Johann Friedrich Meckel, the Younger (1781-1833) [1]

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Johann Friedrich Meckel [2] studied abnormal animal and human anatomy in nineteenth century Germany in an attempt to explain embryological development. During Meckel's lifetime he catalogued embryonic malformations in multiple treatments. Meckel's focus on malformations led him to develop concepts like primary and secondary malformations, atavism, and recapitulation—all of which influenced the fields of medicine and embryology [3] during the nineteenth and twentieth centuries.

Meckel was born 13 October 1781, in the university town of Halle, Germany. His father, Phillip Friedrich Theodor Meckel, and his grandfather, Johann Friedrich Meckel [4] the elder, were physicians and anatomists and Meckel grew up helping his father prepare new specimens for the anatomical museum in their house. Meckel attended a local elementary school until the age of fourteen, when he traveled to Magdeburg, Germany to study at the Cathedral Gymnasium, a university preparatory school.

From 1798 to 1801 Meckel attended the University of Halle [5], in Halle, Germany, where he studied medicine and anatomy. During those years at Halle, Meckel's studies included Kurt Sprengel, Johann C. Reil, and his father. Reil was Meckel's mentor and encouraged him to study brain anatomy. In the final year of his doctoral degree studies, Meckel transferred to the University of Göttingen, in Göttingen, Germany, where he worked on comparative anatomy with Johann Friedrich Blumenbach. After a year at Göttingen, Meckel returned to Halle and presented his thesis on cardiac abnormalities, “De Cordis Conditionibus Abnormibus” (Abnormal Conditions of the Heart), after which he received his doctorate in 1802. Portions of his dissertation were published three years later, in which Meckel introduced for his concepts of primary and secondary malformations—the former refers to a developmental anomaly, while the latter refers to a condition that arises as a result of another malformation.

After graduating from Halle, Meckel traveled to Würzburg, Germany, and Vienna, Austria, to see the anatomical collections housed in each city. Meckel returned to Halle in 1803 to attend his father's funeral and left unfinished at the time of his death was a major medical publication, “Über Entwickelungsgeschichte der Thiere. Beobachtung und reflexion” (On the Developmental History of the Animals. Observations and Reflections), created his own set of laws. These laws became known as von Baer's Laws [7] and state that embryos of a higher animal form do not pass through stages of development in which they resemble lower animal forms; instead, embryos start out generally similar in form and then develop more specific characteristics as the embryos grow. Ernst Haeckel [8], professor of comparative anatomy at the University of Jena [9], in Jena, Germany, contributed to the debate in the 1870s, expanding the Meckel-Serres Law [10] with the inclusion of evolutionary principles, into what became known as recapitulation theory [11], or the biogenetic law [12].

In 1806, Meckel returned to Halle to find Napoleon's forces occupying his hometown. Napoleon had closed the university and set up his temporary headquarters in Meckel's home. In May of 1808 the university reopened and Meckel received the position of professor of surgery, normal and pathological anatomy, and obstetrics. One year later, he married Friederike von Kleist, a woman who aso studied anatomy and who began to administer his anatomical collection.

In 1809 Meckel published about a birth defect where the connection between the fetus's intestine and the mother's yolk sac does not close, resulting in internal bleeding of the newborn. Meckel named this rare defect Meckel's diverticulum, a condition that arises as a result of another malformation. Meckel's focus on malformations led him to develop concepts like primary and secondary malformations, atavism, and recapitulation—all of which influenced the fields of medicine and embryology during the nineteenth and twentieth centuries.

Sources

13. Johann Friedrich Meckel studied abnormal animal and human anatomy in nineteenth century Germany in an attempt to explain embryological development. During Meckel's lifetime he catalogued embryonic malformations in multiple treatises. Meckel's focus on malformations led him to develop concepts like primary and secondary malformations, atavism, and recapitulation—all of which influenced the fields of medicine and embryology during the nineteenth and twentieth centuries.