Paul Ehrlich's Receptor Immunology: The Magnificent Obsession

Arthur M. Silverstein
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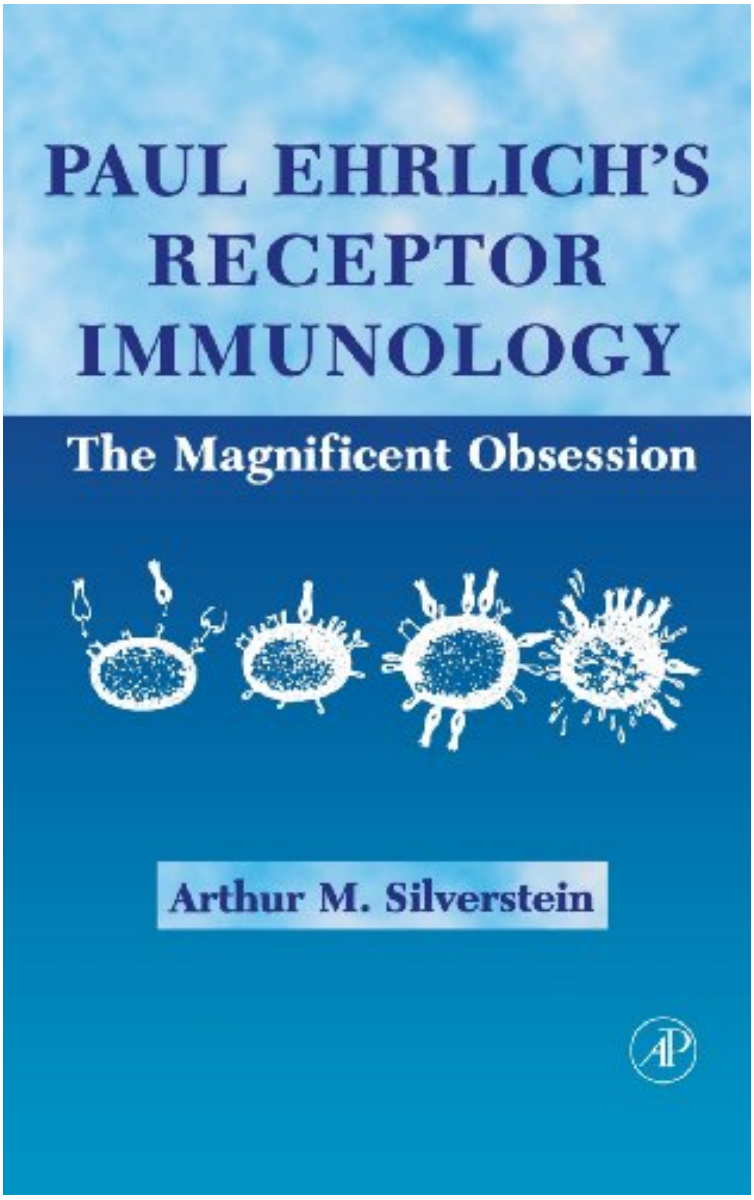

#2311999 in Books Arthur M Silverstein 2001-10-19Original language:EnglishPDF # 1 9.02 x .56 x 5.98l, .99 #File Name: 0126437653202 pagesPaul Erlich s Receptor Immunology The Magnificent Obsession | File size: 66.Mb

Arthur M. Silverstein : Paul Ehrlich's Receptor Immunology: The Magnificent Obsession before purchasing it in order to gage whether or not it would be worth my time, and all praised Paul Ehrlich's Receptor Immunology: The Magnificent Obsession:

Paul Ehrlich's Receptor Immunology: The Magnificent Obsession describes the background to Paul Ehrlich's immunological works and theories and delves into the substance of his experiments in great detail. By exploring these early developments in immunology, the book lays the foundation for modern concepts, providing immunologists, biomedical researchers, and students the context for the discoveries in their field.The selectionist theory of antibody formationKinetics of primary and secondary antibody responseQuantitative methods of measurement of antigens and antibodyDemonstration of passive transfer of immunity from mother to foetus

From The New England Journal of MedicineIn 1904, Paul Ehrlich (1854-1915), one of the great architects of medical science, published three articles in the Boston Medical and Surgical Journal, the immediate predecessor of the New England Journal of Medicine. These articles, which concerned Ehrlich's work in immunology, were summaries of the Herter Lectures he had given at Johns Hopkins University. They dealt with immunochemistry, the mechanism of immune hemolysis in vitro, and the side-chain theory of antibody formation. Whether such articles would appear in a clinical journal today is debatable. At the time of the Herter Lectures, Ehrlich was at the peak of his intellectual powers and scientific influence. He was not only the father of hematology but also one of the founders of immunology. He made key contributions to the field of infectious diseases and, with his idea of the ``magic bullet,'' initiated a new era of chemotherapy. Ehrlich's work on the staining of blood cells -- begun when he was a medical student -- led to the identification of neutrophils, basophils, eosinophils, and reticulocytes; he invented the acid-fast stain for tubercle bacilli and discovered the first effective treatment for syphilis; and his pioneering work on quantitative immunochemistry led to his side-chain theory, the forerunner of all contemporary ideas about receptor-mediated clonal selection. The story of Ehrlich's genius and, equally important, the puzzling hiatus in scientific progress that lasted for 60 years -- until Burnet and others reinvented the cellular basis of the immune response without mentioning Ehrlich -- weaves its way through Silverstein's excellent book. My introduction to Ehrlich began when I saw John Huston's 1940 movie, Doctor Ehrlich's Magic Bullet. It was my inspiration to become a doctor. Much later, I received as a gift The Collected Papers of Paul Ehrlich (London: Pergamon Press, 1956). The first volume contains the three documents that set Ehrlich on a lifetime course of extraordinary discoveries: his doctoral dissertation, published in 1878 when he was 24 years old, in which he first describes mast cells; ``Histology of the Blood,'' which beautifully illustrates the differential staining of all the cellular elements of the blood, bone marrow, and lymphoid tissue; and a description in 1882 of the acid-fast stain that identified Koch's tubercle bacillus in sputum. The other volumes deal with immunology, cancer research, and chemotherapy. Remarkably, for a scientist whose research career lasted for 42 years and brought him many honors, including the Nobel prize, Ehrlich published only 284 papers. Early in his career, Ehrlich was appointed chief physician of the Charite Hospital in Berlin, Germany, but he soon abandoned clinical work for full-time research. Ehrlich's work with what he called his ``dye-cupboard'' laid the foundation for his thinking about immunity and chemotherapy. In his mind, the specific staining of blood cells and bacteria suggested the existence of chemically distinct cellular receptors (which he called ``side chains'') for synthetic dyes. His studies of antibodies against the diphtheria toxin served to reinforce his idea that the toxin and antitoxin fit each other like a lock and key. From this work on immunochemical specificity he made the great leap to his side-chain theory -- the first coherent explanation of the immune response -- and ultimately to the discovery, with Sahashiro Hata, of Salvarsan (arsphenamine), the first successful treatment for syphilis. Silverstein believes that had Ehrlich lived longer, he would have been awarded a second Nobel prize for Salvarsan. Ehrlich was no stranger to controversy. His ground-breaking studies of antibodies against diphtheria toxin culminated in a clinical trial that revolutionized the treatment of childhood diphtheria. Silverstein recounts how Ehrlich's boss, Emil Behring, the codiscoverer of antibodies, outfoxed him in a commercial arrangement with the Hoechst Company and garnered for himself Ehrlich's share of the considerable profits from the sale of antibodies against diphtheria toxin. Ehrlich was denied the Nobel prize for seven years, despite 70 nominations from 13 countries, because of his quarrels about the nature of the antigen-antibody reaction with Svante Arrhenius, a prominent Swedish chemist. And his dispute with Jules Bordet about the nature of complement (a term coined by Ehrlich) ended in a draw -- both were wrong. Ehrlich also had a long-running, often bitter, disagreement with Elie Metchnikoff, discoverer of the macrophage, about the primacy of antibodies (Ehrlich) or phagocytes (Metchnikoff) in immunity. Ironically, the 1908 Nobel prize was awarded to both men. Silverstein gives us samples of Ehrlich's notes to his assistants (his Bloke), which include ``The main thing is to finish the anti-Bordet work'' and ``Continue with all energy the anti-Metchnikoff matter.'' Silverstein's book is not a full-length portrait of Ehrlich, nor does it venture far into the vexing question of discontinuity in scientific discovery (why Ehrlich's side-chain theory was ignored for 60 years). It is a sophisticated, closely argued, and clearly written analysis of Ehrlich's contributions to immunology. The adroit use of a wealth of original sources enriches and strengthens the text. The emphasis throughout is on the idea of the receptor and its corresponding ligand (side chains and haptophores in Ehrlich's nomenclature). Today, receptors and ligands are everywhere, but in 1900, the very idea of such structures was too radical -- and perhaps too logical -- for acceptance by the establishment. The book's subtitle, The Magnificent Obsession, is an apt coda to an extraordinary story of scientific discovery. Robert S. Schwartz, M.D.

of the MMS. "...it gives a rich and detailed overview of the intellectual development of Ehrlich's immunology" -- MEDICAL HISTORY, April 2003 "It is a sophisticated, closely argued, and clearly written analysis of Ehrlich's contributions to immunology. The adroit use of a wealth of original sources enriches and strengthens the text." -- Robert S. Schwartz M.D. in NEW ENGLAND JOURNAL OF MEDICINE, March 2002From the Back CoverPaul Ehrlich's Receptor Immunology: The Magnificent Obsession comprises a comprehensive history and exciting analysis of the work of Paul Ehrlich, MD (1854-1915), one of the founding fathers of immunology. A clinician by training, his research marked him as a pioneer experimentalist in hematology, immunology, and chemotherapy. A 1908 Nobel Prize Laureate for Physiology or Medicine, he also discovered a cure for syphilis (Salvarsan) and propounded the side-chain theory in immunology. As a result of his work, he laid the groundwork for the first 50 years of immunology, including the selectionist theory of antibody formation, kinetics of primary and secondary antibody response, quantitative methods of measurement of antigens and antibody, and demonstration of passive transfer of immunity from mother to fetus.A significant contribution to the Ehrlich legacy that has shaped our current world, this work is an invaluable resource for immunologists, virologists, geneticists, molecular biologists, hematologists, and science historians.Key Features the selectionist theory of antibody formation kinetics of primary and secondary antibody response quantitative methods of measurement of antigens and antibody demonstration of passive transfer of immunity from mother to fetusAbout the AuthorDr. Arthur M. Silverstein is one of the foremost historians of immunology, who's earlier wrok, History of Immunology (1989) is the most significant immunology resource of its kind. A Professor Emeritus of Johns Hopkins University, he continues his work in history of science, medicine, and technology.