IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

ADVANCED BIOLOGICS LLC, Plaintiff, v. ZIMMER BIOMET SPINE, INC., Defendant.	Civil Action No. 21-519-RGA

MEMORANDUM OPINION

Eve H. Ormerod, SMITH, KATZENSTEIN & JENKINS LLP, Wilmington, DE; Robert H. Stier, Jr., PIERCE ATWOOD LLP, Boston, MA.

Attorneys for Plaintiff.

Thatcher A. Rahmeier, FAEGRE DRINKER BIDDLE & REATH, LLP Wilmington, DE; Kevin P. Wagner, Doowon R. Chung, FAEGRE DRINKER BIDDLE & REATH, LLP, Minneapolis, MN.

Attorneys for Defendant.

June 1, 2022

/s/ Richard G. Andrews
ANDREWS, UNITED STATES DISTRICT JUDGE:

Before me is the issue of claim construction of multiple terms in U.S. Patent No. 10,660,986 ("the '986 patent"). The parties submitted a Joint Claim Construction Brief (D.I. 81), and I heard oral argument on May 20, 2022.[1]

I. BACKGROUND

The parties requested construction for six terms contained in Claim 1 of the '986 patent. Claim 1, with the terms at issue identified by italics, reads:

> An implant comprising:
> *cortical allograft bone and cancellous allograft bone obtained from an allograft donor*, wherein the cancellous allograft bone is processed by a method comprising:
> osmotically lysing bone marrow cells in the allograft cancellous bone to enrich for *cells resistant to osmotic lysing*, wherein the step of osmotically lysing comprises exposing the allograft cancellous bone to water or less than 1M acetic acid, and
> during and following the lysing, allowing both the cells resistant to the lysing and *growth factors* released from the cancellous allograft bone to bind to *the cancellous and cortical allograft bones*;
> when implanted, the implant comprises the *cells resistant to lysing* and the *growth factors each associated with the allograft cancellous bone*.

At oral argument, I construed "cortical allograft bone and cancellous allograft bone obtained from an allograft donor" to mean, "cortical bone and cancellous bone obtained from a donor of the same species." I noted that in the context of this construction, "a donor" need not be limited to a single donor. (Tr. 35:18-36:1).

At oral argument, the parties agreed that "growth factors . . . associated with the allograft cancellous bone" should be construed as referring to the growth factors described in the immediately preceding claim limitation that are "released from the cancellous allograft bone" and

[1] Citations to the transcript of the oral argument are preceded by "Tr."

"allow[ed]" "to bind to the cancellous and cortical allograft bones." (Tr. 87:3-17). I now formally adopt the construction, "growth factors released from and in the same composition as the allograft cancellous bone."

The four remaining disputed terms are listed in the chart below, accompanied by each party's proposed construction.

Term	**Plaintiff's Proposed Construction**	**Defendant's Proposed Construction**
"the cancellous and cortical allograft bones"	"the cancellous and cortical bones from an allograft donor"	"cancellous and cortical allograft bone that comprise the implant"
"growth factors"	"stimulative agents that promote growth, repair or regeneration of tissues"	"substances released from lysed cells capable of stimulating bone growth"
"cells resistant to [osmotic] lysing"	"cells that remain intact after exposure to a lysing agent"	Plain meaning ("cells that naturally resist the disruption of cell walls due to osmotic movement of fluid into the cell")
"cells resistant to [osmotic] lysing . . . associated with the allograft cancellous bone"	"cells that remain intact in the porous bone structure and on the bone surface after exposure to a weak lysing agent"	"cells resistant to osmotic lysing bound, directly or indirectly, to the allograft cancellous bone"

II. LEGAL STANDARD

"It is a bedrock principle of patent law that the claims of a patent define the invention to which the patentee is entitled the right to exclude." *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (en banc) (internal quotation marks omitted). "'[T]here is no magic formula or catechism for conducting claim construction.' Instead, the court is free to attach the appropriate weight to appropriate sources 'in light of the statutes and policies that inform patent law.'" *SoftView LLC v. Apple Inc.*, 2013 WL 4758195, at *1 (D. Del. Sept. 4, 2013) (quoting *Phillips*,

415 F.3d at 1324) (alteration in original). When construing patent claims, a court considers the literal language of the claim, the patent specification, and the prosecution history. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 977–80 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996). Of these sources, "the specification is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term." *Phillips*, 415 F.3d at 1315 (internal quotation marks omitted).

"[T]he words of a claim are generally given their ordinary and customary meaning. . . . [Which is] the meaning that the term would have to a person of ordinary skill in the art in question at the time of the invention, i.e., as of the effective filing date of the patent application." *Id.* at 1312–13 (citations and internal quotation marks omitted). "[T]he ordinary meaning of a claim term is its meaning to [an] ordinary artisan after reading the entire patent." *Id.* at 1321 (internal quotation marks omitted). "In some cases, the ordinary meaning of claim language as understood by a person of skill in the art may be readily apparent even to lay judges, and claim construction in such cases involves little more than the application of the widely accepted meaning of commonly understood words." *Id.* at 1314.

When a court relies solely upon the intrinsic evidence—the patent claims, the specification, and the prosecution history—the court's construction is a determination of law. *See Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 574 U.S. 318, 331 (2015). The court may also make factual findings based upon consideration of extrinsic evidence, which "consists of all evidence external to the patent and prosecution history, including expert and inventor testimony, dictionaries, and learned treatises." *Phillips*, 415 F.3d at 1317–19 (internal quotation marks omitted). Extrinsic evidence may assist the court in understanding the underlying technology, the meaning of terms to one

skilled in the art, and how the invention works. *Id.* Extrinsic evidence, however, is less reliable and less useful in claim construction than the patent and its prosecution history. *Id*.

III. DISCUSSION

A. Term 2[2]: the cancellous and cortical allograft bones

The focus of the parties' dispute with respect to Term 2, "the cancellous and cortical allograft bones," is whether the referenced cortical allograft bone must be used in the final implant. Both parties agree the antecedent basis of "the" cancellous and cortical allograft bones in Term 2 is the cancellous and cortical allograft bone from the first limitation of Claim 1, which reads, "An implant comprising: cortical allograft bone and cancellous allograft bone obtained from an allograft donor." Defendant argues this necessitates that the cortical allograft bone referenced in Term 2 be used in the final implant. I disagree.

Antecedent basis requires that the cortical allograft bone of Term 2 be from the same supply of cortical allograft bone that is "obtained from an allograft donor" at the beginning of Claim 1. There is not, however, any requirement that the entire supply of cortical allograft bone harvested from the allograft donor make it into the final implant, so long as the final implant contains some cortical allograft bone obtained from the allograft donor.

Claim 1 requires that the implant, in its final form, comprise cortical allograft bone and cancellous allograft bone obtained from an allograft donor. It then describes the method by which the *cancellous* allograft bone obtained from the donor must be processed. Term 2 is found within the claim limitations describing that method for processing cancellous bone. Claim 1 requires that the cancellous allograft bone used in the final implant be processed according to the method described. By contrast, the claim is silent as to whether any processing must be performed on the

[2] I use the "term" numbering that the parties used in the Joint Claim Construction Brief.

cortical allograft bone that is ultimately used in the final implant. While the claim implies that some of the cortical bone obtained from the allograft donor will be processed alongside the cancellous bone, there is no requirement that all the cortical bone obtained from the allograft donor for use in the final implant be processed alongside the cancellous bone, nor is there any requirement that the cortical bone that is processed alongside the cancellous bone make it into the final implant. The claim is silent as to whether the cortical bone used in the final implant should be entirely processed cortical bone, entirely unprocessed cortical bone, or some mixture of the two.

For these reasons, I adopt Plaintiff's proposed construction, "the cancellous and cortical bones from an allograft donor."

B. Term 3: growth factors

With respect to Term 3, "growth factors," the parties' dispute centers on whether the limitation, "released from lysed cells," should be included in the term's construction. Plaintiff argues this limitation is unnecessary, because the claims themselves already require that the growth factors be "released from the cancellous allograft bone." Defendant responds that the term, "growth factors," appears immediately following the claim's limitation of "osmotically lysing bone marrow cells," and therefore, the growth factors necessarily must be released from those lysed cells.

At oral argument, neither party provided any examples of how growth factors could be "released from the cancellous allograft bone" without being "released from lysed cells." Nevertheless, while Defendant's proposed limitation and the limitation within the claim language may well be co-extensive for practical purposes, formally, the limitation, "released from the cancellous allograft bone," is broader than, "released from lysed cells." Because a clear limitation

on the source of the growth factors already exists in the claim, I decline to adopt Defendant's proposed narrower limitation.

I do not think the examples Defendant cites from the specification discussing growth factors released from lysed cells rise to the level of disclaimer of any other potential source of growth factors within the cancellous allograft bone. (*See* D.I. 81 at 31-32). Rather, these excerpts from the specification, *e.g.*, "[t]he harvested sample can be exposed to lysing conditions and/or a lysing agent to facilitate lysis of the cells therein to release growth factors and nutrients contained [in the] sample," and, "[o]nce cellular components are lysed, they release growth factors and/or bioactive materials, such as cytokines and nutrients, to stimulate growth, differentiation and repair," merely provide an example of how growth factors can be "released from the cancellous allograft bone," as claimed in Claim 1. ('986 Patent 2:31-33, 2:35-38).

The example Defendant cites from the prosecution history, where Advanced Biologics asserted the claimed invention "results in a unique mixture of growth factors that does not read on 'any and all' growth factors," and the prior art did not "teach or suggest the unique mixture of growth factors that is produced when bone marrow or cancellous bone is osmotically lysed," is consistent with the plain meaning definition of growth factors, as limited by the language of Claim 1. (D.I. 81 at 32 (citing D.I. 82-2 at ZB012851, ZB012838-44)). The term "growth factors" as it appears in Claim 1 does not "read on any and all growth factors." It is instead limited to growth factors "released from the cancellous allograft bone." If it is possible for growth factors to be released from a source within the cancellous allograft bone other than lysed bone marrow cells, such growth factors would be covered by the plain language of Claim 1.

For these reasons, I adopt Plaintiff's construction, "stimulative agents that promote growth, repair, or regeneration of tissues."

C. Term 5: cells resistant to [osmotic] lysing

With respect to Term 5, the parties disagree over whether the term, "cells resistant to [osmotic] lysing," refers generally to cells known to have the property of being resistant to lysing or refers specifically to those cancellous bone marrow cells that have survived the osmotic lysing described in the process limitations of Claim 1. Defendant argues, "Advanced Biologics' proposed construction would be fine for purposes of assessing infringement of the claimed process steps, but it . . . ignores the Federal Circuit's law with respect to how product-by-process claims are applied when assessing invalidity."[3] (D.I. 81 at 43-44 (citing *Abbott Lab'ys v. Sandoz*, 566 F.3d 1282, 1293 (Fed. Cir. 2009); *In re Thorpe*, 777 F.2d 695, 697-98 (Fed. Cir. 1985))).

Insofar as Defendant suggests a claim term can have a different meaning in the context of an invalidity analysis than in the context of an infringement analysis, Defendant is mistaken. *See Purdue Pharma L.P. v. Epic Pharma, LLC*, 811 F.3d 1345, 1354 (Fed Cir. 2016) (a product-by-process claim claiming a product that is identical to a prior art product is invalid, even if made by a different process than the prior art product; however, where "the process by which a product is made imparts structural and functional differences distinguishing the claimed product from the prior art," those differences are relevant to the invalidity analysis) (cleaned up); *Amgen Inc. v. F. Hoffmann-La Roche Ltd*, 580 F.3d 1340, 1364-70 (Fed. Cir. 2009) (no anticipation where patent claimed a composition containing "erythropoietin . . . purified from mammalian cells grown in culture" and prior art disclosed erythropoietin obtained from urine, because source limitation imparted "structural and functional differences" that were "not explicitly part of the claim, yet relevant as evidence of no anticipation because of the source limitation.").

[3] The parties agree that Claim 1 is a product-by-process claim.

While process limitations need not be met to prove invalidity of a product-by-process claim, the meaning of a claim term, even in a product-by-process claim, is the same for all purposes. *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1330 (Fed. Cir. 2003) ("It is axiomatic that claims are construed the same way for both invalidity and infringement."). Moreover, while Defendant is correct that only structural limitations are considered in the invalidity analysis of a product-by-process claim, Plaintiff is correct that, in a product-by-process claim, the process can be used to define structural limitations or properties of the product. *Purdue Pharma*, 811 F.3d at 1354; *Abbott Lab'ys*, 566 F.3d at 1294 ("[I]f an inventor invents a product whose structure is either not fully known or too complex to analyze . . ., this court clarifies that the inventor is absolutely free to use process steps to define this product."). Such is the case here.

The phrase, "cells resistant to lysing," as it appears in the final paragraph of Claim 1, is preceded by the article "the," signaling the phrase has an antecedent basis. Its antecedent basis is found in the process limitations of Claim 1, which describe "osmotically lysing bone marrow cells in the allograft cancellous bone to enrich for cells resistant to osmotic lysing," and "allowing . . . the cells resistant to the lysing . . . to bind to the cancellous and cortical allograft bones." Thus, "the cells resistant to lysing" in Term 5 refers to those cells that resisted that osmotic lysing process.

As Advanced Biologics explained to the Examiner during prosecution of the '986 Patent, when an implant is created according to the process described in Claim 1, the "cells resistant to lysing" that are contained in the implant in its final form include both mesenchymal stem cells (MSCs) and "other progenitor cells," such as "adipocytes, chondrocytes, [etc.]." (D.I. 82-2 at ZB012851). Thus, the structural claim limitation, "cells resistant to lysing," defines a specific set of cells consisting of MSCs, adipocytes, chondrocytes, etc. Defendant's construction would

impermissibly allow the structural limitation, "cells resistant to lysing," to be satisfied by a physically different set of cells, such as one consisting only of MSCs. (Tr. 88:7-89:2).

Construing Term 5 to include any cells that have the property of being resistant to lysing would be inconsistent with the plain meaning of the claim, the prosecution history, and the doctrine of antecedent basis. The inventors here defined the structural limits of this term by reference to the claimed process. This is precisely the "exceptional instance" where "the structure of the claimed product is unknown and the product can be defined only by reference to a process by which it can be made." *Abbott Lab'ys*, 566 F.3d at 1294. Claim 1 does not disclose an implant comprising 'any cells known to be resistant to lysing,' as Defendant argues. Claim 1 discloses an implant comprising "the cells" resistant to the previously described lysing process.

For these reasons, I adopt the construction, "cells that remain after exposure to the claimed lysing process."

D. Term 6: cells resistant to [osmotic] lysing . . . associated with the allograft cancellous bone

At oral argument, the parties agreed that Term 6, "cells resistant to [osmotic] lysing . . . associated with the allograft cancellous bone" should be construed by combining the construction for the term, "cells resistant to [osmotic] lysing," with the construction for the second clause of the term, "growth factors associated with the allograft cancellous bone." (Tr. 84:14-86:1). Therefore, I adopt the following construction for Term 6: "cells that remain after exposure to the claimed lysing process, in the same composition as the allograft cancellous bone."

IV. CONCLUSION

For the reasons stated above, I adopt the following constructions:

Term	Construction

"the cancellous and cortical allograft bones"	"the cancellous and cortical bones from an allograft donor"
"growth factors"	"stimulative agents that promote growth, repair or regeneration of tissues"
"cells resistant to [osmotic] lysing"	"cells that remain after exposure to the claimed lysing process"
"cells resistant to [osmotic] lysing . . . associated with the allograft cancellous bone"	"cells that remain after exposure to the claimed lysing process, in the same composition as the allograft cancellous bone"

The parties should submit an appropriate order within five days.