



# Cancer Research

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#### COVER LEGEND

Johannes Müller (1801—1858), one of the fountainheads of modern medicine, was born in Coblenz, Germany. He received his M.D. from the University of Bonn in 1822 and practiced as a physician for only a short period before pursuing an academic career. He was professor of pathology, physiology, and comparative anatomy at the University of Berlin until his retirement.

In Müller's early work, he recognized the similarity between cells previously observed in plants and those which he observed in animals (*Vergleichendes Anatomie der Myxinoiden*, Berlin, 1835), thus introducing into biology the cell theory heretofore applied to botany.

His greatest contribution is that in which he demonstrated the harmony between the pathological and the embryonic development of tumors (*Ueber den feineren Bau und die Formen der Krankhaften Geschwulste*. Berlin: G. Reimir, 1838).

This work was a departure from the prevailing opinion that cancer was a general disease and the tumor a local manifestation. One of the first to use the microscope, Müller showed that the cancer was comprised of a growth of abnormal cells and that these neoplasms resembled those found in normal tissue. Thus he denied the existence of a specific cancer cell and contended that cellular physiology is universal to both normal and pathological growth. His many writings include *Handbuch der Physiologie des Menschen*, 1834—1840.

Müller's studies were conducted within the framework of the prevailing blastema theory of cell genesis which held that "globules," the basic structural element, arose within an amorphous material, blastema, by coagulating into a nucleus around which the rest of the cells formed, in effect, a theory of spontaneous generation.

Strongly built, with broad shoulders, and a massive Achillean head, Müller was a striking, magnetic, impressive teacher of rare personal charm. [Details are from F. H. Garrison. *An Introduction to the History of Medicine*, Ed. 4 (reprinted), pp. 451—453. Philadelphia: W. B. Saunders Co., 1929.]

Among Müller's followers were Brücke, Du Bois Reymond, Helmholtz, Kölliker, Henle, and especially Schwann, who at Müller's suggestion started his classic work on the cellular character of animal tissues, and Virchow, the father of cellular pathology, who was one of his students. Virchow wrote of his teacher's influence, "... he (Müller) was the first to give the cell concept a broad application to pathology in that he directed it upon the study of tumors.... We younger men early learned to think in terms of cellularity." (R. Virchow, *Virchow Arch. Pathol. Anat.*, 87: 389, 1882, from Hans G. Schlumberger, *Origins of the Cell Concept in Pathology*, *Arch. Pathol.*, 37: 396-407, 1944).

Müller founded the *Archiv für Anatomie, Physiologie, und Wissenschaftliche Medizin*, later known as Müller's *Archiv*, in 1934. He received the Copley Medal of the Royal Society of London.

He is shown on the cover in an 1858 photograph which was kindly supplied by Dr. Peter Olch, National Library of Medicine, Bethesda, Maryland. The cancer cells are sketched after Figs. 6 and 7 of Müller's famous 1838 work which contains the first reproduction of cancer cells. The original figures are supplied through the courtesy of the New York Academy of Medicine Library.

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