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Timing genetic variation

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Abstract

The oscillating transfer of electrons in the universal reduction---oxidation reactions maintains temporal coordination of fundamental biochemical reactions in living cells. In fact, the redox cycle, also called the metabolic cycle, is the fundamental biochemical process that controls the timing of all biochemical reactions in living cells, including energy production, RNA transcription, and DNA replication. Through this temporal coordination chemical conflict between the reductive and oxidative reactions is avoided in vivo. Many complex diseases likely involve environmental contributions that can be difficult to assess because the timing of such perturbations relative to the oxidative vs. reductive phase can have opposite effects. It will be shown that environmental variables can modulate the timing of the biochemical redox cycle by a feedback mechanism at the electron transport chain and thereby modulate heredity via induced oxidation of the genome.

Biography

Viktor Stolc is the director of the NASA Ames Genome Research Facility (Mountain View, CA), where he has pioneered the development of large-scale functional genomics projects, including high resolution tiling arrays for the entire human genome and various model organisms. Prior to joining NASA in 2000, Stolc worked as a Damon Runyon Cancer Research post-doctoral fellow at Stanford University Genome Technology Center (Palo Alto, CA), where he co-invented a method for direct multiplex characterization of genomic DNA. Stolc received his doctoral degree from Yale University School of Medicine, Department of Cell Biology (New Haven, CT), where he identified and characterized nuclear RNase P protein components from humans and yeast.