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Environmentally Responsive Mutator Systems: Toward a Unifying Perspective

Abstract. *Biology has long sought a unifying principle. The behaviour of genetically controlled mutator processes adaptively responsive to stress may reflect such a principle. Related mutators exist in diverse organisms from bacteria to mammals. Such systems have evolved from one another and have defined the very evolution of organisms. Many of these mutator systems can determine in a developmental manner a ultramutability or hypermutability throughout the genome. Though the genetic control of high levels of mutability can reflect molecular features, such mutagenic processes reflect a deeper parameter involving forces and their configurations. These configurations must generate stable or uniform configurations from unstable ones throughout the genome and organism. Directed mutation becomes a generative process attuned to non-uniform forces of local niches and to the more uniform forces of a universal niche. The manner of mutagenic, attuned response depends on the level of genomic and transgenomic organization. This is reflected in hierarchies of evolution. Directed mutation is a feature of a universal, generative ordering process, and this feature is marked by a universal dimensionless constant. It is the dynamic consequence of such directed generation which ultimately confers adaptation through dynamic completion. This suggests an underlying, unitary, and necessary dynamics connecting ultramutability systems in all organisms and would serve, in complementation with a molecular approach, to elicit new and productive research avenues. One outcome would be the illustration of a unifying principle governing biological and physical phenomena.*