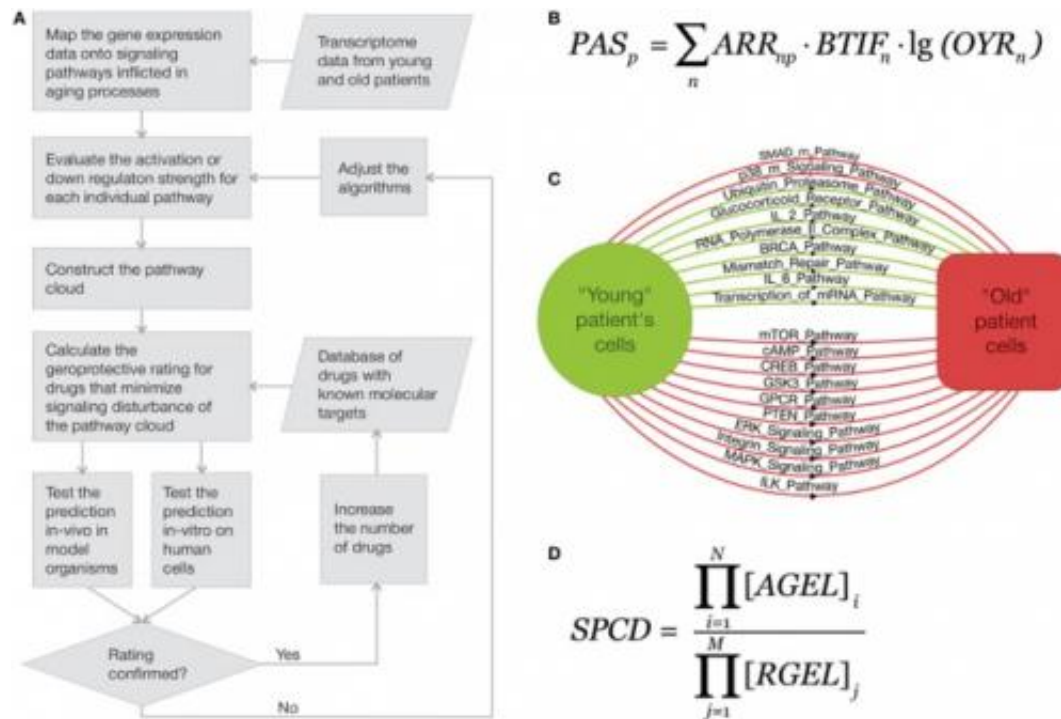


# Russian scientists develop algorithm for anti-aging remedy search

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Credit: Moscow Institute of Physics and Technology

MIPT scientists have provided an algorithm which can help in the search for aging-suppressing drugs. The researchers, whose work is published in *Frontiers in Genetics* magazine, have compared gene expression in young and elderly patients' cells.

The scientists – Alexander Zhavoronkov, Anton Buzdin, Andrey

Garazha, Nickolay Borisov and Alexey Moskalev— have based the new research on their previously-developed methods in the study of [cancer cells](#). Each cell uses particular schemes of [molecular interaction](#), which physiologists call intercellular signaling pathways.

A [signaling pathway](#) is a chain of sequential events of interaction between certain molecules which make the cell respond to stimulation. For example, hormone molecules first interact with the cell's membrane receptors, then the receptors engage with the molecules inside the cell, and those, in turn, deliver the signal into the cell's nucleus. As a result, inside the nucleus there occur changes in the way certain proteins engage with DNA and in the expression of genes. This leads to changes in the synthesis of RNA molecules, which are responsible for protein-producing processes.

Events in a cell's life-cycle can be roughly of two types: normal (such as hormone-induced response or performance of certain functions related to body growth) and abnormal, or pathological (i.e., malignant degeneration). Both these types of events are accompanied by changes in signaling pathway activity. What is more important, the same chain of reactions can be traced in totally different processes, i.e., there is no such thing as a "malignant cell forming protein", or a "long-term memory protein".

The team of experts from MIPT and other Russian and British organizations (the full list of names can be found in the article) suggested comparing peculiarities of signaling pathways activation in young and aging cells. This information is then expanded with the available data on the impact of various substances on signaling pathways.

Thus, the new algorithm helps to predict the type of change in the profile of intracellular molecular interaction which will occur in response to this or that drug.

In their article the scientists point out that their algorithm can be used in rapid and inexpensive search for drugs which can minimize the difference between the [cells](#) of young and [elderly patients](#). This means that it will be possible to speed up the search for longevity drugs and decrease its cost. What is more, this will be achieved not by simply fighting some particular diseases, but by a complex influence on the mechanisms of aging.

**More information:** Paper: [journal.frontiersin.org/Journal/abstract/10.3389/fgen.2014.00049/full](http://journal.frontiersin.org/Journal/abstract/10.3389/fgen.2014.00049/full)

Provided by Moscow Institute of Physics and Technology

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