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The role of exploratory mechanisms in evolution

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ABSTRACT ONLY PROVIDED

Many cellular mechanisms use a process of variation and selection to generate specific patterns. Among these, dynamic instability of microtubules has been shown to employ a specific mechanism to intentionally generate variation. In many systems the growth of neurons or neuronal processes is excessive, the final connections being established by stabilization of functional interactions. When changes in neuronal networks take place, such as in metamorphosis, use is made of the plasticity of neuronal connectivity. In the immune system, specific responses are generated by variation and selection.

Processes that explore a wide range of conditions and a wide range of structures can be called exploratory processes. These are very robust and capable of responding to damage, variability in the environment and ontogenic changes in the organisms. Such robustness would be useful for adapting to changes that occur during phylogenetic changes as well. Given the extensive history of extinction and radiation in evolution, it may be supposed that these mechanisms have themselves been selected for their capacity to survive rapid changes in the organism and for their ability to generate cellular variation.