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Stephen J. Gould's Legacy: Nature, History, Society

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T. Ryan Gregory, University of Guelph

A Gouldian view of the genome

Abstract

The human genome contains more than 3 billion nucleotides, only about 2% of which represent the ~20,000 protein-coding genes. By contrast, a single transposable element known as "Alu" is present in more than 1 million copies per genome, with these and other self-replicating sequences making up more than half of all human DNA. The human genome is not exceptional in this regard; in fact, there are many organisms with genomes much larger than those of humans. Even after decades of continuous study, many basic questions about genome size, structure, and evolution remain to be answered. This talk reviews some of the major questions in genome biology and the importance of incorporating concepts emphasized by Gould, including exaptation, spandrels, non-adaptive explanations, mutations of large effect, and multi-level selection.