

# United States Court of Appeals for the Federal Circuit

02-1207, -1260

INVITROGEN CORPORATION,

Plaintiff-Appellant,

v.

BIOCREST MANUFACTURING, L.P.,  
STRATAGENE HOLDING CORPORTION  
and STRATAGENE, INC.,

Defendants-Cross Appellants.

Francis M. Wilkstrom, Parsons Behle & Latimer, of Salt Lake City, Utah, argued for plaintiff-appellant. With him on the brief were C. Kevin Speirs and Kristine Edde Johnson. Of counsel on the brief was Alan W. Hammond, Invitrogen Corporation, of Carlsbad, California.

Marc R. Labgold, Ph.D., Patton Boggs LLP, of McLean, Virginia, argued for defendants-cross appellants. With him on the brief were Kevin M. Bell and Laura A. Donnelly. Of counsel on the brief was Richard J. Oparil, Patton Boggs LLP, of Washington, DC.

Appealed from: United States District Court for the Western District of Texas

Judge Sam Sparks

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DECIDED: May 7, 2003

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Before RADER, BRYSON, and DYK, Circuit Judges.RADER, Circuit Judge.

On summary judgment, the United States District Court for the Western District of Texas determined that Biocrest Manufacturing, L.P., Stratagene Holding Corporation, and Stratagene, Inc. (collectively Stratagene) did not infringe Invitrogen Corporation's (Invitrogen's) U.S. Patent No. 4,981,797 (issued Jan. 1, 1991) (the '797 patent). Invitrogen Corp. v. Biocrest Mfg., L.P., No. A 01 CA 167 SS (W.D. Tex. Nov. 2, 2001). Because the district court incorrectly construed the claims of the '797 patent, this court vacates and remands.

**I.**

The '797 patent involves DNA technology. DNA molecules have nucleotide sequences called genes that act as blueprints for proteins. Modern medicine may supplement the production of important proteins in the body to treat various maladies. These treatment regimes require large quantities of a particular gene or its corresponding protein. To produce proteins, a laboratory may introduce a DNA molecule containing a particular gene into the bacterium *E. coli*, which serves as a factory to replicate many copies of the DNA molecule and its gene. When an *E. coli* cell replicates by cell division, the DNA in that *E. coli* cell also replicates, providing an increased number of gene sequences from which protein can be expressed. Thus, the *E. coli* can serve as a factory to produce important proteins.

The '797 patent claims a process for making *E. coli* cells with an enhanced capacity to accept foreign DNA. A cell that accepts foreign DNA is called a transformable cell. The transformable cell's capacity to accept foreign DNA is called its

competence. The '797 patent thus claims a method of producing transformable E. coli cells with improved competence. The foreign DNA is generally plasmid DNA -- a relatively small DNA molecule having a looped circular shape. Claim 1 of the '797 patent states:

1. A process for producing transformable E. coli cells of improved competence by a process comprising the following steps in order:
  - (a) growing E. coli cells in a growth-conductive medium at a temperature of 18 °C. to 32 °C.;
  - (b) rendering said E. coli cells competent; and
  - (c) freezing the cells.

'797 patent, col. 10, ll. 26-32 (emphases added).

Invitrogen accused Stratagene of infringing claims 1-5, 7-11, and 13-16 of the '797 patent. Stratagene makes and sells competent E. coli cell lines. Stratagene makes its cell lines by a process that includes the steps of incubating cells at 37 °C, growing the cells in a fermenter at 26 °C, and freezing the cells.

On March 12, 2001, Invitrogen filed a complaint against Stratagene in the District Court for the Western District of Texas. On August 16, 2001, the district court held a Markman hearing to construe the claims. On August 30, 2001, the district court issued an order construing the preamble term "improved competence" and the growing step (a). On September 11, 2001, Stratagene filed a motion for summary judgment of noninfringement based on the district court's claim construction. On November 2, 2001, the district court granted Stratagene's summary judgment motion. On January 31, 2002, the district court issued a final judgment dismissing the action.

Invitrogen appealed the district court's summary judgment of noninfringement. Invitrogen asserts that the district court erred in concluding that the growing step (a) excludes all cell growth carried out above 32 °C. Invitrogen also disputes that the preamble term "improved competence" limits the claims. Stratagene cross-appealed. Stratagene asserts that the district court erred in concluding that the preamble term "improved competence" means that competence is "generally increased" with no numerical limitation.

This court has jurisdiction under 28 U.S.C. § 1295(a)(1) (2000).

## II.

This court reviews without deference a district court's grant of summary judgment, and draws all reasonable factual inferences in favor of the non-movant. Cortland Line Co. v. Orvis Co., 203 F.3d 1351, 1355-56, 53 USPQ2d 1734, 1736 (Fed. Cir. 2000). This court decides for itself whether "the pleadings, depositions, answers to interrogatories, and admissions on file, together with the affidavits, if any, show that there is no genuine issue as to any material fact and that the moving party is entitled to a judgment as a matter of law." Fed. R. Civ. P. 56(c).

A court determines patent infringement by first construing the claims and then applying the construed claims to the accused process or product. Markman v. Westview Instruments, Inc., 52 F.3d 967, 976, 34 USPQ2d 1321, 1326 (Fed. Cir. 1995) (en banc), aff'd, 517 U.S. 370 (1996). This court reviews a district court's claim construction without deference. Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1454, 46 USPQ2d 1169, 1174 (Fed. Cir. 1998) (en banc).

Claim language generally carries the ordinary meaning of the words in their normal usage in the field of invention. Toro Co. v. White Consol. Indus., 199 F.3d 1295, 1299, 53 USPQ2d 1065, 1067 (Fed. Cir. 1999). While this "ordinary meaning" rule is usually expressed as a pat formula, the context supplied by the field of invention, the prior art, and the understanding of skilled artisans generally is key to discerning the normal usage of words in any claim. See, e.g., Hoechst Celanese Corp. v. BP Chems., Ltd., 78 F.3d 1575, 1579 (Fed. Cir. 1996).

The applicant may also act as his own lexicographer and use the specification to implicitly or explicitly supply new meanings for terms. Bell Atl. Network Servs., Inc. v. Covad Communications Group, Inc., 262 F.3d 1258, 1268, 59 USPQ2d 1865, 1870-71 (Fed. Cir. 2001). While prosecution history estoppel does not apply to determining literal claim scope, statements to an examiner during prosecution before the United States Patent and Trademark Office (PTO) may also illuminate the scope of the claims. See Ballard Med. Prods. v. Allegiance Healthcare Corp., 268 F.3d 1352, 1358, 60 USPQ2d 1493, 1498 (Fed. Cir. 2001). Moreover, an applicant may actually disclaim claim scope during prosecution. Id. at 1361. The applicant, however, must clearly and unambiguously express any such surrender of subject matter during prosecution. See Middleton, Inc. v. Minn. Mining & Mfg. Co., 311 F.3d 1384, 1388, 65 USPQ2d 1138, 1141 (Fed. Cir. 2002); Inverness Med. Switz. GmbH v. Princeton Biomeditech Corp., 309 F.3d 1365, 1372, 64 USPQ2d 1926, 1932 (Fed. Cir. 2002).

#### **A. The "Growing" Step**

The district court construed the growing step (a) to mean that "growth must be performed at a temperature within 18 °C to 32 °C, inclusive, and that at no time prior to freezing can the temperature of the cells exceed 32 °C." Invitrogen Corp. v. Biocrest Mfg., L.P., No. A 01 CA 167 SS, slip op. at 10 (W.D. Tex. Aug. 30, 2001) (Claim Construction Order). The district court rejected Invitrogen's argument that the term "comprising" in the preamble meant that claim 1 was open-ended and thus allowed an additional step of growing cells at 37 °C before the growing step (a). The district court instead read the prosecution history of the '797 patent to disclaim all growth outside the range in step (a). In other words, the district court's claim interpretation foreclosed any growth other than growth in the claimed temperature range.

When entering a rejection during prosecution of the application that led to the '797 patent, the PTO examiner stated that 18 °C to 32 °C was essential to the invention. The applicants then amended the claims to replace "less than 37 °C" with "18 °C to 32 °C" in claim 1. The applicants then stated that their amendment ensures that the claimed invention is different

from prior art showing growth at 37 °C. Furthermore, the applicants noted that the invention avoids undesirable effects of growth at 37 °C. On the basis of this rather sketchy record, the district court concluded that the applicants had disclaimed all growth outside the range of 18 °C to 32 °C. Therefore the district court interpreted the claim to exclude any growth outside that range.

To the contrary, claim 1 does not address and therefore permits growth before the steps disclosed in the claim at temperatures outside the range of 18 °C to 32 °C. At the outset, the claim language itself does not preclude growth in advance of the first step in the claim. Step (a) of claim 1 specifies E. coli population growth at 18 °C to 32 °C. Step (b) specifies rendering competent the cells that immediately result from step (a). Step (b) conveys this by stating “rendering said E. coli cells competent” (emphasis added). The cells that are rendered competent in step (b) include specific cells formed at 18 °C to 32 °C in step (a). At no point has this claim addressed or limited any activities that may have occurred before steps (a) and (b).

The transition “comprising” in a method claim indicates that the claim is open-ended and allows for additional steps. See Vivid Techs., Inc. v. Am. Sci. & Eng'g, Inc., 200 F.3d 795, 811, 53 USPQ2d 1289, 1301 (Fed. Cir. 1999) (citing Moleculon Research Corp. v. CBS, Inc., 793 F.2d 1261, 1271, 229 USPQ 805, 812 (Fed. Cir. 1986)). Claim 1 uses the open-ended transition “comprising” to introduce the recited steps. Thus the claim signals to patent practitioners that claim 1 allows activity, even activity that produces E. coli cell growth, before the recited steps. Such activity outside the claim, of course, is not limited by the temperature range recited in claim 1. Thus, the district court erred by extending the claim’s temperature restrictions beyond the reach of the claims. The claim language and its form do not restrict activities to prepare the cells that occur before the claimed method.

As noted earlier, the context of this scientific field illuminates the claim’s meaning and reach. The ’797 patent discusses the field of invention. In this discussion, the patent discloses that skilled artisans in this field grow and store E. coli cells at temperatures outside the range 18 °C to 32 °C in preparation for the claimed method. For example, the ’797 patent discusses preparation of master seeds by a process involving growing E. coli cells at 37 °C (col. 5, ll. 49-50). Master seeds are frozen E. coli strains stored long-term at –70 °C. These master seeds must undergo preparation before becoming the primary seeds for use in the claimed method. The ’797 patent discloses the growth or preparation of primary seeds at 18 °C to 32 °C, but notes that artisans may use higher temperatures because the resulting primary seeds “can be used to prepare competent cells from a culture grown at a lower temperature” (col. 6, ll. 5-13). The specification thus supplies context about the understanding of skilled artisans and the field of invention that confirms that claim 1 does not preclude growth before the first step in the inventive process.

The prosecution history does not show any clear and unambiguous disavowal of steps in advance of the step of

growing *E. coli* cells in the claimed temperature range. By amending the claims to replace “less than 37 °C” with “18 °C to 32 °C” the applicants did not exclude all cells with ancestral growth above 32 °C. Instead, the applicants simply specified the requirement of growth of primary cells within the required range to render the cells competent in the following step (b). In context, the applicants’ statements about the undesirable effects of growth at 37 °C refer to growth at 37 °C that immediately precedes rendering the *E. coli* competent. The applicants did not address growth at 37 °C that occurs before initiation of the claimed method. As the inventors stated in a declaration submitted to the PTO during prosecution, the invention provided improved competence “by growing the cells at 18 °C to 32 °C before rendering the cells competent” compared to an otherwise identical process with growth at 37 °C. The applicants did not disclaim all growth above 32 °C but instead emphasized the advantages of growth at 18 °C to 32 °C immediately before rendering the *E. coli* competent.

The district court’s construction would also effectively exclude the embodiment of Example 3 of the ’797 patent. This court has held that construing a claim to exclude a preferred embodiment “is rarely, if ever, correct and would require highly persuasive evidentiary support.” Vitronics Corp. v. Conceptor, Inc., 90 F.3d 1576, 1583, 39 USPQ2d 1573, 1578 (Fed. Cir. 1996). This court finds no highly persuasive evidentiary support for excluding Example 3. Example 3 shows initial growth at 37 °C followed by growth at 23 °C before rendering the resulting cells competent. Specifically, Example 3 shows cells grown in a flask at 37 °C. Next Example 3 cooled the flask to about 23 °C. Finally, samples were removed at 30-minute intervals between 0 and 120 minutes before being rendered competent and transformed.

Example 3 also is not a comparative example meant to show the deleterious effect of growth at 37 °C. Table 3 shows the results of Example 3. The ’797 patent describes the results as follows: “The results of this experiment indicate that shifting strain RR1 from 37° C. to 23° C. for two hours results in a 60 fold increase in the efficiency of transformation compared to a sample which does not undergo a temperature shift” (col. 10, ll. 20-24). The comparative example is the sample that “does not undergo a temperature shift,” i.e., the sample removed at 0 minutes without spending any time at 23 °C. Thus, the entire context of the patent and its field of invention show that Example 3 demonstrates that even a small amount of growth in the claimed range (e.g., for 30 minutes) increases competence. Indeed the district court’s construction would also exclude other embodiments disclosed in the ’797 because ancestral cells are often grown at 37 °C at some stage.

Thus, an examination of the claim language in its proper scientific context, as well as a proper reading of the prosecution history, shows that step (a) encompasses only growth immediately preceding step (b). As the claim specifies, this growth must fall in the range of 18 °C to 32 °C. Growing the *E. coli* at 18 °C to 32 °C in step (a) yields a mass of cells that step (b) renders competent. The claim scope thus does not preclude preparatory steps in advance of step (a), including growth of *E. coli* at a temperature outside the step (a) range.

## **B. “Improved Competence”**

In its claim construction order, the district court construed the term “improved competence”:

The phrase “improved competence” means that the number or quantity of E. coli cells that take up and establish exogenous DNA is generally increased as compared with the number or quantity generally obtained when cells are prepared by either (1) growing the cells at 37 °C, rendering them competent, and freezing them, or (2) growing the cells at 37 °C, rendering them competent, and not freezing them.

Claim Construction Order at 10. Invitrogen asserts that the preamble term “improved competence” should not limit the claims because the term simply states an intended advantage. Stratagene counters that while the district court correctly concluded that “improved competence” limits the claims, the district court should have also construed “improved competence” to require at least a ten-fold competence increase and to require that repeated freezing and thawing does not decrease competence.

In the first place, the district court correctly discerned that the preamble in this patent acts as a limitation. The district court reasoned: “In response to the Examiner’s rejection, the applicants for the ’797 patent amended the claims to include the ‘improved competence’ language” and “cannot now disavow the claim limitation of ‘improved competence’ because it was clearly essential for procuring the patent.” Id. at 4. This court has stated that “clear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art transforms the preamble into a claim limitation because such reliance indicates use of the preamble to define, in part, the claimed invention.” Catalina Mktg. Int’l Inc. v. Coolsavings.com, Inc., 289 F.3d 801, 808-809, 62 USPQ2d 1781, 1785 (Fed. Cir. 2002) (citing Bristol-Myers Squibb Co. v. Ben Venue Labs., Inc., 246 F.3d 1368, 1375, 58 USPQ2d 1508, 1513 (Fed. Cir. 2001)).

In an official action dated March 22, 1988, the PTO examiner rejected all claims over D. Hanahan, DNA Cloning (1985) (Hanahan), because “[t]he claims do not require increased competency.” In response, the applicants replaced “competent E. coli cells” in the preamble with “E. coli cells of improved competence.” The applicants stated “[n]ew claim 29 corresponds to canceled claim 1 but has been rewritten to make clear that the process gives E. coli cells of improved competence.” The applicants distinguished Hanahan by arguing that the reference “does not teach the preparation of E. coli cells of improved competence” and “the cells produced according to the claimed methods have improved competence.” By the amendment and the accompanying statements, the applicants clearly relied on the preamble term “improved competence” to distinguish Hanahan. “Improved competence” thus limits the claims and is not merely a statement of intended advantage. Thus, the district court properly consulted the context of the preamble language, in this case its prosecution history, to note that it operates as a limit on claim scope.

To determine the limiting effect of the language, the district court again correctly consulted the overall context of the language. The test data in the prosecution history and the patent itself show that the claimed process provided varying amounts of increased competence. Therefore, relying on this scientific data, the district court adopted a general definition of the term “improved.” The district court properly declined to read into the claim any specific numerical improvement, such as a ten-fold increase in competence. At the outset, the claim language itself includes no specific numerical limitation for the “improved competence.” Moreover neither the specification nor the prosecution history supplies any specific improvement measure. Thus “improved competence” requires no specific numerical limitation. This court also finds no basis for construing “improved competence” to require that repeated freezing and thawing does not decrease competence. The district court correctly construed the term “improved competence.”

## CONCLUSION

Because the district court erred in construing the growing step (a) and improperly granted summary judgment that Stratagene does not infringe the ’797 patent based on the erroneous claim construction, this court vacates and remands for further proceedings applying this court’s claim construction.

## COSTS

Each party shall bear its own costs.

VACATED and REMANDED