IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF DELAWARE

BIO-RAD LABORATORIES, INC. and THE UNIVERSITY OF CHICAGO, Plaintiffs, v. 10X GENOMICS, INC., Defendant.	Civil Action No. 1:15-cv-00152-RGA

MEMORANDUM ORDER

Presently before the Court are Plaintiffs' Motion for Summary Judgment (D.I. 235) and Defendant's Motion for Summary Judgment of Non-Infringement and Invalidity (D.I. 242). The issues are fully briefed. (D.I. 236, 243, 263, 273, 289, 290). The Court held oral argument on February 5, 2018. (D.I. 349). For the reasons set forth below, Plaintiffs' motion and Defendant's motion are both granted in part and denied in part.

I. BACKGROUND

On February 12, 2015, RainDance Technologies, Inc. and the University of Chicago filed suit against 10X Genomics, Inc. alleging infringement of six patents. (D.I. 1). Plaintiffs refer to these patents as the Ismagilov patents.

On April 23, 2015, RainDance and the University of Chicago filed an amended complaint asserting an additional patent on behalf of RainDance only. (D.I. 12). On March 25, 2016, RainDance and the University of Chicago filed a second amended complaint in which they asserted the RainDance patent and only five of the Ismagilov patents. (D.I. 32). The RainDance

patent was later dismissed. (D.I. 138). On May 30, 2017, Bio-Rad Laboratories, Inc. substituted for RainDance. (D.I. 180).

The patents-in-suit relate to methods and systems for creating "plugs" in a microfluidic system and for conducting reactions within those "plugs."

II. LEGAL STANDARD

"The court shall grant summary judgment if the movant shows that there is no genuine dispute as to any material fact and the movant is entitled to judgment as a matter of law." Fed. R. Civ. P. 56(a). The moving party has the initial burden of proving the absence of a genuinely disputed material fact relative to the claims in question. *Celotex Corp. v. Catrett*, 477 U.S. 317, 330 (1986). Material facts are those "that could affect the outcome" of the proceeding, and "a dispute about a material fact is 'genuine' if the evidence is sufficient to permit a reasonable jury to return a verdict for the nonmoving party." *Lamont v. New Jersey*, 637 F.3d 177, 181 (3d Cir. 2011) (quoting *Anderson v. Liberty Lobby, Inc.*, 477 U.S. 242, 248 (1986)). The burden on the moving party may be discharged by pointing out to the district court that there is an absence of evidence supporting the non-moving party's case. *Celotex*, 477 U.S. at 323.

The burden then shifts to the non-movant to demonstrate the existence of a genuine issue for trial. *Matsushita Elec. Indus. Co. v. Zenith Radio Corp.*, 475 U.S. 574, 586–87 (1986); *Williams v. Borough of West Chester, Pa.*, 891 F.2d 458, 460–61 (3d Cir. 1989). A non-moving party asserting that a fact is genuinely disputed must support such an assertion by: "(A) citing to particular parts of materials in the record, including depositions, documents, electronically stored information, affidavits or declarations, stipulations . . . , admissions, interrogatory answers, or other materials; or (B) showing that the materials cited [by the opposing party] do not establish the absence . . . of a genuine dispute . . . ." Fed. R. Civ. P. 56(c)(1).

When determining whether a genuine issue of material fact exists, the court must view the evidence in the light most favorable to the non-moving party and draw all reasonable inferences in that party's favor. *Scott v. Harris*, 550 U.S. 372, 380 (2007); *Wishkin v. Potter*, 476 F.3d 180, 184 (3d Cir. 2007). A dispute is "genuine" only if the evidence is such that a reasonable jury could return a verdict for the non-moving party. *Anderson*, 477 U.S. at 247–49. If the non-moving party fails to make a sufficient showing on an essential element of its case with respect to which it has the burden of proof, the moving party is entitled to judgment as a matter of law. *See Celotex*, 477 U.S. at 322.

III. DISCUSSION

A. Plaintiffs' Motion for Summary Judgment

Plaintiffs seek summary judgment on two issues. The first is that Defendant infringes claims 1, 10, and 11 of U.S. Patent No. 8,329,407 ("the '407 patent"). (D.I. 236 at 5). The second is that the asserted claims of U.S. Patent No. 8,889,083 ("the '083 patent") are neither anticipated nor obvious. (*Id.*).

1. Infringement of Claims 1, 10, and 11 of the '407 Patent

As to claim 1 of the '407 patent, Plaintiffs argue there is no dispute that use of Defendant's products "leads to performance of every single element" of that claim. (*Id.* at 11). The parties' briefing focuses on two elements in particular. They are the preamble and step (d).

First, the preamble of claim 1 recites, "A method for conducting a reaction in plugs in a microfluidic system . . . ." ('407 patent, claim 1). I previously found the preamble limiting "only to the extent that it provides an antecedent basis for the terms 'microfluidic system' and 'reaction.'" (D.I. 116 at 14). I construed "microfluidic system" to mean, "system comprised of at least one substrate having a network of channels of micrometer dimension through which fluid may be transported." (*Id.* at 7).

Whether use of Defendant's products meets the preamble of claim 1 appears to turn on whether the method is performed in a "microfluidic system." Plaintiffs' expert, Dr. Sia, maintains that Defendant's GemCode Long Read product performs reactions in a microfluidic system: "Specifically, after the reagents necessary for the PHASE reaction are packaged into droplets, the droplets are collected in a standard Eppendorf tube and placed on a thermal cycler, which is used to provide the suitable temperature conditions so that the PHASE reaction may occur." (D.I. 238, Exh. B ¶ 124). He offers a similar opinion in regard to Defendant's other products. (*See id.* ¶¶ 125, 126). Defendant's expert, Dr. Huck, on the other hand, opines that "the barcoding reaction [in Defendant's products] takes place" during "thermal cycling" (*see* D.I. 274, Exh. E ¶¶ 68, 72, 79), and "[t]he thermal cycler [is] not [a] component[] of a microfluidic system" (*id.* ¶ 174). Given the experts' disagreement regarding whether the thermal cycler is part of the "microfluidic system," there is a dispute of material fact as to whether use of Defendant's products meets the preamble of claim 1.

Second, step (d) of claim 1 provides:

> forming at least one plug of the aqueous fluid containing the at least one biological molecule and the at least one reagent by partitioning the aqueous fluid with the flowing immiscible carrier fluid at the junction of the at least two channels, the plug being substantially surrounded by the immiscible carrier fluid flowing through the channel, wherein the at least one plug comprises at least one biological molecule and the at least one reagent for conducting the reaction with the at least one biological molecule[.]

('407 patent, 78:66–79:8).

Whether use of Defendant's products meets step (d) appears to boil down to a claim construction issue. More specifically, the parties seem to dispute whether the phrase, "the plug being substantially surrounded by the immiscible carrier fluid flowing through the channel,"

requires that the biological reaction occur in "the at least one plug" while "flowing through the channel." (*See* D.I. 236 at 24–27; D.I. 273 at 11–17).

The parties did not raise the disputed phrase in their joint claim construction brief. Accordingly, I did not construe it in my *Markman* opinion. However, in deciding whether the preamble of claim 1 was limiting, I stated that "it is clear that the reaction in question takes place 'in the at least one plug.'" (D.I. 116 at 13–14). I further stated, "Nothing in the body of the claims further limits the location of the reaction." (*Id.* at 14). Thus, I did not conclude that the claims limit the reaction to the "channel." In any event, I do not think the language upon which Defendant now relies requires that the reaction take place in the plug while "flowing through the channel." I think Defendant's reading is too limiting. The plain reading of the disputed language is that when the "at least one plug" is formed, it is "substantially surrounded by the immiscible carrier fluid flowing through the channel."

While I decline to adopt Defendant's construction, I will deny Plaintiffs' motion as to claim 1 of the '407 patent because there is a dispute of material fact as to the outer limits of the "microfluidic system" in the preamble. Similarly, I will deny Plaintiffs' motion as to claims 10 and 11. Claim 10 depends from claims 1, 8, and 9, and claim 11 depends from claims 1 and 8. Thus, Plaintiffs' motion as to claims 10 and 11 depends in part on their arguments in regard to the preamble of claim 1.

Accordingly, Plaintiffs' motion for summary judgment is **DENIED** as to claims 1, 10, and 11 of the '407 patent.

2. Anticipation and Obviousness of the '083 Patent

Plaintiffs seek "summary judgment that the '083 patent is not invalid as anticipated or obvious in view of estoppel arising from 10X's failed attempt to invalidate the '083 patent in *inter partes* review ('IPR')." (D.I. 236 at 30).

I adopt my ruling in regard to IPR estoppel from the discovery conference held on September 6, 2017. (*See* D.I. 224 at 29:11–14; *see also id.* at 28:1–21). In light of that ruling, Plaintiffs' motion is **GRANTED** as to the asserted claims of the '083 patent. Defendant's right to appeal is preserved.

B. Defendant's Motion for Summary Judgment

Defendant seeks summary judgment of non-infringement of the '083 patent and U.S. Patent Nos. 8,822,148 ("the '148 patent") and 7,129,091 ("the '091 patent"). (*See* D.I. 243). It further seeks summary judgment of invalidity of claim 1 of the '407 patent. (*See id.*).

1. Non-Infringement of the '083 Patent

Defendant argues there is no dispute its microfluidic chips do not literally infringe the '083 patent because they contain fluorine. (*See id.* at 10). In other words, they do not meet the patent's requirement of a "non-flourinated microchannel." As Defendant points out, I previously construed "non-flourinated microchannel" to mean, "microchannel that is not composed of a material that includes fluorine atoms or that is treated to include fluorine atoms at its surface (excluding the possible inclusion of impurities or contaminants)." (D.I. 116 at 16).

Defendant maintains, "To eliminate any dispute over the '083 patent, 10X redesigned its microfluidic chips to include fluorine." (D.I. 243 at 10). More specifically, "as of August 2017, all current 10X products utilize microfluidic chips that include 0.02% Kynar 720 (polyvinylidene fluoride)." (*Id.* (citation omitted)). According to Defendant, the fluorine in its products is not a "contaminant" or an "impurity" because Defendant "intentionally included" it in its chips. (*Id.* (emphasis omitted)). As support, Defendant cites excerpts from the *Markman* hearing. (*See id.*; *see also* D.I. 349 at 49:14–18).

Defendant's reliance on what I said at the *Markman* hearing is unavailing. During colloquy at that hearing, there was some discussion of "accidental impurities or [] impurities that

are perhaps known to exist, but are hard to get rid of." (*See* D.I. 105 at 115:2–4; *see also id.* at 111:24–113:16). I did not define the words "impurity" or "contaminant" in my *Markman* opinion, however.

In any event, there seems to be a dispute as to whether the 0.02% Kynar in Defendant's products is properly understood to be an impurity or a contaminant. Defendant's expert, Dr. Huck, opines that "a person of ordinary skill in the art would not have viewed intentionally-added 0.02 % Kynar 720 as an impurity or contaminant." (D.I. 241, Exh. 2 ¶ 361). Plaintiffs' expert, Dr. Sia., on the other hand, opines, "Such a trace amount of this additive is properly characterized as no more than a 'contaminant' or an 'impurity,' which the Court's claim construction exempts." (D.I. 238, Exh. B ¶ 299). Thus, there is a genuine dispute of material fact as to whether Defendant's products literally infringe the "non-flourinated microchannel" limitation in light of the way I have construed that term.

Defendant additionally moves for summary judgment of non-infringement under the doctrine of equivalents. (*See* D.I. 243 at 10–15). The core of Defendant's argument is that prosecution history estoppel bars Plaintiffs from asserting infringement under that doctrine. (*See id.* at 10). More specifically, Defendant maintains, "The 'non-flourinated' limitation was added during prosecution of the application that resulted in the '083 patent to overcome the examiner's prior art rejection." (*Id.* at 11). It argues "the presumption of total surrender clearly applies" because the "non-flourinated amendment narrowed the literal scope of the claim by altering the claimed subject matter from encompassing all types of microchannels to only non-flourinated microchannels." (*Id.* at 12 (emphasis omitted)). Defendant contends that Plaintiffs have failed to rebut that presumption. (*Id.* at 13).

I disagree.

Under the *Festo* doctrine, the presumption that the patentee "surrendered all territory between the original claim limitation and the amended claim limitation" applies where the amendment "narrowed the literal scope of a claim" and was "made for a substantial reason relating to patentability." *Festo Corp. v. Shoketsu Kinzoku Kogyo Kabushiki Co.*, 344 F.3d 1359, 1366–67 (Fed. Cir. 2003). The patentee may overcome the presumption of total surrender in three ways. *Id.* at 1368. "Specifically, the patentee must demonstrate that the alleged equivalent would have been unforeseeable at the time of the narrowing amendment, that the rationale underlying the narrowing amendment bore no more than a tangential relation to the equivalent in question, or that there was 'some other reason' suggesting that the patentee could not reasonably have been expected to have described the alleged equivalent." *Id.* "Questions relating to the application and scope of prosecution history estoppel [] fall within the exclusive province of the court." *Id.*

Here, as a threshold matter, it seems clear to me that the presumption of total surrender applies. The patentee in this case narrowed the scope of the claims by adding, among other things, the term "non-flourinated" before "microchannel" in order to overcome the patent examiner's rejection in light of prior art references Quake and Ramsey. (*See* D.I. 247, Exh. K, pp. 2, 7–8). Thus, the patentee narrowed the literal scope of the claims for a substantial reason relating to patentability. *See Festo*, 344 F.3d at 1366–67.

In my opinion, however, Plaintiffs have overcome the presumption by demonstrating that "the rationale underlying the narrowing amendment [bore] no more than a tangential relation to the equivalent in question." *See id.* at 1369 (alteration in original) (citation omitted). That "criterion asks whether the reason for the narrowing amendment was peripheral, or not directly relevant, to the alleged equivalent." *Id.* "[T]he inquiry into whether a patentee can rebut the

Festo presumption under the 'tangential' criterion focuses on the patentee's objectively apparent reason for the narrowing amendment." *Id.* "[A]n amendment made to avoid prior art that contains the equivalent in question is not tangential; it is central to allowance of the claim." *Id.*

In this case, in responding to the examiner's prior art rejection and amending the claims, the patentee wrote:

> Quake reports that surfactants, such as a fluorinated oil, may be used in an extrusion fluid (column 24, lines 18-20). Quake reports that the extrusion fluid may coat the channel walls (column 19, lines 9-49). Coating channel walls with an extrusion fluid that includes a fluorinated oil does not disclose or suggest the elements of the amended claims of a non-flourinated microchannel, and a carrier fluid including a fluorinated oil and a fluorinated surfactant having a hydrophilic head group in the microchannel.

(D.I. 247, Exh. K, pp. 7–8).

It seems clear to me that the patentee, by amending the claims to require "a non-flourinated microchannel," sought to distinguish the "microchannel" in its system from the channels described in Quake, which may be "coated with . . . surfactants, TEFLON, or fluorinated oils" (*id.*, Exh. A ¶ 118) in order to "prevent material . . . from adhering to the sides of the channels" (*id.* ¶ 94). In other words, I think what Plaintiffs surrendered through their amendment are "microchannel[s]" "coated" with fluorine for a purpose—not those containing *de minimis* amounts of fluorine that have no effect on how the "microchannel" functions in the system. Nowhere in the Quake reference do I see the equivalent in question. Because I conclude the reasons for the amendment bore no more than a tangential relation to the equivalent at issue, I need not address Plaintiffs' argument that the equivalent was not foreseeable at the time of the amendment. (*See* D.I. 263 at 13).

Defendant additionally argues, "Even if the Court were to find that prosecution history does not apply, Plaintiffs still would be barred by the principle of 'specific exclusion' from arguing infringement under the [doctrine of equivalents]." (D.I. 243 at 14).

Under Federal Circuit law, a patentee is barred from asserting infringement under the doctrine of equivalents where the patentee "defin[es] the claim in a way that clearly exclude[s] certain subject matter, [thereby] . . . implicitly disclaim[ing] the subject matter that was excluded." *SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.*, 242 F.3d 1337, 1346 (Fed. Cir. 2001). Thus, as the Federal Circuit has explained, "if a patent states that the claimed device must be 'non-metallic,' the patentee cannot assert the patent against a metallic device on the ground that a metallic device is equivalent to a non-metallic device." *Id.* at 1347.

Accordingly, Plaintiffs may not assert the '083 patent, which claims a "non-flourinated microchannel," against a product containing a "fluorinated microchannel." As discussed above, however, there is a dispute of material fact as to whether the microchannels in Defendant's products are properly understood to be "fluorinated."

Finally, Defendant argues its products do not infringe the '083 patent because they "lack[] a 'plug-fluid/microchannel wall interface,' as required by the claims." (D.I. 243 at 15). According to Defendant, "Because the droplets formed in 10X's systems are completely surrounded by oil, the droplets . . . never touch the microchannel wall." (*Id.* (citation omitted)). Plaintiffs respond, "Nothing in the claims of the '083 patent requires the plug-fluid to be in actual physical contact with the microchannel walls." (D.I. 263 at 14).

I agree with Plaintiffs.

As Plaintiffs point out, the claims require only that "the fluorinated surfactant is present at a concentration such that surface tension at the plug-fluid/microchannel wall interface is

higher than surface tension at the plug-fluid/carrier fluid interface." ('083 patent, 73:18–21). Thus, the focus in the claims is on the difference between the surface tensions at the two interfaces, not on any physical contact between the plug-fluid and microchannel wall or between the plug-fluid and carrier fluid. I see no support for Defendant's attempt to limit the claims so as to require direct contact. Defendant's reading is too narrow. Thus, I cannot conclude as a matter of law that Defendant's products do not infringe the '083 patent as to the "plug-fluid/microchannel wall interface" limitation in the claims.

For the reasons stated above, Defendant's motion is **DENIED** as to the '083 patent.

2. Non-Infringement of the '148 Patent

Defendant seeks summary judgment of non-infringement of the '148 patent.

First, Defendant seeks summary judgment of non-infringement as to its GemCode Long Read product. (*See* D.I. 243 at 16–17). In their opposition, Plaintiffs state they "do not dispute that under the Court's construction of the term 'target sequence,' 10X's GemCode Long Read product will not infringe the '148 patent. Plaintiffs[] reserve their right to challenge the Court's claim construction on appeal." (D.I. 263 at 16 n.6). Accordingly, Defendant's motion for summary judgment of non-infringement of the '148 patent is **GRANTED** as to its GemCode Long Read product.

Second, Defendant argues that its Chromium Genome/Exome product does not literally infringe claim 1 of the '148 patent because the "Landlord" reaction "does not include a step in which 'strands of DNA are denatured to form single-strand templates.'" (D.I. 243 at 17–18). Similarly, it argues there is no dispute its product does not infringe under the doctrine of equivalents. (*Id.* at 20–22). According to Defendant, "Plaintiffs have not proffered any evidence of how the results of Landlord reaction and [polymerase chain reaction] are the same." (*Id.* at 21 (emphasis omitted)).

According to Defendant's expert, Dr. Quackenbush, the Landlord reaction constitutes strand displacement, not denaturation. (D.I. 247, Exh. C ¶ 221). He opines that "displacement activity is distinct from denaturation in which heat . . . is used to separate entire double-stranded DNA molecules." (*Id.* ¶ 223). As support, Dr. Quackenbush cites various textbooks that purportedly distinguish between strand denaturation and displacement. (*See id.* ¶ 225). But none seem to state that strand displacement is not denaturation. Plaintiffs' expert, Dr. Sia, on the other hand, maintains that strand displacement is a form of denaturation. (*See* D.I. 238, Exh. B ¶¶ 253, 452, 455; *see also id.* ¶¶ 241–55 (explaining why Landlord is a polymerase chain reaction)).

I think Defendant is essentially asking that I construe what the various textbooks cited by Dr. Quackenbush say in regard to displacement and denaturation. But none of the excerpts to which he cites are directly on point. It seems to me that whether strand displacement is in fact a form of or equivalent to denaturation will be a battle of the experts at trial. Accordingly, Defendant's motion for summary judgment of non-infringement of the '148 patent is **DENIED** as to its Chromium Genome/Exome product.

3. Non-Infringement of the '091 Patent

Defendant argues its products do not literally infringe the '091 patent because they do not meet the requirement that "each plug comprises both the first and second plug-fluids so that the reaction of the reagents substantially occurs in the plug." (*See* D.I. 243 at 22 (emphasis omitted)). According to Defendant, "there is no dispute that at least some of the GEMS formed in a 10X instrument run do not contain a gel bead," and thus a reaction does not occur in every GEM. (*Id.* at 23 (emphasis omitted)). As support for its position that "each" means "each and every," Defendant cites statements I made at the *Markman* hearing. (*Id.* at 22).

In my opinion, Defendant is attempting to reargue its position from the *Markman* stage in regard to the meaning of the word "each." Its reliance on statements I made during the hearing is

unavailing. While I declined to construe the word "each" in my *Markman* opinion, I stated, "I think it is apparent from the claim language that the phrase 'each plug-fluid' is not meant to include every plug-fluid in the Universe without expressly including such a limitation in the construction of this term." (D.I. 116 at 19). I found no construction was necessary for the word "each," "with the understanding that 'each' refers only to the plugs and plug-fluids in the claim at issue and not plugs and plug-fluids generally." (*Id.* at 19–20). Again, I decline to adopt Defendant's narrow reading of the claims.

Defendant further seeks summary judgment of non-infringement of the '091 patent under the doctrine of equivalents. (D.I. 243 at 25–26).

Having reviewed the briefing and evidence presented by the parties, I conclude there is a dispute of material fact as to whether Defendant's products infringe the '091 patent under that doctrine. (*Compare* D.I. 238, Exh. B (Sia Report) ¶¶ 202–03, *with* D.I. 247, Exh. F (Huck Report) ¶¶ 301–02). I am not persuaded by Defendant's argument that summary judgment is warranted as to infringement under the doctrine of equivalents because Dr. Sia "did not properly consider whether 10X's system was truly equivalent to the system described in the '091 patent claims." (D.I. 243 at 26).

For the reasons stated above, Defendant's motion is **DENIED** as to the '091 patent.

4. Anticipation of the '407 Patent

Finally, Defendant seeks summary judgment of invalidity of claim 1 of the '407 patent on the basis that the Quake reference "discloses all of the steps of claim 1." (D.I. 243 at 26–27). As support, Defendant primarily relies upon paragraph [0170] of that reference. (*See id.* at 33 ("The method of conducting reactions in droplets described in paragraph [0170] satisfies the disputed limitations of claim 1 of the '407 patent. Accordingly, claim 1 . . . is invalid as anticipated by

Quake."); *see also id.* at 29–32). Defendant criticizes Dr. Sia for failing to mention paragraph [0170] anywhere in his report. (*Id.* at 31; *see* D.I. 349 at 118:1–11).

Having reviewed the briefing and the evidence presented by the parties, I conclude there are material facts in dispute as to whether Quake anticipates claim 1 of the '407 patent. (*Compare, e.g.*, D.I. 247, Exh. X (Chang Report) ¶¶ 301–04, *with, e.g.*, D.I. 264, Exh. 17 (Sia Rebuttal Report) ¶¶ 87–89). I will not grant summary judgment to Defendant on the basis that Dr. Sia did not respond to Defendant's expert's discussion of paragraph [0170] buried in a 1600-page report.

Accordingly, Defendant's motion is **DENIED** as to the '407 patent.

IV. CONCLUSION

For the foregoing reasons, Plaintiffs' Motion for Summary Judgment (D.I. 235) is **GRANTED IN PART** and **DENIED IN PART**, and Defendant's Motion for Summary Judgment of Non-Infringement and Invalidity (D.I. 242) is **GRANTED IN PART** and **DENIED IN PART**.

It is **SO ORDERED** this 26 day of June 2018.

Richard G. Andrews
United States District Judge