

New players in the programmed cell death mechanism

April 30 2020



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Skoltech researchers have identified a set of proteins that are important in the process of apoptosis, or programmed cell death. These newly identified proteins can become targets in the development of drugs against cancer or other diseases.

Apoptosis is a form "cell suicide," in which a series of programmed molecular steps in a cell lead to its death. "When a cell senses that

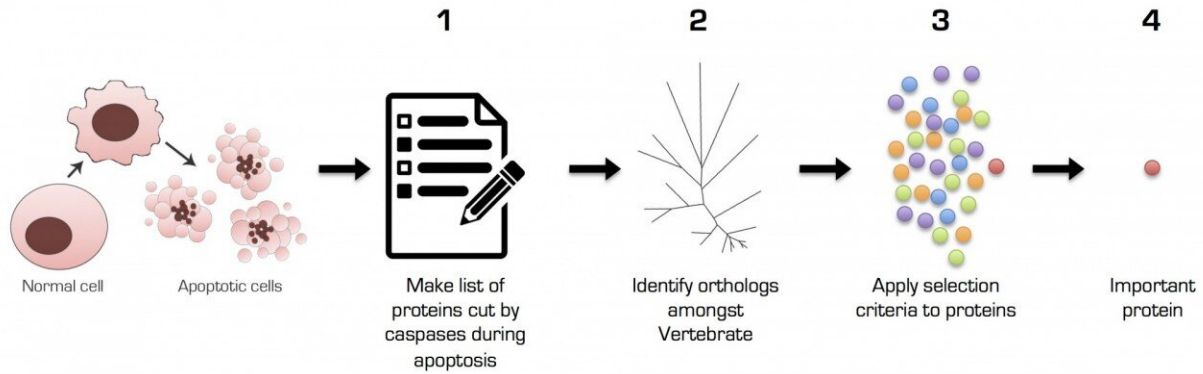
something is wrong, it can commit 'suicide,' or [apoptosis](#), to prevent itself from dividing and spreading the problem. This is a normal mechanism present in all cells of the body and one way by which the body gets rid of unneeded or abnormal cells.

"Most cancers block this process, so that they can proliferate forever. So, understanding the process and knowing the actors that are involved is important in order to identify new targets that can be used to develop therapy for cancer, for instance," explains Dominique Leboeuf, Skoltech Center for Life Sciences Ph.D. student and one of the authors of the study.

Apoptosis is an essential process for proper organ development, immune system functioning, and defense against viral infections and cancerous transformation. Once the apoptotic program is initiated in a cell, special enzymes, called caspases, are activated and cleave a very specific set of proteins.

"The goal of the study was to sort out this set and identify the proteins that are important in the apoptotic program. To do this, we looked at the evolutionary conservation of caspase substrates and additional characteristics of these proteins, based on sequence, structure and biochemical properties. We believed that the proteins that were the most preserved, and met our selection criteria, would be critical in the apoptotic process," stated Skoltech Neurobiology and Brain Restoration Center professor Konstantin Piatkov.

The steps involved in the identification of the final list of proteins:



Credit: Skolkovo Institute of Science and Technology

This work is an important step in the understanding of the apoptotic program, and can be used to further investigate the therapeutic potential of the identified proteins.

On this study Skoltech collaborated with Nina Gubina from the RAS Institute of Theoretical and Experimental Biophysics and Maxim Pyatkov from the RAS Institute of Mathematical Problems of Biology in Pushchino.

More information: Nina Gubina et al. Novel Apoptotic Mediators Identified by Conservation of Vertebrate Caspase Targets, *Biomolecules* (2020). [DOI: 10.3390/biom10040612](https://doi.org/10.3390/biom10040612)

Provided by Skolkovo Institute of Science and Technology

Citation: New players in the programmed cell death mechanism (2020, April 30) retrieved 7 May 2024 from <https://phys.org/news/2020-04-players-cell-death-mechanism.html>

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