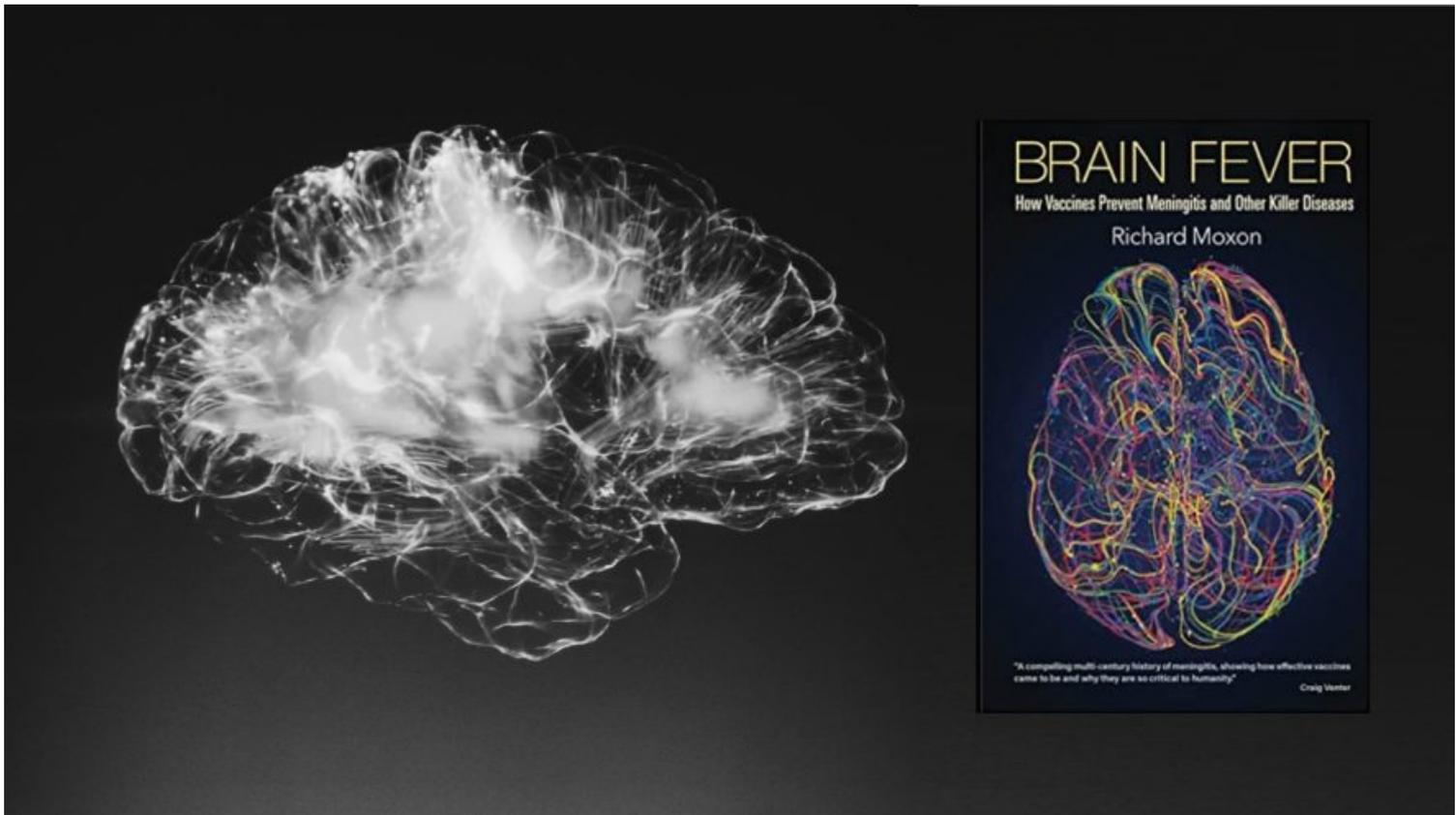
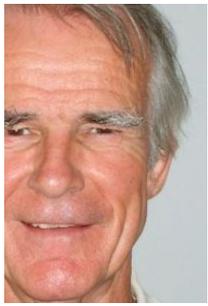


BOOK REVIEW

# Book Review: Brain Fever. Professor Richard Moxon

 by BJGP Life · 28 October 2021





**Hugh Bethell** was a GP in Alton for over four decades. He is the Director of the Staywell Programme, Alton Cardiac Rehabilitation Centre <https://exercisefitnessandhealth.info>

**R**ichard Moxon, emeritus professor of paediatrics at Oxford University, has written a fascinating and highly instructive book about meningitis and the development of vaccines to combat this most terrifying of diseases.

Richard defines himself as a clinician-scientist and has devoted much of his distinguished career to sharpening our weapons against a formidable foe. *Brain Fever* (subtitled “*How vaccines prevent meningitis and other killer diseases*”) is a mixture of autobiography, medical education, medical history, and gripping cliff-hanger. Its relevance in these days of Covid cannot be overstated.

He starts with a description of bacterial meningitis and the history of our understanding of this group of diseases together with an outline of the concept of immunity. He follows with his own story of how he went from being a paediatric trainee in London to working in Boston in the 1970s. Here he introduces a cast of distinguished doctors and scientists who had been or were involved in this field. The story is interlaced with the advances made by these investigators – what they discovered about the molecular structure of meningitis-causing bacteria and the properties which provoke the human immune response. As Professor Moxon says of the knowledge accrued “...*the culmination of brilliant research over several decades, is a prime illustration of the slow, painstaking accumulation of essential information that is typical of great science.*”

Richard’s early research in Boston and Peru focused on *Haemophilus influenzae* type (Hib) meningitis, and the effects of using the capsule of the microbe to induce an antibody response – and the difficulty in provoking an adequate response in infants, the most usual victims of this dreadful infection. At this point he moved to Johns Hopkins, where he won funding for his further research into this disease.

“...*the culmination of brilliant research over several decades, is a prime illustration of the slow,*

Here the tone of the book takes on a more complicated biochemical/genetic flavour. Throughout, the story of vaccine development is interwoven with Richard's own story and that of his family and career. He progresses from his post as Head of the Division of Paediatric Infectious Diseases in 1979 to an invitation in 1984 to apply for the Chair in Paediatrics at Oxford University, an application to which he agreed and in which he was successful.

*painstaking accumulation of essential information that is typical of great science."*

In Oxford he was able to continue his work on the Hib meningitis, work which was rewarded with the production of a highly effective vaccine based on the immune response to the polysaccharide capsule of this toxic microbe. The fascinating tale takes on the guise of a thriller – engaging us in the process of scientific discoveries driven by the determination of the scientists involved, the complexity and competitive involvement of drug firms, sometimes obstructed by politicians, both medical and governmental. This part of the story ends happily with the inclusion of the vaccine into routine childhood immunisation schedules.

You might think that at this stage the story is over. Think again – further challenges await! Meningococcal meningitis remained a serious threat to young lives – and a huge challenge to the peace of mind of any clinician looking after any small children with sudden onset febrile illness. As a GP I was always aware of the possibility that a child I had seen with a minor flu-like illness at 4pm might be terminally ill with meningococcal septicaemia before the day was over. We GPs had seen this threat diminished by routine immunisation against Hib and several different meningococcal vaccines, but Meningitis B was still waiting malignantly in the wings. It was Richard's next challenge.

*A child ... with a minor flu-like illness at 4pm might be terminally ill with*

Systematic attempts to exploit the MenB bacterial capsule as a safe and effective vaccine were not successful; a completely new approach was needed. Richard explains how the use of genome sequencing was used to identify components of the bacterial cell wall to develop a vaccine. As Richard says: "... complete genome

*meningococcal  
septicaemia  
before the day  
was over.*

sequences provide a catalogue of the genes for every virulence factor and potential immunogen from which to select vaccine antigens.” This is now the routine approach to developing vaccines, the most recent example being the spike protein of Covid-19. And it was this approach which led to the Men B vaccine – what

Richard refers to as The Last Frontier.

The contributions of Professor Richard Moxon to the development of meningitis vaccines were seminal and this story leads us through from the early days to where we are now – and what a story. There are countless people alive today who, without the vaccines, would not be with us – and that makes a brilliant conclusion to this gripping tale.

## Featured book

Moxon R. *Brain fever. How Vaccines Prevent Meningitis and Other Killer Diseases.* World Scientific Publishing, July 2021.

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