

# Wilhelm Ludwig Johannsen Biography

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# Biography

Wilhelm Johannsen, whose family did not have the financial means to provide him a college education, served as an apprentice to a pharmacist in 1872 and taught himself chemistry and botany. Johannsen's interest in botany flourished when he became an assistant at the newly-formed Carlsberg laboratory. Here he was given the freedom to experiment and research, even after his resignation in 1887.

Johannsen's extensive research in botany attracted him to the plant experiments surrounding heredity and natural selection. So many opposing theories existed at that time to explain evolutionary change: Charles Darwin's theory of small, continuous changes; Francis Galton's theory of regression; not to mention the rediscovery of Gregor Mendel's theory. Johannsen's work suggested that there might be common ground in these seemingly opposing viewpoints.

Johannsen experimented with bean plants to show that natural selection had no effect on pure line species. In other words, self-fertilizing bean plants didn't produce abnormally large or abnormally small seeds, despite Johannsen's attempts at "selecting" these characteristics. Johannsen knew that the offspring of a pure line were genetically identical and his pure line theory suggested that any differences among them must be due to chance and environment--not natural selection. Johannsen was the first to attribute the origin of small, continuous differences to mutation. Johannsen's discoveries sent biologists to investigate mutations in search of other answers to evolution.

In 1909, there were as many terms to describe what biological component caused inheritance as there were heredity theories. Johannsen clarified the terminology by coining the term gene to describe a unit of inheritance. He felt it was a term that was not associated with any of the many theories that existed to explain evolution. And he didn't stop there. Johannsen came up with the terms phenotype and genotype. Phenotype refers to the observed traits--the actual appearance of an organism. Genotype is the actual genetic code inherited from parents that produces visible differences. The phenotype may change with time, but the genotype is fixed for life.