# Gene regulation study finds coordination between basic cellular processes is lost with increasing age

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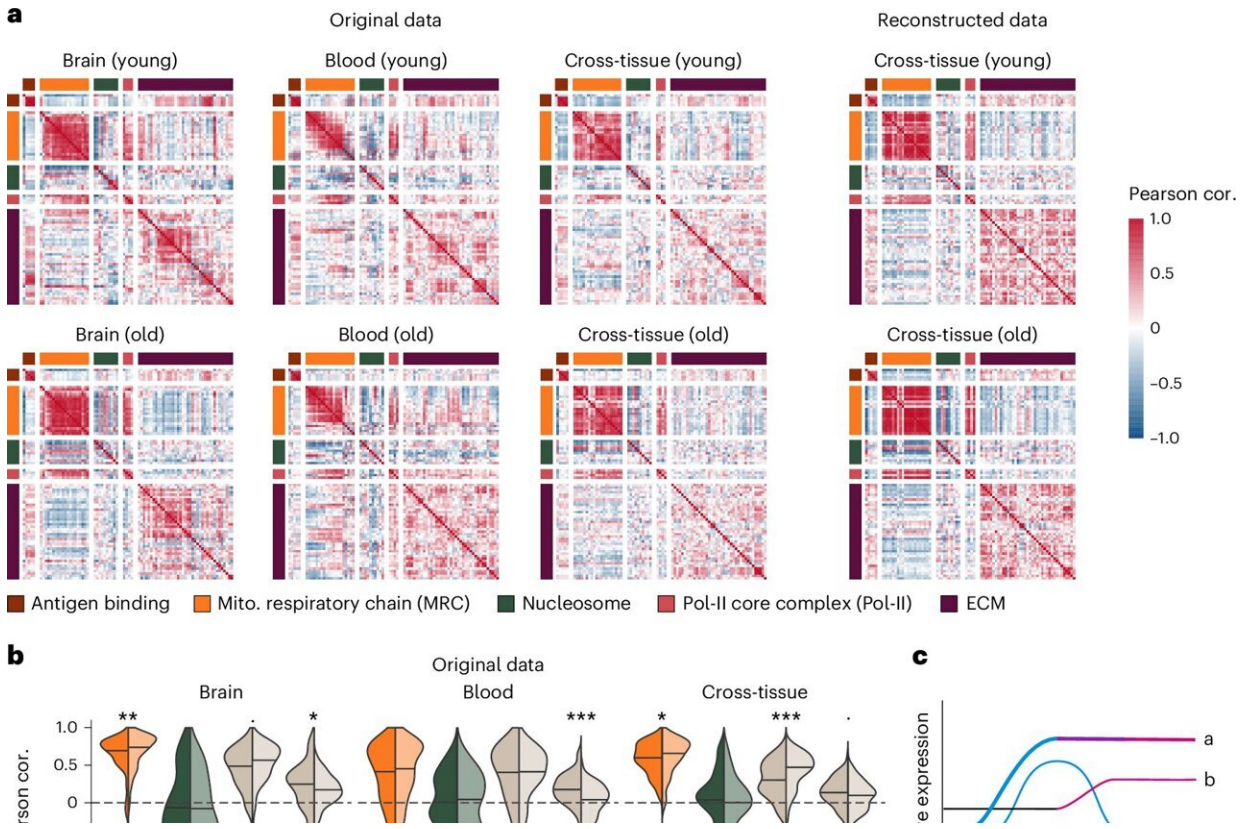


Representative gene–gene relationship changes with age, captured by pairwise correlation and a GRN-based approach. Credit: *Nature Aging* (2024). DOI: 10.1038/s43587-024-00696-y

Gene regulation in our cells—the decision on which proteins are produced for the various processes of the cell—is strictly regulated. It has long been assumed that this regulation deteriorates with age. But until now, it has been unclear how exactly the regulation of individual processes, and above all, the coordination between the processes changes.

Professor Dr. Andreas Beyer and his team from the University of Cologne's CECAD Cluster of Excellence for Aging Research have now used a mathematical model to show that the regulation of genes involved in the same process in the cell changes relatively little over the course of a person's life. However, the coordination between different cellular processes becomes less and less effective. The study is published under the title "Loss of coordination between basic cellular processes in human aging" in *Nature Aging*.

The scientists analyzed age-related changes in gene regulation in eight different human tissue samples in the age range from 20 to 80 years, for which they compiled several thousand data sets from three different databases. By applying their model to this data, they investigated the extent to which the network of gene regulation changes in the course of aging. Surprisingly, they found that the control of most genes does not deteriorate with age.

"Our results show how important it is not only to study individual genes and their effect on aging, but also to take a step back and look at the interaction and communication between the different processes," said first author Dr. Ana Carolina Leote.

Professor Beyer summarized the result: "Aging affects the entire cell. To really understand these changes, we need to analyze all genes simultaneously using computer models that we apply to large data sets."

Next, the team would like to generate such models for the proteins that are encoded in the genes. This is much more complex because several different proteins can be made from one gene.

**More information:** Ana Carolina Leote et al, Loss of coordination between basic cellular processes in human aging, *Nature Aging* (2024). DOI: 10.1038/s43587-024-00696-y

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