

The rise and fall of genome complexity and other macroevolutionary stories

Robert Bakarić and Tomislav Domazet-Lošo

Ruđer Bošković Institute, Zagreb, Croatia

Recent advances in understanding of evolutionary life cycle of genes reveal that gain and loss of gene families is major factor in the evolution of genome composition. However, it is unclear how gene family birth-and-death rates fluctuate at the macroevolutionary scale. Consequently it is obscure how genome complexity changed during evolutionary time in different lineages. Here, using phylostratigraphic approach and newly developed bioinformatic toolkit, we measured gene family birth-and-death rates at the phylogenetic tree comprising more than 600 eukaryotic genomes. We found that, in terms of time, genome reduction is predominant mode of evolution sporadically interrupted by the rapid bursts of gene family gain. These episodes of gene family gain correlate with the major macroevolutionary transitions.