

Karl Ernst von Baer (1792-1876) ^[1]

By: Buettner, Kimberly A. Keywords: Biography ^[2] Epigenetics ^[3] Preformationism ^[4]

Best known for his contributions to the field of [embryology](#) ^[6], [Karl Ernst von Baer](#) ^[5] also pursued a variety of other areas of study including medicine, botany, zoology, and anthropology. Committing his life to scientific research, von Baer's work led to the advancement of the understanding of mammalian reproduction, development, and organ functioning. His embryological discoveries ultimately led him to a view of development that supported [epigenesis](#) ^[7] and refuted long-held thinking about [preformation](#) ^[8]. [Karl Ernst von Baer](#) ^[5] was born on 28 February 1792 in Piep, Estonia, to first cousins Juliane Louise von Baer and Magnus Johann von Baer. As one of ten children, von Baer spent his childhood in Coburg with his father's brother Karl and his wife, Baroness Ernestine von Canne.

Although his uncle and father encouraged military life, von Baer chose to attend the [University of Dorpat](#) ^[9], where he began medical studies in August 1810. At Dorpat, von Baer studied botany, physics, and physiology, and was influenced by professor of physiology [Karl Friedrich Burdach](#) ^[10]. After completing his MD degree in September 1814, von Baer traveled to Berlin and Vienna to continue his education. In 1815 he proceeded to Würzburg to further his medical studies and there he met physiologist and anatomist Ignaz Döllinger as a result of his interest in botany. From 1815-1816 von Baer studied comparative anatomy with Döllinger, who encouraged him to research the development of the [chick](#) ^[11]. However, von Baer was unwilling or unable to spend the time and money necessary to pursue this area of study and instead returned to Berlin during the winter of 1816-1817 to train in practical anatomy.

In August 1817 von Baer became a prosector in anatomy in Königsberg at the invitation of [Karl Friedrich Burdach](#) ^[10]. In 1819 he became Extraordinary Professor of Anatomy and in 1826 Ordinary Professor of Zoology. During his time in Königsberg, von Baer taught zoology, anatomy, and anthropology, founded a zoological museum, acted as director of the botanical gardens, and served as dean of the medical faculty and as rector of the university.

Most of von Baer's contributions to [embryology](#) ^[6] were from 1819-1834 while at Königsberg. During this time, he returned to the study of [embryology](#) ^[6] and made considerable advances in the understanding of extraembryonic membrane development and function in the [chick](#) ^[11] and in mammals. In this work he built on the results of research he had carried out collaboratively in Würzburg with [Christian Heinrich Pander](#) ^[12], as well as on Pander's own work on [chick](#) ^[11] [embryology](#) ^[6]. [Karl Ernst von Baer](#) ^[5] also introduced the term "spermatozoa", for what had previously been referred to as "animalcules" in the seminal fluid, which he believed to be parasites. In 1826 von Baer discovered mammalian eggs in the [ovary](#) ^[13] of Burdach's [dog](#) ^[14], completing a search that began centuries before.

Drawing a number of conclusions from his work on developing embryos, von Baer emphasized that development is epigenetic, proceeding from homogeneous to heterogeneous matter, which he felt made preformationist ideas no longer plausible. He encapsulated his thinking into four statements that are now known as "von Baer's Laws." The first law says

that the general features of a large group of animals appear earlier in the embryo than the special features. The second law says that less general characters are developed from the most general, and so forth, until finally the most specialized appear. The third law is that instead of passing through the stages of other animals, each embryo of a given species departs more and more from them. Finally, the fourth law concludes from the previous three that the embryo of a higher animal is never like the adult of a lower animal, but only like its embryo.

After the death of his brother Louis, von Baer returned with his family to St. Petersburg to retain the family estate. He then entered the Academy of Sciences in St. Petersburg as a Full Member in Zoology in December 1834 after refusing previous offers while in Königsberg. After working at the academy as a librarian, academician, and professor of anatomy and physiology, von Baer retired from active membership in 1862 but continued to work as an honorary member until 1867. After returning to Dorpat, von Baer died on 28 November 1876.

Sources

1. Oppenheimer, Jane. "von Baer, Karl Ernst." *Dictionary of Scientific Biography* 1: 385-389.

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Subject

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