Ageing: A genetic shift from cancer to degenerative diseases

Nature Communications

January 31, 2018

Ageing-associated changes in gene expression follow trajectories akin to those observed in degenerative chronic diseases yet opposite to those found in cancer, reports a study published in Nature Communications. The findings provide insights into the observed shift from cancer to degenerative chronic disease as the major cause of mortality in the later stages of ageing in the human population.

In this study, Christoph Kaleta and colleagues generated a large dataset consisting of ageing-associated gene-expression profiles from four species (humans, mice, zebrafish and killifish) at different ages across four tissue types. They also analysed publicly available data from patients with ageing-associated diseases. The authors found that patterns of gene expression during ageing shift towards those observed in degenerative chronic diseases, and are opposite to those observed in cancer. A similar antagonism is also seen on the genomic level where a large number of shared risk alleles in cancer and degenerative diseases have opposite effects on the predisposition to either type of disease. In addition, the authors show that key contributors to ageing-mediated disease processes are associated with the immune system and cell-division-related processes.

This study hence uncovers a trade-off between cancer and degenerative chronic diseases, providing insight into the shift in their prevalence during ageing, the authors conclude.

DOI:10.1038/s41467-017-02395-2