

Pseudogene Encyclopedia Article

Pseudogene

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Pseudogene

A pseudogene is a sequence of **DNA** that is very similar to a normal **gene** but that has been altered slightly so that it is not expressed. A pseudogene was probably once functional. However, the accumulation of mutations over time rendered it incapable of encoding a protein product. The mutations in a pseudogene typically take the form of stop signals to the **transcription** process.

Typically, a functional gene from which the pseudogene drifted over time exists in addition to the pseudogene. There can be many copies, up to one thousand, of the pseudogene present in the **genome** in addition to the functional copy. The copies form part of the repeated DNA in the genome.

The functional significance of pseudogenes is not yet clear. Several speculations concerning the significance of pseudogenes have been proposed. These speculations include: they are remnants of evolutionary mistakes; conversely, they are genes in the process of evolving, and; they somehow serve a vital role in the expression of their normal counterparts.

Pseudogenes can be found in the genome proper and in the genome of **mitochondria**. Furthermore, pseudogenes are widespread in nature, being found in the DNA of fungi, plants, metazoans, arthropods, chordata, and mammals including man.

A beneficial of pseudogenes has been their use as markers to trace the evolutionary pathway of mitochondrial genomes of various organisms and in studies to ascertain the evolutionary relatedness of two organisms. One possible deleterious effect of pseudogenes may be their potential for complications in human identity tests that are based on **mitochondrial DNA** sequences. Pseudogenes that are identical to sequences in mitochondrial DNA have been detected outside of the mitochondria, in the DNA in the cell's **nucleus**, and in a variety of organisms. Accordingly, tests by forensic scientists designed to probe specifically for mitochondrial sequences would not be reliable without further modifications.