

Arno G. Motulsky, MD, Founder of Medical Genetics, dies at age 94

July 5, 1923 – January 17, 2018

Arno Motulsky was the founder of Medical Genetics at the University of Washington. Today he died at the age of 94 years, surrounded by his children Judy, Harvey, and Arlene. The life and career of Arno Motulsky were in every way remarkable. His contributions to human genetics were as a scientist, clinician, and mentor.

In 1939, at age 16, Motulsky was among the Jewish passengers attempting to flee Germany on the MS St. Louis. The ship was denied entry to Cuba and turned away from the United States. It was forced to return to Europe, where the young Motulsky was arrested in Belgium, ironically, for being German. After a series of transfers, he was sent to the Gurs internment camp in Vichy France. Unlike many, he did not die of starvation or cholera, but survived to leave France in June of 1941 just ten days before his 18th birthday, when transit would have been impossible through Franco-controlled Spain.

Motulsky came to America, met his future wife Gretel in night school in Chicago, became an American citizen, and joined the U.S. Army. He attended Yale University as part of the Army's program for rapid training of physicians, earning his M.D. at the University of Illinois in 1947. He and Gretel married in 1945. He undertook residencies in medicine and hematology, studying hemoglobinopathies with Karl Singer at Michael Reese Hospital in Chicago and during the Korean War, was posted at Walter Reed Hospital to study red cell disorders affecting American troops.

In 1953 Dr. Motulsky accepted a position in internal medicine at the University of Washington in Seattle and soon became known for his interest in teaching human genetics. The chairman of medicine asked him to found a Division of Medical Genetics, which opened in 1957 with Dr Motulsky and Stanley Gartler, PhD, as the first faculty members.

As the division grew, Motulsky worked both as a physician and scientist. He began to explore genetic reasons for differences in patients' responses to drugs, developing the new field of pharmacogenetics and becoming known as the "father of pharmacogenetics." In this same period, he demonstrated, in

mice, that bone marrow transplantation was a successful treatment for the red blood cell disorder spherocytosis.

During the 1960s, Dr. Motulsky's interests broadened to encompass the global role of genetic variation in human disease and in genetics as a tool to understand biological processes. He recruited George Stamatoyannopoulos, M.D. to the division, and they worked together on the genetics of G6PD deficiency and population genetics of blood groups and other human variation..

In 1970, Joseph Goldstein arrived in Seattle as a medical fellow. Dr. Motulsky suggested to Goldstein that high cholesterol and lipid levels might be best understood through human genetics. Together they published the landmark papers describing the transmission of hyperlipidemia in families. They proposed that very high cholesterol levels in these families might be due to a single gene. Goldstein made this project his life's work. In 1985 Dr. Motulsky watched proudly as Joe Goldstein and Mike Brown were awarded the Nobel Prize in Physiology or Medicine "for their discoveries concerning the regulation of cholesterol metabolism." Dr. Motulsky continued to work with lipids throughout his career.

Dr. Motulsky's ever-expanding interests came to include the iron disorder hemochromatosis, associations of HLA antigens with disease, genetic linkage, interaction of genes and environment, hypertension, nutrition, alcoholism, color vision (with the late Samir Deeb), and pesticide metabolism (with Clement Furlong). He contributed importantly to national discussions of bioethical problems, including abortion. The genetics of Jewish populations was a special area of interest. He studied and taught extensively about Jewish genetic diseases and their origins, first in 1979, with the publication of *Genetic Diseases Among Ashkenazi Jews*, edited with Richard Goodman. Into his 80s, Dr. Motulsky was much sought after as a speaker on the genetics of Jewish populations.

Humble and approachable, Dr Motulsky taught generations of medical geneticists. His textbook, *Human Genetics: Problems And Approaches* (commonly called "Vogel and Motulsky") was initially co-authored with the late Friedrich Vogel and first released in 1979. It is the definitive textbook in human genetics and has had a great influence on the field internationally for 35 years. It has been translated into Italian, Japanese, Chinese, and Russian. Each edition was extensively reworked; the 4th edition was released in 2010 with Dr. Motulsky still the principal author. Dr. Motulsky was also a co-editor of the 1992 (revised 2002) *The Genetic Basis of Common Diseases*. Dr. Motulsky was a national model for mentoring, as

described in *Good Mentoring: Fostering Excellent Practice in Higher Education* (Nakamura et al., 2009). The American Society of Human Genetics named its award in genetics education for him. In his final publication,

For six decades, Dr. Motulsky provided service and leadership in science policy and advocacy nationally and internationally. He was a founding member of the Institute of Medicine (now the National Academy of Medicine) and served on Presidential Commissions, WHO Expert Advisory Panels, National Research Council Committees. He served on the President's Commission on Bioethics; National Research Council committees on nutrition, on genetic testing, and on gene therapy; the Science Council for Atomic Bomb Survivor Studies in Japan; the scientific advisory boards of the Howard Hughes and Markey Foundations; and advisory panels for World Health Organization.

Dr. Motulsky's awards included election to the U.S. National Academy of Sciences and National Academy of Medicine, the American Philosophical Society, and the American Society for Clinical Investigation. He was awarded the Alexander von Humboldt Award and a Lifetime Achievement Award of American College of Medical Genetics. The American Society of Human Genetics honored him with all three of its most senior awards: the William Allen Memorial Award, the Excellence in Education Award, and the Victor A. McKusick Leadership Award.

Into his 90s, Dr. Motulsky remained an active and productive presence at the University of Washington. He was up to date on the literature and offered very welcome advice. On his last day at the university, he attended the seminar of a former trainee, Jim Evans, and asked an insightful question.

In his last publication, Dr Motulsky reflected on his life as a physician, scientist, and mentor, as "the adventure of an American geneticist." Throughout his 60-year career in genetics and medicine, he personified the physician-scientist-educator. His legacy extends into every area of modern human and medical genetics. His broad influence and humble leadership style reflected his genius and commitment. He was a brilliant scientist and our teacher, mentor, role model, and friend.

Dr Motulsky is survived by his children Judy Walker, Harvey Motulsky (Lisa Norton), and Arlene Audergon (Jean-Claude Audergon); six grandchildren (Collette, Jordan, Wendy, Nathan, Joey, and Ruby); and two great grandchildren (Loretta and Vivian). Services have not yet been announced.

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