UNITED STATES DISTRICT COURT
FOR THE SOUTHERN DISTRICT OF NEW YORK

ASSOCIATION FOR MOLECULAR PATHOLOGY; AMERICAN COLLEGE OF MEDICAL GENETICS; AMERICAN SOCIETY FOR CLINICAL PATHOLOGY; COLLEGE OF AMERICAN PATHOLOGISTS; HAIG KAZAZIAN, MD; ARUPA GANGULY, PhD; WENDY CHUNG, MD, PhD; HARRY OSTRER, MD; DAVID LEDBETTER, PhD; STEPHEN WARREN, PhD; ELLEN MATLOFF, M.S.; ELSA REICH, M.S.; BREAST CANCER ACTION; BOSTON WOMEN'S HEALTH BOOK COLLECTIVE; LISBETH CERIANI; RUNI LIMARY; GENAE GIRARD; PATRICE FORTUNE; VICKY THOMASON; KATHLEEN RAKER,

Plaintiffs,

-against-

UNITED STATES PATENT AND TRADEMARK OFFICE; MYRIAD GENETICS; LORRIS BETZ, ROGER BOYER, JACK BRITTAIN, ARNOLD B. COMBE, RAYMOND GESTELAND, JAMES U. JENSEN, JOHN KENDALL MORRIS, THOMAS PARKS, DAVID W. PERSHING, and MICHAEL K. YOUNG, in their official capacity as Directors of the University of Utah Research Foundation,

Defendants.

No. 09 Civ. 4515 (RWS)

ECF Case

DECLARATION OF DR. MARK SKOLNICK

I, Mark Skolnick, declare:

1. In 1968 I received a B.A. in economics from the University of California at Berkeley. In 1975 I received a Ph.D. in genetics from Stanford University, Stanford, California.

2. I am a founder of Myriad Genetics, Inc. ("Myriad") and currently serve as Myriad's Chief Scientific Officer and am a member of the Myriad Board of Directors. I was personally involved in the identification and characterization of the *BRCA1* and *BRCA2* genes. I am one of the named inventors in United States Patent Nos. 5,710,001, 5,747,282, & 5,753,441.

3. Myriad's discovery of BRCA1 and BRCA2 was not a trivial exercise. Nor was Myriad's molecular cloning of the genes, as described in detail in the Declaration of Donna Shattuck, the beginning of the process. Cloning was instead the culminating step in a series of endeavors on my part that lasted nearly thirty years as well as the significant effort of dozens of members of the collaborating research teams.

Connecting Demography with Genetics

4. The first scientific step in my search for the BRCA genes arose from my interest in demography, the study of human populations. The standard wisdom in the 1960's was that this was a small field that should be studied within the context of sociology or economics. However, in 1967, as a researcher at the Institute for Population and Urban Research at the University of California at Berkeley, I had the insight that demography could be applied to genetics. I further reasoned that demographic research could be successfully merged with genetic research through the study of individuals in the context of multigenerational families, rather than the analysis of aggregate statistics of populations, such as birth rates, death rates, and migration patterns.

5. During a visit to Stanford, I met Dr. Luca L. Cavalli-Sforza, a professor in the Genetics Department at Stanford and also Director of the Institute of Genetics, in Pavia Italy. Dr. Cavalli-Sforza was one of only a handful of prominent population geneticists worldwide, and the only one who had understood the value of constructing a genealogy. Dr. Cavalli-Sforza offered me the opportunity to pursue the reconstruction of genealogies from Parma Valley, Italy to study gene flow patterns by entering the Ph.D. program at Stanford and also moving to Pavia to work with him.

6. Dr. Cavalli-Sforza had been working on this project since 1955 with little success, largely due to inadequate computing capabilities. In just over 5 years at Stanford, Parma and Pavia, I was able to integrate ideas for heuristic searches of solution spaces, which were part of the artificial

intelligence program at Stanford, with the data available in Italy to create the first computerized genealogical reconstruction from parish records.

Computerizing Genealogy to Reveal the Genetics of Cancer

7. While doing my research in Pavia and Parma, I was introduced to three Mormons who had come to establish a project to microfilm Italian parish records as they do worldwide. These interactions introduced me to the vast resources of the Utah Genealogical Society in Salt Lake City. Soon after, in 1973, I was asked by organizers of a cancer center at the University of Utah how the Mormon interest in genealogy could be used to provide a unique aspect to their evolving center. I made a proposal that was audacious at the time: reconstruct the entire Utah Mormon Genealogy from three generation family group sheets and link the genealogy to the Utah Cancer Registry which had a record for each cancer case statewide for the current generation.

8. Rather than looking for evidence of genetic predisposition by looking for vertical transmission, the standard approach, we looked for horizontal familial excess (siblings and cousins). A population based study of cancer in a genealogy was especially innovative because many researchers at the time saw cancer families as merely an interesting and unimportant anomaly. I, however, had the intuition that a population-based analysis of cancer would reveal the underlying genetics of cancer. Although this notion may seem trivial now in light of today's molecular understanding of cancer as a genetic disease, the idea was novel at the time.

9. In order to move my cancer research forward I also had to invent new methods for analysis of this database. My colleagues and I created new methods for pedigree analysis, appropriate for the complex pedigrees found in Utah, and I created a method called the Genealogical Index for analysis of the Utah Genealogy. The NIH thought that the Utah Genealogy was important and novel enough to merit the creation of a resource so that it could be of maximal utility in the future.

Extensive Effort Was Needed to
Gather Critical Data from Extensive Cancer Kindreds

10. The next step in the process which led to the discovery of BRCA1 and BRCA2 was the development of a familial cancer screening clinic, which we used extensively for the study of breast and ovarian cancer, among other familial cancers. Our approach required roughly 100 person-years of effort over two decades to study tens of thousands of members of large families with clusters of cancer. This resource was ultimately the key to our success.

Technical Innovations Helped in Finding Inherited Disease-Related Genes

11. However, a final innovative step was required in the 1970's—the concept of the use of DNA sequence polymorphism to map the human genome. We devised a technique called Restriction Fragment Length Polymorphisms (RFLPs) for genetic mapping, which was an important innovative step in the human genome project.

12. My group's activities turned to mapping and cloning disease-causing genes based on these markers. Given the difficulty of finding the genes in cancer families, we turned our attention to easier targets, to become familiar with the techniques required. We successfully mapped and cloned the gene underlying Alport Syndrome, which was known to be on the X chromosome and was one of the first genes to be found with this new technology. We also mapped the gene for neurofibromatosis, *NF1*, but were not the first to clone it because we did not have a large enough team to compete with the groups of Ray White and Francis Collins.

Private Funding and Corporate Structure Were Critical in Finding *BRCA1* and in Ensuring the Public's Full Benefit from the Discovery

13. The *NF1* experience provided a valuable lesson to me: if I hoped to give the public the full benefit of my innovate steps and clone important genes I was going to need adequate funding and a research group large enough to compete in the laborious process of actually finding the

underlying gene. So when in the fall of 1990 the linkage of a breast cancer predisposing gene, *BRCA1*, to chromosome 17 was announced, I knew that before my pioneering work in cancer genetics could help in finding the underlying gene, I was going to need a competitive team.

14. I was also keenly aware that NIH had awarded Francis Collins a massive genome center grant which would allow him to pursue cloning this gene, and that my group would most likely not be given adequate funds to compete. This in fact turned out to be true. My collaborators and I submitted a small grant proposal to pursue BRCA1, but we were turned down. We were told we didn't have the family material to be competitive, when in fact it was common knowledge that we had spent years collecting the most extraordinary breast cancer families in the world. On resubmission, we were awarded a small grant, with the funding committee stating that we should be allowed to compete even though we did not stand a chance to find the gene.

15. In other words, all the technological, informatic and pedigree innovations we had made were in danger of dying on the vine for lack of funding. Fortunately, I did not wait for NIH funding. I was acutely aware of the diagnostic importance of BRCA1. I was also aware that many other important discoveries had failed to benefit society due to the lack of an interested corporate party. I decided to create a company, Myriad Genetics, to allow our group to couple adequate molecular resources with our exceptional family data to permit us to discover BRCA1 and ensure that the public would benefit from our discovery. I am most proud of this strategy, perhaps my most important innovation.

16. Myriad Genetics was founded in May of 1991 when my interest in pursuing the discovery of the BRCA1 gene coincided with the interest of a local venture capital group in creating a company in the field of human genetics. In August 1992, we were able to attract a major pharmaceutical company as a corporate collaborator and sponsor who provided $4M in corporate research funding and who also purchased $1M in stock. We also were able to interest Dr. Walter

Gilbert, who had won a Nobel Prize in 1980 for DNA sequencing and was a founder of Biogen, to join us. He brought many ideas and talents to the company, but further introduced us to an investment firm that in March of 1993 was able to raise about $8.8M in a private placement offering for Myriad. We found the first mutations in BRCA1 in the spring of 1994 and completed a second private placement financing of $9M in February of 1995. In October of 1995 we went public and in December of 1995 we discovered the BRCA2 gene.

17. Research within a company is very different from research in academia. We were acutely aware that if we were to fail to find BRCA1 we would have had great difficulty in surviving as a company and that our jobs would be lost. Rather than working for individual recognition, we worked for Myriad's recognition, and a spirit of cooperation, urgency, and comradery existed that is rare in academia. We also knew that if we found BRCA1 we would be collectively charged with bringing a diagnostic to market that had enormous significance to many women. I was acutely aware of the difficulty of changing practice in medicine, of the great changes that were required, and of the value a commercial effort could bring to helping society.

18. This is seldom recognized, but many medical discoveries languish without a corporate interest. In the United States, for example, Myriad has incurred great expense and overcome great difficulty to bring about widespread testing. In Europe, where there is no significant corporate interest, testing is infrequent largely because of the lack of a coordinated educational effort.

The strategy worked: Myriad and its collaborators were able to clone and characterize the BRCA1 and BRCA2 genes, as detailed in the Declaration of Donna Shattuck. Our team was smaller and started later than others, but the excellence of the team and our focus on the correct areas of the genome provided by our family data allowed us to work at a superior pace. Even our competitors recognized the importance of our achievement. Natalie Angier, *Fierce Competition Marked Fervid*

Race For Cancer Gene, N.Y. Times, September 20, 1994, at C1 (Mary-Claire King described it as "'beautiful' and 'lovely' and deserving of all the praise it might win.")

The Real Reason for Criticism of the BRCA Patents Is Not philosophical or Ethical, but a Simple Case of Financial Self-Interest

19. One of my first questions when this lawsuit was filed was "Why now?" Myriad discovered the *BRCA1* and *BRCA2* genes 15 and 13 years ago, respectively, and these discoveries were met with no small amount of press coverage. Further, researchers and commentators almost immediately began complaining about gene-related patents. See, e.g., D. Suslton ¶ 33. Finally, Plaintiffs allege Myriad threatened Drs. Kazazian and Ganguly with suit over ten years ago. Why was this suit not brought at that time?

20. I believe there are two primary reasons, both of which are essentially economic. The first reason is a fairly obvious one. Plaintiffs did not have enough financial incentive in the mid- to late 1990s to bring suit because BRCA testing was not very prevalent. Only after Myriad invested over $200M raising awareness, improving education, and securing insurance coverage did the financial incentive of commercial infringement reach a level that warranted a lawsuit. Plaintiffs mention numerous labs ready to perform BRCA testing. What Plaintiffs fail to mention is that (1) these labs stand to make a substantial profit doing this kind of free-riding testing and (2) most of this testing would not be possible without Myriad's investment in patient and physician awareness and in insurance reimbursement.

21. I believe a second more subtle reason drives many opponents of gene-related patents: academic protectionism. Myriad's detractors exhibit strange behavior, which is in fact understandable when properly analyzed. They lament patenting even though they patent their discoveries. They claim our efforts are trivial, without any analysis of what led to our success. They utilize the genomic equipment that patents protect, and the patented computer equipment and

processes that are part of daily scientific life. They have no trouble with the commercialization of engineering and computer science that these innovations imply. But when the commercial world enters their domain, i.e., when biotechnology and genomics companies attempt to compete for the very medical science discoveries that they believe should be the monopoly of academia, they cry foul. I believe this is because now it is their prestige and livelihood that are being challenged.

22. Indeed Myriad was the first genomics company that became successful. But the reason for the bilious attacks against us is that in the past various academic groups competed with each other on the one hand and various commercial groups competed with each other on the other hand. There had never previously been competition between a company and more than a dozen academic groups. If research stays in academia, the same groups which make the discoveries control the funding. When important research migrates to biotechnology and genomics companies in particular, the funding is generated outside of academia, and they lose control. *See, e.g.*, Natalie Angier, *Fierce Competition Marked Fervid Race For Cancer Gene*, N.Y. Times, September 20, 1994, at C1 ("You get more grants, more money, more speaking engagements at scientific conferences, better graduate students and postdoctoral fellows applying to your lab," said Dr. Barbara Weber of the University of Pennsylvania, an unsuccessful contender who said her entire laboratory had devoted every minute of the last three years to finding the gene. "It's also very glamorous. So of course I'm disappointed and frustrated.").

23. Thus what academic opponents to gene-related patents attempt to mask as ethical and constitutional issues is real nothing more than a vested interest group, academia, attempting to undermine another group, the biotechnology industry, for daring to compete in their arena.

24. It would be tragic to wipe out an entire class of patents, along with the companies that depend on them, based on this type of protectionism. This would be a serious disservice to the

public and I shudder to consider how many important and vital discoveries in medicine and healthcare might never happen without the contribution of a robust biotechnology industry.

Pursuant to 28 USC § 1746, I declare under penalty of perjury that the foregoing is true and correct.

Mark Skolnick

Mark Skolnick, Ph.D

Executed on Dec. 21, 2009

CERTIFICATE OF SERVICE

This is to certify that on December 23, 2009, a true and correct copy of the foregoing document has been served on all counsel of record via the court's ECF system.

/s/ Brian M. Poissant
Brian M. Poissant