oncogene.

(1) Note. An oncogene is a genetic sequence whose expression transforms a normal cell into a cancerous cell. A proto-oncogene is a genetic sequence found in a noncancerous cell which, when mutated in a characteristic way, can become an oncogene.

SEE OR SEARCH THIS CLASS, SUBCLASS:

344.1, for an animal cell producing a monoclonal antibody which binds to an antigen characterized by name or molecular weight (e.g., CEA, NCA, CC glycoprotein, melanoma gp 150 antigen, etc.).

331 Immunoglobulin or antibody binds a specifically identified amino acid sequence:

This subclass is indented under subclass 326. Subject matter involving an animal cell which produces an antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with a protein or peptide antigen or antigenic determinant whose amino acid sequence is disclosed.

(1) Note. It is suggested that the patents in this subclass be cross-referenced to Class 530, in the appropriate subclasses, 387.1 through 389.8, that provide for antibodies that bind the antigen or antigenic determinant that the disclosed sequence comprises.

332 Immunoglobulin or antibody binds a microorganism or normal or mutant component or product thereof (e.g., animal cell, cell surface antigen, secretory product, etc.):

This subclass is indented under subclass 326. Subject matter involving an animal cell which produces a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a microorganism, or with a substance shed or secreted by a microorganism, or with a chemically-altered component of a microorganism, or with a chemically-altered substance shed or secreted by a microorganism.

(1) Note. A microorganism, for the purpose of this and the indented subclasses, is a cell from a multicellular organism, a single-celled organism, a virus, or other intracellular organism.

(2) Note. A mutant or chemically-altered component or product of a microorgan-

ism may be made by chemical synthesis or chemical modification or by expression of a cloned altered gene.

(3) Note. Monoclonal antibodies or fragments thereof that bind a mutant or chemically-altered component or product of a microorganism are proper for the subclass that provides for monoclonal antibodies that bind the corresponding normal component or product.

333 Binds a nucleic acid or derivative or component thereof (e.g., DNA, RNA, DNA-RNA hybrid, nucleotide, nucleoside, carcinogen-DNA adduct, etc.):
This subclass is indented under subclass 332. Subject matter involving an animal cell which produces a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with a nucleic acid, a component of a nucleic acid, such as a nucleotide or nucleoside, or a modified nucleic acid, such as carcinogen-DNA adduct resulting from exposure to a carcinogen.

(1) Note. An adduct is an addition group or compound.

334 Binds a receptor (e.g., transferrin receptor, Fc receptor, dihydropyridine receptor, IL-2 receptor, etc.):
This subclass is indented under subclass 332. Subject matter involving an animal cell which produces a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with a free or microorganism-associated receptor.

(1) Note. A receptor is a structure integral to a microorganism or released into the surrounding milieu that has binding specificity for a particular three-dimensional structural configuration of a molecule or portion thereof.

(2) Note. For the purpose of this subclass, an antibody is not considered a receptor. Patents disclosing cells producing nonanti-idiotypic monoclonal antibodies or fragments thereof that bind other immunoglobulins are proper for subclass 337 unless the monoclonal antibodies specifically bind lymphocyte-bound immunoglobulins, in which case the patents are proper for subclass 343.1.

335 Binds a lymphokine, cytokine, or other secreted growth regulatory factor, differentiation factor, intercellular mediator specific for a hematopoietic cell (e.g., interleukin, interferon, erythropoietin, etc.):
This subclass is indented under subclass 332. Subject matter involving an animal cell which produces a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with a lymphokine, cytokine, or any other secreted growth stimulatory factor, growth inhibitory factor, differentiation factor, or intercellular mediator that targets any type(s) of hematopoietic cell(s).

(1) Note. The term "growth regulatory factor" is meant to encompass any secretory factor that is growth-stimulatory or growth-inhibitory; i.e., that will stimulate or inhibit clonal expansion of cells.

(2) Note. The term "differentiation factor" is meant to encompass any secretory factor that causes cells to progress from a relatively undifferentiated state to a more differentiated state, wherein said progression may include clonal expansion.

(3) Note. The term "intercellular mediator" is meant to encompass any secretory factor that affects cellular functions such as chemotaxis, etc.

(4) Note. See Class 424, subclass 85.1 definitions for examples of lymphokines and cytokines.

(5) Note. Hematopoietic cells are considered to be bone marrow stem cells and cells derived from bone marrow stem cells, including cells at any stage of differentiation from progenitor cells to mature erythrocytes, granulocytes, lymphocytes, etc., both normal and neoplastic.

336 Binds a hormone or other secreted growth regulatory factor, differentiation factor, intercellular mediator, or neurotransmitter (e.g., insulin, human chorionic gonadotropin, intragonadal regulatory protein, Mullerian inhibiting substance, inhibin, epidermal

growth factor, nerve growth factor, dopamine, norepinephrine, etc.):
This subclass is indented under subclass 332. Subject matter involving an animal cell which produces a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with a neurotransmitter, with a hormone, or with any other secreted growth regulatory factor, differentiation factor, or intercellular mediator that targets cells other than hematopoietic cells.

(1) Note. The term "growth regulatory factor" is meant to encompass any secretory factor that is growth-stimulatory or growth-inhibitory; i.e., that will stimulate or inhibit clonal expansion of cells.

(2) Note. The term "differentiation factor" is meant to encompass any secretory factor that causes cells to progress from a relatively undifferentiated state to a more differentiated state, wherein said progression may include clonal expansion.

(3) Note. The term "intercellular mediator" is meant to encompass any secretory factor that affects cellular functions such as chemotaxis, etc.

337 Binds a plasma protein, serum protein, or fibrin (e.g., clotting factor, fibrinolytic factor, complement factor, immunoglobulin, apolipoprotein, etc.):
This subclass is indented under subclass 332. Subject matter involving an animal cell which produces a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with a plasma protein, serum protein, or with fibrin.

(1) Note. Patents with disclosures to cells producing monoclonal antibodies or fragments thereof that bind proteins, including enzymes, that are members of plasma "activation systems", such as the clotting system, the fibrinolytic system, the bradykinin system, and the complement system, are proper for this subclass.

(2) Note. Patents with disclosures to cells producing nonanti-idiotypic monoclonal antibodies or fragments thereof that bind immunoglobulins are proper for this subclass, unless the monoclonal antibodies specifically bind lymphocyte-bound immunoglobulins, in which case, they are proper for subclass 343.1.

(3) Note. See Class 530, subclasses 380+ definitions for examples of plasma and serum proteins.

338 Binds an enzyme:
This subclass is indented under subclass 332. Subject matter involving an animal cell which produces a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an enzyme.

339 Binds a virus or component or product thereof (e.g., virus associated antigen, etc.):
This subclass is indented under subclass 332. Subject matter involving an animal cell which produces a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a virus, or with a substance shed by a virus, such as a viral antigen.

339.1 Binds a retrovirus or component or product thereof (e.g., HIV, LAV, HTLV, etc.):
This subclass is indented under subclass 339. Subject matter involving an animal cell which produces a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a retrovirus, or with a substance shed by a retrovirus, such as a viral antigen.

(1) Note. Retroviruses are RNA viruses that encode the enzyme, reverse transcriptase, and are associated with acquired immune deficiency syndrome (AIDS) and related disorders, as well as with some forms of cancer, such as those caused by HTLV (human T-lymphotrophic virus) I and II, Rous sarcoma virus, MMTV (murine mammary tumor virus), feline leukemia virus, etc.

340 Binds a bacterium or similar microorganism or component or product thereof (e.g., Streptococcus, Legionella, Mycoplasma,

bacterium associated antigen, exotoxin, etc.):
This subclass is indented under subclass 332. Subject matter involving an animal cell which produces a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a bacterium or similar microorganism, or with a substance shed or secreted by a bacterium or similar microorganism.

(1) Note. For the purpose of this subclass, microorganisms "similar" to bacteria are those that have properties in common with typical bacteria, but which differ from them in characteristic ways. Examples of such microorganisms are rickettsiae, chlamydiae, and mycoplasmas.

341 Binds a fungus or plant cell or component or product thereof (e.g., fungus associated antigen, etc.):
This subclass is indented under subclass 332. Subject matter involving an animal cell which produces a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a fungus or plant cell, or with a substance shed or secreted by a fungus or plant cell.

(1) Note. Fungi include yeasts and molds.

342 Binds a parasitic protozoan or metazoan cell or component or product thereof (e.g., Dirofilaria, Eimeria, Coccidia, Trichinella, parasite cell surface antigen, etc.):
This subclass is indented under subclass 332. Subject matter involving an animal cell which produces a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a parasitic protozoan or metazoan cell, or with a substance shed or secreted by a parasitic protozoan or metazoan cell.

(1) Note. Metazoan parasites include such multicellular organisms as the parasitic flatworms and roundworms.

343 Binds a hematopoietic cell or component or product thereof (e.g., erythrocyte, granulocyte, macrophage, monocyte, platelet, myelogenous leukemia cell, bone marrow stem cell, granulocytic cell surface antigen, hemoglobin, thrombospondin, glycophorin, etc.):
This subclass is indented under subclass 332. Subject matter involving an animal cell which produces a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a hematopoietic cell, or with a substance shed or secreted by a hematopoietic cell.

(1) Note. Hematopoietic cells are considered to be bone marrow stem cells and cells derived from bone marrow stem cells including cells at any stage of differentiation from progenitor cells to mature erythrocytes, granulocytes, lymphocytes, etc., both normal and neoplastic.

343.1 Binds a lymphocytic or lymphocytic-like cell or component or product thereof (e.g., B cell, B-lineage bone marrow cell, null cell, natural killer cell, B-lymphoblastoid cell, B-lineage acute lymphoblastic leukemia cell, B-lymphocytic cell surface antigen, etc.):
This subclass is indented under subclass 343. Subject matter involving an animal cell which produces a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a lymphocytic or lymphocytic-like cell, or with a substance shed or secreted by a lymphocytic cell or lymphocytic-like cell.

(1) Note. Lymphocytes are considered to be either B- or T-lineage cells. Null cells, K cells, and natural killer cells are considered "lymphocytic-like" cells, since they have the morphology of lymphocytes but not the antigenic markers of either B- or T-lineage cells.

343.2 Binds a T-lymphocytic cell or component or product thereof (e.g., T- cell, thymocyte, T-lineage bone marrow cell, T-lymphoblastoid cell, T-lineage acute lymphoblastic leukemia cell, T-lymphocytic cell surface antigen, etc.):
This subclass is indented under subclass 343.1. Subject matter involving an animal cell which produces a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or iso-

lated part of a T-lymphocytic cell, or with a substance shed or secreted by a T-lymphocytic cell.

344 Binds a cancer cell or component or product thereof (e.g., cell surface antigen, etc.):
This subclass is indented under subclass 332. Subject matter involving an animal cell which produces a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an integral or isolated part of a cancer cell, or with a substance shed or secreted by a cancer cell.

344.1 Binds an antigen characterized by name or molecular weight (e.g., CEA, NCA, CC glycoprotein, melanoma gp 150 antigen, etc.):
This subclass is indented under subclass 344. Subject matter involving an animal cell which produces a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with an antigen that is an integral or isolated part of cancer cell, or that is shed or secreted by a cancer cell, and that is disclosed by name or molecular weight.

345 Immunoglobulin or antibody binds a drug, hapten, hapten-carrier complex, or specifically identified chemical structure (e.g., theophylline, digoxin, etc.):
This subclass is indented under subclass 326. Subject matter involving an animal cell which produces a monoclonal antibody or antigen-binding fragment thereof whose antigen-binding site(s) will combine with a drug, hapten, hapten-carrier complex, or with a specifically-identified chemical structure that is disclosed.

(1) Note. A hapten is a molecule or portion thereof that has little or no antigenicity unless coupled to a carrier molecule that is antigenic. Haptens are usually, but not always, of low molecular weight. Common carriers are proteins such as bovine serum albumin (BSA) and keyhole limpet hemocyanin (KLH).

(2) Note. This is the proper subclass for animal cells producing catalytic antibodies.

346 Fused or hybrid cell, per se:
This subclass is indented under subclass 325. Subject matter wherein the animal cell is a cell resulting from (a) the fusion of two cells or (b) the insertion of the nucleus of one cell into another.

347 Two or more cell types, per se, in co-culture:
This subclass is indented under subclass 325. Subject matter wherein two or more types of cell are present in the same cell culture.

(1) Note. Methods of culturing two or more types of cells together; i.e., methods of co-culturing, are classified in subclass 373 of this class.

348 Insect cell, per se:
This subclass is indented under subclass 325. Subject matter wherein the animal cell is of insect origin.

(1) Note. Insects do not include other arthropods such as arachnids and crustaceans.

349 Avian cell, per se:
This subclass is indented under subclass 325. Subject matter wherein the animal cell is of avian origin; i.e., from a bird.

350 Canine cell, per se:
This subclass is indented under subclass 325. Subject matter wherein the animal cell is of canine origin.

(1) Note. Canines are members of the family Canidae, including dogs, wolves, jackals, foxes, coyotes, etc.

351 Feline cell, per se:
This subclass is indented under subclass 325. Subject matter wherein the animal cell is of feline origin.

(1) Note. Felines are members of the family Felidae, including domestic cats, lions, tigers, jaguars, leopards, cheetahs, etc.

352 Rodent cell, per se:
This subclass is indented under subclass 325. Subject matter wherein the animal cell is of rodent origin.

(1) Note. Rodents are members of the order Rodentia, including rats, mice, deer mice, Chinese hamsters, Syrian hamsters, squirrels, chipmunks, guinea pigs, woodchucks, marmots, muskrats, lem-

mings, voles, chinchillas, etc. Excluded from the order Rodentia, and therefore from this subclass, are: members of the order Lagomorpha; e.g., rabbits and hares; members of the order Carnivora; e.g., weasels, minks, raccoons, etc.; and members of the order Insectivora; e.g., shrews, moles, and hedgehogs.

353 Rat (i.e., Rattus):
This subclass is indented under subclass 352. Subject matter wherein the animal cell is of rat origin.

(1) Note. This subclass includes members of the genus Rattus, including the common domestic rat; i.e., laboratory rat.

354 Mouse (i.e., Mus):
This subclass is indented under subclass 352. Subject matter wherein the animal cell is of mouse origin.

(1) Note. This subclass includes members of the genus Mus, including the common domestic mouse; i.e., laboratory mouse.

355 Blood or lymphatic origin or derivative:
This subclass is indented under subclass 354. Subject matter wherein the mouse cell is of blood or lymphatic origin.

356 L cell or derivative (e.g., Ltk(-), etc.):
This subclass is indented under subclass 354. Subject matter wherein the mouse cell is of L cell origin.

357 Fibroblast, fibroblast-like cell or derivative (e.g., NIH 3T3, etc.):
This subclass is indented under subclass 354. Subject matter wherein the mouse cell is of fibroblast origin or is most similar to a fibroblast in phenotype.

358 Chinese Hamster Ovary (i.e., CHO):
This subclass is indented under subclass 352. Subject matter wherein the animal cell is of Chinese Hamster ovary origin.

359 Expressing recombinant tPA:
This subclass is indented under subclass 358. Subject matter wherein the Chinese Hamster ovary cell expresses tissue plasminogen activator (tPA) from a recombinant gene.

360 Expressing recombinant hormone or growth factor:
This subclass is indented under subclass 358. Subject matter wherein the Chinese Hamster ovary cell expresses a polypeptide having hormone or growth factor activity, said polypeptide being expressed from a recombinant gene.

361 Expressing recombinant receptor:
This subclass is indented under subclass 358. Subject matter wherein the Chinese Hamster ovary cell expresses a receptor polypeptide from a recombinant gene.

362 Expressing recombinant antigen:
This subclass is indented under subclass 358. Subject matter wherein the Chinese Hamster ovary cell expresses a polypeptide used to stimulate an immune response or for recognition by an antibody, said polypeptide being expressed from a recombinant gene.

363 Primate cell, per se:
This subclass is indented under subclass 325. Subject matter wherein the animal cell is of primate origin.

(1) Note. Primates are members of the order Primates, including humans, apes, monkeys, lemurs, marmosets, tamarins, baboons, etc.

364 Monkey kidney:
This subclass is indented under subclass 363. Subject matter wherein the primate cell is of monkey kidney origin.

365 COS (e.g., COS-7, etc.):
This subclass is indented under subclass 364. Subject matter wherein the monkey kidney cell is a COS cell.

(1) Note. COS-1 and COS-7 are African Green monkey kidney cells transformed with replication-defective SV40, and which exhibit fibroblast-like morphology.

365.1 Expressing recombinant lymphokine, interferon, hormone, growth factor or morphogen:
This subclass is indented under subclass 365. Subject matter wherein the COS cell expresses a polypeptide having lymphokine, interferon, hormone, growth factor or morphogen activity, said polypeptide being expressed from a recombinant gene.

366 Human:
This subclass is indented under subclass 363. Subject matter wherein the primate cell is of human origin.

367 HeLa cell or derivative:
This subclass is indented under subclass 366. Subject matter wherein the human cell is of HeLa cell origin.

368 Nervous system origin or derivative:
This subclass is indented under subclass 366. Subject matter wherein the human cell is of nervous system origin.

(1) Note. This subclass includes, in addition to neurons, those cells normally associated with neuron in vivo; e.g., glial cells.

369 Renal origin or derivative:
This subclass is indented under subclass 366. Subject matter wherein the human cell is of renal; i.e., kidney, origin.

(1) Note. Excluded from this subclass are cells of urinary tract origin outside the kidney; e.g., urinary bladder cells.

370 Hepatic origin or derivative:
This subclass is indented under subclass 366. Subject matter wherein the human cell is of hepatic; i.e., liver, origin.

371 Epithelial origin or derivative:
This subclass is indented under subclass 366. Subject matter wherein the human cell is of epithelial origin.

372 Blood, lymphatic or bone marrow origin or derivative:
This subclass is indented under subclass 366. Subject matter wherein the human cell is of blood, lymphatic or bone marrow origin.

372.1 Myeloma origin or derivative:
This subclass is indented under subclass 372. Subject matter wherein the human cell is of myeloma origin.

(1) Note. A myeloma is a primary tumor arising from bone marrow cells.

372.2 B-cell or derivative:
This subclass is indented under subclass 372. Subject matter wherein the human cell is a B-cell; i.e., B-lymphocyte.

372.3 T-cell or derivative:
This subclass is indented under subclass 372. Subject matter wherein the human cell is a T-cell; i.e., T-lymphocyte.

373 Method of co-culturing cells:
This subclass is indented under subclass 325. Subject matter wherein two or more different animal cell types are cultured together.

374 Method of storing cells in a viable state:
This subclass is indented under subclass 325. Subject matter wherein animal cells are stored under conditions to maintain their viability.

375 Method of regulating cell metabolism or physiology:
This subclass is indented under subclass 325. Subject matter wherein a particular metabolic activity or physiological trait of the animal cell is nonmutagenically and non-recombinantly altered.

(1) Note. Examples of such activities or traits included in this and the indented subclasses which may be altered or regulated are the differentiation state of said cells, ability of cells to metabolize nitric oxide, cell-to-cell contact, cell cycle synchronization or lack thereof, resistance or sensitivity to particular compounds, etc.

(2) Note. Excluded from this subclass are methods which alter the physiology of cells in a broad or nonspecific manner; e.g., mere culturing in a medium, which promotes normal cell growth and division, or shifting the culture temperature to achieve a general heat shock response.

SEE OR SEARCH THIS CLASS, SUBCLASS:

6, for mutagenic and/or recombinant methods which are part of a selection, assay, or test process.

440+, for methods of mutating or genetically altering cells.

376 Method of synchronizing cell division:
This subclass is indented under subclass 375. Subject matter wherein the cell cycles of a plurality of cells are brought to the same point in the cell cycle, whereupon cell division occurs essentially in phase for at least one cell cycle.

377 Method of altering the differentiation state of the cell:
This subclass is indented under subclass 375. Subject matter wherein the cell is caused to progress to a more specialized state; i.e., more differentiated; is caused to regress to a less specialized state; i.e., less differentiated; or is prevented from progressing with an increase or decrease in the degree of differentiation.

(1) Note. An example of subject matter intended for this subclass would be the use of retinoic acid to cause tumor cells to differentiate.

(2) Note. Methods of employing only substances which merely promote or inhibit cell division without altering the differentiation state of the cell are classified in this class, subclass 384.

378 Method of detaching cells, digesting tissue or establishing a primary culture:
This subclass is indented under subclass 325. Subject matter wherein animal cells are detached from a solid surface or matrix, or from one another, or a primary culture of animal cells is established.

(1) Note. Establishing a primary culture entails starting a culture of the organisms of choice from their original source, such as a tissue sample, blood, etc.

379 Using mechanical means (e.g., trituration, etc.):
This subclass is indented under subclass 378. Subject matter wherein the cells are detached using a mechanical means of separating, triturating, cutting, or comminuting the matrix or tissue.

380 Releasing bound or adhered cell using protease:
This subclass is indented under subclass 378. Subject matter wherein the cells are released from a solid surface or matrix using a proteolytic enzyme.

381 Digesting tissue with protease:
This subclass is indented under subclass 378. Subject matter wherein the cells in a tissue are detached from one another using a proteolytic enzyme.

382 Method of culturing encapsulated cells:
This subclass is indented under subclass 325. Subject matter wherein an encapsulated cell is cultured.

(1) Note. An encapsulated cell is a cell held within or coated by a polymer or gel layer; e.g., alginate, gelatin, albumin, or a semi-permeable polymer.

SEE OR SEARCH THIS CLASS, SUBCLASS:

41+, for the use of an encapsulated cell to produce a product.

174+, for methods of immobilizing animal cells.

383 Method of culturing cells in suspension:
This subclass is indented under subclass 325. Subject matter wherein the cell culture is in suspension.

384 Culture medium contains a growth factor or growth regulator:
This subclass is indented under subclass 383. Subject matter wherein the cell culture medium contains a substance which stimulates or inhibits cell division without altering the differentiation state of the cell.

385 Medium contains a colony stimulating factor:
This subclass is indented under subclass 384. Subject matter wherein the medium contains a substance which is a colony stimulating factor.

386 Medium contains an interleukin:
This subclass is indented under subclass 384. Subject matter wherein the medium contains a substance which is an interleukin.

387 Medium contains a polypeptide hormone:
This subclass is indented under subclass 384. Subject matter wherein the medium contains a substance which is a polypeptide hormone.

388 Culture medium contains an albumin:
This subclass is indented under subclass 383. Subject matter wherein the medium contains a substance which is an albumin.

389 Culture medium contains a transferrin:
This subclass is indented under subclass 383. Subject matter wherein the medium contains a substance which is a transferrin.

390 Culture medium contains an incompletely defined plant or microbial extract excluding animal extract:
This subclass is indented under subclass 383. Subject matter wherein the medium contains an incompletely-defined plant or microbial extract, but contains no extract derived from an animal source.

(1) Note. An extract is incompletely defined if at least one of the components of said extract is not characterized.

391 Culture medium contains an animal extract:
This subclass is indented under subclass 4067. Subject matter wherein the medium contains an animal extract.

(1) Note. Animal extracts include compositions derived from whole animals as well as animal cells, tissues and organs. Methods employing highly purified factors; e.g., colony stimulating factors, are classified in this class, subclasses 385 through 389. Methods employing viable intact cells or intact cellular material; i.e., co-culturing, are classified in this class, subclass 373.

392 Serum:
This subclass is indented under subclass 391. Subject matter wherein said animal extract comprises serum.

393 Using airlift or laminar flow aeration or foam culture:
This subclass is indented under subclass 383. Subject matter wherein the cell culture is subjected to airlift or laminar flow aeration, or is cultured as a foam.

394 Wherein culture vessel is rotated or oscillated or culture is agitated:
This subclass is indented under subclass 383. Subject matter wherein the culture vessel is subjected to rotation or oscillation, or the culture is agitated.

395 Solid support and method of culturing cells on said solid support:
This subclass is indented under subclass 325. Subject matter including solid supports for cell growth and culture methods wherein the animal cells are cultured employing a specific solid support for them to attach to.

SEE OR SEARCH THIS CLASS, SUBCLASS:
174+, for methods of immobilizing animal cells.
283.1+, for apparatus for cell culture

396 Support is a resin:
This subclass is indented under subclass 395. Subject matter wherein the support is a resin.

(1) Note. Resins include ion exchange resins.

397 Support is a gel surface:
This subclass is indented under subclass 395. Subject matter wherein the support is a gel surface.

398 Support is a fiber:
This subclass is indented under subclass 395. Subject matter wherein the support is in the form of a fiber.

399 Fabric, mat, gauze, or fibrous coating:
This subclass is indented under subclass 398. Subject matter wherein the fiber is in the form of a fabric, mat, gauze or coating.

400 Hollow:
This subclass is indented under subclass 398. Subject matter wherein the fiber is hollow.

401 Support is a membrane:
This subclass is indented under subclass 395. Subject matter wherein the support is a membrane.

402 Support is a coated or treated surface:
This subclass is indented under subclass 395. Subject matter wherein the support is coated or treated to enhance attachment or growth.

SEE OR SEARCH THIS CLASS, SUBCLASS:
181, for processes of immobilization of microorganisms using an agent to link the microorganism to a solid support.

403 Support is a suspendable particle:
This subclass is indented under subclass 395. Subject matter wherein the support is a suspendable particle.

SEE OR SEARCH THIS CLASS, SUBCLASS:
175+, for microorganisms immobilized on a solid support which may be particulate.

404 Culture medium, per se:
This subclass is indented under subclass 325. Subject matter which is a culture medium, per se.

405 Contains a growth factor or growth regulator:
This subclass is indented under subclass 404. Subject matter wherein the culture medium contains a substance which stimulates or inhibits cell division without altering the differentiation state of the cell.

406 Contains a polypeptide hormone:
This subclass is indented under subclass 405. Subject matter wherein the culture medium contains a polypeptide hormone.

407 Contains an albumin:
This subclass is indented under subclass 404. Subject matter wherein the culture medium contains albumin.

408 Contains an animal extract:
This subclass is indented under subclass 404. Subject matter wherein the culture medium contains an animal extract.

(1) Note. Animal extracts include compositions derived from whole animals as well as animal cells, tissues and organs. Methods employing highly purified factors; e.g., colony stimulating factors, are classified in this class, subclasses 384 through 389. Media already containing other viable intact cells or intact cellular material would be classified based upon said cells or cellular material, this class, subclasses 326+.

410 PLANT CELL OR CELL LINE, PER SE (E.G., TRANSGENIC, MUTANT, ETC.); COMPOSITION THEREOF; PROCESS OF PROPAGATING, MAINTAINING, OR PRESERVING PLANT CELL OR CELL LINE; PROCESS OF ISOLATING OR SEPARATING A PLANT CELL OR CELL LINE; PROCESS OF REGENERATING PLANT CELLS INTO TISSUE, PLANT PART, OR PLANT, PER SE, WHERE NO GENOTYPIC CHANGE OCCURS; MEDIUM THEREFORE:
This subclass is indented under the class definition. Subject matter which includes plant cells or cell lines, per se which may be transgenic, mutant, or products of other processes for obtaining plant cells; compositions containing plant cells; processes of in vitro propagating, maintaining or preserving plant cells or cell lines; processes of isolating or separating plant cells; processes of regenerating plant cells into tissues, plant parts, or plants, per se, wherein no genotypic change occurs; and medium for propagation, maintenance, preservation, etc. of plant cells or cell lines.

(1) Note. Not included in this subclass, are processes wherein a product is synthesized by a biochemical transformation of matter; i.e., a transformation wherein the transforming agent is a plant cell culture

or tissue or processes wherein the tissue is first cultured and then destroyed by subsequent extraction, for example to extract compound or composition from the tissue. Such subject matter is provided for in subclasses 41+ of this class.

SEE OR SEARCH THIS CLASS, SUBCLASS:

262+, for processes wherein a preexisting material or compound present in a composition or material is contacted with an enzyme, plant cell, animal cell, etc. to isolate or recover the preexisting material which is chemically unchanged by the process.

317.1, for subcellular parts of microorganisms (bacteria, animal cell, plant cell, etc.).

440+, for processes of producing a stable heritable change in the genotype of a microorganism, an animal cell, or a plant cell by artificially inducing a structural change in a gene or by the incorporation of genetic material from an outside source. Processes of mutation which are processes directed to the production or selection of essentially random changes to the DNA of a cell without the incorporation of exogenous DNA are provided for in this area. Also included are processes in which the cellular matter of two or more fusing partners is combined producing a fused or hybrid cell.

SEE OR SEARCH CLASS:

47, Plant Husbandry, for apparatus and processes used in treating the earth and its products and includes all inventions relating thereto that have not been especially provided for in other classes. subclass 1.1 includes mushroom culture. Subclasses 59+ include processes for fostering growth beyond germination of plants in a soilless nutrient environment (water culture). Subclass 57.6 includes coated or impregnated seed not specifically provided for elsewhere. Subclass 58.1 includes miscellaneous processes for plant cultivation and propagation.

426, Food or Edible Material:Processes, Compositions, and Products, appropriate subclasses for products and processes of preservation and preparation of edible material, including earth products.

504, Plant Protecting and Regulating Compositions, for compositions for treating terrestrial or aquatic plants or their habitat with chemicals which affect the growth characteristics of the plants and processes of mere use of said compositions.

800, Multicellular Living Organisms and Unmodified Parts Thereof and Related Processes, for methods of plant breeding, methods of mutating plants, methods of producing plants using somatic cell fusion, methods of introducing nucleic acid into or rearrangement of genetic material within a plant, and for plants and plant parts, per se.

411 Tomato cell or cell line, per se:
This subclass is indented under subclass 410. Subject matter wherein the plant cell or cell line is from a tomato plant.

(1) Note. The tomato is a member of the genus Lycopersicon.

412 Corn cell or cell line, per se:
This subclass is indented under subclass 410. Subject matter wherein the plant cell or cell line is from a corn plant.

(1) Note. Corn is also known as maize and is a member of the genus Zea.

413 Herbicide resistant:
This subclass is indented under subclass 412. Subject matter wherein the corn cell or cell line will survive exposure to certain herbicides.

414 Tobacco cell or cell line, per se:
This subclass is indented under subclass 410. Subject matter wherein the plant cell or cell line is from a tobacco plant.

(1) Note. Tobacco is a member of the genus Nicotiana.

415 Soybean cell or cell line, per se:
This subclass is indented under subclass 410. Subject matter wherein the plant cell or cell line is from a soybean plant.

(1) Note. Soybean is a member of the genus Glycine.

416 Sunflower cell or cell line, per se:
This subclass is indented under subclass 410. Subject matter wherein the plant cell or cell line is from a sunflower plant.

(1) Note. Sunflower is a member of the genus Helianthus.

417 Potato cell or cell line, per se:
This subclass is indented under subclass 410. Subject matter wherein the plant cell or cell line is from a potato plant.

(1) Note. Potato is a member of the genus Solanum.

418 Plant cell or cell line, per se, is pest or herbicide resistant or pest lethal:
This subclass is indented under subclass 410. Subject matter wherein the plant cell or cell line has a property which allows it to survive pest or herbicide attacks or a property which makes it lethal to living organisms which prey on or come in contact with it.

(1) Note. The term pest includes insects, fungi, or other organisms which may be detrimental to the plant cell.

419 Plant cell or cell line, per se, contains exogenous or foreign nucleic acid:
This subclass is indented under subclass 410. Subject matter wherein the plant cell or cell line has been transformed by the insertion of nucleic acid which is either exogenous or foreign to it.

(1) Note. The nucleic acid may come from any outside source; e.g., animal, different plant family, genus, species, etc.

420 Culture, maintenance or preservation techniques, per se:
This subclass is indented under subclass 410. Subject matter directed to the processes of culturing, propagating, maintaining, preserving, or regenerating of plant cells or cell lines.

421 Involving protoplast:
This subclass is indented under subclass 420. Subject matter wherein the process includes the presence of a protoplast.

(1) Note. A protoplast is a viable intact plant cell from which the cell wall has been removed.

422 Involving conifer cell or tissue (e.g., pine, spruce, fir, cedar, etc.):
This subclass is indented under subclass 420. Subject matter wherein the process includes the presence of a conifer cell or tissue.

(1) Note. Conifers (class Coniferae), include pines, spruces, firs, cedars, hemlocks, yews, larches, cypresses, redwoods, junipers, etc.

423 Involving tomato cell or tissue:
This subclass is indented under subclass 420. Subject matter wherein the process includes the presence of a tomato cell or tissue (Lycopersicon).

424 Involving corn cell or tissue:
This subclass is indented under subclass 420. Subject matter wherein the process includes the presence of a corn cell or tissue (i.e., Zea mays or maize).

425 Involving tobacco cell or tissue:
This subclass is indented under subclass 420. Subject matter wherein the process includes the presence of a tobacco cell or tissue (Nicotiana).

426 Involving soybean cell or tissue:
This subclass is indented under subclass 420. Subject matter wherein the process includes the presence of a soybean cell or tissue (Glycine).

427 Involving cotton cell or tissue:
This subclass is indented under subclass 420. Subject matter wherein the process includes the presence of a cotton cell or tissue (Gossypium).

428 Involving sunflower cell or tissue:
This subclass is indented under subclass 420. Subject matter wherein the process includes the presence of a sunflower cell or tissue (Helianthus).

429 Involving potato cell or tissue:
This subclass is indented under subclass 420. Subject matter wherein the process includes the presence of a potato cell or tissue (Solanum).

430 Involving regeneration or propagation into a plant or plant part:
This subclass is indented under subclass 420. Subject matter wherein the process is one in which the plant cell or tissue regenerates or propagates into a plant or plant part which is more mature or differentiated than the starting cell or tissue, e.g., growing a mature plant from meristematic tissue, culturing a root to induce formation of a cell mass which is cultured in a medium which results in a plantlet, etc.

(1) Note. Plant parts include seed, embryo, flower, leaf, differentiated tissue (i.e., specific organs), bud, meristem, shoot, root, tuber, fruit, stem, cutting, bulb, corm, rhizome, pollen, mycelium, spore, ascocarp, and sclerotia.

430.1 Involving callus or embryonic stage:
This subclass is indented under subclass 430. Subject matter wherein the regeneration or propagation process includes a callus or embryonic stage at some stage of the process.

(1) Note. A callus is a growth of unorganized and either unconnected or loosely connected plant cells generally produced by culturing an explant.

(2) Note. For the purposes of this subclass, embryonic stage may be a proembryo, early stage proembryo, late stage proembryo, cotyledonary embryo, embryo, etc.

431 Medium, per se, for culture, maintenance, regeneration, etc.:
This subclass is indented under subclass 410. Subject matter which is a medium, per se, for culturing, maintaining, regenerating, differentiating, isolating, etc. the plant cell, cell line, or tissue.

440 PROCESS OF MUTATION, CELL FUSION, OR GENETIC MODIFICATION:
This subclass is indented under the class definition. Processes for (1) producing a mutation in an animal cell, plant cell or microorganism, (2) fusing animal, plant, or microbial cells, (3) producing a stable and heritable change in the genotype of an animal cell, plant cell, or a microorganism by artificially inducing a structural change in a gene or by incorporation of genetic material from an outside source, or (4) producing a transient change in the genotype of an animal cell, plant cell, or microorganism by the incorporation of genetic material from an outside source.

(1) Note. A mutation is a change produced in cellular DNA which can be either spontaneous, caused by an environmental factor or errors in DNA replication, or induced by physical or chemical conditions. The processes of mutation included in this and indented subclasses are processes directed to production of essentially random changes to the DNA of an animal cell, plant cell, or a microorganism without incorporation of exogenous DNA. It should be noted that incorporation of exogenous genetic material into a cell or microorganism or rearrangement of genetic material within a cell or microorganism is not considered a mutation; see the SEE OR SEARCH THIS CLASS, SUBCLASS references below.

(2) Note. For the purposes of this and indented subclasses, in vitro mutagenesis, which is a method where cloned DNA is modified outside of the cell or microorganism and then incorporated into a cell or microorganism is not considered to be a mutation. see the SEE OR SEARCH THIS CLASS, SUBCLASS references below.

(3) Note. Genetic material from an outside source may include chemically synthesized or modified genes.

(4) Note. For purposes of this and indented subclasses, transient changes effected by incorporation of genetic material from

an outside source involve expression of one or more phenotypic traits encoded by said genetic material. A transient change is one which is passing or of short duration. Methods producing non-genetically encoded changes effected by a nucleic acid molecule, such as anti-sense nucleic acid, are not proper for this and indented subclasses.

SEE OR SEARCH THIS CLASS, SUBCLASS:

375, for treating an animal cell with an antisense nucleic acid thereby altering cell metabolism or physiology.

455+, for processes of introducing nucleic acid into or rearrangement of nucleic acid within an animal cell.

468+, for processes of introducing nucleic acid into or rearrangement of nucleic acid within a plant cell.

471+, for processes of introducing nucleic acid into or rearrangement of nucleic acid within a microorganism.

SEE OR SEARCH CLASS:

800, Multicellular Living Organisms and Unmodified Parts Thereof and Related Processes, for processes of mutation, cell fusion, and genetic modification resulting in a whole living multicellular organism (nonhuman animal or plant) and the resulting nonhuman animal or plant, per se.

441 Mutation employing a chemical mutagenic agent:

This subclass is indented under subclass 440. Processes wherein structural change in a gene is effected by a reaction of an animal, plant, or microbial cell with a chemical compound or composition.

(1) Note. Chemical or enzymatic alteration of a nucleic acid outside of a cell, followed my introduction of said nucleic acid into a cell, e.g., in vitro mutagenesis or site-directed mutagenesis, etc. is not proper for this or indented subclasses. See the SEE OR SEARCH THIS CLASS, SUBCLASS references below.

(2) Note. Enzymatic alteration of a nucleic acid without introduction into a cell is not proper for this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

91.1+, for enzymatically altering a nucleic acid without further introducing it into a cell or microorganism.

375, for treating an animal cell with an antisense nucleic acid thereby altering cell metabolism or physiology.

455+, for processes of introducing nucleic acid into or rearrangement of nucleic acid within an animal cell.

468+, for processes of introducing nucleic acid into or rearrangement of nucleic acid within a plant cell.

471+, for processes of introducing nucleic acid into or rearrangement of nucleic acid within a microorganism.

442 By replacement of standar nucleic acid base with base analog (e.g., 5-bromouracil, etc.):

This subclass is indented under subclass 441. Processes involving a compound which is incorporated into a DNA strand by replacing a normally present deoxynucleotide triphosphate thereby altering its base-pair sequence.

(1) Note. Examples of base analogs include 5-bromouracil, 5-fluorouracil, 5-bromodeoxyuridine, 5-ethyl-2'-deoxyuridine, 5-iodo-2'-deoxyuridine, and 6-thioguanine.

(2) Note. The mode of action of the base analog is that it substitutes for a standard nucleic acid base during replication and causes a new base pair to appear in daughter cells in a later generation.

443 By use of intercalating agent (e.g., acridine orange, etc.):

This subclass is indented under subclass 441. Processes involving a compound which intercalates between bases in a DNA molecule.

(1) Note. Examples of intercalating agents include acridine orange, 2-nitro-7-methoxynaphtho-[2,1-b]-furan, and acriflavin.

(2) Note. The mode of action of the intercalating agent is that it inserts between two base pairs. The consequence is that when the DNA with intercalating agent is replicated, additional bases appear in its sequence and, though less common, deletion of a base may also occur.

444 By use of alkylating agent (e.g., nitrosoguanidine, etc.):
This subclass is indented under subclass 441. Processes involving a compound which alkylates a base moiety in a DNA molecule.

(1) Note. Examples of alkylating agents include nitrosoguanidine and derivatives, N-acetoxy-N-2-acetylaminofluorine, ethylmethanesulfonate, and diethyl sulfate.

445 By use of oxidative deamination agent (e.g., nitrous acid, etc.):
This subclass is indented under subclass 441. Processes involving a compound which oxidatively deaminates one or more bases in a DNA molecule.

446 Mutation employing radiation or electricity:
This subclass is indented under subclass 440. Processes wherein structural change in a gene is effected by exposure of an animal, plant, or microbial cell to radiation or an electric field.

(1) Note. Radiation includes electromagnetic waves (gamma rays, x-rays, ultraviolet, visible, infrared, and radio waves), or particle radiation, e.g., beta, alpha, etc.

SEE OR SEARCH THIS CLASS, SUBCLASS:
173.1+, for treatment of a cell with wave or electrical energy without causing mutation.

SEE OR SEARCH CLASS:
204, Chemistry: Electrical and Wave Energy, subclass 157.64 for processes of preparing an organic compound containing nitrogen, sulfur, phosphorus, or silicon by a chemical reaction induced or effected by ionizing radiation.

447 X-ray irradiation:
This subclass is indented under subclass 446. Processes involving irradiation with x-rays.

448 Ultraviolet irradiation:
This subclass is indented under subclass 446. Processes involving irradiation with ultraviolet (UV) light.

449 Fusion of cells:
This subclass is indented under subclass 440. Processes wherein cellular matter of two or more fusing partners is combined, thereby producing a cell which initially contains the genes of both of the fusing partners.

(1) Note. This subclass does not include fusion of a liposome to a cell unless two or more cells are also fused by the process.

(2) Note. This subclass does not include fusion of a cell to an enveloped virus as part of an infection or genetic alteration method.

(3) Note. Placement of a method in this subclass does not require fusion of nuclei.

SEE OR SEARCH THIS CLASS, SUBCLASS:
326+, for fused or hybrid animal cells, per se, which express immunoglobulin or antibody.
346, for fused or hybrid animal cells, per se, which do not produce immunoglobulin or antibody.
455+, for methods of liposome fusion for genetic alteration or recombination between or within DNA molecules in animal cells.
456+, for methods of introducing into an animal cell a nucleic acid surrounded by viral coat protein.
467, for methods of introducing an oncogene into an animal cell to establish a cell line.
471+, for methods of liposome fusion for genetic alteration or recombination between or within DNA molecules in plant cells.

472, for methods of introducing into a microorganism a nucleic acid surrounded by a phage coat protein.

450 Employing electric current:
This subclass is indented under subclass 449. Processes wherein the fusion is effected by exposure of the fusing partners to an electric current.

(1) Note. This subclass includes use of alternating current, direct current, or pulsed current.

451 One of the fusing cells is a human antibody-producing cell:
This subclass is indented under subclass 449. Processes wherein one or more of the fusing partners is of human origin and expresses a functional immunoglobulin, e.g., a human B-lymphocyte, etc.

452 One of the fusing cells is a mouse antibody-producing cell:
This subclass is indented under subclass 449. Processes wherein one or more of the fusing partners is of mouse origin and expresses a functional immunoglobulin, e.g., a mouse B-lymphocyte, etc.

453 One of the fusing cells is a microorganism (e.g., prokaryote, fungus, etc.):
This subclass is indented under subclass 449. Processes wherein one or more of the fusing partners is of plant origin.

(1) Note. For purposes of this subclass, a plant cell is a cell which originates from a multi-cellular member of the plant kingdom.

454 One of the fusing cells is a microorganism (e.g., prokaryote, fungus, etc.):
This subclass is indented under subclass 449. Processes wherein one or more of the fusing partners is a cell which is a unicellular organism (e.g., prokaryote, fungus, etc.).

(1) Note. The terms "unicellular organism" or "microorganism" include prokaryotes, eubacteria, cyanobacteria, archaebacteria, fungi, unicellular algae, protozoa, and protista.

455 Introduction of a polynucleotide molecule into or rearrangement of nucleic acid within an animal cell:
This subclass is indented under subclass 440. Processes of inserting polynucleotide molecules into or rearranging genetic material within an animal cell.

(1) Note. For purposes of this and the indented subclasses "animal cell" includes cells of organisms of the animal kingdom wherein said cells are not part of a tissue or an organ nor are they part of a multicellular organism during the process.

(2) Note. For purposes of this subclass, protozoans, also called protoctistans, are considered to be microorganisms and therefore methods of transforming them are classified elsewhere.

(3) Note. Insertion or introduction includes transfection, microinjection, particle-mediated transformation, lipofection, and infection.

(4) Note. Rearrangement includes processes which occur within a cell: transposition, gene duplication, and deletion or insertion of a polynucleotide segment from or into another polynucleotide segment, respectively.

(5) Note. Neither antisense oligonucleotides nor catalytic RNA molecules function as genetic material within cells. Therefore processes of inserting an antisense oligonucleotide and/or catalytic RNA molecule into a cell are excluded from this and the indented subclasses.

(6) Note. Processes of introducing nucleic acid into or rearrangement of nucleic acid within a cell wherein the final process step is to isolating, selecting for, identifying, screening for, etc. The transformed cells are considered to be test processes and are properly classified elsewhere.

SEE OR SEARCH THIS CLASS, SUBCLASS:

6, for methods of transforming cells with nucleic acid wherein the final step of the method involves measuring or testing for the transformant (e.g., selecting, isolating, screening, identifying, etc).

375, for a method of using antisense oligonucleotides or catalytic RNA to treat animal cells in vitro.

471+, for methods of transforming protozoans.

SEE OR SEARCH CLASS:

514, Drug, Bio-affecting and Body Treating Compositions, subclass 44 for in vivo methods of treating animal cells within a multicellular organism with a polynucleotide.

800, Multicellular Living Organisms and Unmodified Parts Thereof and Related Processes, subclasses 21+ for methods of making nonhuman animals which may involve introduction of nucleic acid into or rearrangement of nucleic acid within the animal.

456 The polynucleotide is encapsidated within a virus or viral coat:

This subclass is indented under subclass 455. Processes wherein the nucleic acid which is to be introduced into the cell is surrounded, entirely or substantially, by viral coat protein when brought into contact or proximity to said cell.

(1) Note. Viral coat protein may be a protein with a naturally occurring, mutated or recombinantly modified sequence, or a protein which is an entirely synthetically designed sequence, provided that said protein forms an organized array around the nucleic acid and facilitates independent entry of said nucleic acid into said cell.

457 Helper virus is present:

This subclass is indented under subclass 456. Processes wherein a helper virus is present.

(1) Note. A helper virus is a virus which permits another nucleic acid molecule present in the same cell as said helper virus to be replicated and assembled as a virus or virus-like particle.

(2) Note. The nucleic acid molecule which is replicated and assembled as a virus or virus-like particle by functions encoded by the helper virus may itself be viral or non-viral.

458 The polynucleotide is coated with or encapsulated within a lipid containing material (e.g., liposome, etc.):

This subclass is indented under subclass 455. Processes wherein the nucleic acid molecule is entrapped within a liposome, lipidic particle, or other lipid containing artificial membrane vesicle, or is coated with a cationic lipid, e.g., DOTMA, etc.

459 Involving particle-mediated transfection (i.e., biolistic transfection):

This subclass is indented under subclass 455. Processes wherein the nucleic acid is present upon or within a particle which is inserted into the cell, wherein said particle penetrates the cell membrane in a ballistic fashion, i.e., due to a relatively high velocity.

460 Involving laser treatment of the cell before or during transfection:

This subclass is indented under subclass 455. Processes wherein the cell membrane is rendered permeable to entry of the nucleic acid by means of irradiation with a laser beam or pulse.

461 Involving electroporation:

This subclass is indented under subclass 455. Processes wherein the cell membrane is rendered permeable to entry of the nucleic acid by means of a pulse of electric current.

462 Involving site-specific recombination (e.g., Cre-lox, etc.):

This subclass is indented under subclass 455. Processes wherein recombination between the nucleic acid and another nucleic acid, or within the nucleic acid, occurs in a site-specific fashion, directed by a specific enzyme or other specific catalytic agent.

(1) Note. Not proper for this subclass are methods wherein a recombination event is directed by homology or similarity

over a significant stretch of each molecule, and wherein the recombination reaction is driven by general recombination mechanisms of the cell. Also not proper for this subclass are random integration methods which are classified according to other elements of the invention.

SEE OR SEARCH THIS CLASS, SUBCLASS:
463, for general or homologous recombination methods.

463 Involving general or homologous recombination (e.g., gene targeting, etc.):
This subclass is indented under subclass 455. Processes wherein one or more segments of nucleic acid of sufficient length and similarity to target said nucleic acid to a region or regions of DNA in the cell are present on the nucleic acid molecule and wherein the segment or segments direct homologous recombination into said region or regions in the cell by means of the general recombination mechanism of the cell.

(1) Note. Not proper for this subclass are methods wherein a recombination event occurs in site-specific fashion, directed by a specific enzyme or other specific catalytic agent. Also excluded are random integration methods which are classified instead according to other elements of the invention.

SEE OR SEARCH THIS CLASS, SUBCLASS:
462, for recombination events occurring in site-specific fashion, directed by a specific enzyme or other specific catalytic agent.

464 Involving gene duplication within the cell (e.g., amplification, co-amplification, etc.)
This subclass is indented under subclass 455. Processes wherein copy number of a segment of the nucleic acid within the cell, e.g., a gene, etc., is increased in tandem or head-to-tail fashion without a concomitant increase in the copy number of the entire nucleic acid molecule.

(1) Note. Co-amplification occurs when amplification of one nucleic acid segment results in amplification of a second nucleic acid segment, wherein said second segment would not normally amplify alone.

SEE OR SEARCH THIS CLASS, SUBCLASS:
91.2+, for methods of amplifying a nucleic acid by means of a cell or enzyme, e.g., PCR, etc.

465 Involving co-transfection:
This subclass is indented under subclass 455. Processes wherein the nucleic acid is introduced into a cell simultaneously with a second, separate and different nucleic acid molecule, such that the cell becomes transfected by both nucleic acid molecules.

466 The polynucleotide is a shuttle vector or a trasiently replicating hybrid vector:
This subclass is indented under subclass 455. Processes wherein the nucleic acid contains at least two different origins of replication with said different origins being functional in cells from different organisms and at least one of said origins being of animal origin and functional in the transfected cell.

(1) Note. For the purposes of this subclass, transient replication is defined as replication of the vector only for a limited duration, such that said vector does not persist in the host cell or cell line, e.g., SV40, polyoma virus, etc.

467 Inroducing an oncogene to establish a cell line:
This subclass is indented under subclass 455. Processes wherein the introduced nucleic acid immortalizes or transforms the cell to allow continuous growth and division of said cell and its progeny, as a cell line.

468 Introduction of a polynucleotide molecule into or rearrangement of a nucleic acid within a plant cell:
This subclass is indented under subclass 440. Processes of inserting polynucleotide molecules into or rearranging genetic material within a plant cell.

SEE OR SEARCH CLASS:

800, Multicellular Living Organisms and Unmodified Parts Thereof and Related Processes, subclasses 278+ for processes of introducing nucleic acid into or rearrangement of nucleic acid within a plant or plant part resulting in a whole living transgenic plant or plant part.

469 Introduction via Agrobacterium:

This subclass is indented under subclass 468. Processes wherein the nucleic acid is introduced into the plant cell by means of an Agrobacterium.

470 Introduction via electroporation, particle, fiber or microprojectile mediated insertion, or injection:

This subclass is indented under subclass 468. Processes wherein the nucleic acid molecule is introduced into the plant cell by electroporation, particle, fiber or microprojectile mediated insertion, or injection.

(1) Note. Electroporation involves the use of an electric pulse of sufficient voltage and time to open temporary gaps in the cell membrane to permit a polynucleotide to enter the cell. Microprojectile insertion or injection involves the use of velocity or pressure to penetrate the plant cell wall and membrane in order to introduce the nucleic acid molecule into the cell. Particle or fiber mediated insertion involves using microscopic particles or fibers as carriers of the nucleic acid.

471 Introduction of a polynucleotide molecule into or rearrangement of nucleic acid within a microorganism (e.g., bacteria, protozoa, bacteriophage, etc.):

This subclass is indented under subclass 440. Processes of inserting polynucleotide molecules into or rearranging genetic material within a microorganism such as bacteria, protozoa, bacteriophage, etc.

(1) Note. For purpose of this and indented subclasses, the term microorganism includes prokaryotes such as Escherichia coli, Bacillus, Thermococcus, Halobacterium, and other bacteria; unicellular eukaryotes such as yeasts, molds, protozoans, and unicellular algae; and bacteriophage.

(2) Note. Insertion includes techniques such as transformation, transfection, transduction, conjugation, microinjection, particle-mediated transformation, lipofection, and infection.

(3) Note. Rearrangement includes processes which occur within a microbial cell such as transposition, gene duplication, and deletion or insertion of a polynucleotide segment from or into another polynucleotide segment, respectively.

(4) Note. Neither antisense oligonucleotides nor catalytic RNA molecules function as genetic material (i.e., do not encode genetic information) within cells. They act as agents which act upon molecules which do encode genetic information. Therefore processes of inserting an antisense oligonucleotide and/or catalytic RNA molecule into a cell are not included in this and indented subclasses.

SEE OR SEARCH THIS CLASS, SUBCLASS:

6, for processes of introducing nucleic acid into or rearrangement of nucleic acid within a microorganism wherein the final process step is isolating, selecting for, identifying, screening for, etc., the transformed cell.

243+, for a method of using antisense oligonucleotides or catalytic RNA to treat microbial cells.

472 The polynucleotide is encapsidated within a bacteriophage, bacteriophage coat, or transducing particle:

This subclass is indented under subclass 471. Processes wherein the nucleic acid which is to be introduced into a microbial cell is surrounded entirely or substantially by phage coat protein when brought into contact or proximity with said cell.

(1) Note. Phage coat protein is a protein with a naturally occurring, mutated, or recombinantly modified sequence, or a protein which is of a synthetically

designed sequence, provided that said protein forms an organized array around the nucleic acid and facilitates independent entry of said nucleic acid into said cell.

(2) Note. A phagemid or phasmid is a recombinant DNA vector that may act as a phage or as a plasmid, i.e., it is a hybrid between plasmid and filamentous phage cloning vehicles. If the phagemid is encapsidated within a phage coat, it is proper for the processes in this subclass. If the phagemid is not encapsidated and does not encode for phage coat protein, it is considered a plasmid and is not proper for this subclass.

(3) Note. A transducing particle is a DNA molecule surrounded by a complete bacteriophage protein coat, said particle facilitating independent entry of said DNA into a host microoorganism.

SEE OR SEARCH THIS CLASS, SUBCLASS:

475, for processes of introducing nucleic acid into a microorganism where the nucleic acid is unencapsidated bacteriophage or viral nucleic acid.

476+, for processes of introducing nucleic acid into a microorganism where the nucleic acid is plasmid or episome.

473 The polynucleotide contains a transposon:

This subclass is indented under subclass 471. Processes wherein the nucleic acid inserted into the microbial cell contains a transposon.

(1) Note. A transposon is a nucleic acid sequence which possesses repeated terminal insertion sequences, a transposase gene (i.e., an integrase gene), a resolvase gene, and the capability of inserting itself or a copy of itself into the DNA of a microbial cell.

474 The polynucleotide is a cosmid:

This subclass is indented under subclass 471. Processes wherein the nucleic acid inserted into the microbial cell is in the form of a cosmid vector.

(1) Note. A cosmid is a DNA vector of a closed circular structure which possesses a cos site of bacteriophage lambda, or the equivalent packaging site of another bacteriophage which uses the headfull mechanism of packaging, and an insert of cloned DNA, where a bacteriophage mechanism of packaging was used to form the initial library of clones.

475 The polynucleotide is unencapsidated bacteriophage or viral nucleic acid:

This subclass is indented under subclass 471. Processes wherein the nucleic acid is that of a bacteriophage or virus which when inserted into the microbial cell is not surrounded by phage or viral coat protein.

(1) Note. Phage coat protein is a protein with a naturally occurring, mutated or recombinantly modified sequence, or a protein which is of a synthetically designed sequence, provided that said protein forms an organized array around the bacteriophage or viral nucleic acid and facilitates the independent entry of said nucleic acid into said cell.

(2) Note. The nucleic acid proper for this subclass is capable of infecting a microbial cell, i.e., is capable of directing the formation of infectious particles in said cell.

(3) Note. A phagemid or phasmid is a recombinant DNA vector that may act as a phage or as a plasmid, i.e., it is a hybrid between plasmid and filamentous phage cloning vehicles. If the phagemid is not encapsidated in phage coat, but encodes for phage coat protein, it is proper for the processes in this subclass. If the phagemid is not encapsidated and does not encode for phage coat protein, it is considered a plasmid and is not proper for this subclass.

(4) Note. Viruses of microorganisms and bacteriophages which never undergo a packaged, extracellular existence are included in this subclass.

(5) Note. Viroids and virusoids of microorganisms are proper for this subclass.

SEE OR SEARCH THIS CLASS, SUBCLASS:

472, for processes of introducing nucleic acid into a microorganism where the nucleic acid is encapsidated within a bacteriophage coat or transducing particle.

476+, for processes of introducing nucleic acid into a microorganism where the nucleic acid is plasmid or episome.

476 The polynucleotide is a plasmid or episome:

This subclass is indented under subclass 471. Processes wherein the nucleic acid is a plasmid or episome and therefore capable of autonomous replication in the microorganism cell.

(1) Note. The nucleic acid is either circular or linear in its replicating form and is circular, linear, or a linearized circle when introduced into the microbial cell.

(2) Note. An episome is a small, self-replicating molecule of DNA that is separate from the main chromosome. It has the ability to move on and off the main chromosomal elements.

(3) Note. A phagemid or phasmid is a recombinant DNA vector that may act as a phage or as a plasmid, i.e., it is a hybrid between plasmid and filamentous phage cloning vehicles. If the phagemid is not encapsidated and does not encode for phage coat protein, it is considered a plasmid and proper for the processes of this and the indented subclasses.

SEE OR SEARCH THIS CLASS, SUBCLASS:

472, for processes of introducing nucleic acid into a microorganism where the nucleic acid is encapsidated within a bacteriophage coat or transducing particle.

475, for processes of introducing nucleic acid into a microorganism where the nucleic acid is unencapsidated bacteriophage or viral nucleic acid.

477 Plasmid or episome contains DNA targeting homologous recombination to bacteriophage, viral, or chromosomal DNA within a microorganism:

This subclass is indented under subclass 476. Processes wherein one or more DNA segments of sufficient length and similarity to target said DNA to a region or regions of DNA in a microbial cell are present on the plasmid or episome, which segment or segments direct homologous recombination into said region or regions in the microorganism.

(1) Note. Included in this subclass is the use of plasmids with one continuous segment directing single cross-over recombination or two separate flanking segments directing double cross-over recombination.

478 Plasmid or episome contains at least part of a gene encoding a restriction endonuclease or modification enzyme:

This subclass is indented under subclass 476. Processes wherein at least part of a gene for a restriction endonuclease or at least part of a gene for a modification enzyme is present on the plasmid or episome.

(1) Note. A restriction endonuclease cleaves DNA at a site possessing a defined nucleotide pattern. A modification enzyme methylates or otherwise modifies DNA at sites possessing specific nucleotide patterns thereby preventing cleavage by a particular restriction endonuclease.

(2) Note. This subclass does not include the use of genes encoding endonucleases or methylases which are not involved in restriction and modification.

479 Plasmid or episome confers the ability to utilize directly a compound which a wild type microoraganism is unable to utilize:

This subclass is indented under subclass 476. Processes wherein the plasmid or episome contains nucleic acid which enables a microorganism transformed with said plasmid or episome to metabolize a compound not metabolizable by the wild type microorganism.

(1) Note. For purposes of this subclass, metabolism of a compound is defined as a biochemical activity upon said compound that results in the formation of a product or intermediate product which is further useful to the microorganism or useful in production of energy useable by the microorganism.

(2) Note. This subclass includes the use of nucleic acids conferring the ability to utilize compounds such as isoprenoids, camphor, L-tartrate, etc.

(3) Note. This subclass is not intended to include use of nucleic acids encoding antibiotic resistance as the means of conferring the new metabolic activity. i.e., where said compound is an antibiotic.

(4) Note. This subclass is not intended to include the use of genes which indirectly confer the ability to utilize a nutrient substrate which the wild type microorganism cannot utilize, e.g., a gene encoding an enzyme which damages plant cell walls thereby permitting the recombinant microbe access to nutrients within, etc.

480 Plasmid or episome contains at least part of a gene encoding a toxin or encoding for virulence or pathogenicity:
This subclass is indented under subclass 476. Processes wherein at least part of a gene for a toxin or at least part of a gene for causing virulence or pathogenicity is present on the plasmid or episome.

(1) Note. A toxin is a compound which is inhibitory to biological function of a cell type, tissue, organ, or entire living individual.

(2) Note. This subclass includes use of genes encoding cytotoxins.

(3) Note. The use of a gene for encoding for a product which is being used as a toxin is appropriate for this subclass.

(4) Note. A virulence or pathogenicity gene is a gene which when lost leads to the inability of the pathogenic organism to damage the host, i.e., the inability to inhibit a biological function of the host individual or a component cell, tissue or organ thereof.

(5) Note. This subclass does not include use of genes which encode degradatory enzymes which do not normally possess in vivo roles of inhibition of biological function, e.g., trypsin, collagenase, etc., unless said enzymes are being employed as toxins in the invention.

481 Plasmid or episome contains a gene which complements a nutritional deficiency mutation:
This subclass is indented under subclass 476. Processes wherein the plasmid or episome contains a gene which restores an ability to import and/or utilize one or more nutrient compounds to a microorganism where such an ability is normally present in the wild type microorganism but has been lost.

482 Plasmid or episome contains a gene which confers resistance to metal, silicon, selenium, or tellurium toxicity:
This subclass is indented under subclass 476. Processes wherein the plasmid or episome contains a gene which confers resistance to metals, silicon, selenium, or tellurium which are toxic to a microorganism.

(1) Note. The conferred resistance in the microorganism permits growth of said microbe or growth of said microbe which is more rapid or vigorous than for the wild type, when said microbe is exposed to a toxic metallic element or silicon, selenium, or tellurium in either the ground or ionized state.

483 Yeast is a host for the plasmid or episome:
This subclass is indented under subclass 476. Processes wherein the plasmid or episome is introduced into a yeast.

(1) Note. A yeast is a unicellular fungus which is mono or oligonucleate and does not possess hyphae or an amoeboid morphology. This subclass thus does not include mycelial fungi and slime molds.

(2) Note. A fungus with a clearly defined yeast phase of growth and another phase, e.g., filamentous, etc., is classified here when the yeast phase is being transformed or recombined.

(3) Note. Examples of host genera proper for this subclass are Saccharomyces, Schizosaccharomyces, Kluyveromyces, Pichia, Hansenula, and Torulopsis.

SEE OR SEARCH THIS CLASS, SUBCLASS:
484, for use of mycelial fungi as hosts for a plasmid or episome.

484 Mycelial fungus is a host for the plasmid or episome:
This subclass is indented under subclass 476. Processes wherein the plasmid or episome is introduced into a mycelial fungus.

(1) Note. A mycelial fungus is a fungus which possesses coenocytic (i.e., multinucleate) filamentous hyphae, including fungi wherein said hyphae are interconnected to form a mycelium.

(2) Note. This subclass includes molds of the genera Neurospora, Aspergillus, Penicillium, Trichoderma, Fusarium, Mucor, and Rhizopus. Slime molds are not included because they do not meet the definition criteria for mycelial fungi.

(3) Note. Processes of transforming fungi which possess macroscopic structures, e.g., mushrooms, etc. are not proper for this subclass. Fungi with macroscopic structures are considered plants rather than microorganisms.

SEE OR SEARCH THIS CLASS, SUBCLASS:
483, for processes where yeast is a host for a plasmid or episome.

SEE OR SEARCH CLASS:
800, Multicellular Living Organisms and Unmodified Parts Thereof and Related Processes, subclasses 278+ for processes of genetically transforming fungi which possess macroscopic structures.

485 Microorganism of the genus Bacillus is a host for the plasmid or episome:
This subclass is indented under subclass 476. Processes wherein the plasmid or episome is introduced into a microorganism of genus Bacillus.

486 Microorganism of the genus Streptomyces is a host for the plasmid or episome:
This subclass is indented under subclass 476. Processes wherein the plasmid or episome is introduced into a microorganism of genus Streptomyces.

487 Microorganism of the genus Brevibacterium or genus Corynebacterium is a host for the plasmid or episome:
This subclass is indented under subclass 476. Processes wherein the plasmid or episome is introduced into a microorganism of genus Brevibacterium or a microorganism of genus Corynebacterium.

488 Microorganism of the genus Escherichia is a host for the plasmid or episome:
This subclass is indented under subclass 476. Processes wherein the plasmid or episome is introduced into a microorganism of genus Escherichia.

488 Plural nonidentical plasmids are introduced into a host microorganism or culture thereof (e.g., plasmid is part of a library, etc.):
This subclass is indented under subclass 476. Processes wherein two or more nonidentical plasmids are present in a mixture to be used for transforming a microorganism or culture thereof.

(1) Note. This subclass includes methods wherein a mixture of different plasmid types is added to a culture of microorganisms and wherein only one of the types of plasmid is ultimately inserted into each individual recipient microbial cell, e.g., transformation to generate a library of plasmids, etc., and methods wherein two or more types of plasmids are inserted into the same recipient cell, e.g., cotransformation, etc.

490 The polynucleotide is an unbranched linear fragement:
This subclass is indented under subclass 471. Processes wherein the inserted nucleic acid is an unbranched linear molecule.

(1) Note. This subclass includes transformation mixtures wherein the linear fragments may be the same or different.

CROSS-REFERENCE ART COLLECTIONS

Cross-reference Art Collections 960-975 are related to subclasses 7.1 through 7.95

800 ELIMINATION OR REDUCTION OF CONTAMINATION BY UNDESIRED FERMENTS (E.G., ASEPTIC CULTIVATION):
Subject matter in which a culture is subjected to physical or chemical treatment to suppress or reduce the growth of a microorganism present in order to permit another microorganism to propagate.

801 ANEROBIC CULTIVATION:
Subject matter in which microorganism cultivation takes place in the absence of oxygen or oxygen bearing gas.

802 LOGARITHMIC GROWTH PHASE:
Subject matter in which the initial growth period of a microorganism culture is extended or controlled or is otherwise of interest.

803 PHYSICAL RECOVERY METHODS; E.G., CHROMATOGRAPHY, GRINDING:
Subject matter in which a microorganism or microbial product other than an enzyme is recovered or purified by physical means alone.

804 SINGLE CELL PROTEIN:
Subject matter in which the suitability of a microorganism to supply palatable protein is disclosed.

805 TEST PAPERS:
Subject matter in which a test material is carried on a bibulous material which may be cellulosic or noncellulosic.

806 FERTILITY TESTS:
Subject matter in which fecundity or pregnancy is determined.

807 GAS DETECTION APPARATUS:
Subject matter in which means is provided to detect the presence of gas in a qualitative or quantitative manner.

808 OPTICAL SENSING APPARATUS:
Subject matter in which means senses the production or absorbtion of light by a sample or otherwise optically examines a specimen.

809 INCUBATORS OR RACKS OR HOLDERS FOR CULTURE PLATES OR CONTAINERS:
Subject matter including heating means for culture containers or means to support such containers.

810 PACKAGED DEVICE OR KIT:
Subject matter in which a measuring or testing device or sample or plurality of such is in a container or package.

811 INTERFERON:
Subject matter in which the antiviral agent interferon is isolated or treated.

812 FOAM CONTROL:
Subject matter in which the formation of froth in fermentors is suppressed by physical or chemical treatment.

SEE OR SEARCH CLASS:

516, Colloid Systems and Wetting Agents; Subcombinations Thereof; Processes of Making, Stabilizing, Breaking, or Inhibiting, subclasses 115+ for compositions for or subcombination compositions for or breaking of or inhibiting of foam colloid systems, when generically claimed or when there is no hierarchically superior provision in the USPC for the specifically claimed art. Nominal recitation of a Class 435 process (e.g., fermentation or fermentation step) combined with a process otherwise classifiable in Class 516 is proper for Class 516, while recitation of a significant Class 435 step combined with a step or composition

otherwise classifiable in Class 516 is proper for Class 435 with a discretionary cross-reference to Class 516.

813 CONTINUOUS FERMENTATION:
Subject matter which is arranged to facilitate continuous operation.

814 ENZYME SEPARATION OR PURIFICATION:
Subject matter in which an enzyme is separated or purified.

815 By sorption:
This subclass is indented under subclass 814. Subject matter in which an enzyme is separated or purified by absorption or adsorption.

816 By solubility:
This subclass is indented under subclass 814. Subject matter in which an enzyme is separated or purified by manipulation of the relative solubility of the enzyme in a solvent.

817 ENZYME OR MICROBE ELECTRODE:
Subject matter in which an enzyme or microbe is part of an electrode.

818 AERATION OR OXYGEN TRANSFER TECHNIQUE:
Subject matter in which a fermentor is aerated or other process of oxygen transfer is disclosed.

819 FERMENTATION VESSELS IN SERIES:
Subject matter in which two or more fermentation vessels are connected in series.

820 SUBCELLULAR PARTS OF MICROORGANISMS:
Subject matter in which the subcellular parts of a microorganism are isolated or treated.

821 MICROORGANISMS USED IN THE DESTRUCTION OF HAZARDOUS OR TOXIC WASTE:
Collection of microorganisms specifically disclosed as being useful for the destruction of hazardous or toxic waste.

822 Using bacteria or actinomycetales:
The subject matter below are microorganism cross-reference art collections. The bacteria terminology below is based upon "Bergey's Manual of Determinative Bacteriology," Eighth Edition, which is to be considered dispositive of the subject matter.

823 Acetobacter:

824 Achromobacter:

825 Actinomadura:

826 Actinomyces:

827 Actinoplanes:

828 Aerobacter:

829 Alcaligenes:

830 Arthrobacter:

831 Azotobacter:

832 Bacillus:

833 Bacillus brevis:

834 Bacillus cereus:

835 Bacillus circulans:

836 Bacillus licheniformis:

837 Bacillus megaterium:

838 Bacillus polymyxa:

839 Bacillus subtilis:

840 Brevibacterium:

841 Chainia:

842 Clostridium:

843 Corynebacterium:

844 Corynebacterium diphtheriae:

845 Corynebacterium poinsettiae:

846 Corynebacterium pyogenes:

847 Erwinia:

848 Escherichia:

849 Escherichia coli:

850 Flavobacterium:

851 Haemophilus:

852 Klebsiella:

853 Lactobacillus:

854 Lactobacillus acidophilus:

855 Lactobacillus brevis:

856 Lactobacillus casei:

857 Lactobacillus plantarum:

858 Methylomonas:

859 Micrococcus:

860 Micrococcus flavus:

861 Micrococcus glutamicus:

862 Micrococcus lysodeikticus:

863 Mycobacterium:

864 Mycobacterium avium:

865 Mycobacterium fortuitum:

866 Mycobacterium smegmatis:

867 Micromonospora:

868 Micromonospora chalcea:

869 Micromonospora purpurea:

870 Mycoplasma:

871 Neisseria:

872 Nocardia:

873 Proteus:

874 Pseudomonas:

875 Pseudomonas aeruginosa:

876 Pseudomonas fluorescens:

877 Pseudomonas putida:

878 Rhizobium:

879 Salmonella:

880 Serratia:

881 Serratia marcescens:

882 Staphylococcus:

883 Staphylococcus aureus:

884 Staphylococcus epidermidis:

885 Streptococcus:

886 Streptomyces:

887 Streptomyces albus:

888 Streptomyces antibioticus:

889 Streptomyces aureofaciens:

890 Streptomyces aureus:

891 Streptomyces bikiniensia:

892 Streptomyces candidus:

893 Streptomyces chartreusis:

894 Streptomyces diastatochromogenes:

895 Streptomyces filipinensis:

896 Streptomyces fradiae:

897 Streptomyces griseus:

898 Streptomyces hygroscopicus:

899 Streptomyces lavendulae:

900 Streptomyces lincolnensis:

901 Streptomyces noursei:

902 Streptomyces olivaceus:

903 Streptomyces platensis:

904 Streptomyces rimosus:

905 Streptomyces sparogenes:

906 Streptomyces venezuelae:

907 Streptosporangium:

908 Streptovirticillium:

909 Vibrio:

910 Xanthomonas:

911 Using fungi:

912 Absidia:

913 Aspergillus:

914 Aspergillus awamori:

915 Aspergillus flavus:

916 Aspergillus fumigatus:

917 Aspergillus niger:

918 Aspergillus oryzae:

919 Aspergillus ustus:

920 Aspergillus wenti:

921 Candida:

922 Candida albicans:

923 Candida lipolytica:

924 Candida tropicalis:

925 Cephalosporium:

926 Cephalosporium acremonium:

927 Cephalosporium caerulens:

928 Cephalosporium crotocinigenium:

929 Fusarium:

930 Hansenula:

931 Mucor:

932 Paecilomyces:

933 Penicillium:

934 Penicillium brevi:

935 Penicillium chrysogenum:

936 Penicillium notatium:

937 Penicillium patulum:

938 Pichia:

939 Rhizopus:

940 Saccharomyces:

941 Saccharomyces carlsbergensis:

942 Saccharomyces cerevisiae:

943 Saccharomyces lactis:

944 Torulopsis:

945 Trichoderma:

946 Using algae:

947 Using protozoa:

948 Using viruses or cell lines:

960 IMMUNOHISTOCHEMICAL ASSAY:
Subject matter involving antigen-antibody binding or ligand-receptor binding involving the study of the structure or function of intact tissue.

(1) Note. Cross-reference Art Collections 960-975 are related to subclasses 7.1 through 7.95, above.

961 INCLUDING A STEP OF FORMING, RELEASING, OR EXPOSING THE ANTIGEN OR FORMING THE HAPTEN-IMMUNOGENIC CARRIER COMPLEX OR THE ANTIGEN, PER SE:
Subject matter involving a step of (1) forming, releasing, or exposing an antigen, (2) forming a hapten-immunogenic carrier complex, or (3) claiming the structure of the antigen, per se.

962 PREVENTION OR REMOVAL OF INTERFERING MATERIALS OR REACTANTS OR OTHER TREATMENT TO ENHANCE RESULTS (E.G., DETERMINING OR PREVENTING NONSPECIFIC BINDING, ETC.):
Subject matter involving (1) preventing the formation of interfering reactants or material, (2) removal of interfering reactants or material, or (3) treatment described as improving or enhancing the result of the assay.

963 METHODS OF STOPPING AN ENZYME REACTION OR STABILIZING THE TEST MATERIALS:
Subject matter involving (1) methods of stopping an enzyme reaction or (2) methods of stabilizing the test materials.

964 INCLUDING ENZYME-LIGAND CONJUGATE PRODUCTION (E.G., REDUCING RATE OF NONPRODUCTIVE LINKAGE, ETC.):
Subject matter involving the production of an enzyme-ligand conjugate.

965 INVOLVING IDIOTYPE OR ANTI-IDIOTYPE ANTIBODY:
Subject matter involving idiotype or anti-idiotype antibodies.

966 INVOLVING AN ENZYME SYSTEM WITH HIGH TURNOVER RATE OR COMPLEMENT MAGNIFIED ASSAY (E.G., MULTI-ENZYME SYSTEMS, ETC.):
Subject matter involving (1) an enzyme system with high turnover rate or (2) the use of complement to enhance the results of the assay.

(1) Note. This subclass also provides for the cyclic enzyme system for steroid assay.

967 STANDARDS, CONTROLS, MATERIALS (E.G., VALIDATION STUDIES, BUFFER SYSTEMS, ETC.):
Subject matter involving the standards, controls, or materials used in antigen-antibody or ligand-receptor binding assays.

968 HIGH ENERGY SUBSTRATES (E.G., FLUORESCENT, CHEMILUMINESCENT, RADIOACTIVE, ETC.):
Subject matter involving a high energy substrate such as one which is fluorescent, chemiluminescent, or radioactive.

969 MULTIPLE LAYERING OR REACTANTS:
Subject matter including the reacting of multiple ligand-binder components to result in amplification of the detection system.

(1) Note. This subclass is not intended to include conventional layered test strips or slides.

SEE OR SEARCH THIS CLASS, SUBCLASS:
970, for test strips or test slides.

970 TEST STRIP OR TEST SLIDE:
Subject matter involving the use of a test strip or slide which carries the reagents or reactants involved in the test.

971 CAPTURE OF COMPLEX AFTER ANTIGEN-ANTIBODY REACTION:
Subject matter involving reaction of antigen with antibody in solution resulting in an antigen-antibody complex which is then captured through insolubilization prior to a determination step.

972 MODIFIED ANTIBODY (E.G., HYBRID, BIFUNCTIONAL, ETC.):
Subject matter involving antibodies which have been altered physically or chemically.

973 SIMULTANEOUS DETERMINATION OF MORE THAN ONE ANALYTE:
Subject matter involving an analysis in which multiple analytes are determined at the same time.

974 AIDS RELATED TEST:
Subject matter involving a test for Acquired Immunodeficiency Syndrome.

975 KIT:
Subject matter in which measuring or testing reagents are in kit form.

FOREIGN ART COLLECTIONS

The definitions for FOR 100-FOR 122 below correspond to the definitions of the abolished subclasses under Class 435 from which these collections were formed. See the Foreign Art Collections schedule for specific correspondences. [Note: The titles and definitions for indented art collections include all the details of the one (s) that are hierarchically superior.

FOR 100 ANIMAL OR PLANT CELL (E.G., CELL LINES, ETC.); COMPOSITION THEREOF; PROCESS OF PROPAGATING, MAINTAINING OR PRESERVING ANIMAL OR PLANT CELL OR COMPOSITION THEREOF; PROCESS OF ISOLATING OR SEPARATING AN ANIMAL OR PLANT CELL OR COMPOSITION THEREOF; PROCESS OF PREPARING A COMPOSITION CONTAINING ANIMAL OR PLANT CELL; CULTURE MEDIA THEREFORE:
Foreign art collections including animal or plant cells, per se; compositions containing animal or plant cells; processes of in vitro propagation of animal or plant cells or groups of cells that are not organized tissues; processes of maintaining or preserving animal or plant cells or compositions thereof; processes of isolating or separating an animal or plant cell or composition thereof; processes of preparing a composition containing animal or plant cells; culture media therefore.

FOR 101 nimal cells, per se, culture techniques and media:
Foreign art collections including animal cell culture techniques, the media used to culture the cells and the animal cells, per se.

FOR 102 Techniques of establishing a primary culture:
Foreign art collections wherein a primary culture of animal cells is established.

FOR 103 Culture of encapsulated cells:
Foreign art collections wherein an encapsulated cell is cultured.

FOR 104 Culture of cells on solid support (e.g., anchorage dependent cells):
Foreign art collections wherein the animal cells are cultured on a solid support.

FOR 105 Support is suspendable particle:
Foreign art collections wherein the solid support is a suspendable particle.

FOR 106 Culture of cells on membrane:
Foreign art collections wherein the solid support is a membrane.

FOR 107 Hollow fibre membrane:
Foreign art collections wherein the membrane is in the form of a hollow tube or fibre.

FOR 108 Solid support treated or coated to enhance attachment or growth:
Foreign art collections wherein the solid support is treated or coated to enhance attachment or growth.

FOR 109 Culture in suspension:
Foreign art collections wherein the cell culture is in suspension.

FOR 110 Fused or hybrid cells:
Foreign art collections wherein the cell resulting from (a) the fusion of two cells, (b) the insertion of the nucleus or chromocone of one cell into another or (c) the treatment of a cell with an immortalizing agent which results in a cell which will proliferate in long-term culture.

FOR 111 Ab or Ig fragments producing cells:

Foreign art collections wherein the fused or hybrid cells are immunoglobulin or immunoglobulin fragment producing cells.

FOR 112 Culture medium, per se:
Foreign art collections wherein the culture medium, per se, is claimed.

FOR 113 Defined medium:
Foreign art collections wherein the media is composed of purified distinct chemical compounds.

FOR 114 Plant cells, per se, culture techniques and media:
Foreign art collections including plant cells, per se, and processes of culture of plant cells and the media for the culture or regeneration of plant cells.

FOR 115 Culture techniques (e.g., meristem culture, etc.):
Foreign art collections directed to the process of culture of plant cells.

FOR 116 Culture in suspension:
Foreign art collections wherein the cell culture is carried out in suspension.

FOR 117 Protoplasts:
Foreign art collections wherein a plant protoplast is cultured.

FOR 118 Callus culture:
Foreign art collections wherein a callus culture is grown.

FOR 119 Regeneration (includes nonflowering ornamentals):
Foreign art collections wherein the callus is used to regenerated a differentiated plant.

FOR 120 Agronomic crops (e.g., tobacco, grains, etc.):
Foreign art collections wherein the plant is an agronomic crop.

FOR 121 Fruit and vegetable crops (e.g., tobacco, etc.):
Foreign art collections wherein the plant is a fruit or vegetable crop.

FOR 122 Culture medium, per se, or regeneration medium, per se:
Foreign art collections wherein a culture medium, per se, or a regeneration medium, per se, is claimed.

END