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The Enzyme Treatment of Cancer and Its Scientific Basis:

being collected papers dealing with the origin, nature, and scientific treatment of the natural phenomenon known as malignant disease

John Beard, D.Sc.; with a foreword by Nicholas J. Gonzalez, M.D.

Excerpt from the Foreword

The year 2008 marked the 150th anniversary of the birth of Dr. John Beard, the pioneering University of Edinburgh embryologist who in 1902 first proposed an anti-cancer effect for the proteolytic enzyme trypsin and its related “ferments,” as he called the pancreatic digestive secretions. Though his work generated considerable interest as well as controversy during his lifetime, by the time of his death in 1924, his ideas were virtually forgotten, relegated to a footnote of medical history. However, recent evidence from the world of molecular biology, as well as our own ongoing research efforts, continue to confirm the basic elements of Beard’s hypothesis. So it is with great satisfaction that at this time, I have the honor of introducing a reprinted version of his wonderful text, **The Enzyme Treatment of Cancer**, published in England in its first and only edition in 1911. In this remarkable book—which has never been previously reissued—Beard detailed his elaborate theory about enzymes and cancer, and the long route that led him from the most esoteric of embryological considerations, the development of the sense organs of fish, to thoughts about malignant disease, its origins, and its treatment.

The mid to latter half of the 19th century was a time of major advances in science in general, and the biomedical sciences in particular. In 1846, the American dentist/physician William Morton (1819-1868) first demonstrated the anesthetic effects

of ether, in turn making complex surgeries possible and routine. In 1847, the Hungarian Ignaz Semmelweis (1818-1865), with little knowledge of microorganisms, proposed doctors simply wash their hands to avoid spreading the deadly puerperal fever of childbirth, which at the time was devastating the maternity wards of European hospitals. The German physician Rudolf Virchow (1821-1902), though he vehemently opposed Semmelweis' theories about hygiene, made enormous contributions to the field of pathology, defining the microscopic character of many diseases including leukemia and other cancers.

Louis Pasteur (1822-1895), one of the great pioneers in microbiology, codified the revolutionary germ theory of disease, claiming microorganisms such as bacteria were the source of many common deadly ailments. A variation of his famed vaccine for rabies is still used today. Joseph Lister (1827-1912), building on the suggestions of both Semmelweis and Pasteur, confirmed the value of sterile technique and in so doing, made surgery safer than anyone previously had thought possible. Paul Ehrlich (1854-1915) helped usher in the modern world of drug therapy for disease when he synthesized the first effective treatments for both sleeping sickness and syphilis. And though neither a physician nor an academic scientist, the Austrian monk Gregor Mendel (1822-1884) unraveled the basics of inheritance by observing the humble pea plants growing in his monastery garden. His simple suggestions about the transmission of dominant and regressive traits from generation to generation ultimately served as the foundation for all 21st century molecular biology and molecular genetics, the driving force of contemporary medical research.

There were many other notables, many more achievements, and into this heady scientific world Beard came of age. He received undergraduate training in zoology at the Royal College of Science in London, before completing graduate training in zoology and embryology at the esteemed German universities of Wurzburg and Freiburg, where he obtained a Ph.D. degree in 1884. From 1890 until 1920, he taught at the University of Edinburgh, primarily as a Lecturer in Comparative Embryology and Vertebrate Zoology. In a memoir, a student of the time, Sir John S. Flett, described Beard in some detail:

> He was an interesting man, somewhat of a crank, but an enthusiast who had studied under Huxley and spent several years at German universities. His methods were peculiar. He took a new textbook by Arnold Lang (subsequently translated) and read to us paragraphs selected from the book. I promptly purchased the German edition and hence found it easy to follow the course and fill up the gaps in prelection. Beard, however, was anything but a good teacher. He had two subjects which absorbed his interest: (a) the origin of sense organs, which he derived from the lateral line of fishes (b) the phylogeny of the vertebrata; and he was constantly diverging from his set

subject and giving dissertations on these hobbies. It was very entertaining but had little reference to the schedule of subjects which we had to study for the examination. (1)

Beard, an embryologist by training, was not in his early career even vaguely interested in medical research, let alone cancer, instead initially devoting his time to unraveling the development of sense organs such as the eye and ear in invertebrates and in fish. His Ph.D. studies, for example, dealt with the early formation of nerves in an obscure parasitic worm. (2) Many of his pioneering findings from this time, now proven correct, are standard fare in the embryology texts of our day.

His studies of neurons, how they initially form and grow, led him through a most convoluted route to consider the growth and development of the placenta. This tissue anchors the mammalian fetus to the uterus and serves as the point of connection between its blood supply, carrying the wastes of metabolism, and the blood vessels of the mother, supplying oxygen and nutrients. Beard did much to uncover the details of placental growth beginning after conception, first reporting that in many respects the tissue in its early stages appeared and behaved like a malignant tumor. (continued in the book)