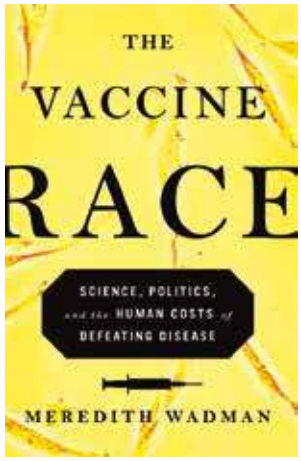
The Vaccine Race: Science, Politics, and the Human Costs of Defeating Disease

Meredith Wadman
Viking; February 7, 2017; 448 pages

Reviewed by Thoru Pederson, PhD

In *The Vaccine Race*, Meredith Wadman writes a book that is readable by all audiences—the medical community, and the general public. She has been a staff reporter at *Science* magazine, and holds a medical degree from Oxford. The most vivid and successful elements of her book are her descents into the weeds of vaccinology while keeping the reader engaged.

Wadman takes an objective stand. She did thorough research, and conducted interviews with all the key people.



It is a very engaging story.

The book presents a cell line, but the tissue donor remains sotte voce. (The donor has never been publicly identified other than as a Swedish woman.) It tells the story of how a particular cell from this fetal tissue was teased into culture and became extremely important in vaccine development. The story is also about this cell line's disputed ownership.

Beyond the swirling legal issues that Wadman addresses, she reminds us that any vaccine (there are not that many) is a tremendous achievement of laboratory and clinical science. Apart from the controversial cell line issues, Wadman's book is primarily about a momentous landmark in the history of medicine: the advent of an effective vaccine for rubella.

Although duly covering earlier eras in the ascent of vaccines, Wadman situates the story around the Wistar Institute in Philadelphia. She presents its history in anatomical science in engaging detail, and then moves into the 1960s when the institute became a world leader in virology under the leadership of the Polish-American scientist Hilary Koprowski.

Koprowski viewed scientists at the institute who were skilled at cell cultivation as technical supporters, while regarding staff virologists as the true enablers of the institute's overall vaccine goals. Koprowski's quest for a live polio vaccine was underway at the Wistar Institute, but would not be won.

Wadman draws out the story of the then-unheralded cell culturist at Wistar, Leonard Hayflick, a man typified by extraordinary scientific skill, and tremendous persistence. These two qualities became a focal point of the story, and indeed the man's entire career.

Hayflick had for years been working on the establishment of human cell lines from aborted fetuses obtained from a Philadelphia hospital and one in Stockholm. He focused on assays to determine the absence or presence of endogenous viruses, and scrupulously tracked the cells for the chromosomal aberrations typically seen in tumor-derived cell lines. Wadman's account of these efforts is meticulous and engaging.

After 25 of these cell lines had been established they

were all lost in a freezer failure. Hayflick had to start all over, and soon established WI-26 (the initials for the Institute). Demand for it by labs around the world was so great that the supply was soon depleted. It was clear to Hayflick that a major expansion of the stocks of any new line would be necessary before distribution.

In June 1962, Hayflick established a lung fibroblast cell line from a female abortus received from a Swedish hospital. He dubbed the line WI-38, a label that would become one of the most famous cell line names in medical history—at least to vaccinology. Even for readers who are not cell biologists, this part of the story is stirring drama.

Hayflick and his colleagues determined that WI-38 cells were demonstrably free of viruses, and that their chromosomal complement was normal and remained so during propagation. Then, they noticed something new: WI-38 cells stopped growing after a certain number of serial cultivations, approximately 50 population doublings. This discovery became the foundation of a new field in cell biology, "cell replication senescence."

The book returns to its main theme of vaccinology and the quest for an effective rubella vaccine. The author covers the work of Wistar's Stanley Plotkin, and the parallel race waged (but lost) by Merck. There may not be a better account of the rubella vaccine story, at least in a form as accessible for the general reader. Wadman's account of the rubella vaccine is masterful.

In 1968, Hayflick accepted a faculty position at Stanford University. Given the widely established importance of WI-38 cells in vaccinology worldwide, and uncertain of how they would be cared for if left behind, Hayflick took most of the stocks with him. There was much controversy about this, as the author details.

I commend this book on the basis of the author's engaging coverage of the rubella vaccine story. For those who ponder the ethical issues around the proper use of human tissue there is also much to be found here. This is a story about a triumphant chapter in the history of vaccinology.

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