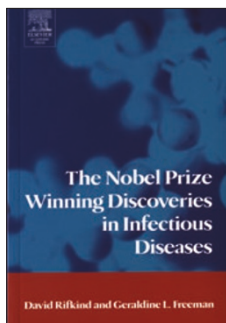


Infectious Nobelitis



The Nobel Prize Winning Discoveries in Infectious Diseases

David Rifkind and Geraldine L. Freeman

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Reviewed by Robin A Weiss

This short and readable book describes 25 Nobel Prize-winning discoveries in infectious diseases. Following a brief introduction on Alfred Nobel and the prizes, the book is divided into five parts: immunity, antimicrobials, bacteria, viruses (including prions) and parasites. Each part comprises short vignettes on the significance of individual prizes from Emil von Behring in 1901 for diphtheria antitoxin to Peter Doherty and Rolf Zinkernagel in 1996 for specificity of cell-mediated defense and Stanley Prusiner in 1997 for prions as a new biological principle of infection. The 2005 award to Barry Marshall and Robin Warren for linking *Helicobacter pylori* to stomach ulcers came too late for inclusion in this book, although their discovery is mentioned in relation to stomach cancer.

I liked the quotations heading each chapter. For Peyton Rous, the authors reached back to Montaigne: "Whenever a new discovery is reported, they say first, 'It is probably not true' then that 'It is true but not important' and finally, 'Yes, it is important, but no longer new.'" Rous's key experiments on transmission of tumors in chickens by filtrates were published in 1911, leading to an award in 1966, the longest incubation period for any of the prizes which in Nobel's will were intended to recognize a discovery in the previous year. The reason may not only be Montaigne's; the award to Danish oncologist Johannes Fibiger in 1928 for discovery of a parasitic nematode in rats causing cancer turned out to be spurious, which made the Nobel committee very cautious. Rifkind and Freeman, however, are kinder than the Nobel centennial (*The Nobel Prize: The First 100 Years*, Imperial College Press, London; 2001) and consider that, owing to later discoveries linking liver and bladder flukes to carcinomas, "Fibiger may have not got it all right, but he certainly did not get it all wrong."

This book has not got it all right either. For instance, *Corynebacterium diphtheriae* was discovered in 1882, not 1894; Howard Temin actually discovered reverse transcriptase (as did David Baltimore); Luc Montagnier is misspelled; and it seems odd to label wasps as ectoparasites on account of their venomous sting. The 1908 Prize to Ilya Mechnikov and Paul Ehrlich for discoveries about innate immunity to infection is omitted altogether.

I was disappointed that the authors did not discuss changing trends and controversies concerning the prizes. In early years, as much recognition was

given for modes of transmission—malaria by mosquitos (Ronald Ross, 1902), typhus by lice (Charles Nicolle, 1928) and the control of both vectors by DDT (Paul Müller, 1948)—as for pathogen discovery, such as the malaria parasite (Charles Laveran, 1907) and *Mycobacterium tuberculosis* (Robert Koch, 1905). Henrique de Rocha Lima, who identified the typhus pathogen *Rickettsia prowazekii*, was not awarded a prize, while Ricketts and Prowazek themselves died of their disease, as did Jesse Lazear from self-testing the mosquito transmission of yellow fever. Nobel Prizes are not awarded posthumously, even to those who sacrificed their lives for the progress of science.

From their very inception, the Nobel Prizes in infectious diseases have been contentious. Von Behring was cited for developing diphtheria and tetanus antitoxins, but Shibasaburo Kitasato played just as important a role, and both depended on Paul Ehrlich's precise methods of serum standardization. Did the Nobel committee insist on only one name, or did they not regard a Japanese colleague as a serious contender? Italian parasitologists feel sore that Giovanni Battista Grassi was not recognized alongside Ross because he demonstrated mosquito transmission of human malaria contemporaneously with Ross' study in birds. Patrick Manson also had a major role, having previously discovered mosquito transmission of filariasis. The rival claims of priority between these giants became intense. A modern-day committee might have recognized Grassi, Manson and Ross jointly.

There are probably only two twentieth-century names in infectious diseases that the general public would recognize: Alexander Fleming and Jonas Salk. But the polio prize was awarded in 1954 to those who first cultured the virus, John Enders, Tom Weller and Frederick Robbins, without whose discovery neither Salk nor Albert Sabin could have developed their vaccines. Only one Nobel Prize was awarded for a vaccine—to Max Theiler (1951) for yellow fever—whereas three were given for antibiotics: sulfonamides (Gerhard Domagk, 1939), penicillin (Alexander Fleming, Ernst Chain and Howard Florey, 1945) and streptomycin (Selman Waksman, 1952).

The Nobel Prize for Literature ignored James Joyce, Marcel Proust, Virginia Woolf and Graham Greene, so it is fitting to ask "Who in infectious diseases is distinguished by omission?" I would choose Friedrich Loeffler, discoverer with Paul Frosch of animal viruses in 1898. Previously, Loeffler had discovered the diphtheria pathogen, and it was he, rather than his mentor Koch, who enunciated Koch's postulates. I also wonder about Christopher Andrewes, who identified human influenza virus in 1933. Alick Isaacs, like Proust, sadly died too soon to gain sufficient recognition in his lifetime for the discovery of interferon with Jean Lindemann. And the most notable achievement against infectious disease in the Nobel era was the eradication of smallpox in 1977 led by Donald Henderson, but this does not qualify as it was not a discovery.

Rifkind and Freeman's account serves as an introduction for the general reader to microbiology, immunology and infectious diseases (although the part on viruses is weaker than the others). There are also some interesting points for the specialist. But for a deeper consideration of the Nobel Prizes, I would recommend the centennial volume of the Nobel Foundation. For an appreciation of the birth of microbiology in the pre-Nobel era and discoveries in the first half of the twentieth century, there is still nothing to beat *Milestones in Microbiology* (ASM Press, Washington, DC; 1987).

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