



Eliot L. Berson



Photograph courtesy of Harvard Ophthalmology/Massachusetts Eye and Ear

A Pioneer in the Study and Treatment of Retinal Degenerations

Eliot Lawrence Berson grew up in Chelsea, Massachusetts. His father, H. Arthur Berson, MD, was a well-respected, skilled pediatrician and teacher who inspired both of his sons to pursue a career in medicine. Although Eliot had done well in the Chelsea public schools, he decided as a junior in high school that transferring to a private school would increase his chances for acceptance to a better college and, by extension, medical school. He was initially admitted to Phillips Academy Andover on the condition that he repeat his junior year to “catch up” with his classmates.

Eliot, aged 16 and already showing his determination, argued that he did not have the time to give Andover two years, considering the many years of medical training ahead. The Director of Admissions relented and allowed Eliot to attend Andover for one year, letting him graduate with the Class of 1954.

His academic success at Andover was followed by even greater accomplishments at Yale College. Majoring in zoology, he was first in his class sophomore year, admitted to Sigma Xi and Phi Beta Kappa as a junior, and graduated summa cum laude in 1958. This propelled him to Harvard Medical School where he developed an interest in visual science. After internship at the University of California, San Francisco, he completed residency training in St. Louis at Barnes and McMillan Hospital under the renowned ophthalmologist, Bernard Becker. There he published his first original paper, “Treatment of Experimental Fungal Keratitis,” and began his distinguished career as an ophthalmologist.

From 1966 to 1968, Eliot served as a clinical associate in the ophthalmology branch of the National Institute of Neurological Diseases and Blindness (predecessor to the National Eye Institute). Its chief, Dr. Ludwig von Sallmann, was a distinguished and formal ophthalmologist, greatly admired by Eliot. In later years, lamenting on informality that had pervaded academic medicine, Eliot would often comment that “when Dr. von Sallmann entered the room, everyone stood up”. Working with Drs. Peter Gouras and Ralph

Gunkel at the NIH, Eliot became an expert in clinical electroretinography and began his studies on retinitis pigmentosa (RP).

Eliot was recruited to join the Harvard Department of Ophthalmology in 1968. He initially established an electroretinography service at Children's Hospital but soon relocated to the Massachusetts Eye and Ear Infirmary. The electroretinography (ERG) service quickly became a major tertiary referral center. Bolstered by the philanthropic efforts of Beverly and Bernard Berman of Baltimore and Llura and Gordon Gund in Princeton, a commitment was made by the Retinitis Pigmentosa Foundation, which the Bermans and Gunds founded, to raise \$675,000 for RP research and to secure and equip 2,500 square feet of space within the newly-renovated Infirmary for the first ever multi-disciplinary laboratory for the study of retinal degenerations.

Not everyone at the Infirmary embraced this project. Eliot was viewed by some as a brash outsider who should not be in a position to control research funds outside of the long-established Howe Research Laboratory. Nevertheless, the Berman-Gund Laboratory for the Study of Retinal Degenerations was dedicated in 1974. Eliot's vision of a multidisciplinary laboratory at Harvard to find a treatment for RP had become a reality. Animosity toward the project and Eliot would soon fade, and Eliot would direct the laboratory for nearly 40 years.

Eliot received his first research grant from the National Eye Institute (NEI) in 1969, and that funding continued uninterrupted for 39 years. He also served as principal investigator of a Retinitis Pigmentosa Foundation (now Foundation Fighting Blindness) Center grant and received support for a similar duration. His initial research efforts concentrated on the characteristics of full-field electroretinography in diagnosing and typing different forms of RP, quantifying their progression, and determining the impact of nutritional deficiencies on the eyes of animal models. He became convinced of the potential value of vitamin A in the treatment of RP, despite contrary opinions by others.

The year 1982 was a particularly important year for Eliot. He was appointed the first incumbent of the William F. Chatlos Professorship in Ophthalmology at Harvard Medical School, a chair he would hold for the remainder of his life. After a protracted courtship, he married Kyra Kaplan, who had grown up in New Hampshire and graduated from Brandeis University. Kyra was unequivocally committed to supporting Eliot's career which included work hours extending well into evenings and weekends. Throughout their 35 years of marriage, they traveled the world and enjoyed summers on the Maine coast.

In 1984 he was awarded funding by the NEI to serve as principal investigator of a randomized clinical trial which would demonstrate by 1993 that 15,000 IU of vitamin A palmitate per day was an effective treatment that slowed disease progression in adults with typical forms of RP. (He extended the benefit of vitamin A to children with RP, published posthumously in 2018.) Other studies demonstrated the additional benefit of docosahexaenoic acid and lutein as supplements to vitamin A palmitate treatment.

For a Massachusetts Eye and Ear resident rotating through Eliot's ERG service, the experience was memorable. Patients from all over the world would wait endlessly to be tested by Eliot. Many of them had been told that there was no treatment for their inevitable and imminent blindness. Eliot spent 45 minutes or longer with every patient — something rare today in medical practice, but of profound benefit to his patients. They would leave his office with an evidence-based prognosis and the implications for their children. For some patients he provided the exhilarating news that, in fact, they did not have the progressive form, based on their ERGs. For others, there was the prospect of an extended period of useful vision, determined by their ERG profile.

Eliot was a methodical examiner and skilled refractionist. Although he relied heavily on the ERG ("I really only perform ophthalmoscopy as a courtesy to the patient" he would quip at Grand Rounds and to residents), he demonstrated that some patients would often benefit from a correct refraction and "a decent pair of glasses". There was also the infamous written exam for residents, required to pass the rotation, although the only penalty for failure was to retake the exam.

Eliot realized the importance of identifying mutated genes responsible for retinitis pigmentosa and allied conditions. In 1990 he, with Ted Dryja and others, reported that a mutation in the rhodopsin gene was responsible for one form of autosomal dominant RP. Their paper opened the flood gates of such research, and today several hundred gene mutations that cause RP have been identified. Eliot collaborated with many scientists in this effort, most notably Ted Dryja with whom he co-authored more than 80 papers, and Carlo Rivolta of Basel, Switzerland.

This work was integral to setting the stage for the first successful 21st-century gene therapy for one form of RP. In total Eliot published 248 original papers in addition to 36 reviews. There were numerous other individuals who collaborated with Eliot, including Bruce Goldstein, K.C. Hayes, Bernard Rosner and Carol Weigel-DiFranco. Susan Schmidt and Michael Sandberg were early recruits to the Berman-Gund Lab, and the latter co-authored papers with him for more than 40 years. Together, the two developed state-of-the-art full-field electroretinography that was pivotal for objectively monitoring disease progression in RP and allied retinal degenerations.

Eliot also recognized the importance of working with outstanding clinicians. Robert Brockhurst saw patients for years in the ERG Service, and Alexander Gaudio volunteered Mondays away from his vitreo-retinal practice in Connecticut to work with Eliot over the course of three decades.

Eliot was the recipient of numerous awards and honors during his career. They included the Alcon Research Institute Award (1988 and 1997), the Franceschetti Award from the International Society for Genetic Eye Diseases (1990), the Taylor Smith Medal from the New England Ophthalmological Society (1991), the Friedenwald Award from the Association for Research in Vision and Ophthalmology (1992), the New York Lighthouse Pisart Vision Award (1993), the Distinguished Alumni Award from the Department of Ophthalmology, Washington University School of Medicine (1999), the Llura Liggett

Gund Award from the Foundation Fighting Blindness (1999), the Ludwig von Sallmann Prize from the International Congress of Eye Research (2006), the Award of Merit in Retina Research, Retina Society (2010), the Foundation Fighting Blindness Visionary Award (2012), and the Distinguished Clinical Achievement Award, Harvard Medical School, Department of Ophthalmology (2013).

Eliot was an exacting clinician and researcher, sharply critical of observations or findings that he felt incorrect. He would speak out forcefully at conferences or meetings, thus developing a reputation of being a harsh critic. But none of this reflected self-interest — rather it was his great desire to get things right. On March 19, 2017, at the age of 79, he suffered a myocardial infarction at home and succumbed to cardiac arrest.

Eliot Berson will be remembered by his patients as a kind and gentle person of exceptional intelligence and determination who helped countless patients with these afflictions. He advanced the field of hereditary retinal degenerations, especially RP, enormously. Whenever he perceived misdirection at work, he would admonish, “Patients are going blind!” Such is his legacy to those who worked with him. Just as importantly, he was a devoted son, husband, and brother who is sorely missed.

Respectively submitted,

John Dowling, *Chairperson*

Frank Berson

Gordon Gund

Alexander Gaudio

Michael Sandberg

Note: This minute has borrowed substantially from the remembrance of Eliot Berson by Frank Berson, written for the American Academy of Ophthalmology.