

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 39

UNITED STATES PATENT AND TRADEMARK OFFICE

**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Ex parte EDWARD R. LAVALLIE

Appeal No. 2002-1479
Application No. 08/794,042

ON BRIEF

Before WINTERS, MILLS, and GRIMES, Administrative Patent Judges.

GRIMES, Administrative Patent Judge.

DECISION ON APPEAL

This is a decision on appeal under 35 U.S.C. § 134 from the examiner's final rejection of claim 42, the only claim remaining. Claim 42 reads as follows:

42. A recombinant, biologically active, enterokinase light chain, free of enterokinase heavy chain, comprising amino acids 564 to 798 of SEQ ID NO:2.

The examiner relies on the following reference:

Light et al. (Light), "The Preparation and Properties of the Catalytic Subunit of Bovine Enterokinase," Journal of Biological Chemistry, Vol. 259, pp. 13195-13198 (1984)

Appellant relies on the following references:

Light et al. (Light & Janska), "The amino-terminal sequence of the catalytic subunit of bovine enterokinase," Journal of Protein Chemistry, Vol. 10, No. 5, pp. 475-480 (1991)

LaVallie et al. (LaVallie), "Cloning and functional expression of a cDNA encoding the catalytic subunit of bovine enterokinase," Journal of Biological Chemistry, Vol. 268, No. 31, pp. 23311-23317 (1993)

Fonseca et al. (Fonseca), "The purification and characterization of bovine enterokinase from membrane fragments in the duodenal mucosal fluid," Journal of Biological Chemistry, Vol. 256, No. 23, pp. 14516-14520 (1983)

Liepnieks et al. (Liepnieks), "The preparation and properties of bovine enterokinase," Journal of Biological Chemistry, Vol. 254, No. 5, pp. 1677-1683 (1979)

Claim 42 stands rejected under 35 U.S.C. § 102(b) as anticipated by Light.

We reverse.

Background

Enterokinase is a naturally occurring protease. See the specification, page 2. The specification discloses that "although extensive research efforts have been mounted by several different research groups since the first partial purification of bovine enterokinase more than 15 years ago, no one has yet been successful in cloning enterokinase. . . . [Bovine enterokinase was] isolated in the late 1970s. Liepnieks et al., J. Biol. Chem. 254 :1677(1979) described an enterokinase having 35% carbohydrate, a molecular weight of 150,000, with a heavy (115,000) and light (35,000) chain connected by one or more disulfide bonds. Subsequent studies of the light chain, i.e., the catalytic subunit, were reported in Light et al., J. Biol. Chem. 259:13195(1984). Most recently,

Light et al., J. Protein Chem. 10:475(1991), disclosed what was later proven to be an incorrect partial amino-terminal sequence for the catalytic subunit of bovine enterokinase. To date, it has been impossible to obtain recombinantly produced enterokinase activity and there continues to exist a need for such a product.” Id., page 2.

The specification discloses cloning of DNA encoding bovine enterokinase. See pages 10-19. The specification also discloses expression of the enterokinase light chain in recombinant host cells. See pages 20-24. Expression of the cloned light chain in CHO host cells resulted in secretion of a 42 kD product into the conditioned medium. See page 20.

Discussion

Claim 42 is directed to an active, recombinant enterokinase light chain, free of heavy chain, comprising amino acids 564-798 of SEQ ID NO:2. The examiner rejected the claim as anticipated by Light. As noted by the examiner, Light teaches “purification of the catalytic subunit of bovine enterokinase.” Examiner’s Answer, page 3. The examiner concluded that Light’s purified enzyme meets all the limitations of claim 42, for the following reasons:

(1) “The catalytic subunit . . . appeared as a single component on SDS-gel electrophoresis. . . . Therefore, the purified bovine catalytic subunit meets the recited limitation of enterokinase light chain, free of enterokinase heavy chain.” Examiner’s Answer, page 4.

(2) “Light et al.[.] teach that the isolated light chain enterokinase was enzymatically active . . . and thus meets the functional limitation of biologically active in the claim.” Id.

(3) “While the claim is limited to a specific sequence, it is noted that the claimed sequence was derived from cloning the bovine DNA. . . . Light et al.[.]

purifies the enzymatically active light chain, free from enterokinase heavy ch[a]in also from bovines and therefore it necessarily flows that the claimed amino acid sequence is an inherent property of the purified bovine enterokinase light chain of Light et al.” Id.

(4) “While the product/composition of the prior art is purified from the native source and is not characterized as ‘recombinant’ (i.e. produced by a recombinant DNA), the recitation of recombinant does not convey a structural or functional difference . . . [because the] purification or production of a product by a particular process (i.e. the instant recombinant) does not impart novelty or unobviousness to a product when the product is taught by the prior art.” Id., pages 4-5.

Appellant argues, in a nutshell, that the Light reference relied on by the examiner must be read together with previously published references, by the same author, that are cited in the Light reference. When the prior art is viewed as a whole, Appellant argues, the evidence is insufficient to support a prima facie finding that the enzyme disclosed by Light is the same as the instantly claimed enzyme, and therefore the prior art does not support a rejection under § 102. See the Appeal Brief, pages 4-7, and the Reply Brief, pages 2-9.¹

“[T]he Patent Office has the initial burden of coming forward with some sort of evidence tending to disprove novelty.” In re Wilder, 429 F.2d 447, 450, 166 USPQ 545, 548 (CCPA 1970). “Under 35 U.S.C. § 102, every limitation of a claim must identically appear in a single prior art reference for it to anticipate the claim.” Gechter v. Davidson, 116 F.3d 1454, 1457, 43 USPQ2d 1030, 1032 (Fed. Cir. 1997).

¹ Appellant also argues that the product of claim 42 would not have been obvious in view of Light. See the Appeal Brief, pages 7-9. However, as the examiner has pointed out, claim 42 does not stand rejected under 35 U.S.C. § 103. Therefore, we need not address Appellant’s arguments regarding nonobviousness, and we take no position on that issue.

The prior art reference need not expressly disclose every claim limitation; a claim is also anticipated if the disclosed product or process would have inherently met the limitations of the claim. See, e.g., Verdegaal Bros., Inc. v. Union Oil Co., 814 F.2d 628, 631, 2 USPQ2d 1051, 1053 (Fed. Cir. 1987) (“A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference.”).

Moreover, “[a]n inherent structure, composition or function is not necessarily known. . . . Insufficient prior understanding of the inherent properties of a known composition does not defeat a finding of anticipation.” Atlas Powder Co. v. IRECO Inc., 190 F.3d 1342, 1349, 51 USPQ2d 1943, 1947 (Fed. Cir. 1999). “[W]hen the PTO shows sound basis for believing that the products of the applicant and the prior art are the same, the applicant has the burden of showing that they are not.” In re Spada, 911 F.2d 705, 708, 15 USPQ2d 1655, 1658 (Fed. Cir. 1990).

However, “the examiner must provide some evidence or scientific reasoning to establish the reasonableness of the examiner’s belief that the functional limitation is an inherent characteristic of the prior art” before the burden is shifted to an applicant to disprove the inherency. Ex parte Skinner, 2 USPQ2d 1788, 1789 (Bd. Pat. App. Int. 1986). And to sustain the rejection, since patentability is determined based on a preponderance-of-the-evidence standard, the evidence must show that the prior art product more likely than not is the same as the claimed product. See, e.g., In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992) (“After evidence or argument is submitted

by the applicant in response, patentability is determined on the totality of the record, by a preponderance of the evidence with due consideration to persuasiveness of argument.”).

In this case, we agree with Appellant that, when all the evidence of record is taken into account, the examiner’s position is not sustainable. We agree with Appellant that the Light reference relied on by the examiner must be read in conjunction with previous publications by that author. The Light reference states that “[b]ovine enterokinase was purified from the duodenal mucosal fluid by the procedure of Fonseca and Light,” page 13197, citing Fonseca.

Fonseca, in turn, states that “[b]ovine enterokinase has been purified from the mucosal fluid adhering to the intestinal wall. . . . The properties of the enzyme in the fluid are identical with those found previously with the mucosal cell preparation (Liepnieks, J.J. and Light, A. (1979) J. Biol. Chem. 254, 1677-1683).” Abstract. More specifically, Fonseca states that “[t]he properties of the purified mucosal fluid enterokinase were identical with the mucosal cell enzyme with respect to the molecular weights of the intact enzyme, as well as the heavy and light polypeptide chains, the amino acid composition, and the enzymatic activity.” Page 14516, right-hand column. Thus, we agree with Appellants that those of skill in the art would have considered the disclosures of Fonseca and Liepnieks to also apply to the enzyme disclosed by Light.

Liepnieks discloses a bovine enterokinase light chain having the following properties:

- (1) a molecular weight of 35,000 daltons (abstract);

- (2) a nonglycosylated molecular weight of 23,000 (page 1682, right-hand column);
- (3) 222 total amino acids (page 1680, right-hand column); and
- (4) an amino acid composition that includes 23 aspartic acid residues and 14 leucine residues per molecule of protein (Table III).

None of these properties are shared by the instantly claimed enterokinase light chain:

- (1) The glycosylated molecular weight of the claimed enzyme is 42,000 daltons (specification, pages 13 and 20), while the glycosylated molecular weight of the prior art enzyme is 35,000 daltons.
- (2) The calculated molecular weight of the instant protein is 26,262 (see LaVallie, page 23316),² while the calculated molecular weight of the prior art enzyme is 23,000 daltons.
- (3) Claim 42 is directed to an enterokinase light chain that comprises amino acids 564 to 798, inclusive, of SEQ ID NO:2. Thus, the claimed enzyme has 235 amino acids, while the prior art enzyme is disclosed to have 222 amino acids.
- (4) Amino acids 564 to 798 of SEQ ID NO:2 include 11 aspartic acid residues and 18 leucine residues (Reply Brief, page 8; see also Figure 2), while the prior art enzyme includes 23 aspartic acids and 14 leucines.

In addition, as Appellant points out, the prior art enzyme was isolated from bovine duodenal mucosal cells (Liepnieks) or mucosal fluid (Fonseca, Light), while the instant specification states that “[b]ovine enterokinase (EK-2 grade) was purchased from Biozyme . . . [and] further purified using porcine pancreatic trypsin inhibitor (Sigma) coupled to activated SEPHAROSE CL-4B.” Page 13.

² The enterokinase light chain amino acid sequence taught by LaVallie (Figure 2) appears to be the same as that of that of amino acids 564-798 of instant SEQ ID NO:2. Therefore, the calculated molecular weight disclosed by LaVallie would also appear to apply to the instantly claimed enzyme.

Although the examiner correctly notes that the enzyme preparation of both the prior art and the specification ultimately are derived from a bovine source, that fact alone does not necessarily mean that both preparations contain the identical enzyme. In particular, the record contains no evidence regarding how the commercial preparation of enterokinase was purified, thus indicating a potential explanation for the apparent differences between the prior art and claimed enzymes.

Thus, the evidence of record shows that the claimed enzyme differs from the prior art enzyme in a number of properties, including molecular weight, number of amino acids, and amino acid composition. In view of these differences, we conclude that the evidence is insufficient to support a prima facie case of anticipation by inherency and we therefore reverse the rejection under 35 U.S.C. § 102(b).

REVERSED

Sherman D. Winters)	
Administrative Patent Judge)	
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)	BOARD OF PATENT
Demetra J. Mills)	
Administrative Patent Judge)	APPEALS AND
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)	INTERFERENCES
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