

Wilhelm Roux

Wilhelm Roux was a nineteenth-century experimental embryologist who was best known for pioneering *Entwicklungsmechanik*, or developmental mechanics. Roux was born in Jena, Germany, on 9 June 1850, the only son of Clotilde Baumbach and a university fencing master, F. A. Wilhelm Ludwig Roux. Roux described himself as an aloof child, but when he was fourteen he cultivated a passion for science that was encouraged by the director at Oberrealschule in Meiningen. Roux attended the University of Jena in 1869, but his education was halted after the first year because of his service in the military during the Franco-Prussian War. When he returned from the war, he continued to take classes and was admitted into the University of Jena medical faculty. He passed his medical examination in 1877 and became a licensed doctor.

In 1879 Karl Hasse invited him to be an unsalaried lecturer or Privatdozent at the Anatomical Institute in Breslau (Wrocław). Roux accepted and worked his way up over the course of the next ten years, becoming an associate professor and eventually a director for the Institut für Entwicklungsgeschichte in 1889, where he worked with Gustav Born and Hans Strasser. During this period, Roux made several substantial contributions to the field of experimental embryology. In 1881 he used Charles Darwin's theory of natural selection to describe the relationships between cells and the development of organs in embryos, and published these ideas in *Der Kampf der Theile im Organismus*. Ernst Haeckel praised the work, but Roux's mentor, Gustav Schwalbe, had a distaste for the book's philosophical nature. A few years later, in 1883, Roux discussed another theory that would later develop into the Roux-Weismann theory of mosaic development in his paper "Über die Bedeutung der Kernteilungsfiguren." In essence, Roux proposed that chromatin is composed of a variety of substances, with a variety of qualities, rather than being composed of a uniform substance. When a cell divides this substance is allocated unequally between the daughter cells, thus resulting in dissimilar cells. According to Roux, the information in these daughter cells gives these cells a pre-set course of development. August Weismann eventually expounded upon this theory, proposing an elaborate architecture of which the cell was composed and discussing the implications of this theory for heredity.

Roux also conducted many influential experiments on the early development of the embryo. Perhaps the most famous were published in 1888 as "Beiträge zur Entwicklungsmechanik des Embryo. Über die künstliche Hervorbringung halber Embryonen durch Zerstörung einer der beiden ersten Furchungskugeln, sowie über die Nachentwicklung (Postgeneration) der fehlenden Körperhälfte." In this series of experiments, Roux examined green frog blastomeres at the 2- and 4-cell stages of development. He destroyed one of the blastomeres by puncturing it with a hot needle and observed the development of the remaining blastomere. He found that the remaining blastomere would develop into a half embryo, following the same course of development it would have if it were still joined with the other blastomere. He concluded from these experiments that blastomeres at the earliest stages of development already have a predetermined fate, meaning they develop mosaically.

These accomplishments helped to form Roux's program of *Entwicklungsmechanik*, or developmental mechanics. Roux saw *Entwicklungsmechanik* as a means of transcending normal experimentation. *Entwicklungsmechanik* represented a program of research with analysis of the causes of embryonic development as its backbone. Roux continued to be fascinated by the embryo's course of development and continued to pursue this passion after becoming a professor of anatomy at the University of Innsbruck in 1889. In 1894, while working as the director for the Anatomical Institute at the University of Halle, he founded the first journal of experimental embryology, called *Archiv für Entwicklungsmechanik der Organismen*.

Roux was a member of thirty-seven professional societies and was honored numerous times as the founder of Entwicklungsmechanik. The University of Halle created a prize in his honor for his contributions to experimental embryology. Roux died on 15 September 1924 in Halle, Germany.

Sources

1. Churchill, Frederick B. "Roux, Wilhelm." *Dictionary of Scientific Biography* 11&12: 570-74.
2. Gradmann, Christoph. "Wilhelm Roux." *Encyclopedia of Life Sciences*. John WileySons, 2001. <http://mrw.interscience.wiley.com.ezproxy1.lib.asu.edu/emrw/9780470015902/els/article/a0002547/current/pdf> (Accessed October 7, 2008).