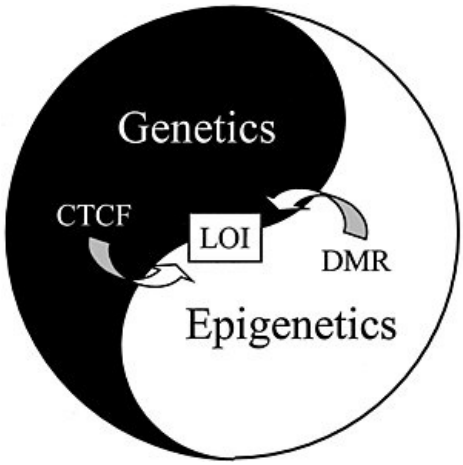
History of Epigenetics

Although the word epigenetics was not used until the middle of the 20th century, in many sources it starts from antiquity. Back then it was Hippocrates, who claimed that we inherit parts of our parents, and Aristotle, who even uses the word epigenesis, which means the development of an individual from a kind of undifferentiated substance. In the 19th century, Mendel came up with his laws, which were not recognized until 35 years later. In general, before the advent of Mendel, the concept of heredity and development was not distinguished, after him everyone turned to research on heredity, while the issue of development was pushed to the sidelines and left to embryologists and developmental biologists. Even T. H. Morgan, although he was an embryologist, did not deal with the development of Drosophila in his laboratory. According to him, it was a completely different field.



Vztah mezi genetikou a epigenetikou v případě nádorových onemocnění. The relationship between genetics and epigenetics in the case of cancer. The relationship is better expressed by the yin and yang symbol than by classic Venn diagrams. LOI (loss of imprinting) can be caused by both a genetic disorder of CTCF and epigenetically altered DMR methylation.[1]

However, as early as the beginning of the 20th century, scientists noticed that undifferentiated cells can develop into multiple types of cells. In 1902, Hans Spemann is said to have split a salamander egg with his child's hair, and two complete animals developed from it. It wasn't until the middle of the 20th century that Conrad Waddington came up with the term epigenetics and looked at how the same genetic information in the nucleus of a cell affects its function differently. The second important representative was Ernst Hadorn, who dealt with the differentiation of pluripotent cells in Drosophila and disorders of this differentiation, which were then manifested by the poor function of expressed genes. It was therefore clear that, despite the same genetic make-up, some genes in the cell are active, while others for some reason "sleep" and are inactive. The essence of this mechanism was clarified by each scientist in his own way, and there were a number of incomplete theories and conjectures. More attention began to be paid not only to inheritance between organisms, but also between cells. Questions arose as to why different types of cells arise from one bone marrow cell, what is the principle of differentiation and also why one of the two X is inactivated. In 1975, the first publication on the activation method of cytosine methylation in DNA was published. The subsequent development of cloning, sequencing and the use of restriction endonucleases provided evidence. The importance of methylation was confirmed by the fact that the methylated sequences were cleaved by endonucleases other than the methylated ones (isoschiomers). Further evidence was a method of activating genes by demethylating them. Since 1987, epigenetics has seen a big "boom" and today it belongs to the fastest developing fields of biology.

Difference Between Genetics and Epigenetics

Genetics

- The change occurs within a single cell.
- The change is irreversible.
- Acquired properties are not inherited.
- The environment has no effect.

Epigenetics

- The change occurs in a group of cells with the same receptor for a given ligand.
- The change is often reversible.
- Acquired traits are inherited - so it's dual inheritance and a return to the idea for which Lamarck was ridiculed.
- The environment has an effect.

Links

- ws: Historie epigenetiky

External links

- Epigenetika (česká wikipedie)
- Epigenetics (anglická wikipedie)

References

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Kategorie:Genetika Kategorie:Biologie Kategorie:Molekulární biologie Kategorie:Dějiny lékařství

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