


 RETROSPECTIVE

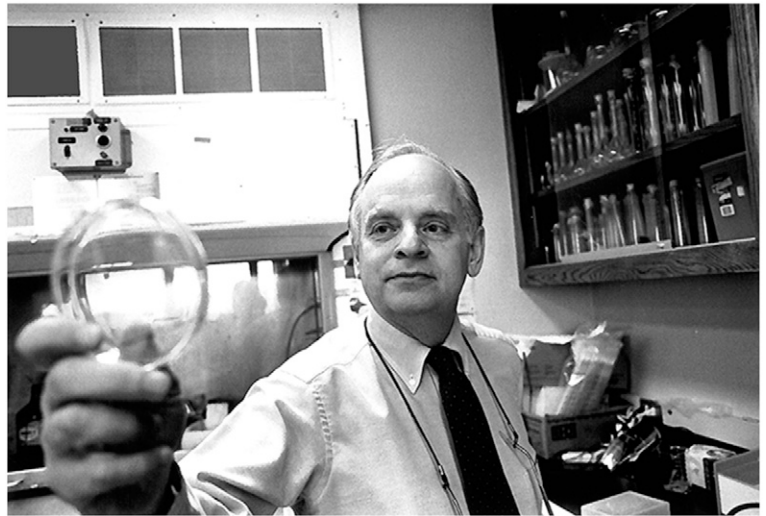
Seymour J. Klebanoff: Discoverer of WBC killing mechanisms

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Seymour J. Klebanoff, MD, PhD, died peacefully on August 31, 2016 at the age of 89. He began his medical and scientific career at the University of Toronto (Doctor of Medicine, 1951), where he coauthored his first paper, dealing with renal anatomy, in 1950 (1). Klebanoff proceeded to complete Doctor of Philosophy studies in biochemistry at the University of London (1954), followed by postdoctoral fellowships at the University of Toronto and the Rockefeller University. Studies conducted at the Rockefeller, investigating thyroid peroxidase and its role in iodinating tyrosine to form thyroid hormones, attracted the attention of the distinguished endocrinologist Robert H. Williams, founding chair of the Department of Medicine at the University of Washington. Klebanoff was recruited to the University of Washington, where he spent the remainder of his career, making many important scientific contributions and serving in key leadership positions.

Among Klebanoff's prominent scientific discoveries were descriptions of the microbicidal properties of myeloperoxidase, a protein that accounts for 5% of the dry weight of human neutrophilic phagocytes but with previously uncertain function. Myeloperoxidase catalyzes the hydrogen peroxide-mediated oxidation of halides to potent microbicidal compounds. Of these, the chloride derived product, HOCl, is the most readily observed in the phagocytic compartment of neutrophils. In his own words, spoken for a lay publication, Klebanoff said: "It's as if the phagocytes attract bacteria into an intracellular swimming pool and then turn on a spigot of Clorox to kill them" (2). In collaboration with Robert A. Clark in his laboratory, Klebanoff and Clark published a thoroughly comprehensive monograph of neutrophil histology, pathophysiology, and function simply entitled, *The Neutrophil: Function and Clinical Disorders* (3). For more than two decades, this carefully referenced volume of more than 600 pages served as a key authoritative resource for individuals interested in this aspect of innate immunity.

Klebanoff became a world leader in defining the antimicrobial mechanisms of phagocytes and the role of biological oxidants in the pathogenesis of diseases, with studies ranging from very basic to clinically oriented



Seymour J. Klebanoff. Image courtesy of the University of Washington School of Medicine.

research. Dr. Klebanoff had continuous NIH funding during his active career and was the recipient of an NIH MERIT Award in 1988. His research led to the understanding of how white blood cells defend the body against bacterial infections. In recognition of the impact of more than 230 original publications and scholarly reviews, he was inducted into the National Academy of Sciences in 1987.

Other scientific recognitions include the Marie T. Bonazinga Annual Research Award of the Leukocyte Biology Society (1985), the Burroughs Wellcome Visiting Professorship of the Royal Society of Medicine (London) with receipt of Gold Medal (1989), election to the Institute of Medicine (1992), the Alexander Fleming (formerly Bristol) Award of the Infectious Diseases Society of America (1993), the Bristol-Myers Squibb Award for Distinguished Achievement in Infectious Disease Research (1995), election to fellowship in the American Academy of Arts and Sciences (1998), and receipt of the Association of American Medical Colleges Award for "Distinguished Research in the Biomedical Sciences" (2007).

As a leader at his home institution, Klebanoff served many roles, including Director of the Research

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The authors declare no conflict of interest.

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