Understanding aging and control of lifespan through genome analyses

Vadim N. Gladyshev

Brigham and Women's Hospital, Harvard Medical School, vgladyshev@rics.bwh.harvard.edu

Understanding mechanisms that control lifespan is among the most challenging biological problems. Many complex human diseases are associated with aging, which is both the most significant risk factor and the process that drives the development of these diseases. The aging process can be changed (e.g., mammals are characterized by >100-fold difference in lifespan, which can both increase and decrease during evolution). We employ this diversity in mammalian lifespan and the associated life-history traits to study mechanisms that regulate species lifespan. For this, we utilize methods of comparative genomics to examine pairs of genomes of related short- and long-lived species (including the most exceptional mammals with regard to lifespan, such as naked mole rats and microbats) and carry out analysis of lifespan across a panel of mammals. These studies identify both lineage-specific and coordinated adaptations involving various pathways. These studies will be presented at the conference. It is our hope that a better understanding of causal relationships and molecular mechanisms of mammalian lifespan control will lead to a better understanding of human diseases of aging.