

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF NEW YORK

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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,

09 Civ. 4515 (RWS)

v.

ECF Case

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,

DECLARATION OF
WENDY CHUNG, MD.
PhD

Defendants.

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I, Wendy Chung, M.D., PhD, declare under penalty of perjury:

1. I am the Herbert Irving Professor of Pediatrics and Medicine in the Division of Molecular Genetics at Columbia University in New York. I am also Director of Clinical Genetics and Director of Clinical Oncogenetics. I am one of the plaintiffs in this case.

2. I received a B.A. in Biochemistry and Economics from Cornell University in 1990. I received a PhD in genetics from Rockefeller University in 1996 and an MD from Cornell University Medical Center in 1998.

3. I am Board Certified in both Clinical Genetics and Molecular Genetics.

4. I am a member of several professional organizations, including the plaintiff American College of Medical Genetics.

5. I have been conducting research on human genetics for the last 17 years in the areas of obesity, diabetes, breast cancer, pulmonary hypertension, inherited arrhythmias, congenital heart disease and spinal muscular atrophy.

6. I have lectured and published widely on the subject of genetics. I have also received many research grants to do research in the area of genetics. In addition, I am director of the fellowship program in molecular genetics and cytogenetics at Columbia.

7. A full copy of my current curriculum vitae is attached.

8. One of my current areas of research is breast cancer. I have received grants of over \$1 million to investigate various genetic aspects of breast cancer.

9. I am the co-investigator of the Breast Cancer Family Registry, funded by the National Cancer Institute of the National Institutes of Health. The goal of the Registry is to collect and study families with multiple cases of breast and/or ovarian cancer and to study genetic and environmental factors influencing cancer susceptibility, clinical outcomes, identify high risk individuals for prevention trials, and study health behaviors. I am responsible for genetic counseling of all patients in the study and serve on the Ashkenazi and Molecular Genetics working groups.

10. In order to study the genetic code of the families in our research, we must sequence their genes. Sequencing of a gene can be done easily by several processes that are all well known and understood by scientists. Sequencing is done in both research and clinical laboratories all over the world. A gene sequence, which is a list of the letters that

represent the instructions of the gene, can be examined to determine if it contains any alterations or mutations. Those alterations or mutations can then be further investigated to determine if they have any significance such as for increasing the propensity to a particular disease. Sequencing involves purifying the DNA from the body and from at least some surrounding cellular material and making copies of the gene of interest, but the resultant sequence is functionally identical to the sequence that nature made in the body. The alterations or mutations in the gene that we are able to identify after sequencing the gene were made by nature, not by the process of sequencing or by me or other scientists, and the effect of those alterations or mutations is dictated by nature, not by any scientist.

11. As part of my molecular genetics research, we sequence human genes, including the BRCA1 and BRCA2 genes of research subjects in my research lab. We look at the sequences to determine if there are any alterations and investigate whether those alterations have clinical significance.

12. We do some of this work in our own lab where we have the personnel, expertise, and facilities necessary to do gene sequencing, including sequencing of the BRCA1 and BRCA2 genes.

13. As a result of the patents owned by Myriad Genetics, I am forbidden from telling the research subjects in my studies the results of their BRCA1 and BRCA2 tests. Even if I determine in my lab that the sample from a particular woman contains a mutation that correlates with an increased risk of breast and/or ovarian cancer, I am prohibited as a result of Myriad's patents from telling that woman any results obtained in my research laboratory alone.

14. As a researcher, I believe I have an ethical responsibility to offer my test subjects access to information about their genes. In order to meet this ethical responsibility, I offer my research subjects the option of finding out their results. As a result of the patents, I can only do that by sending samples to Myriad Genetics to test the sample so I can communicate that information to the patients. That process takes approximately 2-3 weeks.

15. I no longer recall how I learned that Myriad vigorously prohibits labs from sequencing BRCA1 and BRCA2 genes for clinical purposes. That fact is well known and often discussed by molecular geneticists and laboratory directors. I recall hearing about several cease and desist letters from Myriad to other labs, including Yale and University of Pennsylvania. When I became co-investigator of the Registry, it was made clear to me that although we could sequence the BRCA1 and BRCA2 genes for purely research purposes, Myriad would not permit us to do so for clinical purposes.

16. In addition to directing a research laboratory, I also co-direct a clinical molecular genetics laboratory at Columbia. My clinical diagnostic laboratory does not currently do BRCA1 or BRCA2 genetic testing because of the patents. Instead, we send samples to Myriad. I estimate we send approximately 300 samples to Myriad each year.

17. If the patents were invalidated, I would immediately take steps to begin clinical sequencing of the BRCA1 and BRCA2 genes. I would offer clinical testing not only to the individuals who participate in the Registry, but also to the broader community of patients at Columbia University, its affiliate hospitals, and hospitals around the country. I would do testing for the named plaintiff women in this case. I would also be

in a position to tell the research subjects in my research their genetic test results, and to relay this information promptly.

18. My clinical laboratory has the personnel, expertise, and facilities to do various types of sequencing of the BRCA1 and BRCA2 genes. If the patent were invalidated, we could and would offer testing that is more comprehensive than that Myriad currently offers. We would offer full sequencing, analysis of deletions, duplications, and rearrangements as one package. This would include genomic analysis that Myriad does not do as part of its standard BRCA1 and BRCA2 sequencing.

19. Myriad relied exclusively on sequencing technology for many years that was unable to detect all mutations in the genes. It was only after considerable pressure from the scientific community that the company added methods to detect these deletions, insertions, and re-arrangements in 2006.

20. Currently, Myriad's test results may report to a patient that she has an alteration but that it is unknown whether the variant increases the risk of breast or ovarian cancer or not. These are often referred to as variants of uncertain significance. As of 2005, approximately 1,433 BRCA1/BRCA2 genetic tests had been reported out by the company to have such variants. These variants are reported disproportionately in minority populations (African Americans, Hispanics, and Asians) because we have less information about the normal genetic variation in minority populations.

21. Our longstanding engagement in and commitment to BRCA1 and BRCA 2 research would allow us to do extensive analyses for patients (including but not limited to the named plaintiffs) in the face of a result of "variant of uncertain significance." That would include, for example, looking at whether a variant has appeared in other species,

developing a computational model to attempt to predict whether that alteration is disease-causing, analyzing multiple family members for segregation of the variant with cancer, and analyzing large numbers of unaffected controls from the same ethnic group.

22. I am familiar with the BIC database, which I understand is discussed in detail in Dr. Swisher's declaration. I agree with her that the sharing of data on mutations in the BRCA1 and BRCA2 genes is essential for the advancement of knowledge about the nature of those genes and the clinical significance of the mutations or alterations found. If the patents were invalidated and my clinical lab was permitted to do sequencing, we would share all of the results of our work with the BIC database. I believe such actions would quickly increase knowledge about the alterations in the gene and would result in fewer variants of unknown significance.

23. There is value for patients in having lab tests done in more than one lab. Women who are told they are positive for a mutation of the BRCA1 or BRCA2 genes that correlates with an increased risk of breast and/or ovarian cancer have enormously important decisions to make. It is important that they make those decisions based on accurate information. I have seen instances in which the same genetic test yielded discordant results from two different labs, and it is essential to find out what the correct result is. When only one lab runs a test, it is difficult for that lab to even become aware of possible errors in its testing method. Multiple tests from different labs can ensure that the information patients are using to make those critical and potentially life-altering decisions is accurate.

24. Myriad is willing to perform genetic testing only on blood samples and will not routinely perform genetic testing on paraffin embedded tissue from previous cancer

specimens although this testing is performed in research laboratories such as my own. In many cases, the family member with either breast or ovarian cancer is deceased and the only source of genetic material for testing is a tumor sample that was previously removed. Testing an affected family member is necessary for accurate interpretation of a negative result in other unaffected family members. A negative genetic result in the daughter of a BRCA1 or BRCA2 mutation carrier reduces the daughter's risk of cancer to that of the general population while the cancer risk for a daughter with a negative genetic result of a mother who had early onset breast cancer but was negative for BRCA1 or BRCA2 remains substantially elevated over the general population. If we were able to do testing as a result of the patent's invalidation, we would perform testing on all specimen types.

25. Genes are products of nature and not inventions of man. They are so basic to science that any restriction that prevents scientists from looking at the genes themselves or examining the effects of the genes is fundamentally inconsistent with the advancement of human knowledge.

I declare, pursuant to 28 U.S.C. § 1746, under penalty of perjury under the laws of the United States, that the foregoing is true and correct to the best of my knowledge and belief.



Wendy Chung, M.D., PhD

Executed on July 30, 2009