

**SYSTEMS EVOLUTIONARY ANALYSIS ON THE PUTATIVE HOX TRANSCRIPTIONAL NETWORKS**

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We have entered the new era of biology so-called omics era; the vast amounts and various kinds of omics data now become available. The knowledge of various cellular processes and networks such as gene regulatory and signaling networks is also accumulating. In this new era, these data and knowledge make it possible to understand how genes interact and work together as a unified system and as such how life has evolved. To understand the evolution of life as a unified system, we propose a new paradigm of evolutionary biology that we call "systems evolution". Basic concepts in "systems evolution" lie in that life must be in every evolutionary stage, even in its very primitive one, organized in a completely unified system, so that evolution in organizational level can not take place by partial alteration of its parts: any organizational changes must comply with systems constraints of already-established systems structures. Thus macroevolutions are forced to be hierarchical with nested structures. These nested structures are sustained by corresponding gene regulatory and signaling networks. To establish the theory of "systems evolution", we are focusing on the developmental systems. We already revealed the evolutionary history of Hox genes between bilaterian-cnidarian ancestor and bilaterians, and obtained the evolutionary conserved motifs which are considered to coordinate the specificity of Hox proteins. We then reconstructed of the putative Hox transcriptional network by integrating omics data in silico. We will show the putative Hox transcriptional network, and show systems evolutionary analysis on the putative Hox transcriptional network.