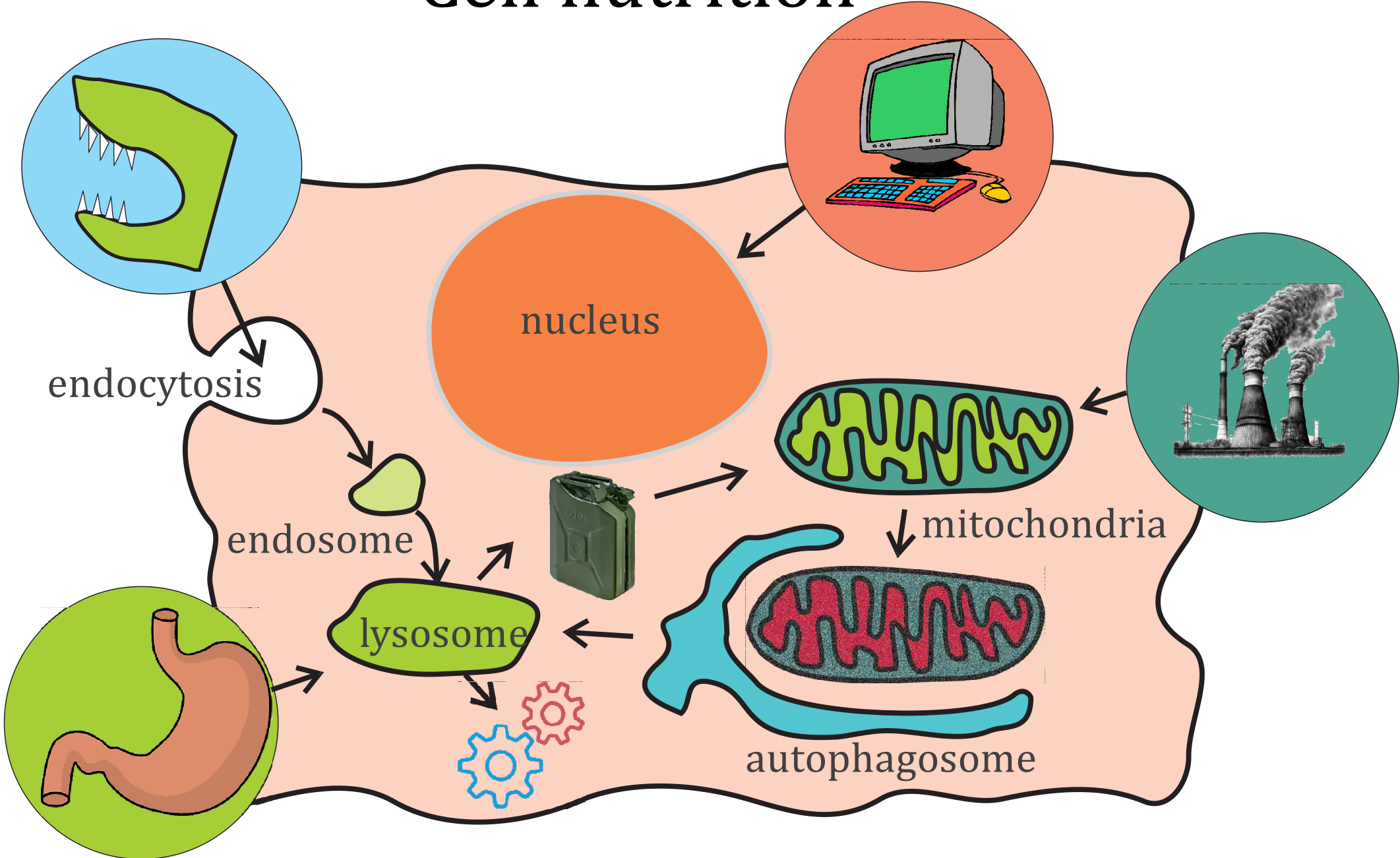


An Update on Cellular Nutrition

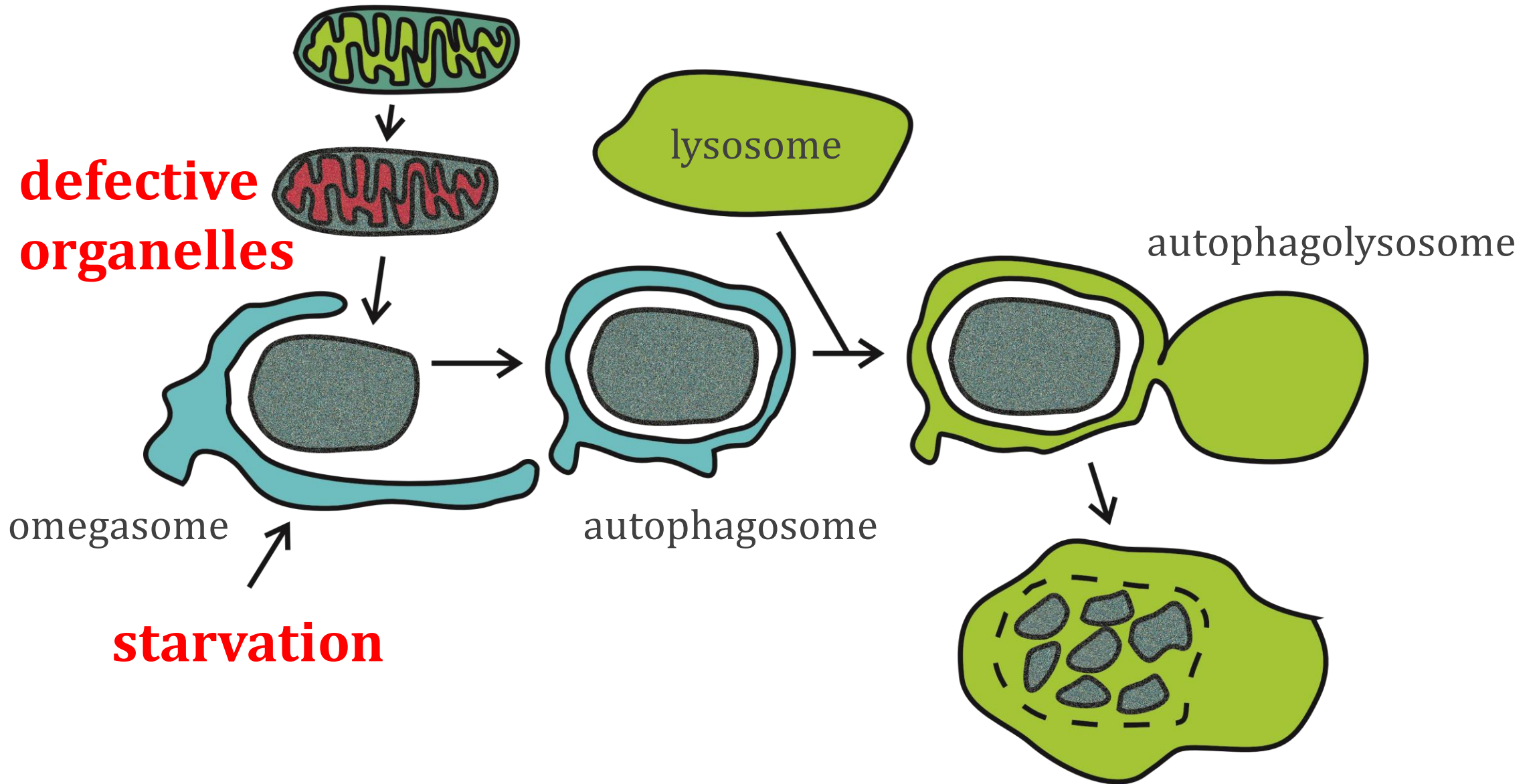
Petr Sergiev

Lomonosov Moscow State University,
Skolech

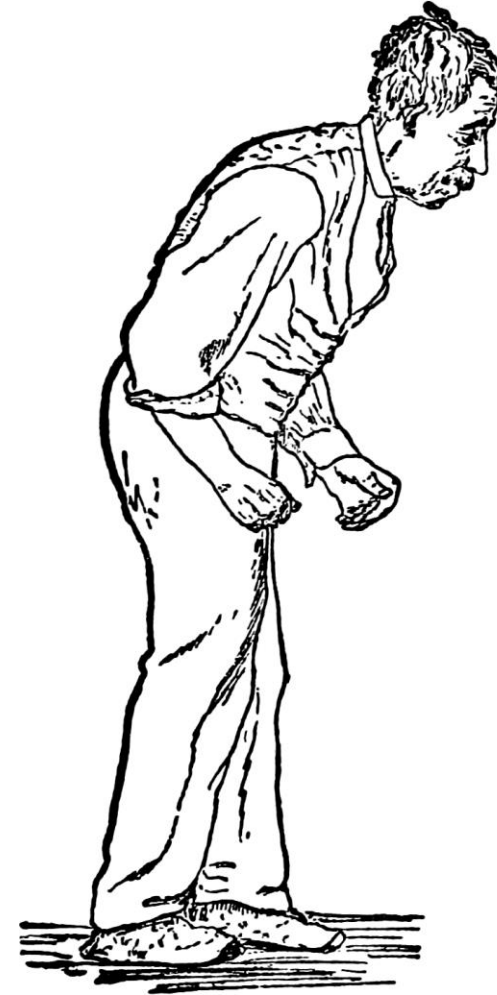
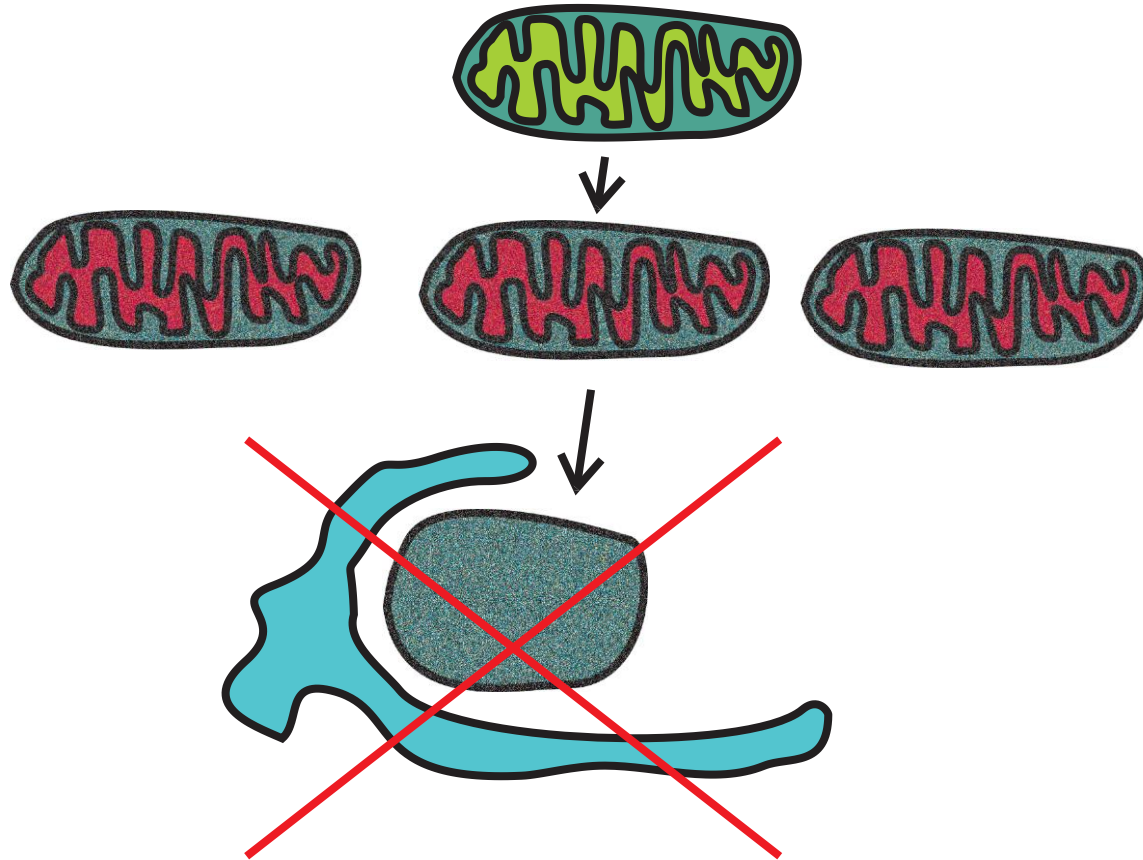
Cell nutrition



Autophagy



Autophagy is needed for health

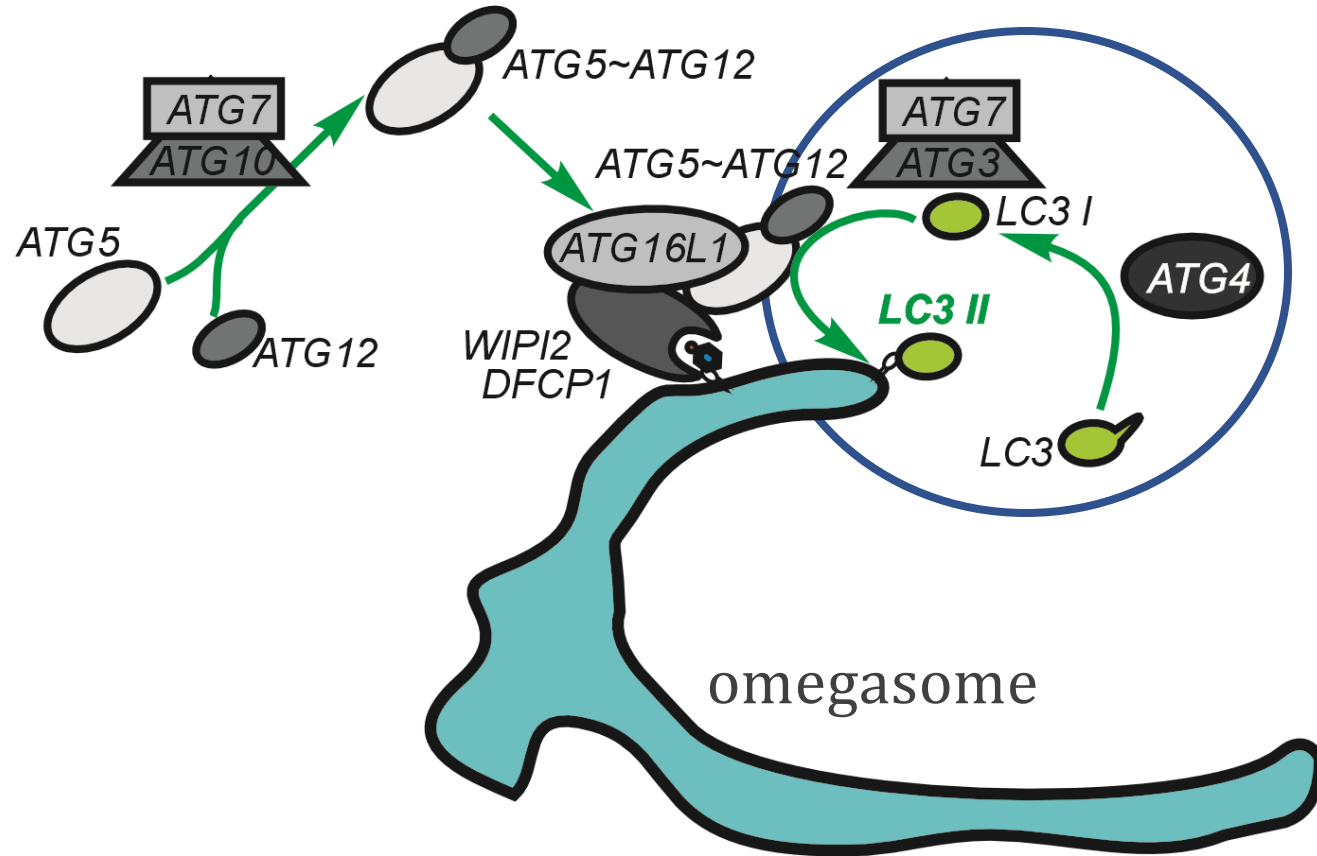


We set up a new search for autophagy
boost

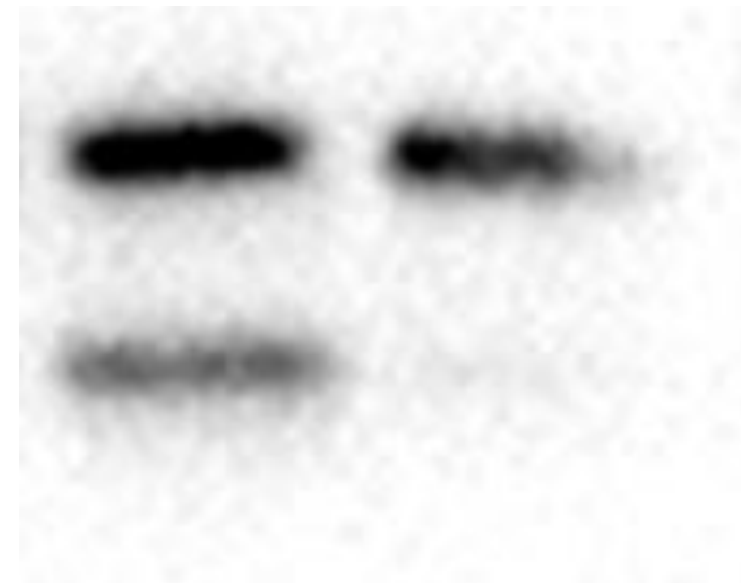


How could we understand that autophagy is effective?

A specific protein, LC3 is modified to mediate recognition of autophagy targets



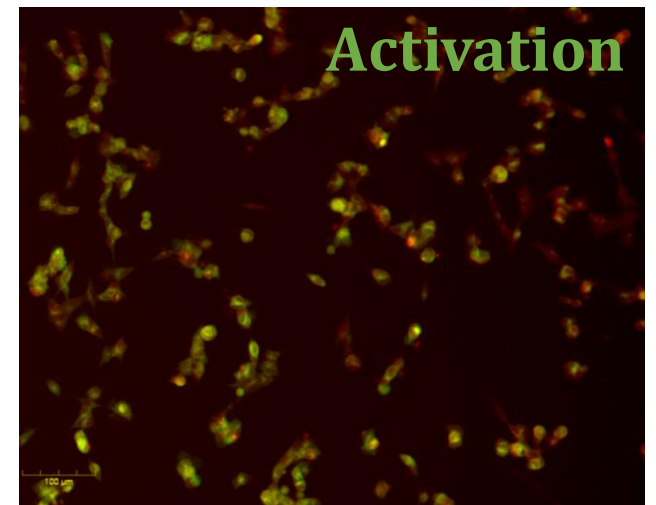
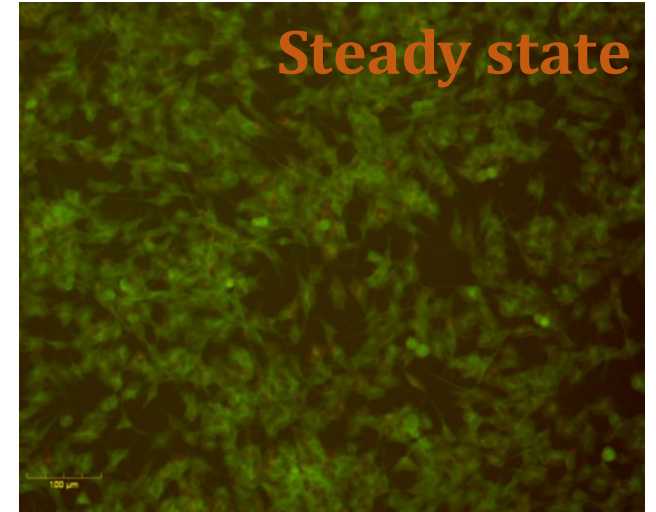
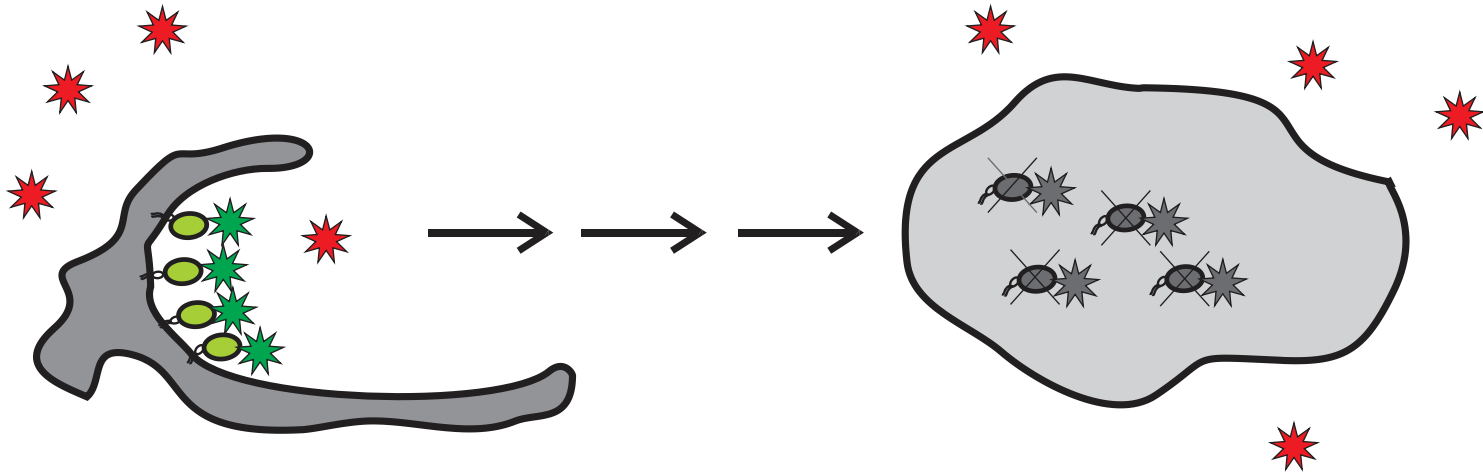
Activation **Steady state**



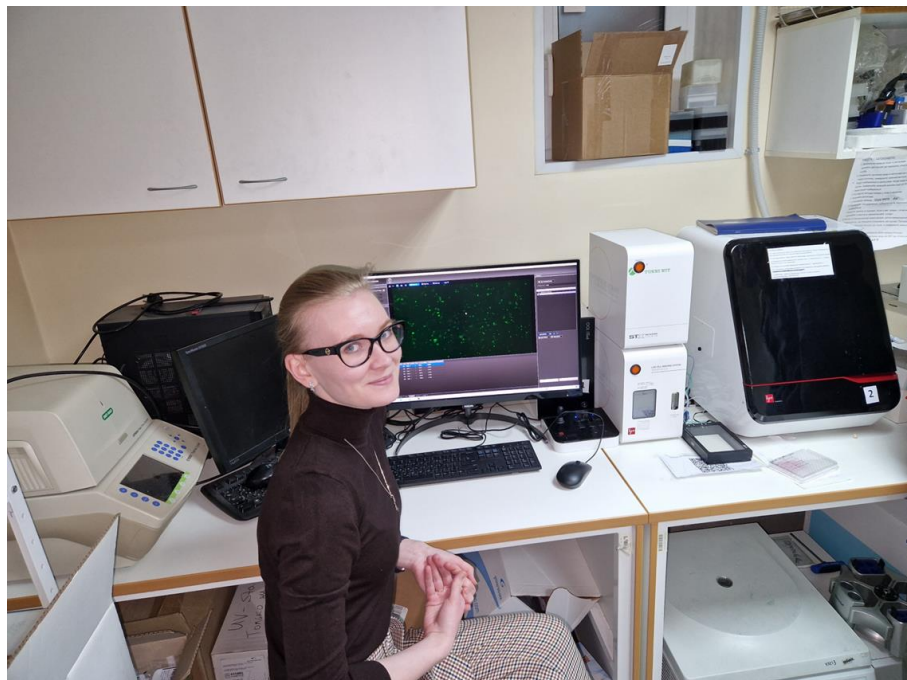
LC3 I
●
LC3 II
●

How could we understand that autophagy is effective?

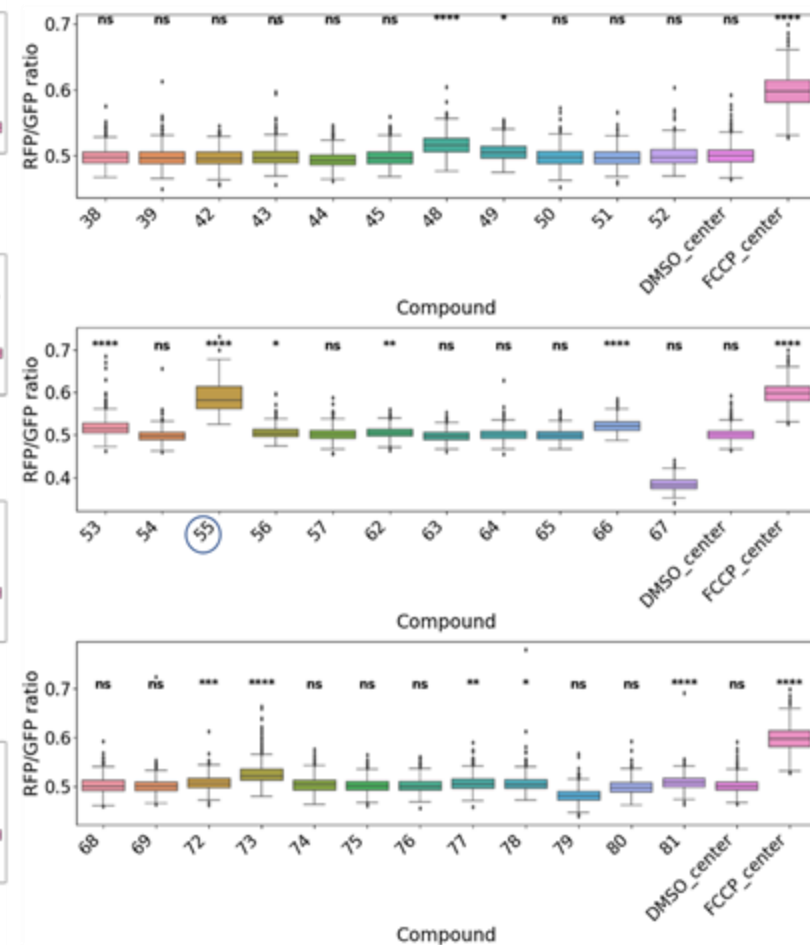
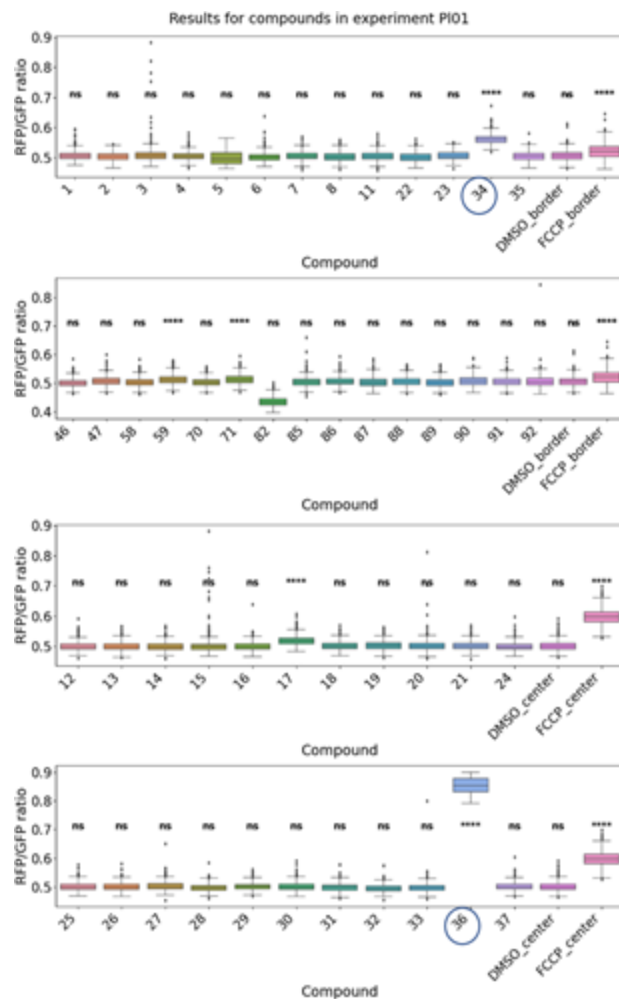
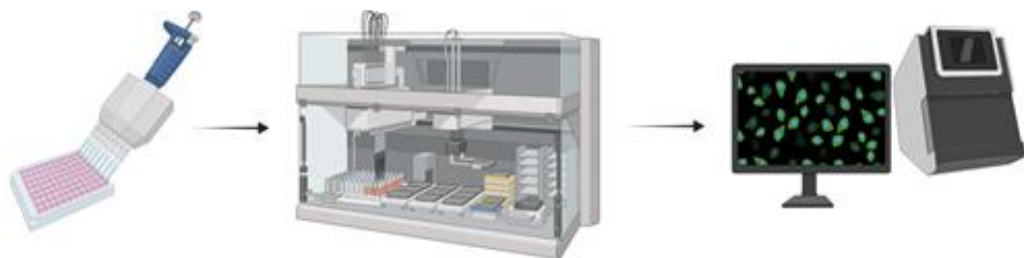
Fluorescent microscopy assay



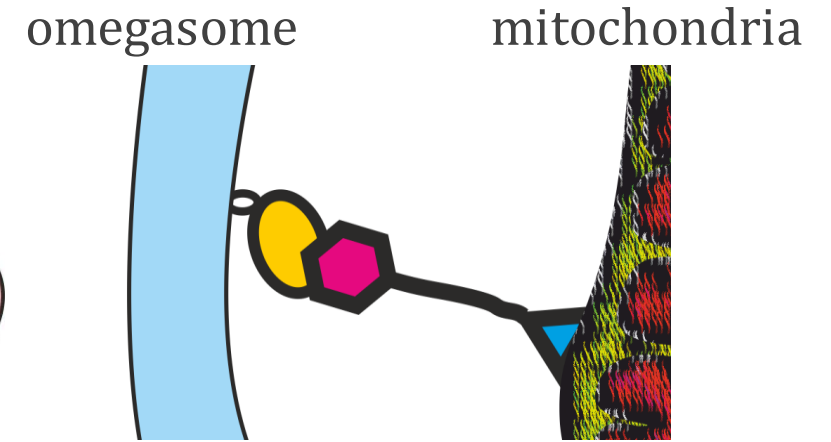
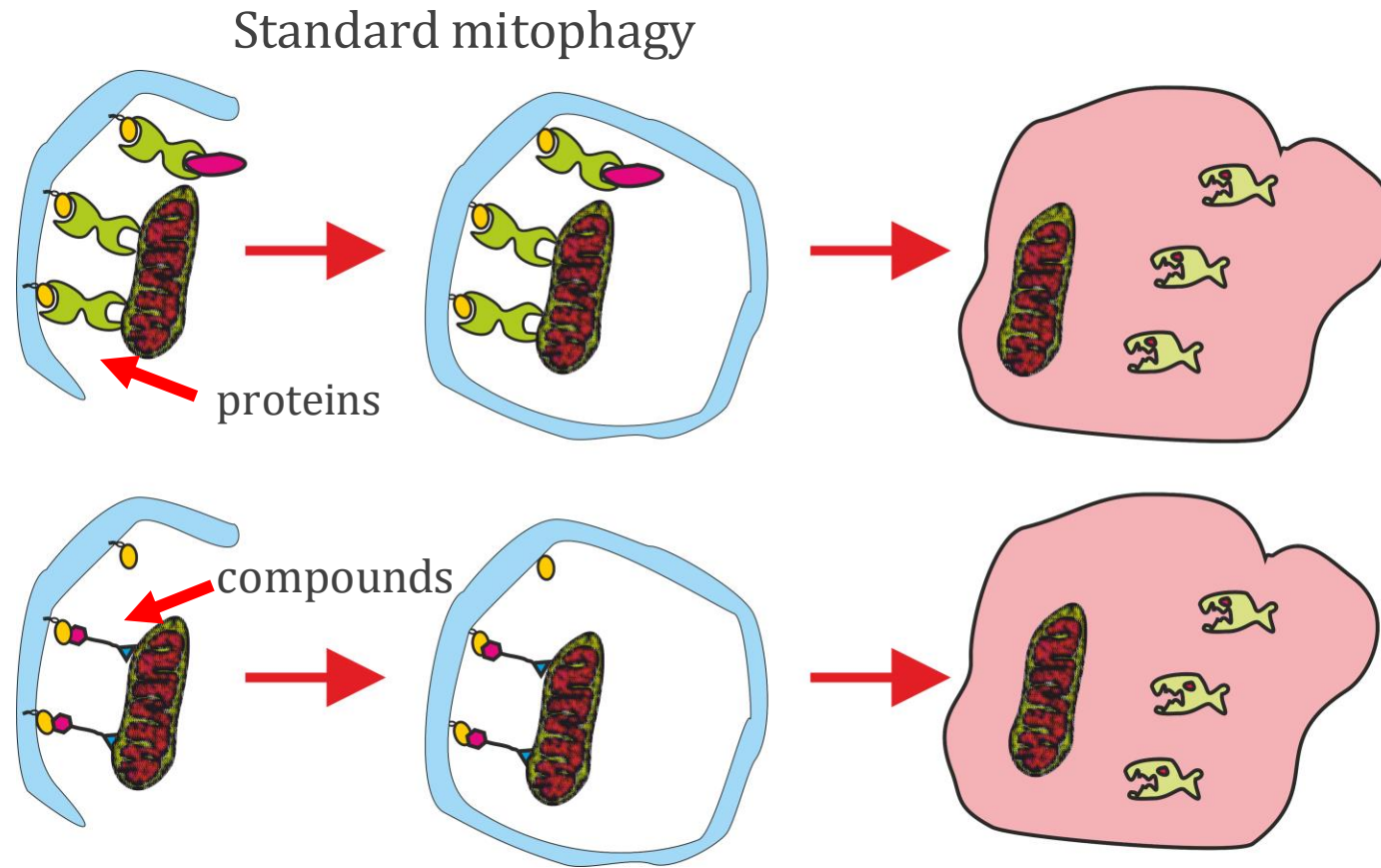
Chemical library screening



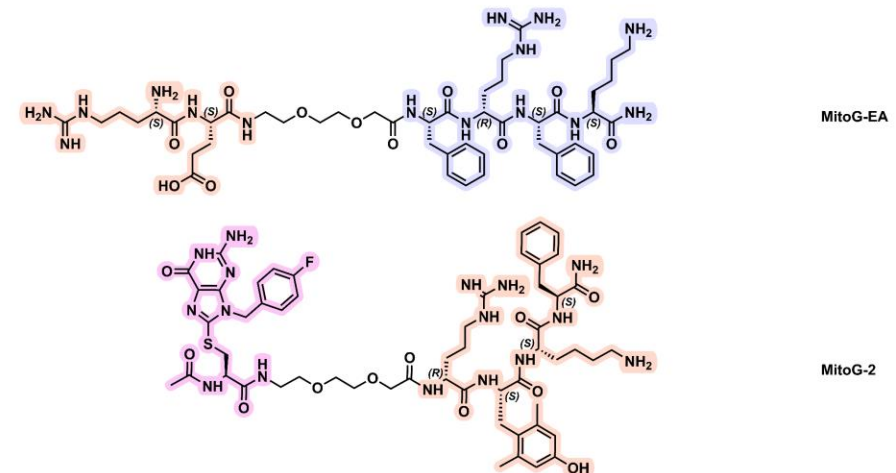
>30 000 compounds



Bifunctional compounds - AUTACs



AUTACs



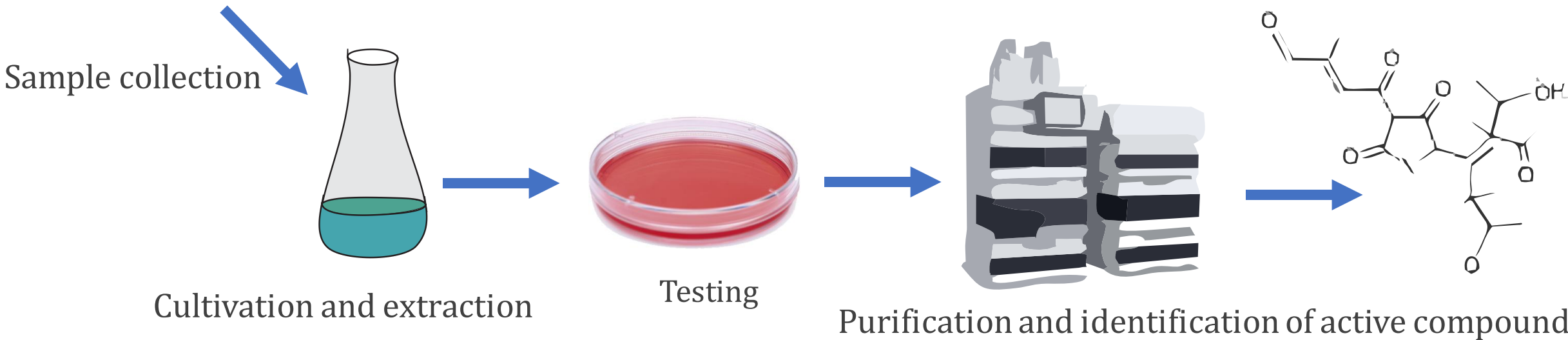
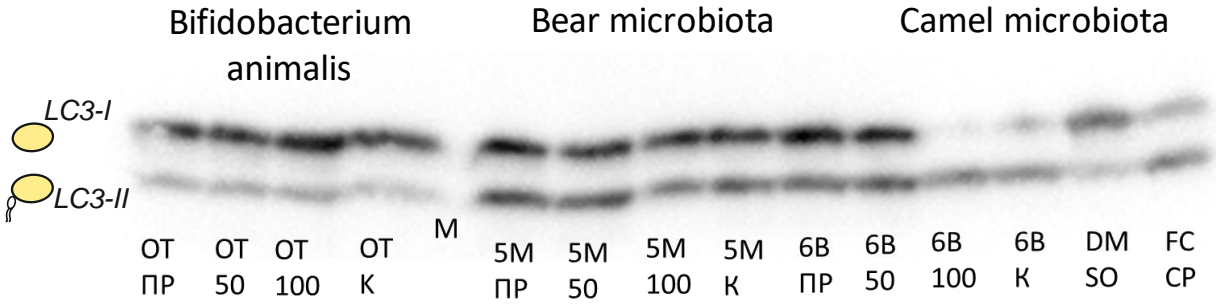
>50 variants tested

Microbiota



Animals naturally resistant to long starvation

Microbiota



Medicinal plants and spices



270 medicinal plants

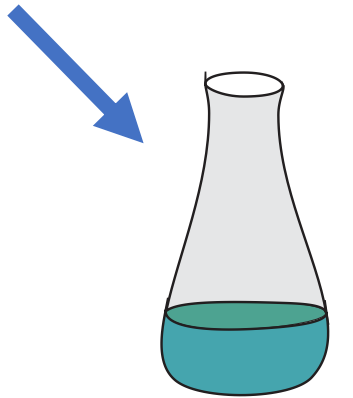


25 plant cell cultures

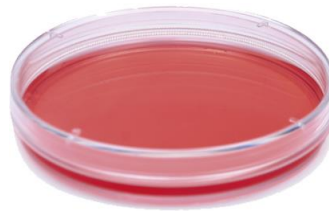


Spices

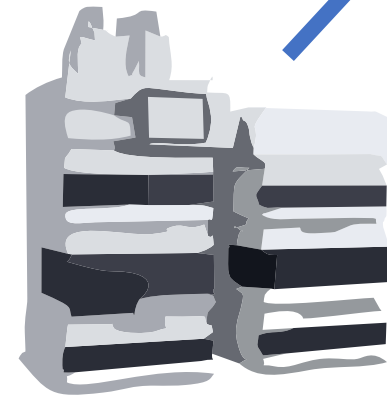
Medicinal plants and spices



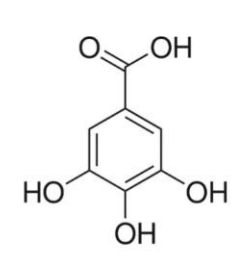
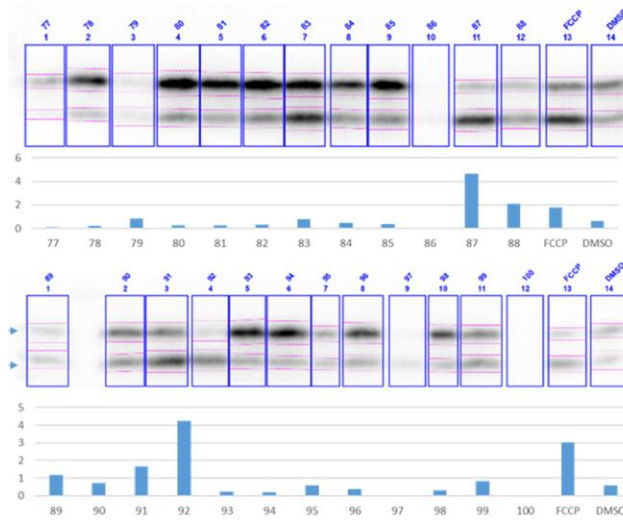
Extraction



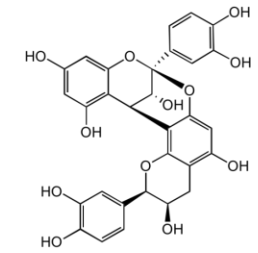
Testing



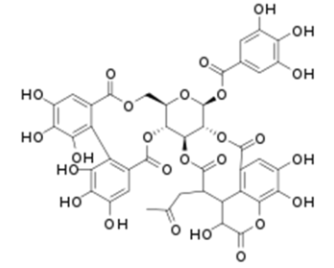
Purification and identification of active compound



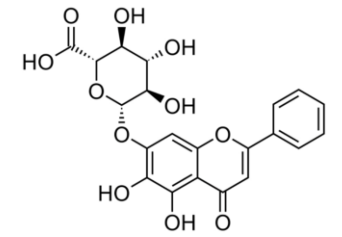
Gallic acid



Procyanidin



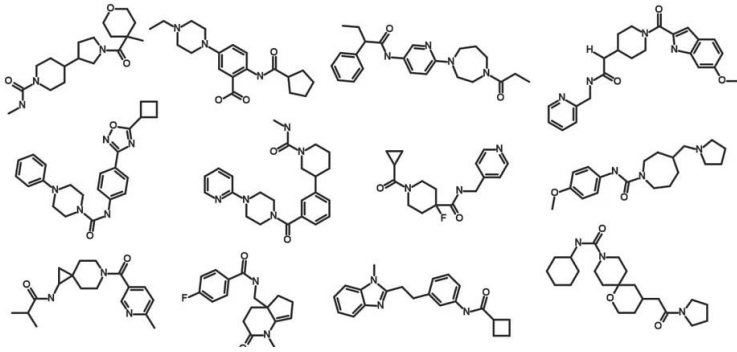
Chebulagic acid



Baicalin

And several NEW compounds

A set of autophagy activators



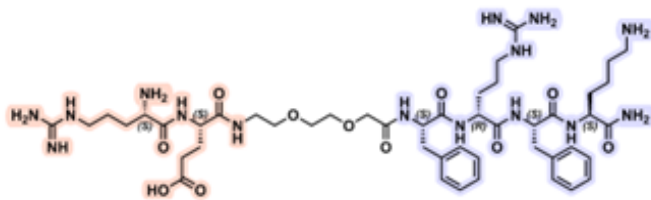
Chemical library



Microbiome products

Selected set of
activators

~50 chemicals

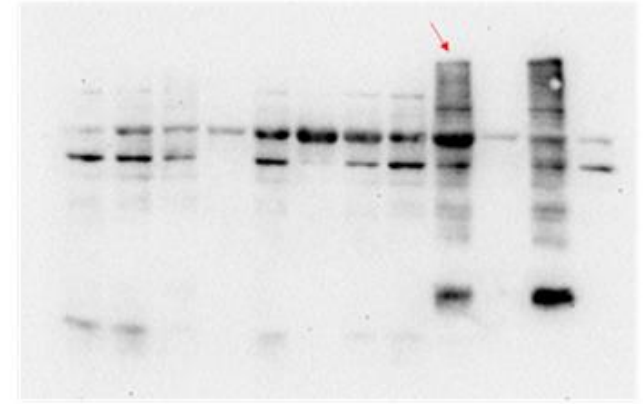
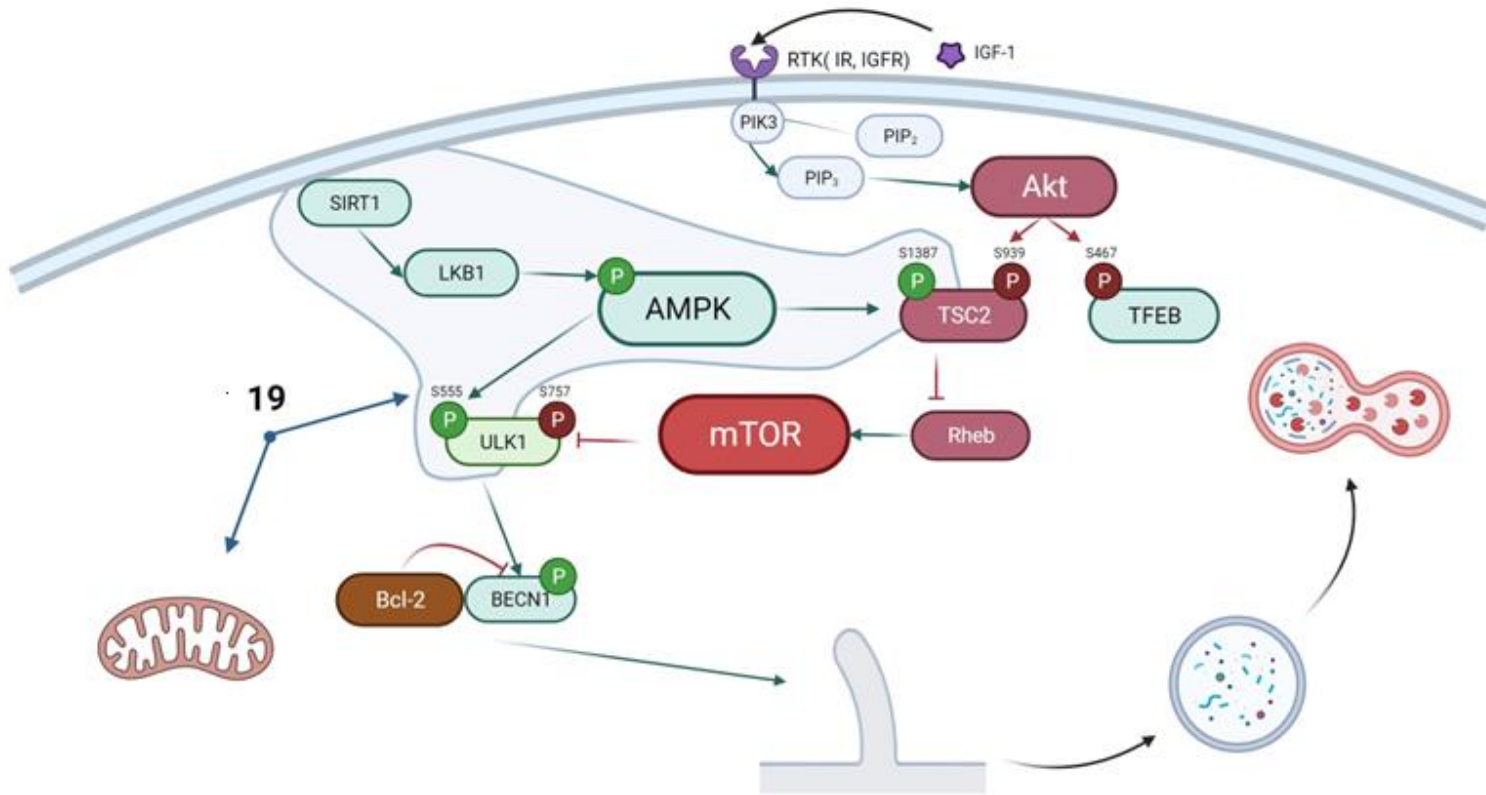


Bifunctional compounds



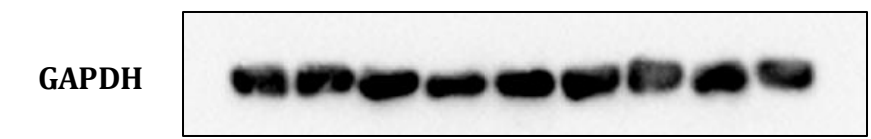
Medicinal plants

Mechanism



11 12 13 14 15 16 17 18 19 20 FCCP DMSO

phospho-ubiquitin



C, $\mu\text{g}/\mu\text{l}$ 50 25 10 F7,5 D 25 10 F D

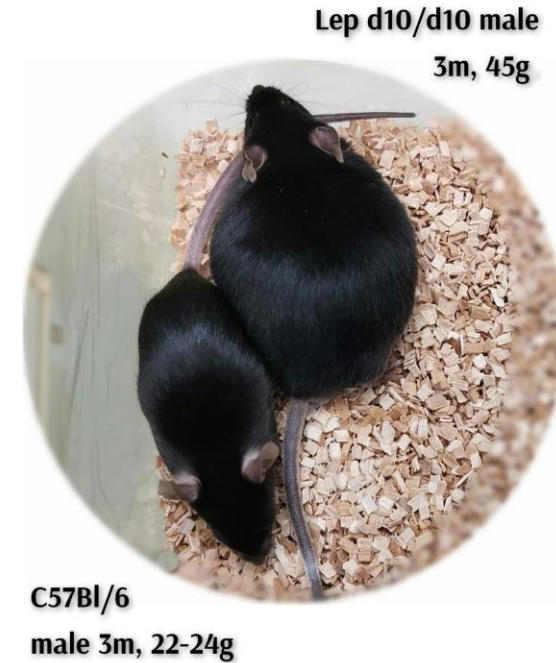
WT

dSIRT1

Animal model testing

- **T2D, obesity model**

LEP KO mice (homemade at Lomonosov Moscow State University)



- **Chemically induced Parkinson disease model**

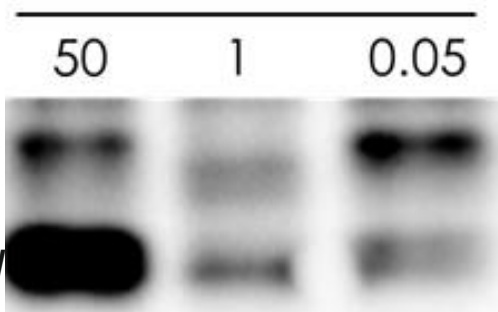
Brachyodanio rerio + MPTP



Animal model testing

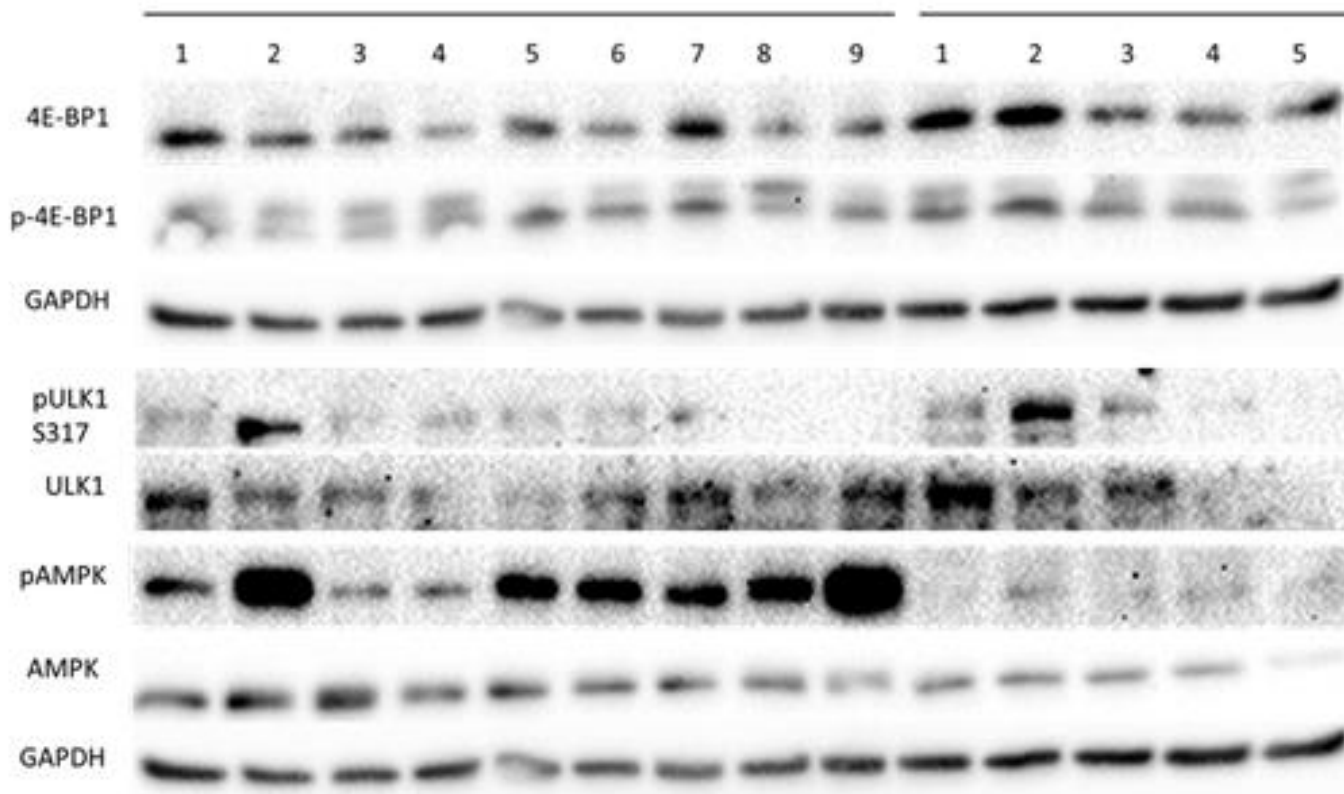


19

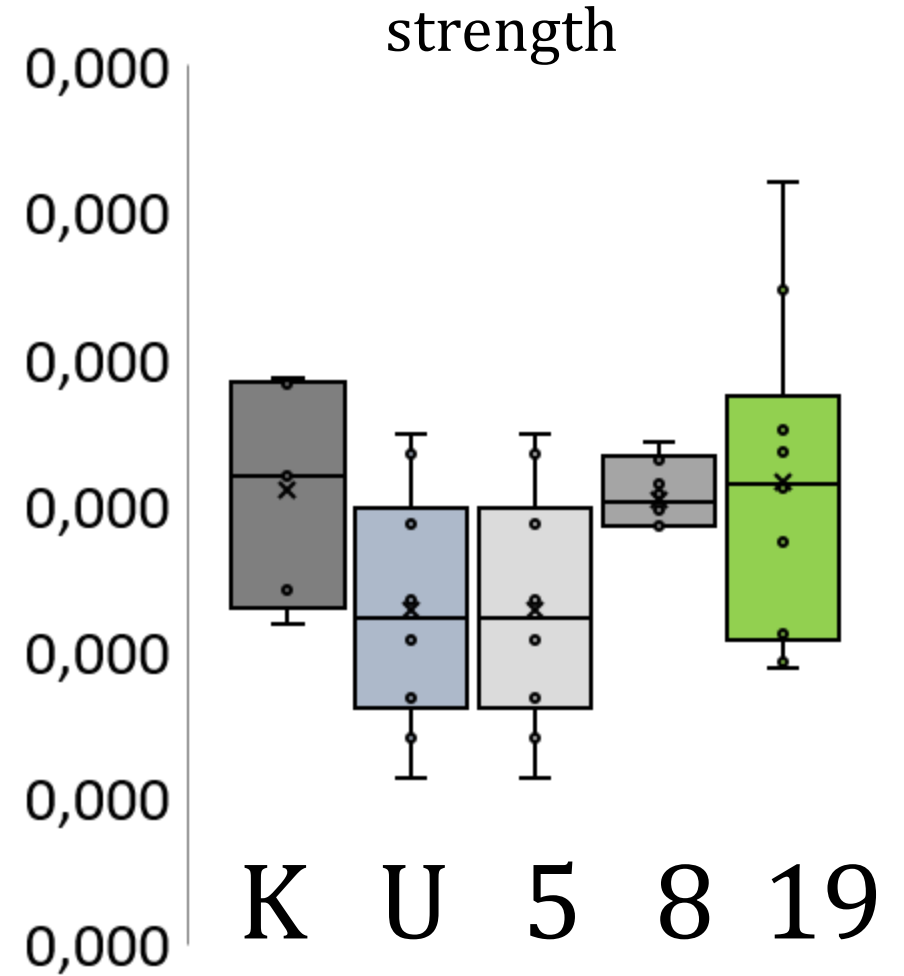
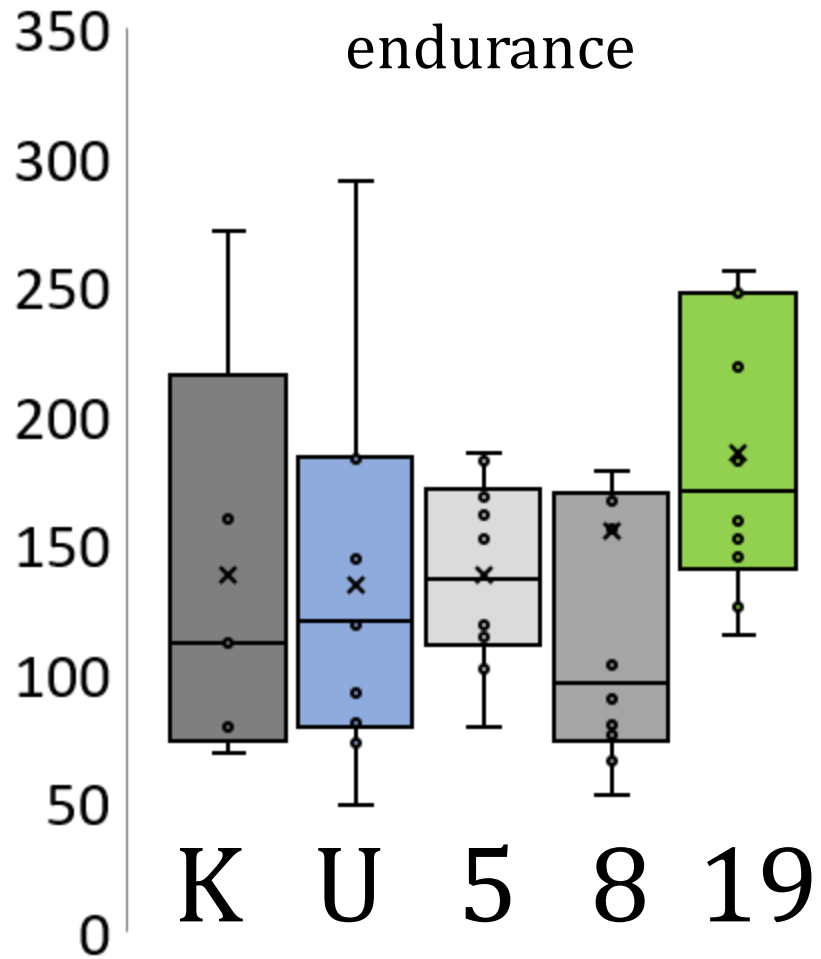


19

K

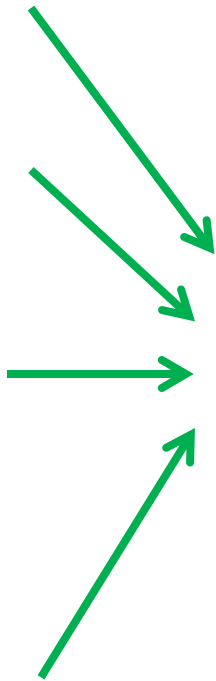
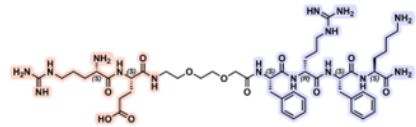
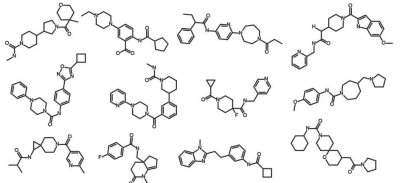


Animal model testing

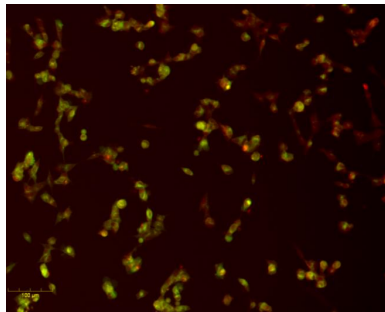


Summary

Different sources of activators



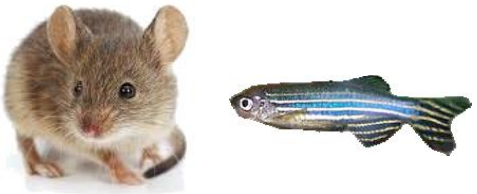
Activity assays



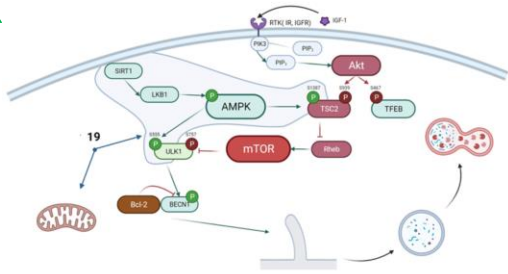
Purification identification



Animal testing



Molecular mechanism



Thank you

