Gene expression becomes heterogeneous with age in humans and rats

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In a study of the effects of aging on gene expression, researchers have found that variation in gene expression among individuals tends to increase with age. The findings, which impact our understanding of the molecular forces that govern age-related changes, are reported in the May 23rd issue of *Current Biology* by Mehmet Somel and colleagues at the Max Planck Institute for Evolutionary Anthropology and the University of Cambridge.

One long-standing observation concerning the physiological decline that accompanies aging is its variability--some people age better than others. However, there has thus far been little or no evidence supporting the existence of similar heterogeneity at the level of gene expression. Lack of such evidence, in turn, gives support to a "programmed aging" hypothesis and argues against the more commonly accepted "stochastic aging" model, in which random biological events play an important role.

In the new work, researchers put to the test the question of whether gene-expression heterogeneity increases with age. Using a wide range of expression data from both humans and rats, the researchers showed that levels of gene expression become more variable with age. Furthermore, they found that the tendency toward increased variation is not restricted to a specific set of genes, implying that increased heterogeneity is the outcome of random processes such as genetic mutation.

These observations corroborate the notion that aging is underpinned by stochastic events. That said, the authors of the study point out that the

observed increases in expression variation are surprisingly small, leaving plenty of room for further explanations regarding the relationship between aging-related changes at the organismal level and the underlying molecular mechanisms of aging. Nevertheless, the new results show that with the increasing amounts of molecular data available to researchers, scientists will now experience improved opportunities to answer age-old questions about the nature of aging.

Source: Cell Press