

EVOLUTION OF MAJOR CHANGES IN ANIMAL MORPHOLOGY. REMARKS ON EVOLUTION OF ANIMAL DEVELOPMENTAL PROGRAM AND ON HUMAN GENETIC HERITAGE

Summary

Evolution of complex organisms required additions of new gene loci and appearing of new functions by duplications of preexisting genes and subsequent diversification of duplicated copies. However, the number of genes in genome is surprisingly low in animal and human genomes, since it is limited by genetic load, which is a function of mutation rate and real number of genes,. The genetic information of a higher organism is organized in a very economical way. There is hierarchical regulation of genes transcription by transcription factors, and pathways of post translational regulation of activity of gene products that are common for the whole animal kingdom. The roles of *hox* genes, wnt/catenin and

apoptosis pathways in animal development, evolution, and homology of genes involved in these regulations (ortolologous and paralogous) are discussed in this article. It may be speculated that a common ancestor of all animals contained a set of genes of developmental program which was prerequisite for animal evolution. There is some difficulty in explanation how extensive morphological changes could be favoured by natural selection. The problem of “macroevolution” may be reduced to evolution of developmental program. However, this evolution did not require special mechanisms not consistent with paradigms of the theory of evolution.