

Project 1.3 Targeting mitochondrial potassium channels to regulate cellular senescence

Supervisor: Prof. Adam Szewczyk, PhD Dsc.

Laboratory: Laboratory of Intracellular Ion Channels

www: <https://nencki.edu.pl/laboratories/laboratory-of-intracellular-ion-channels/>,
<https://infraredmito.nencki.edu.pl/>

Background:

Cellular aging is a key factor in the development of age-related diseases and is one of the main challenges in modern science. This phenomenon is studied on many levels and from many aspects. In our Laboratory, we discovered that senescent smooth muscle cells lose the activity of one of the potassium channels present in mitochondria. Therefore, our aim is to investigate whether and how the activity of potassium channels is related to cellular aging. We will also use activators and inhibitors of these channels to influence cellular aging and, through this, determine whether these modulators can potentially be used as senolytics, i.e., substances that delay the aging process.

Aim:

1. Investigating the variability in the expression of various potassium channels during aging.
2. Explaining the molecular pathways related to aging that lead to changes in the expression of potassium channels.
3. Evaluating the protective effects of channels and their modulators against the aging process.

Publication: Głuchowska A, Kalenik B, Kulawiak B, Wrzosek A, Szewczyk A, Bednarczyk P, Mosieniak G. (2023) Lack of activity of the mitochondrial large-conductance calcium-regulated potassium channels in senescent vascular smooth muscle cells. Mech Ageing Dev. doi: 10.1016/j.mad.2023.111871

Requirements:

- education: Master's degree in molecular biology, biochemistry, chemistry, biophysics, or a related field;
- technical Skills: Basic knowledge of molecular biology or biochemistry techniques;
- communication Skills: Good command of the English language

WE OFFER:

- participation in an innovative research project on cellular aging;
- the possibility of professional development at a renowned Polish Academy of Sciences institute with access to cutting-edge research technologies;
- participation in training and scientific conferences.

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