



REVIEW: Siddhartha Mukherjee, *The emperor of all maladies: a biography of cancer*.

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## REVIEWS

# Cancer: An Oncologist's View

Siddhartha Mukherjee. *The emperor of all maladies: a biography of cancer*. 570 pp. New York: Scribner, 2010.\*

Barbara C. Canavan<sup>†</sup>

When *The Emperor of All Maladies* was published in late 2010, I knew it would be near the top of my stack of books to read. Since I am a PhD student in the History of Science and Medicine, reading a notable book on the history of cancer and its treatments is a must. Sadly, at the time of its publication, my mother had just died unexpectedly at age 82 of a disease for which she had never received a prior diagnosis: cancer, or acute myelogenous leukemia, to be exact. From diagnosis to death took a mere six days. So I hesitated to take this in-depth look at cancer, a disease that left my family and me stunned and grieving from such a sudden loss. I reasoned, however, that the approach of the book would be detached and scientific, perhaps similar to the tone of the academic tomes that I tackle each week. I began to read.

The tone was surprisingly personal, the language beautiful and fluid. There in the prologue were words that hit me hard: “Leukemia is cancer of the white blood cells—cancer in one of its most explosive, violent incarnations [...] Its pace, its acuity, its breathtaking, inexorable arc of growth forces rapid, often drastic decisions; it is terrifying to experience, terrifying to observe, and terrifying to treat” (p. 3). This is a cancer, Mukherjee explains, in its molten liquid form. Not only is *The Emperor of All Maladies* the history of cancer in general, but it’s also the history of leukemia in particular. The author is a physician and oncologist whose research focuses on leukemia, the disease that had declared itself to my family so dramatically. I could not put this book down.

Dr. Mukherjee weaves the “biography” of cancer—a history of the disease and its treatments—throughout the book, illustrating it with personal stories of patients

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and their treatments. For over three thousand years, cancer has been known to healers. The ancient Egyptians knew about many tumors, and the Greeks referred to malignant tumors as *carcinomas*. Mukherjee describes the earliest known reference to cancer from a papyrus written by Imhotep, an Egyptian physician who lived around 2600 B.C. His prescription for tumors was simple: "there is none" (p. 41). In the second century CE, the physician Galen wrote that the cause of cancer was systemic, an excess of black bile, one of the body's four "humours," brought on by bad diet and environment.

By the sixteenth century CE, surgeons charred tumors with coal-fired hot irons. Mukherjee describes the eighteenth-century discovery that chimney sweeps exposed to soot were more likely to develop scrotal cancer. This was one of the first times a link was established between a cancer-causing agent and the cancer itself. Fast forward to the early 1970s—Mukherjee describes this period of cancer history as "contentious"—and researchers still did not understand what makes cells turn malignant. Thus, well into the twentieth century, the scientific understanding of cancer's biology was incomplete. As Mukherjee explains, the answer is in the first steps of a cell's transformation to cancer.

Cancer begins with a single cell that mutates and grows out of control. Cancer cells are clones that descend from this single ancestral cell. Mukherjee writes, "If we seek immortality, then so, too, in a rather perverse sense, does the cancer cell" (p. 6). In fact, cancer is so effective that it kills about 600,000 Americans each year; more than seven million people around the world will die of cancer in a single year. The author explains that many cancers are the result of our ability to survive into old age. Success in curing other fatal diseases has had the effect of making cancer look more prevalent. The author cites statistics: of all American deaths, twenty-five percent will be attributed to cancer. Globally, the figure is fifteen percent—developing countries have shorter life expectancies with far less opportunity for age-related cancer. Some cancers are the result of novel substances that get into our bodies. For example, the incidence of lung cancer rose sharply in the twentieth century when more people took up smoking. In terms of cancer treatments, Mukherjee writes that they have become progressively better through novel drug cocktails, which result in remission of cancer for months or even years. During the sixteenth century, Paracelsus, a physician and alchemist, advised that every drug used to treat patients is a poison in disguise. Cancer chemotherapy, writes Mukherjee, is a poison disguised as a drug. Mukherjee credits patients with a decline in the most extreme chemotherapy regimens. Patients became less willing to accept punishing chemotherapy and advocated for treatments with fewer side effects. Mukherjee is most optimistic about genome mapping and the future ability to target cancer treatments more effectively without killing off healthy cells. Even cancers that are very different from each other create similar genetic pathways. Mukherjee maintains that this creates new opportunities for treating cancer at the level of cancer genome, unique for each patient.

Mukherjee maintains that medicine is about storytelling, and he tells a very good story. With *The Emperor of All Maladies*, he contributes to a better understanding of cancer, and this reviewer can recommend the book for a general audience interested in the genetics of cancer. Although the account is often technical, the author renders the story with intelligence, accessibility, and compassion. Readers seeking stories about specific cancers may be disappointed with this broad historical narrative of 472 pages. The author recounts cancer discoveries, setbacks, and future hopes. Stories about patients and treatments are mostly related to the author's area of expertise, blood cancers. Whatever its form, the author makes clear, cancer is dauntingly complex. Despite many dramatic scientific breakthroughs, progress in treating cancer has been incremental. In 2011, the book won the Pulitzer Prize for general non-fiction. *The Emperor of All Maladies* is a page-turner, even if you already know how it ends.

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