United States District Court,
N.D. California, San Jose Division.

BIO-RAD LABORATORIES, INC,
Plaintiff(s).
v.
APPLERA CORPORATION, et al,
Defendant(s).

No. C 02-05946 JW

March 23, 2004.

David Leon Bilsker, Howrey LLP, East Palo Alto, CA, Thomas C. Mavrakakis, Palo Alto, CA, Bobby A. Ghajar, Wallace W. Wu, Howrey, LLP., Simon, Arnald & White, Los Angeles, CA, Kfir B. Levy, Fish & Richardson, P.C., Washington, DC, Tracy Jolles Holland, Dell Inc., Round Rock, TX, for Plaintiff.

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CLAIM CONSTRUCTION ORDER FOLLOWING *MARKMAN* HEARING

JAMES WARE**, District Judge.**

I. INTRODUCTION

This is a patent infringement case. FN1 Plaintiff Bio-Rad Laboratories ("Bio-Rad") is the owner and named assignee of U.S. Patent No. 5,089,111 (the '111 patent). Bio-Rad sued defendants, Applied Biosystems and Applera Corporation (collectively, "Applera"), for infringing one or more claims of the ' 111 patent. The Court has jurisdiction over the patent infringement claims pursuant to 28 U.S.C. s. 1338.

Bio-Rad is a Delaware corporation with its principal place of business in Hercules, California. Applied Biosystems is an operating group of Applera Corporation, a Delaware corporation. Applied Biosystems has its principal place of business in Foster City, California. Venue in this jurisdiction is proper pursuant to 28 U.S.C. s. 1391 and 1400(b).

The parties have asked the Court to construe disputed terms in claims 1 through 18 of the '111 patent. On January 30, 2004, the Court held a hearing in accordance with Markman v. Westview Instruments, Inc., 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996), to construe the disputed terms and phrases of the asserted claims.

II. BACKGROUND

A. Separation Technology Prior to the Invention

The claimed invention of the '111 patent claims a method to improve the reproducibility and reduce the time to perform electrophoretic separations by employing an aqueous media that contains a water-soluble polymer.

Electrophoresis is the migration of electrically charged particles in solution or suspension in the presence of an applied electric field. *McGraw-Hill Encyclopedia of Science & Technology,* 7th ed. (1992), Vol. 6, p. 257. Generally, each particle moves toward the electrode of opposite polarity with a particular electrophoretic mobility. Id. The electrophoretic mobility of a particle is the velocity with which a particle moves divided by the magnitude of the electric field at a given set of column conditions. Id. Electrophoretic mobility is directly proportional to the magnitude of the charge on the particle, and is inversely proportional to the size of the particle. Id.

The phenomenon of electrophoresis was first observed in 1807 by Russian physicist F.F. Reuss. Electrophoresis was employed as an experimental technique with the introduction of an electrophoresis apparatus by Anne Tiselius in 1937. Id. Between 1937 and 1989, other methods of utilizing electrophoresis were developed, such as gel techniques, isoelectric focusing, isotachophoresis, particle electrophoresis, capillary electrophoresis, capillary zone electrophoresis, capillary isotachophoresis, and alternating-field electrophoresis. *See* id. at 257-260. Some of the more relevant methods are described below.

1. Electrophoresis Using Gel Media

The resolving power of electrophoresis was greatly improved by the introduction of gels as supporting media. Id. at 258. The gel matrix prevents thermal convection caused by the heat which results from the passage of electric current through the sample. Id. The absence of convection greatly reduces the mixing of the various parts of the sample, and thereby allows for more stable separation. Id. The dimensions of the cross-links of the gel also provide a molecular sieving effect, which increases the resolving power of the electrophoretic separation of molecules of different sizes. Id. In addition, the gel media supports a gradient of a separate reagent, which assists in the separation of macromolecules. Id.

2. Capillary Electrophoresis

Electrophoretic separations in small-diameter capillaries are used to produce fast high-resolution separations with great ease of automation compared to conventional slab gel electrophoresis. Id. at 259. Capillary electrophoresis can be considered to encompass a number of electrophoretic methods, including zone electrophoresis, isotachophoresis, iso-electric focusing, and gel electrophoresis. Id. Automated commercial instrumentation for capillary electrophoresis became available in 1988. Id.

In the 1980s, capillary electrophoresis was conducted in a capillary filled with a buffer solution, and separations are based upon only the electrophoretic mobilities of the various analyte species. FN2 Id. at 259. In one column configuration, a capillary of a nonconducting material, such as, Teflon or fused silica, is immersed in buffer reservoirs at both ends. *See* id. The mixture of sample ions to be separated is applied to the head of the column in a narrow band, whose width is much less than the length of the column, and the individual substances migrate and are separated according to their net electrophoretic velocities. Id. Electrical contact to the high voltage electrodes is generally made through the conducting buffer reservoirs. Id.; *see* Fig. 1. Detection of the moving analyte bands is most readily accomplished by some form of on-column device involving ultraviolet adsorption or fluorescence emission. Id. "The widths of the migrating bands are influenced by diffusion and thermal gradients, and care must be taken to minimize the latter." Id.

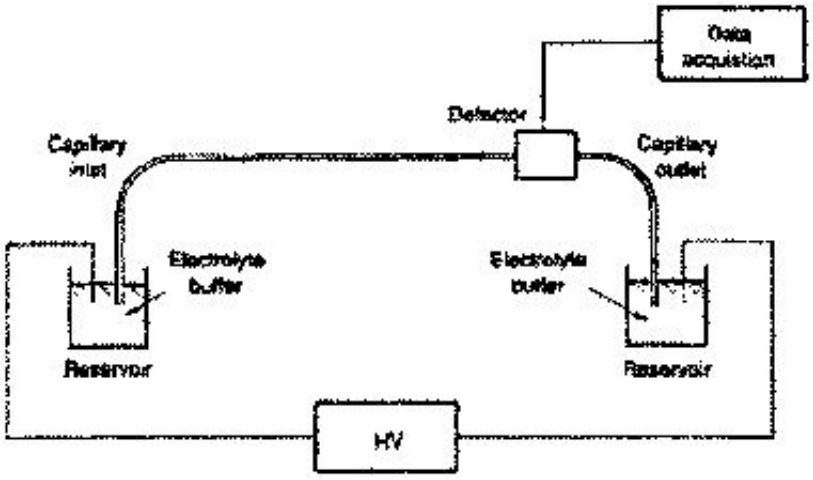

Figure 1. Generic diagram of a capillary electrophoresis system. *See Science,* "Capillary Electrophoresis," Manuel Gordon, *et al.,* Oct. 14, 1988 (hereinafter, "*Gordon* ").

Capillary free zone electrophoresis is particularly useful for separating small peptides and proteins. Separation occurs on the basis of the charge to mass ratio. '111 patent, col. 1, ll. 30-33. Thus, large and small molecular weights sample ions with corresponding charge to mass ratios are not separated from each other. For this reason, capillary free zone electrophoresis separations are very difficult to achieve in samples involving a mixture of different molecular weight polynucleotides and many sodium dodecylsulfate ("SDS")-treated proteins. '111 patent, col. 1, ll. 33-37.

The use of a gel in conjunction with capillary electrophoresis improved separation of different sized molecules. Id. at col. 1, ll. 38-40. However, placing gel media within capillaries is problematic, because the gel undergoes physical and chemical changes with each use, such that the gel is usually disposed of after one use. Id. at col. 1, ll. 39-44. In addition, using gel media in capillaries is not practical for use with cartridges designed for automated instrumentation. Id. at col. 1, ll. 44-46.

The prior art discloses using cellulose derivatives in capillary electrophoresis for suppressing electroendosmosis and other types of bulk flow by increasing the viscosity of the buffer solution. Id. at col. 2, ll. 5-8. The quantities used for this purpose are small, however, with no substantial tendency to detain the sample ions during their migration or to affect their separation. Id. at col. 2, ll. 9-13.

B. THE CLAIMED INVENTION

The named inventors of the '111 patent are Ming Zhu, Jeng-Chyh Chen, and Stelan Hj erten. The inventors claim a way to separate sample ions from each other on the basis of molecular size by electrophoresis through an aqueous solution containing a polymer of a selected molecular weight and concentration. The molecular weights of the selected polymers depends, *inter alia,* on the sample ions to be separated. '111 patent, col. 2, ll. 51-52. Unlike prior art systems that utilized a gel media to facilitate electrophoresis, the claimed invention performs the electrophoretic separation with an aqueous media containing water-soluble polymers. Id. at col. 1, ll. 50-68. Although the aqueous solution contains polymers, there is no gel in the

solution that assists in the separation process. Id.

The '111 patent describes the polymers as generally non-crosslinked. Id. at col. 1, ll. 66-67. The '111 patent discloses the use of branched and linear polymers, with linear polymers being preferred for many applications. Id. at col. 1, ll. 67-68. In addition, the polymers may be neutral or charged, neutral being preferred in applications where charge interaction between the sample ions and the polymer is sought to be avoided. Id. at col. 2, ll. 1-4. The '111 patent discloses using a mixture of particular polymers in which varying molecular weights are purposely combined. The polymers claimed in the invention include: cellulose derivatives, saccharide-based and substituted saccharide-based polymers, polysilanes, polyvinylalcohol and polyvinylpyrrolidone. Id. at col. 10, ll. 44-47.

The claimed invention resides in the discovery that dissolved polymers in general produce a molecular sieving effect when used in certain amounts, these amounts being generally higher than those amounts of the cellulose derivatives used for suppressing bulk flow. FN3 Id. at col. 2, ll. 13-18. At these polymer levels, the decrease in sample ion mobility is a function of both the type of polymer used and its concentration as well as the size of the sample ion. Id. at col. 2, ll. 34-40.

Aqueous media with dissolved polymers in accordance with this invention may be used for biomolecular separations in general, although they are of particular utility in separations performed in capillary columns with high voltage, such as high performance electrophoresis. Id. at col. 2, 19-24. The use of polymers in this manner permits the separation of species which vary in molecular weight with insufficient or no variation in charge to mass ratios, and lends itself to easy preparation of the separation media and high reproducibility. Id. at col. 2, 24-28.

C. PROSECUTION HISTORY

The '111 patent issued from application Serial No. 07/589,915, which was a continuation-inpart of copending application Serial No. 07/303,174 filed on January 27, 1989, now abandoned.

1. INFORMATION DISCLOSURE

Pursuant to 37 C.F.R. s.s. 1.97 and 1.98, the inventors submitted a list of three references. The first disclosure was written by Tietz, *et al.,* "Electrophoresis on Uncrosslinked Polyacrylamide: Molecular Sieving and its Potential Applications," *Electrophoresis,* 19867, 217-220 (hereinafter " *Tietz* "). *Tietz* iis relevant for its disclosure of molecular sieving in a solution containing noncrosslinked polymer.

The second and third references were authored by Han-Joachim Bode, "The Use of Liquid Polyacrylamide in Electrophoresis, Mixed Gels Composed of Agar-Agar and Liquid Polyacrylamide" *Analytical Biochemistry,* 83 (1977) (hereinafter " *Bode* ")(D.I.93, Ex. 9, HWB0281.) The second reference discusses the inclusion of non-crosslinked polymers in a molecular sieving medium. The third reference is relevant for its discussion on the influence of non-crosslinked polymers in a molecular sieving medium. The examiner considered all three references. Id. at HWB0258.

2. FIRST OFFICE ACTION

On May 29, 1990, the examiner rejected claims 1 through 26, but allowed claim 27. FN4 Claims 1 through 20 and 22 through 26 were rejected as indefinite under 35 U.S.C. s. 112 para. 2, for failing to particularly point out and distinctly claim the subject matter that the applicants regard as the invention. FN5 The

examiner also stated that there was no antecedent basis for "said macromolecular species" in the previous claim language. Id. at HWB0251.

Claims 1 through 13 were also rejected under 35 U.S.C. s. 103 as being obvious in light of *Tietz*. The examiner explained that *Tietz* disclosed successful molecular sieving experiments using non-crosslinked linear polyacrylamide in concentrations ranging from 5 through 20 weight percent by volume ("% w/v"). The examiner stated that because the experiments in *Tietz* using polyacrylamide "were successful the polyacrylamide must inherently have the numerous characteristics recited in the above claims, e.g., a molecular weight of about 10,000 to about 2,000,000." D.I. 93, HWB0252; D.I. 93 HWB0278.

The examiner further stated that "since the applicant fails to positively demonstrate unexpected results using smaller diameters than those used by Tietz et al [sic] these limitations are considered to be a design choice." Id. (citations omitted). The examiner also noted that the voltage ranges stated in claims 12 and 13 were conventional.

Rejecting claims 1 through 13 as obvious in light of *Tietz* and U.S. Patent No. 4,865,706 (hereinafter, " *Karger* "), the examiner explained that it would be obvious to one skilled in the art that the method disclosed in *Tietz* could be performed using smaller diameter capillary tubes. Id.

The examiner also rejected as obvious claims 1 through 21 over another article written by Bode, "SDS-Polyethyl Electrophoresis: A Possible Alternative to SDS-Polyacrylamide Gel Electrophoresis," *FEBS Letters,* 65(1) (1976), pp. 56-58. The article disclosed molecular sieving utilizing a 10% w/v polyethylene glycol ("PEG") solution that is supported by cellulose acetate foils, but also explains that the method is equally applicable to carrier-free electrophoresis. The examiner concluded that it would be obvious to one skilled in the art to perform the PEG method in glass tubes. Id.

The examiner stated that claims 22 through 26 "would be allowed if rewritten to overcome the rejection under 35 U.S.C. s. 112 and to include all of the limitations of the base claim and any intervening claims." Id.

3. APPLICANTS' RESPONSE TO FIRST OFFICE ACTION

In their response filed on July 17, 1990, applicants cancelled claims 14 through 22 and amended claims 1 through 8 and 23 through 26. Claim 1 was independent with all claims dependant thereon except for claim 27, which had been allowed in the first office action. Applicants amended claim 1 to correct an antecedent problem by replacing "macromolecule" with the term "sample ion." Also, applicants further claimed a "substantially linear polymer" as a "substantially linear water-soluble cellulose derivative polymer." D.I. 93, Ex. 9, HWB0259-62.

The applicants explained that the recitation regarding the increase in retention time refers to the increase which is attributable to the presence of the polymer, and is accordingly the increase over what the retention time would be if the polymer were not present. They explained that the "percent increase" term is used according to its common usage, which indicates the retention time with the polymer present minus the retention time in the absence of the polymer, divided by the latter and multiplied by 100. Id. at HWB0262-63. After the applicants' amendments, the pending claims were 1 through 13 and 23 through 27.

4. NOTICE OF ALLOWABILITY FOR 303,174 APPLICATION

On July 20, 1990, in response to applicants' amendments, the PTO issued a notice of allowability for claims 1-13 and 23-27 of the 303,174 application.

5. CONTINUATION-IN-PART 589,915 APPLICATION

On September 27, 1990, the applicants filed a continuation-in-part application 07/589,915. FN6 Subsequently, the 07/303,174 application was abandoned. The application 07/589,915 contained 19 claims. Claims 1 and 16 were independent with all of the remaining claims being dependant upon claim 1.

Claim 1 of the 589,915 application differed from claim 1 of the 303,174 application. The applicants expanded claim 1 by replacing the phrase "a gel-free aqueous solution of a substantially linear water-soluble cellulose derivative polymer" with the phrase "a gel-free aqueous solution of a water-soluble polymer selected from a group consisting of cellulose derivatives, saccharide-based and substituted saccharide-based polymers, polysilanes, polyvinylalcohol and polyvinylpyrrolidone." *Compare* D.I. 93, Ex. 9, HWB0260 with D.I. 93, Ex. 9, HWB0325.

6. INFORMATION DISCLOSURE STATEMENT

On December 14, 1990, the applicants filed an information disclosure statement in accordance with 37 C.F.R. s. 1.56. On September 16, 1991, the examiner considered the disclosed U.S. Patent No. 4,305,798. Additionally, the examiner acknowledged three disclosed foreign patents.

7. NOTICE OF ALLOWABILITY OF 589,915 APPLICATION

In the first office action dated September 20, 1991, the examiner issued a notice of allowability for all 19 claims stating:

An appropriate search of the prior art failed to reveal any reference(s) which explicitly teach or fairly suggest a method of separating a mixture of sample ions of varying molecular weights in a sample into components, said method comprising *electrophoretically passing* said sample through a separation column containing a gel-free aqueous solution of a water-soluble polymer selected from the group consisting of cellulose derivatives, saccharide-based and substituted saccharide-based polymers, poly-silanes, poly vinyl alcohol, and polyvinyl pyrrolidone, said polymer having a molecular weight of about 10,000 to about 2,000,000, *said molecular weight being within a range of about 0.1 to about 200 times the average molecular weight of said sample ions in said mixture,* the concentration of said polymer in said solution being sufficient to retard the flow of said species through said separation column to degrees which with the molecular weights of said species. Similarly, no reference(s) teach explicitly or fairly suggests a method of separating a mixture of polynucleotide chains in a sample each containing from about 10 to about 10,000 base paris [sic, pairs], said method comprising electrophoretically passing said sample through a capillary column containing a gel-free aqueous solution of a substantially linear polymer selected from *the group consisting of methyl cellulose, hydroxypropyl methyl, hydroxyethyl methyl cellulose, and hydroxybutyl methyl cellulose,* said polymer characterized in terms of *the viscosity of a 2% aqueous solution thereof being within a range of about 1,000 centipoise to about 10,000 centipoise at 25 (deg.)C,* and *the concentration of said polymer in said in said [sic] solution is from about 0.1% to 5% by weight.*

Notice of Allowability (D.I.93, Ex. 9C, HWB0343-44) (emphasis in the original). The examiner explained that none of the prior art disclosed a use of a gel-free aqueous solution containing a water-soluble polymer to aid in the electrophoretic separations. Also, the examiner explained that no prior art references taught or

even suggested a method of separating a mixture of polynucleotide chains in a sample each containing from about 10 to about 10,000 base pairs by electrophoretically passing the sample through media containing a gel-free aqueous solution of substantially linear polymers in a concentration of about 0.1 to 5.0 percent by weight. The examiner placed no emphasis on the design choice of the container in which the separation occurred.

III. STANDARDS

The construction of the claims in a patent is a matter left to the province of the court. Markman, 517 U.S. at 391. A court's objective is to determine the plain meaning, if any, that those of ordinary skill in the art would apply to the language used in the patent claims. Warner v. Ford Motor Co., 331 F.3d 851, 854 (Fed.Cir.2003) (citing Rexnord v. Laitram Corp., 274 F.3d 1336, 1342 (Fed.Cir.2001)). While the court may look to pertinent art dictionaries, treatises and encyclopedias for assistance, Texas Digital Sys., Inc. v. Telegenix, Inc., 308 F.3d 1193, 1202-03 (Fed.Cir.2002), the intrinsic record is the best source of the meaning of claim language. Vitronics Corp. v. Conceptronics, Inc., 90 F.3d 1576, 1582 (Fed.Cir.1996). Unless the inventor has manifested an express intent to depart from the ordinary and accustomed meaning that patent claim language has in the art, there is a heavy presumption that the inventor intended the ordinary meaning to apply. *See* Teleflex Inc. v. Ficosa N. Am. Corp., 299 F.3d 1313, 1325 (Fed.Cir.2002) *(en banc)* (citation omitted); Bell Atlantic Network Servs., Inc. v. Covad Communications Group, Inc., 262 F.3d 1258, 1268 (Fed.Cir.2001) (citation omitted). The use of extrinsic evidence in the claim construction process is "proper only when the claim language remains genuinely ambiguous after consideration of the intrinsic evidence." Interactive Gift Express, Inc. v. Compuserve Incorp., 256 F.3d 1323, 1332 (Fed.Cir.2001).

IV. DISCUSSION

A. DISPUTED CLAIM TERMS REQUESTED TO BE CONSTRUED

The parties have asked the Court to construe disputed terms and phrases contained in eighteen of the nineteen claims of the '111 patent. The claims, with the disputed terms in bold, are as follows:

1. A method of separating a mixture of sample ions of varying molecular weights in a sample into components, said method comprising electrophoretically passing said sample through a **separation column** containing a gel-free aqueous solution of a water-soluble polymer selected from the group consisting of **cellulose derivatives, saccharide-based** and substituted saccharide-based polymers, polysilanes, polyvinylalcohol and polyvinylpyrrolidone, said polymer having a molecular weight of about 10,000 to about 2,000,000, said molecular weight being within a range of about 0.1 to about 200 times the average molecular weight of said sample ions in said mixture, the concentration of said polymer in said solution being sufficient to retard the flow of said species through said separation column to degrees which vary with the molecular weights of said species.

2. A method in accordance with claim 1 in which said **sample ions** are macromolecular species, and said concentration of said polymer is sufficient to increase the retention time of said macromolecular species in **said column** by 25%.

3. A method in accordance with claim 1 in which said **sample ions** are macromolecular species, and said concentration of said polymer is sufficient to increase the retention time of said macromolecular species in **said column** by at least about 50%.

4. A method in accordance with claim 1 in which said polymer has an average molecular weight which is between the lowest and highest molecular weights of said **sample ions** in said mixture.

5. A method in accordance with claim 1 in which said polymer has a molecular weight range which is at least coextensive with that of said **sample ions.**

6. A method in accordance with claim 1 in which said polymer has an average molecular weight which is within a range of about 0.2 to about 20 times the average of the lowest and highest molecular weights of said **sample ions.**

7. A method in accordance with claim 1 in which said polymer has an average molecular weight which is within a range of about 0.5 to about 2 times the average of the lowest and highest molecular weights of said **sample ions.**

8. A method in accordance with claim 1 in which said **separation column** is a capillary tube with an internal diameter of less than about 200 microns.

9. A method in accordance with claim 1 in which said **separation column** is a capillary tube with an internal diameter of from about 25 microns to about 50 microns.

10. A method in accordance with claim 1 in which said separation column is a capillary tube with an internal diameter of less than about 100 microns, and the passing of said sample therethrough is achieved by applying a voltage of at least about 100 volts per centimeter of capillary tube length across **said** capillary tube **.**

11. A method in accordance with claim 1 in which **said separation column** is a capillary tube with an internal diameter of less than about 100 microns, and the passing of said sample therethrough is achieved by applying a voltage of at least about 300 volts per centimeter of capillary tube length across said capillary tube**.**

12. A method in accordance with claim 1 in which said polymer is a **water-soluble cellulose derivative** characterized in terms of the viscosity of a 2% aqueous solution thereof being within a range of about 15 centipoise to about 17,000 centipoise at 25 (deg.)C.

13. A method in accordance with claim 1 in which said polymer is a **water-soluble cellulose derivative** characterized in terms of the viscosity of a 2% aqueous solution thereof being within a range of about 1,000 centipoise to about 10,000 centipoise at 25 (deg.)C.

14. A method in accordance with claim 1 in which said polymer is a **water-soluble cellulose derivative** characterized in terms of the viscosity of a 2% aqueous solution thereof being within a range of about 1,000 centipoise to about 10,000 centipoise at 25 (deg.)C, and the concentration of said polymer in said solution is at least about 0.1% by weight.

15. A method in accordance with claim 1 in which said polymer is a water-soluble **cellulose derivative** characterized in terms of the viscosity of a 2% aqueous solution thereof being within a range of about 1,000 centipoise to about 10,000 centipoise at 25 (deg.)C, and the concentration of said polymer in said solution is

from about 0.1% to about 10% by weight.

16. **A method of separating a mixture of polynucleotide chains in a sample,** said polynucleotide chains each containing from about 10 to about 10,000 **base pairs,** said method comprising electrophoretically passing said sample through a **capillary column** containing a gel-free **aqueous solution** of a substantially linear polymer selected from the group consisting of methyl cellulose, hydroxypropyl methyl **cellulose,** hydroxyethyl methyl cellulose, and hydroxybutyl methyl **cellulose,** said polymer characterized in terms of the viscosity of a 2% aqueous solution thereof being within a range of about 1,000 centipoise to about 10,000 centipoise at 25 (deg.)C, and the concentration of said polymer in said solution is from about 0.1% to about 0.5% by weight.

17. A method in accordance with claim 1 in which said polymer is a member selected from the group consisting of **cellulose derivatives, saccharide-based polymers, substituted saccharide-based polymers,** and polyvinylalcohol.

18. A method in accordance with claim 1 in which said polymer is a member selected from the group consisting of **saccharide-based polymers** and **substituted saccharide-based polymers.**

B. STIPULATED AGREEMENT REGARDING PARTICULAR CLAIM TERMS

The parties have agreed upon the meaning of the following terms: (1) "said species" means "sample ions"; (2) "2% aqueous solution" means "2% by weight aqueous solution"; (3) "increase in retention time" means "the increase which is attributable to the presence of the polymer, and is accordingly the increase over what the retention time would be if the polymer were not present." Joint Claim Construction and Prehearing Statement Under Patent Local Rule 4-3, D.I. 86.

C. DISCUSSION OF DISPUTED TERMS

1. "A gel-free aqueous solution of a water-soluble polymer"

The parties have asked the Court to construe the phrase "a gel-free aqueous solution of a water soluble polymer" that appears in claim 1 of the '111 patent. In particular, the parties dispute the meaning of the term "gel-free." Bio-Rad contends that the term "gel" would be "understood by someone of ordinary skill in the art to mean a material that is not liquid or solid, something between the two." Bio-Rad Reply Brief, p. 12 line 28-p. 13 line 1. According to Bio-Rad, a substance "[f]ree of gel would be a material that does not have that physical structure," id. at p. 13, lines 1-2, and that a gel is not defined by the presence of cross-linking.

Applera construes the phrase "a gel-free aqueous solution" to mean "a non-crosslinked polymer dissolved in a water-based solvent." Applera individually defines "gel-free," "aqueous," and "solution," and relies on the '111 patent abstract to support limiting the plain and ordinary meaning of the term to include only non-crosslinked polymers.

The Court finds that one of ordinary skill in the art would understand the term "gel" to mean a colloid in a more solid form than a liquid form. *See McGraw-Hill Dictionary of Scientific and Technical Terms* (1976); *see also Webster's Ninth New Collegiate Dictionary* (1991). Where "colloid" is a substance that is in a state of division preventing passage through a semipermeable membrane, consisting of particles too small for resolution with an ordinary light microscope, and that in suspension or solution fails to settle out and diffracts a beam of light. *Webster's Ninth Collegiate Dictionary; see also McGraw-Hill Dictionary of*

Scientific and Technical Terms (1976) (defining colloid as a system of which one phase is made up of particles having dimensions of 10-10,000 angstroms (1-1000 nanometers) and which is dispersed in a different phase).

The Court looks to the specification to determine "whether the presumption of ordinary and customary meaning is rebutted." Tex. Digital Sys., 308 F.3d at 1204. After reading the title of the '111 patent, "Electrophoretic Sieving in Gel-Free Media With Dissolved Polymers," the abstract and specification, a person of ordinary skill in the art would understand that unlike the prior art that utilized gel slabs or gels in any form, the '111 patent utilizes electrophoretic media containing no gel. In other words, the patentee used the term "gel-free" to distinguish his invention from the prior art which utilized gel mediums.

Throughout the patent, the patentees make repeated references to the difficulty in using gel mediums. In the abstract, the patentee provides, "species ... are separated by this method, which is of particular interest in high performance electrophoresis in capillary columns *where use of gels would be awkward and inconvenient*." '111 patent abstract (emphasis added). In the specification, the patentee states "the *gel media* in which these separations take place however *require careful preparation and special handling techniques, with problems in reproducibility and stability,*" '111 patent, col. 1, ll. 19-23 (emphasis added); "the *preparation and use of such gels is particularly problematic,* since they undergo physical and chemical changes with each use." '111 patent, col. 1, 39-41 (emphasis added); *see also* id. at col. 1, ll. 42-47.

Additionally, the specification states that "[m]acromolecular sample ions and other biological species may thus be separated from each other and from sample ions of lesser size *without the use of a gel*." '111 patent, col. 1, ll. 60-62 (emphasis added). Thus, the phrase "without the use of a gel," supports a definition of "gel-free" that refers to a media containing no gel.

The specification supports a definition that allows crosslinked and non-crosslinked polymers by stating that "polymers used herein are *generally* non-crosslinked polymers." Id. at col. 1, ll. 66-67 (emphasis added). The patentee's inclusion of the adverb "generally" means that in most cases the polymers utilized are non-crosslinked, but in some cases the polymers are cross-linked. Thus, the specification does not support construing "a gel-free aqueous solution of a water-soluble polymer" to exclude crosslinked polymers.

The prosecution history supports a broad plain and ordinary meaning of the term. The examiner twice allowed claims despite prior art teaching the use non-crosslinked polyacrylamide in electrophoresis. D.I. 93, Ex. 9, HWB0276. A construction that limits "gel-free aqueous ..." to non-crosslinked polymers would fly in the face of the examiner's reason for allowing the claims,-that none of the prior art disclosed using a *gel-free* aqueous solution of a water soluble polymer. *See* 589,915 Application Notice of Allowability, D.I. 93, Ex. 9, HWB0343-44.

The use of extrinsic evidence in the claim construction process is "proper only when the claim language remains genuinely ambiguous after consideration of the intrinsic evidence." Interactive Gift, 256 F.3d at 1332. Applera cites to extrinsic evidence to support its contention that all polymers in gels must be crosslinked. The Court finds that the plain and ordinary meaning of the term is not ambiguous and the specification and prosecution history do not refute the plain and ordinary meaning. Extrinsic evidence may never be relied upon to vary or contradict the clear meaning of terms in the claims. Markman v. Westview Instruments, Inc., 52 F.3d 967, 981 (Fed.Cir.1995) (*en banc*), *aff'd,* 517 U.S. 370, 116 S.Ct. 1384, 134 L.Ed.2d 577 (1996). Thus, the Court will not consider extrinsic evidence in construing this disputed term. *See* Interactive Gift, 256 F.3d at 1332.

The Court construes the phrase "**a gel-free aqueous solution of a water-soluble polymer**" to mean "**an electrophoretic medium that contains no gel and that consists of an aqueous solution containing a water-soluble polymer.**" The Court construes the term "gel" to have its plain and ordinary meaning. FN7

2. "Separation column", "capillary column", and "capillary tube"

The parties dispute the meaning of the terms "separation column," "capillary column," and "capillary tube." The term "separation column" appears in claim 1, which is one of the two independent claims in the '111 patent. The term "capillary column" appears in independent claim 16. A particular type of "separation column," a "capillary tube" is a disputed term that appears in dependent claims 8 through 11. Claims 8 through 11 are dependent on independent claim 1.

Applera contends that the patentee used all three terms interchangeably, D.I. 120, p. 91, ll. 11-13, and that claim differentiation should not apply because other limitations exist in the claims to distinguish the claims. FN8 Applera defines "separation" and "column" separately. Although "separation column" is a technical term, Applera relies on *American Heritage Dictionary* and *The Oxford English Dictionary* to support its independent constructions of the terms "separation" and "column." Applera construes "column" to mean "a cylindrical or slightly tapering body of considerable greater length than distance." Referencing the same two dictionaries, Applera generally defines "separation" and "separating" to mean "to remove; to segregate; to set aside for a special purpose; to isolate ." Relying on the specification of the patent, Applera construes "separation column" to mean "a tube along the length of which sample ions are separated" and "separation" to mean "segregation on the basis of molecular weight."

Applera asserts that the term "tube" as stated in dependant claims 8 through 11 refers to a capillary. In support of its position, Applera relies on the nine examples in the specification utilizing capillary electrophoresis. Applera further contends that in examples 1A, 2A, 2B, and 3 the patentee used the terms "column" and "capillary" interchangeably.

Applera construes the term "capillary column" to mean "a narrow-bore tube along the length of which the polynucleotide chains are separated." Joint Claim Construction Chart, D.I. 86. Applera supports its contention by referring to the specification where all of the examples perform electrophoresis in a capillary. Applera further contends that the "separation" must occur "along the length of" the structure. At the *Markman* Hearing, the parties addressed this issue.

Bio-Rad clarifies that the invention is the separation media, not the shape of the container that supports media. D.I. 120, p. 24. Bio-Rad contends that the plain and ordinary meaning of "separation column" is a structure that supports the separation medium while electrophoresis occurs.

Bio-Rad contends that a person of skill in the art would understand from the language used in claims, the specification, and the patent's file history that the term "capillary column" means "a separation column where that structure includes a capillary." At the *Markman* Hearing, Bio-Rad defined "capillary" as "being this kind of very small hairlike tube." D.I. 120, p. 13, ll. 2-3.

Bio-Rad contends that all three terms refer to any container where sample ion movement occurs. D.I. 120, p. 29, line 2-p. 30, line 14. Bio-Rad contends that a "separation column" is broader than a "capillary column," which in turn is broader than a "capillary tube with an internal diameter ..." Bio-Rad contends that a

"separation column" is the most generic form of a container to support the separation media. D.I. 120, p. 18, ll. 6-7; D.I. 120, p. 18, ll. 8-12.

Bio-Rad contends that the language of claim 1 surrounding the term "separation column," supports Bio-Rad's proposed construction. Specifically, Bio-Rad contends that "language of claim 1 demonstrates that the 'separation column' is what supports (i.e., 'contain[s]') the separation medium (*i.e.,* 'a gel-free aqueous solution of a water soluble polymer')." Bio-Rad's Claim Construction Brief, at 13 line 12-14 (emphasis in original).

Bio-Rad contends that language of claim 1 "demonstrates that the separation column is where electrophoretic separation occurs (*i.e., 'electrophoretically passing said sample through a separation column containing a ... polymer ... sufficient to retard the flow of said species through said separation column to degree which vary.')*." *Id*. at 13, line 14-17 (emphasis in original).

The plain and ordinary meaning of the term "separation column" to one of ordinary skilled in the art is: "a structure, generally cylindrical, that supports the separation medium where electrophoretic separation occurs." One skilled in the art would understand "electrophoretically passing said sample through a separation column" to mean that the electrophoresis occurs within the separation column as described above, where the column includes any structure that contains the claimed gel-free aqueous solution of water-soluble polymer.

Claim 1 explains that the concentration of polymer in solution is sufficient to retard the flow of the mixture of sample ions. '111 patent, col. 10, ll. 51-53. The claimed invention, *inter alia,* uses water-soluble polymers to aid in the separation by retarding the flow of larger molecules migrating through polymer solution contained in a separation column. *See* ' 111 patent, col. 2, ll. 47-49. Claim 1 only requires that the "separation column" contain "a gel-free aqueous solution of a water-soluble polymer." Unlike some separation columns where the vertical orientation of the column is essential to the separation process (i.e. distillation columns are generally vertical), no such limitation is stated or implied in the specification or the prosecution history. *See* Stryker Corporation v. Davol Inc., 234 F.3d 1252 (Fed.Cir.2000) (construing the term "column" to its broadest plain and ordinary meaning "a vertically extending structure that performs the function of receiving the motor" because no restrictions mandated by the claims, specification, or file history suggested otherwise).

In the prior art, the mediums used for electrophoresis separations were generally stationary, for example, a gel slab. Later the prior art began to use aqueous buffer solutions but the separations were still performed in a vessel that was packed with a gel. *See* D.I. 93, HWB0276. The '111 patent claims an invention that allows the electrophoresis media to be an aqueous solution.

Among the many advantages of aqueous separation media is that it can be added directly to the buffer solution that contains a mixture of charge molecules to be separated, or the sample to be separated can be sent through a gel-free aqueous solution containing the water-soluble polymer.

The Court is required to interpret claims "in view of the specification" without unnecessarily importing limitations from the specification into the claims. Tex. Digital, 308 F.3d at 1204-05. The specification supports a broad definition of the plain and ordinary meaning of the term "separation column" by disclosing that the column may be of varying configurations and lengths. *See* '111 Patent, col. 4, ll. 14-16. The Court finds that one skilled in the art would interpret "varying configurations" to allow for varying diameters

within a separation system, collectively referred to as a separation column.

Applera attempts to limit the claim by importing a limitation that the sample ions must be segregated. *See Markman Hearing,* D .I. 120, p. 48, l. 9-p. 49, l. 7. The Court finds that Applera's proposed construction imports limitations from the specification into the claim without first overcoming the heavy presumption that the plain and ordinary meaning of the term applies. *See* Sunrace Roots Enterprise Co. Ltd. v. Sun Victory Trading Co., Inc., 336 F.3d 1298, 1305 (Fed.Cir.2003); Superguide Corp. v. DirecTV Enterprises, Inc., No. 02-1561, 2004 WL 253013, at (Fed.Cir.2004).

Electrophoresis begins when a current is applied to a sample contained in the separation media. *See* Figures 1 and 2. One container or multiple containers may be involved depending on the column configuration and sample ions to be separated. *See Gordon*. Migration through the claimed polymer solution exemplifies "passing through" the separation column. Prosecution history does not support limiting the plain and ordinary meaning of "separation column", "capillary column," and "capillary tube." Moreover, the Notice of Allowability placed no significance on the shape of the container holding the media used to facilitate electrophoresis. *See* D.I. 93, Ex. 9C, HWB0343-44.

An appropriate search of the prior art failed to reveal any reference(s) which explicitly teach or fairly suggest a method of separating a mixture of sample ions of varying molecular weights in a sample into components, said method comprising *electrophoretically passing* said sample through a separation column containing a gel-free aqueous solution of a water-soluble polymer selected from the group consisting of ..., said polymer having a molecular weight of ..., the concentration of said polymer in said solution being sufficient to retard the flow of said species through said separation column to degrees which with the molecular weights of said species.

Id. (emphasis in the original). The examiner explained that none of the prior art disclosed using a gel-free aqueous solution of a water-soluble polymer to aid in the electrophoretic separations and placed no significance on the structure of the vessel containing the gel-free aqueous solution. *Id*.

The court finds that Applera's proposed construction improperly limits the term "separation column" to a preferred embodiment, "a capillary tube." *See* Karlin Technology, Inc. v. Surgical Dynamics, Inc., 177 F.3d 968 (Fed.Cir.1999) (applying the doctrine of claim differentiation to preserve a broad construction of a claim in suit); *see also* Rodime PLC v. Seagate Technology, Inc., 174 F.3d 1294, 1304-05 (Fed.Cir.1999); Toro Co. v. White Consol. Industries, Inc., 199 F.3d 1295, 1302 (Fed.Cir.1999).

The claim language used in dependant claims 8 through 11 clearly states that a "capillary tube with an internal diameter of ..." defines a particular type of "separation column." The Court finds that a "capillary tube" is a type of separation column, but not the only type. Neither the specification nor the prosecution history refute the heavy presumption that the plain and ordinary meaning should apply.

The Court construes "**separation column**" to mean "**a structure, generally longer than it is wide, that supports the separation medium where electrophoretic separation occurs.**" *See* Loctite Corp. v. Ultraseal Ltd., 781 F.2d 861, 867 (Fed.Cir.1985) ("Generally, particular limitations or embodiments appearing in the specification will not be read into the claims."), overruled on other grounds by Nobelpharma AB v. Implant Innovations, Inc., 141 F.3d 1059 (Fed.Cir.1998); Teleflex, 299 F.3d at 1328 ("To the extent that the district court construed the term 'clip' to be limited to the embodiment described in the specification, rather than relying on the language of the claims, we conclude that the district court

construed the claim term 'clip (28)' too narrowly."); Comark Communications, Inc. v. Harris Corp., 156 F.3d 1182, 1186 (Fed.Cir.1998) (cautioning against the limitation of the claimed invention to preferred or specific embodiments or examples); Transmatic, Inc. v. Gulton Indus., Inc., 53 F.3d 1270, 1277 (Fed.Cir.1995) ("[A] patent claim is not necessarily limited to a preferred embodiment disclosed in the patent."); SRI Int'l, Inc. v. Matsushita Elec. Corp., 775 F.2d 1107, 1121 n. 14 (Fed.Cir.1985) (*en banc*) ("That a specification describes only one embodiment does not require that each claim be limited to that one embodiment.").

For the reasons stated above, the court construes "capillary column" in claim 16 to mean "a separation column that contains a capillary in at least one portion of the column." The Court construes the term "capillary" to mean "a very small bore structure capable of supporting medium suitable for carrying out an electrophoretic separation." *See Webster's Ninth New Collegiate Dictionary* (1991); *see also* Superguide Corp., 358 F.3d 870, 2004 WL 253013, at * 8 ("The law 'does not require that an applicant describe in his specification every conceivable and possible future embodiment of his invention.' ") (citing SRI Int'l, 775 F.2d at 1121). For illustrative purposes, an example of a capillary column is shown in Figure 1. *See also McGraw-Hill Encyclopedia* at vol. 6, p. 261.

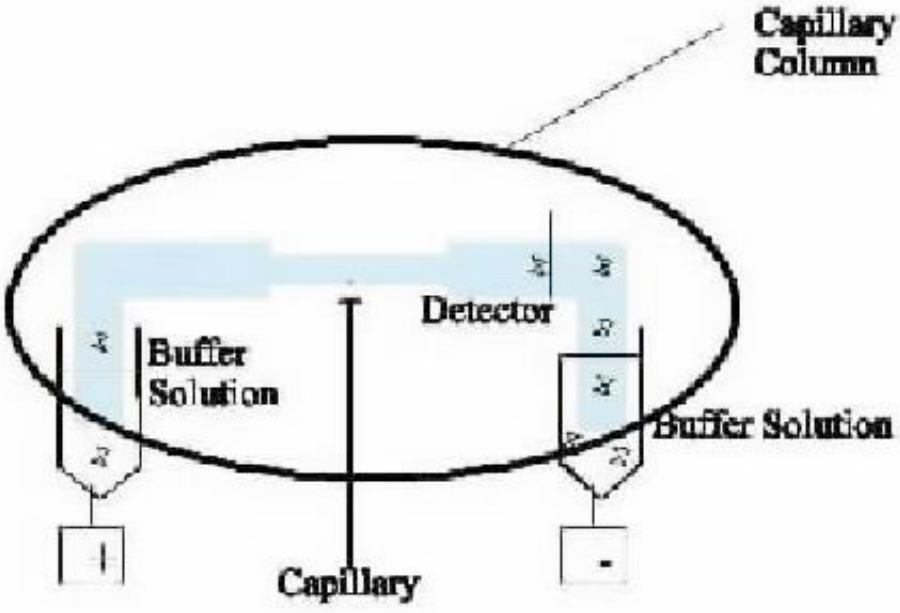

Figure 2. Example of Capillary Column Configuration.

Claims 8 through 11 are dependent upon independent claim 1. Claims 8 through 11 each recite "[a] method in accordance with claim 1 in which said separation column is a capillary tube with an internal diameter of ..." In contrast to "separation column" and "capillary column," the term "capillary tube" is limited to a particular configuration defined by the particular internal diameter stated in the more restrictive dependant claims. In other words, the term "capillary tube" is limited to a cylindrical structure of uniform internal diameter by the language used in the dependent claims 8 through 11.

At the *Markman* Hearing, Bio-Rad admitted that a capillary tube must be cylindrical and must have an internal diameter of 200 microns or less. D.I. 120, p. 41, ll. 1-6. The Court finds that the plain and ordinary

meaning of the term "capillary tube" is a cylindrical tube with an internal diameter of 200 microns or less. The Court finds that the claim language supports this construction in that the stated internal diameters are less than or equal to 200 microns. Neither the specification nor the prosecution history refutes this construction. '111 patent, col. 4, ll. 43-46.

The Court construes to the term "capillary tube" to mean "**a cylindrical tube no more than 200 microns in diameter.**"

3. "A method of separating a mixture of sample ions of varying molecular weights in a sample into components"

(a) Preamble

The parties dispute the meaning of the phrase "[a] method of separating a mixture of sample ions of varying molecular weights in a sample into components" that appears at the beginning of independent claim 1. Bio-Rad considers the phrase an introductory clause that does not require further construction.

Applera proposes a construction of the phrase "[a] method of separating a mixture of sample ions of varying molecular weights in a sample into components" to mean "a process for separation of sample ions on the basis of their molecular weight." Applera contends that the Court is obligated to construe the preamble because it contains two antecedent claim terms ("sample" and "sample ions") referred to later in the claim. FN9

The issue is whether this preamble merely describes a setting for the invention or defines and limits the scope of the invention. "Whether a preamble of intended purpose constitutes a limitation to the claim is, as has long been established, a matter to be determined on the facts of each case in view of the claimed invention as a whole." In re Stencel, 828 F.2d 751, 754 (Fed.Cir.1987). The Federal Circuit has explained that a preamble is construed according to normal claim construction principles. Bell Communications Research, Inc. v. Vitalink Communications Corp., 55 F.3d 615, 620 (Fed.Cir.1995) (citations omitted); *see also* Applied Materials, Inc. v. Advanced Semiconductor Materials Am., Inc., 98 F.3d 1563, 1572-73 (Fed.Cir.1996) ("Whether a preamble stating the purpose and context of the invention constitutes a limitation of the claimed process is determined on the facts of each case in light of the overall form of the claim, and the invention as described in the specification and illuminated in the prosecution history.") "Accordingly, 'resort must be had in the first instance to the words of the claim,' words to which we ascribe their ordinary meaning unless it appears the inventor used them otherwise." Bell Communications Research, Inc., 55 F.3d at 620 (citing Envirotech Corp. v. Al George, Inc., 730 F.2d 753, 759 (Fed.Cir.1984)).

In this case, the claims, specification, and prosecution history of the ' 111 patent demonstrate that the preamble phrase "[a] method of separating a mixture of sample ions of varying molecular weights in a sample into components" is not a limitation of claim 1. The applicants did not rely on this phrase to define the invention nor is the phrase essential to understand limitations or terms in the claim body notwithstanding the antecedent basis between "a sample" and "a mixture of sample ions."

The Court finds that the preamble is merely an introductory clause not essential to the invention. In other words, there is nothing novel contained in the preamble itself that acts to define and thus limit the invention. The preamble could be removed and the novel portions of the claimed invention would not be effected. *See* IMS Tech, Inc. v. Haas Automation, 206 F.3d 1422, 1434 (Fed.Cir.2000); *see also* STX, LLC v. Brine, Inc., 211 F.3d 588, 591 (Fed.Cir.2000); Bristol-Myers Sqiubb Co. v. Ben Venue Labs., Inc., 246 F.3d 1368, 1375

(Fed.Cir.2001) (steps of claimed method are performed the same way regardless of whether, as stated in the preamble, a reduction of hematologic toxicity occurs).

Without any analysis of the language of Claim 1, Applera goes directly to the specification to improperly limit claim 1 to a particular separation method performed solely on the basis of molecular weight. *See* Bell Communications Research, Inc., 55 F.3d at 620; Envirotech Corp., 730 F.2d at 759. Applera overlooks that every claim deals with electrophoretic separations, which is a type of electrokinetic phenomena. FN10 The Court finds that the invention is "the separation media, the gel-free aqueous media that contains certain polymers," *Markman Hearing,* D.I. 120, p24, ll. 1-2, not a particular "basis of" separation restricted to only one variable, such as molecular weight, as suggested by Applera. Moreover, the prosecution history of the ' 111 patent strongly supports not reading the preamble of claim 1 as a limitation as not one statement during prosecution was directed at the preamble to overcome prior art. *See* Catalina Marketing International, Inc. v. Coolsavings.com, Inc., 289 F.3d 801, 809 (Fed.Cir.2002) (citing various cases).

(b) "Sample ions"

The parties have asked the Court to construe the term "sample ions" that appears in claims 1 through 7. Bio-Rad construes the term "sample ions" to mean "charged molecules." Applera construes "sample ions" to mean "charged molecules that are to be electrophoretically passed through the separation column."

Dictionaries are often helpful in ascertaining the plain and ordinary meaning of claim language. Tex. Digital Sys., Inc. v. Telegenix, Inc., 308 F.3d at 1202-03; Iverness Med. Switz. GmbH v. Warner Lambert Co., 309 F.3d 1373, 1378 (Fed.Cir.2002). According to *Webster's Ninth New Collegiate Dictionary* (1991), "ion" is defined as an atom or group of atoms that carries a positive or negative electric charge as a result of having lost or gained one or more electrons. *McGraw-Hill Dictionary of Scientific and Technical Terms* (1976), defines "ion as an isolated electron ... or molecule which by loss or gain of one or more electrons has acquired a net electric charge."

The Court finds that the plain and ordinary meaning to one skilled in the art of the term "sample ion" is "a sample of charged molecules." *See McGraw-Hill Dictionary of Scientific and Technical Terms* (1976); *Webster's Ninth New Collegiate Dictionary* (1991); *see also* Applera Corp. v. Micromass UK Ltd., 186 F.Supp.2d 487, 493 (D.Del.2002) (explaining that "applying an electrical charge to the molecules of the substance being analyzed, resulting in *charged molecules known as ions*." (emphasis added)).

The specification and prosecution history do not rebut this presumption. The phrase "sample ion" appears in the specification over twenty times. After carefully examining each occurrence, the Court finds no reason to rebut the presumption of ordinary and customary meaning but instead finds that the specification supports construing "sample ion" to mean "charged molecules." *See* Rexnord Corp. v. Laitram Corp., 274 F.3d 1336, 1342 (Fed.Cir.2001) (holding that a court's claim construction should be consistent with the patent's written description and drawings).

There is simply nothing in the claims, specification or prosecution history to support Applera's qualified definition. Tex. Digital Sys., 308 F.3d at 1204; *see also Inverness Med. Switz. Gmbh v. Princeton Biomeditech Corp.,* 309 F.3d at 1371-72. For the reasons stated above, the Court construes the term "sample ions" to have its plain and ordinary meaning.

4. "A method of separating a mixture of polynucleotide chains in a sample"

(a) Preamble

The parties have asked the court to construe the preamble in claim 16 that recites "[a] method of separating a mixture of polynucleotide chains in a sample." Bio-rad contends that this phrase is not a limitation and refers to separations of both single and double stranded Deoxyribonucleic Acid ("DNA") or Ribonucleic Acid ("RNA"). FN11 Applera construes the phrase "[a] method of separating a mixture of polynucleotide chains in a sample" to mean "a process for separation of polynucleotide chains on the basis of their molecular weight." *Joint Claim Construction Chart,* D.I. 86.

The court finds that one of ordinary skill of the art would understand "[a] method of separating a mixture of polynucleotide chains in a sample" to be merely a statement describing the invention's intended field of use and not a limitation to the claim. *See* Loctite Corp. v. Ultraseal Ltd., 781 F.2d 861, 868 (Fed.Cir.1985) (holding that preamble not a limitation when it simply states the intended use or purpose of the invention); *see also Pitney Bowes,* 182 F.3d at 1305 (holding that a preamble only limits the invention if it recites essential structure or steps, or if it is "necessary to give life, meaning, and vitality "to the claim.").

As previous discussed, a preamble will limit an invention where the applicant clearly used the preamble to distinguish the prior art. *See* Bristol-Myers Squibb Co., 246 F.3d at 1375. Here, the examiner allowed claim 16 the first time it was presented to the examiner in the 303,174 application. FN12 Unlike most cases involving preamble disputes, here the applicants did not even need to file a single statement directed to the claim containing the disputed phrase much less the phrase itself. The Court finds that Applera has failed to overcome the heavy presumption that claim terms be given their ordinary meaning. *See* Sunrace, 336 F.3d at 1304. For the reasons stated above, the Court does not find the preamble of claim 16 to be a limitation.

(b) "Base pairs"

The parties have asked the Court to construe the term "base pairs" that appears in independent claim 16. Bio-Rad contends that the ordinary customary meaning of the term "base pairs" when used-as in this claim-refers to the length of both single and double stranded polynucleotides. Bio-Rad cites to Examples 4 and 5 of the '111 patent demonstrate that the term "base pairs" is used to describe the size or length of "polynucleotide chains." Bio-Rad contends that these examples use the term "base pair" to describe the various lengths of DNA being separated. *See* Ex. 2 at col 7, ll. 33-col. 8, ll. 53.

Applera construes the term "base pairs" to mean "the opposing complementary base structures that form the 'rungs' of the 'ladder-like' double-stranded configuration of nucleic acid molecules such as DNA." *Joint Claim Construction Chart,* D.I. 86. Applera supports its position by 1) referring to a treatise definition of the term and 2) explaining that the examples disclosed in the patent specification consistently refer to double-stranded DNA. Adoption of Applera's construction would limit claim 16 to cover only double-stranded DNA separations but not single-stranded DNA or RNA molecular separations. FN13

The *Dictionary of Biochemistry and Molecular Biology, 2nd ed.,* (1989) presents two definitions for the term "base pair." Bilsker Declaration, Ex. 17. The first definition of the term "base pair" refers to "[a] pair of hydrogen-bonded bases." Id . The second definition is more conducive with the claim language. It defines "base pair" as "a unit of length in nucleic acid molecules that is equal to one base pair." D.I. 93, Ex. 17. The specification may be useful in determining a claim term's ordinary meaning where a dictionary has been consulted but it becomes necessary to choose between multiple definitions. Texas Digital, 308 F.3d at 1203.

One of ordinary skill in the art would understand from the language of claim 16 that the term "base pairs"

refers to the length of the polynucleotide chain from the way the term is used in the claim as seen in the following phrase: "[a] method of separating a mixture of polynucleotide chains in a sample, said polynucleotide chains each containing from about 10 to about 10,000 base pairs."

Nothing in the specification limits the claimed invention to only double-stranded DNA. Before presenting examples in the specification, the patentee included a disclaimer that the "following examples are offered strictly for purposes of illustration, and are intended neither to define nor limit the invention in any manner." Although examples 4 and 5 involve the use of "DNA fragments," claim 16 refers to "polynucleotide chains," which is a broader group that includes (but is not limited to) DNA fragments. In other words, polynucleotide chains do not have to be double-stranded they could also be single-stranded. *See* Paper Bag Co. v. Eastern Bag Co., 210 U.S. 405, 28 S.Ct. 748, 751, 52 L.Ed. 1122 (1908); *see also CCS Fitness,* 288 F.3d at 1366; SRI Intern., 775 F.2d at 1122.

The Court construes the term "**base pairs**" as used in the '111 patent to mean "**a measurement of length for a polynucleotide chain (*e.g.,* either single or double stranded DNA or RNA) that is equal to one base pair.**"

The specification supports construing "base pairs" as a measurement of length: example 4 "illustrates the separation of DNA fragments of *differing lengths,* " '111 patent, col. 7, ll. 33-34 (emphasis added); various charts describe the length of the DNA fragments by referring to the number of "base pairs" in the chain, '111 patent, col. 7, table I, ll. 62-69; and example 5 "illustrates the separation of a mixture of at least fifteen *lengths* of DNA fragments, the *lengths differing by 123 base pairs*." '111 patent, col. 8, ll. 15-17 (emphasis added). Nothing in the prosecution history refutes the Court's construction of the term.

5. "Saccharide-based and substituted saccharide-based polymers," "cellulose derivatives," "methyl cellulose," "hydroxypropyl methyl cellulose," "hydroxyethyl methyl cellulose," and "hydroxybutyl methyl cellulose"

Applera requests that the Court construe the meaning of the words "cellulose" and "saccharide" in isolation. Bio-Rad objects on the basis that no case or controversy exists regarding these terms because (1) Applera did not disclose initially that these terms were in fact disputed pursuant to Patent Local Rule 4-2 and (2) Applera allegedly uses one or more of the listed chemicals in its accused product.

The word "cellulose" only appears as part of the terms "cellulose derivatives," "methyl cellulose," "hydroxypropyl methyl cellulose," "hydroxyethyl methyl cellulose," and "hydroxybutyl methyl cellulose." Similarly, the term "saccharide" only appears as part of the phrase "saccharide-based and substituted saccharide-based polymers" in claims 1 and 18.

The Court finds that all of these terms refer to identifiable chemical compounds. The parties have not adequately briefed construction of these terms or explained the relevance of these initially undisclosed terms to this litigation. At this time, the Court does not find additional construction of these terms would be helpful to a jury. To the extent that the parties dispute the plain and ordinary meaning of the chemical compounds, the parties have until March 22, 2004 to file a request for an additional *Markman* Hearing.

The Court will not construe "cellulose" and "saccharide" in isolation as the terms do not appear in isolation in the claims. Upon a showing of good cause, the Court will conduct an additional *Markman* Hearing to construe only terms from the following list: "cellulose derivative," "methyl cellulose," "hydroxypropyl

methyl cellulose," "hydroxyethyl methyl cellulose," "hydroxybutyl methyl cellulose," and "saccharide-based and substituted saccharide-based polymers." Any subsequent *Markman* Hearing will not postpone discovery.

V. CONCLUSION

The parties are ordered to attend a Case Management Conference scheduled for March 29, 2004 at 10:00 AM. Prior to filing any dispositive motion, the moving party must first advise the Court and opposing counsel of its intention to do so by filing and serving a request for a case management conference regarding dispositive motion(s). The request must outline the undisputed factual basis and legal basis of the proposed motion(s) and a proposed briefing and hearing schedule. The Court may schedule a case management conference to establish the schedule for briefing and hearing the motion(s) in an orderly and efficient manner or may issue an order adopting the schedule proposed by the parties.

FN1. In addition to claims of direct, inducement and contributory patent infringement, Bio-Rad has also asserted claims of trademark infringement and unfair competition. Applera has asserted counterclaims for a declaratory judgment of noninfringement, patent invalidity and, or alternatively, unenforceability, as well as a claim of unfair competition.

FN2. Analyte is the sample being analyzed. *McGraw-Hill Dictionary of Scientific and Technical Terms,* 6th ed. (2003).

FN3. Under the existence an external electric field, bulk flow exists where viscous forces drag components of the solution along with the sample ions moving towards the oppositely charged electrode. *McGraw-Hill Encyclopedia of Science & Technology,* 7th ed. (1992), Vol. 6, p. 260.

FN4. As written, claim 27 of the 303,174 application became claim 16 of the continuation-inpart 589,915 application that ultimately issued as claim 16 in the '111 patent. Claim 16 of the '111 patent recites:
A method of separating a mixture of polynucleotide chains in a sample, said polynucleotide chains each containing from about 10 to about 10,000 base pairs, said method comprising electrophoretically passing said sample through a capillary column containing a gel-free aqueous solution of a substantially linear polymer selected from the group consisting of methyl cellulose, hydroxypropyl methyl cellulose, hydroxyethyl methyl cellulose, and hydroxybutyl methyl cellulose, said polymer characterized in terms of the viscosity of a 2% aqueous solution thereof being within a range of about 1,000 centipoise to about 10,000 centipoise at 25 (deg.)C, and the concentration of said polymer in said solution is from about 0.1% to about 0.5% by weight.

FN5. Title 35 U.S.C. s. 112 para. 2 (2003) states that:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

FN6. A continuation-in-part ("C.I.P.") is an application that is filed during the pendency of an application filed earlier by the same inventor (i.e., the parent application), disclosing some subject matter common to the parent application, as well as some subject matter not common to and not supported by the parent application. The C.I.P. may or may not claim new subject matter. Although a C.I.P. application discloses subject matter not found in the parent application, one or more of its claims may be directed solely to subject matter disclosed in the parent application. In such cases, the effective filing date for the C.I.P. claims that are supported in the parent application is the filing date of the parent application. *See* Rohm & Haas Co. v. Dawson Chemical Co., Inc., 557 F.Supp. 739 (Tex.1983).

FN7. The Court's construction of the term "gel" is consistent with Federal Circuit precedent. In *Amgen Inc. v. Hoechst Marion Roussel, Inc.,* the Federal Circuit discussed an analytical technique available in 1983 for detecting differences in glycosylation between two glycoproteins. *See* Amgen Inc. v. Hoechst Marion Roussel, Inc., 314 F.3d 1313, 1340 (Fed.Cir.2003). The court stated that sodium dodecylsulfate-polyacrylamide gel electrophoresis ("SDSPAGE") was a widely used procedure for determining the apparent molecular weight of a particular protein or glycoprotein. While the *Amgen* court did not define the term "gel" it is clear from the context in which the term was used that it referred to the physical state of the electrophoretic medium.

FN8. At the *Markman* Hearing, Counsel for Applera, Vernon Winters, stated that "[t]he doctrine of claim differentiation exists to apply only when given a particular construction claims would have the same-exactly the same scope, and that's not true here." D.I. 120, p. 94, ll. 19-23.

FN9. Applera did not initially disclose the preamble as a disputed phrase. The Court finds that the parties have adequately briefed the issue in their papers filed with the Court.

FN10. Electrokinetic phenomena is associated with the movement of charged particles through a continuous medium or with the movement of a continuous medium over a charged surface. *McGraw-Hill Encyclopedia of Science & Technology,* 7th ed., vol. 6, 1992, p. 145. Electrophoresis is a type of electrokinetic phenomena. As such, there are multitude of factors effecting separation other than molecular weight, such as, van der Waals interactions, charge of the ions, electroosmosis and chemical bonds. *See generally id.*

FN11. Bio-Rad's *Markman* Hearing slide presentation.

FN12. As written, claim 27 of the 303,174 application became claim 16 of the continuation-in-part 589,915 application that ultimately issued as claim 16 in the '111 patent. *See supra* fn. 4.

FN13. In support of its position, Applera cites to Wang Laboratories, Inc. v. America Online, Inc., 197 F.3d 1377, 1383 (Fed.Cir.1999). In *Wang,* the court limited a disputed term to the preferred embodiment. The court relied on several factors, the most important being that the patentee during prosecution of the patent

had limited the claimed invention to overcome prior art. Unlike in the applicants in *Wang,* in the case at hand, the applicants of the '111 patent did not make any disclosures to overcome prior art. Thus, *Wang* is not on applicable to the case at hand.

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