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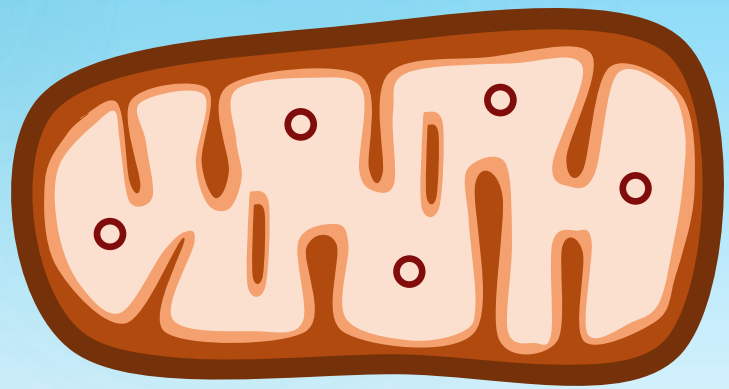
Could the cells energy status be the key to Parkinson's in all people with Parkinson's?

DR HEATHER MORTIBOYS

Mitochondria

- Generate most of the cell's energy
- Batteries of the cell
- Energy in cells is called ATP



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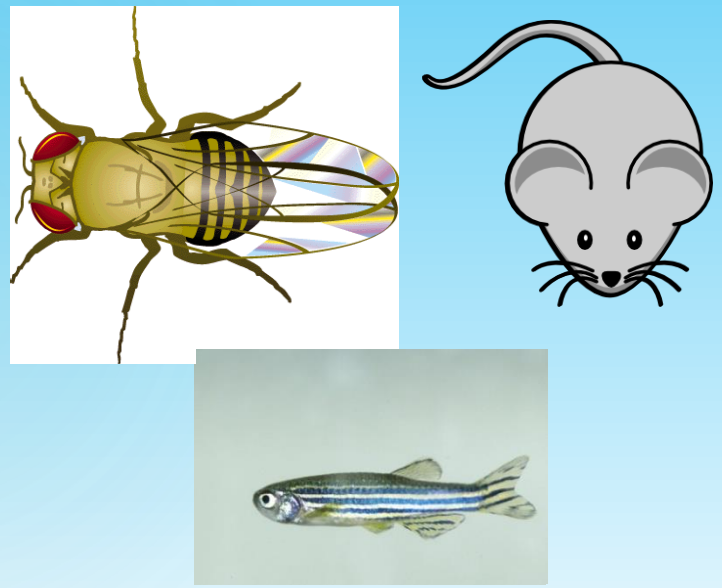
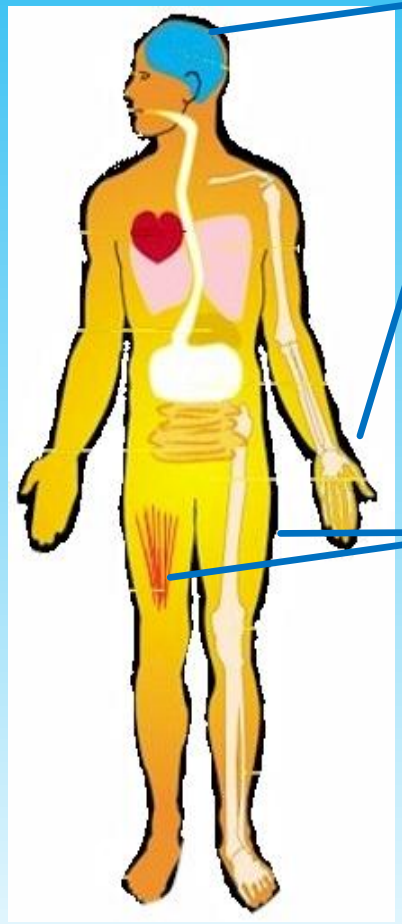
Mitochondria and Parkinson's

- Contaminated heroin gave drug users Parkinsonism
- The contaminant stopped the mitochondria working so well

Genetic animal models show mitochondrial abnormalities



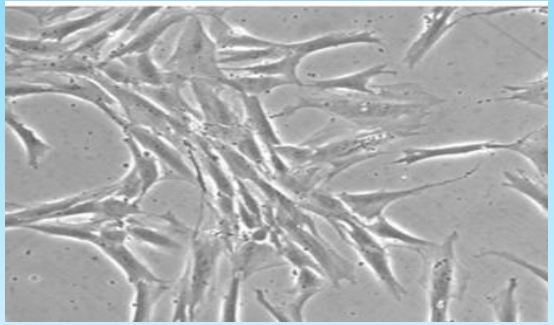


Brain and skin cells

Muscle and blood

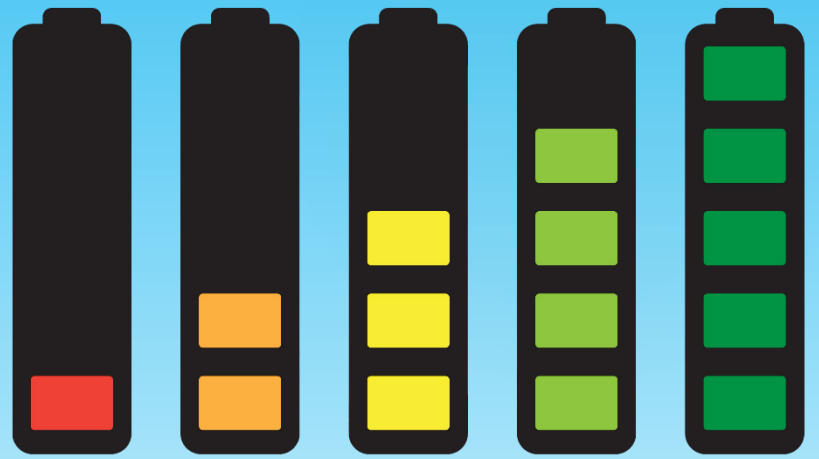
What we do in the lab

- We take a skin biopsy of people with and without Parkinson's
- We can then compare the differences in the mitochondria and other pathways which link to the mitochondria
- We look at the mitochondria in skin cells of people with Parkinson's



Mitochondria and Parkinson's

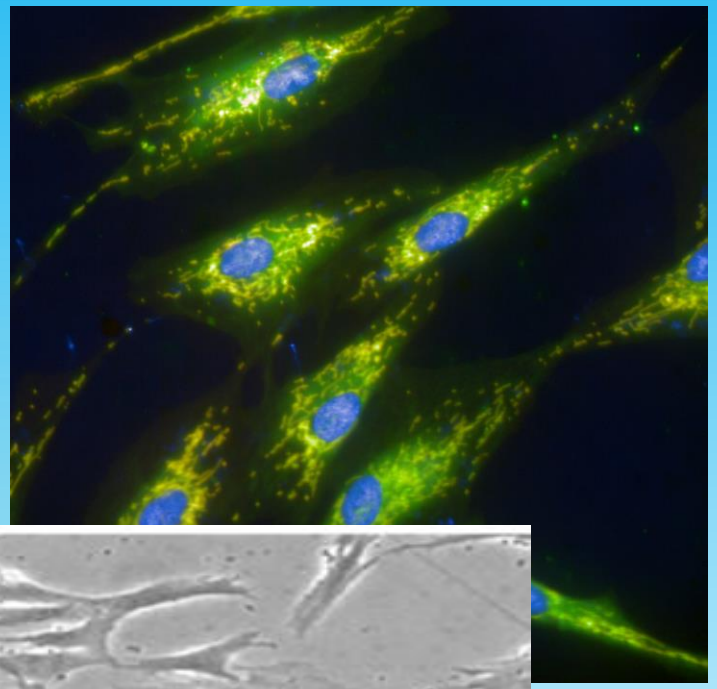
- We found that levels of ATP are lower in people with Parkinson's
- We found changes in the shape of the mitochondria
- If the cell identifies that the mitochondria are not working, they can be recycled. This recycling also does not work properly in people with Parkinson's
- We found that we could increase ATP levels with different drugs

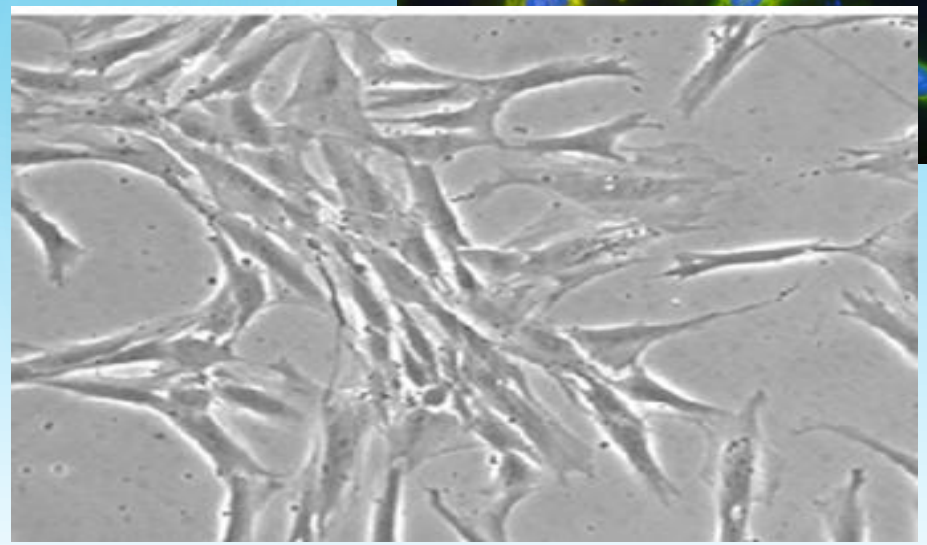


Large scale compound screening

- Testing a range of compounds to determine which may help the health of **mitochondria**
- Using **skin cells** from people with and without Parkinson's
- Testing 1000's of compounds in skin cells

Learning from skin cells





Donation of skin samples

Isolate skin cells

Grow

Use in experiments
-Determine health of mitochondria

Shape

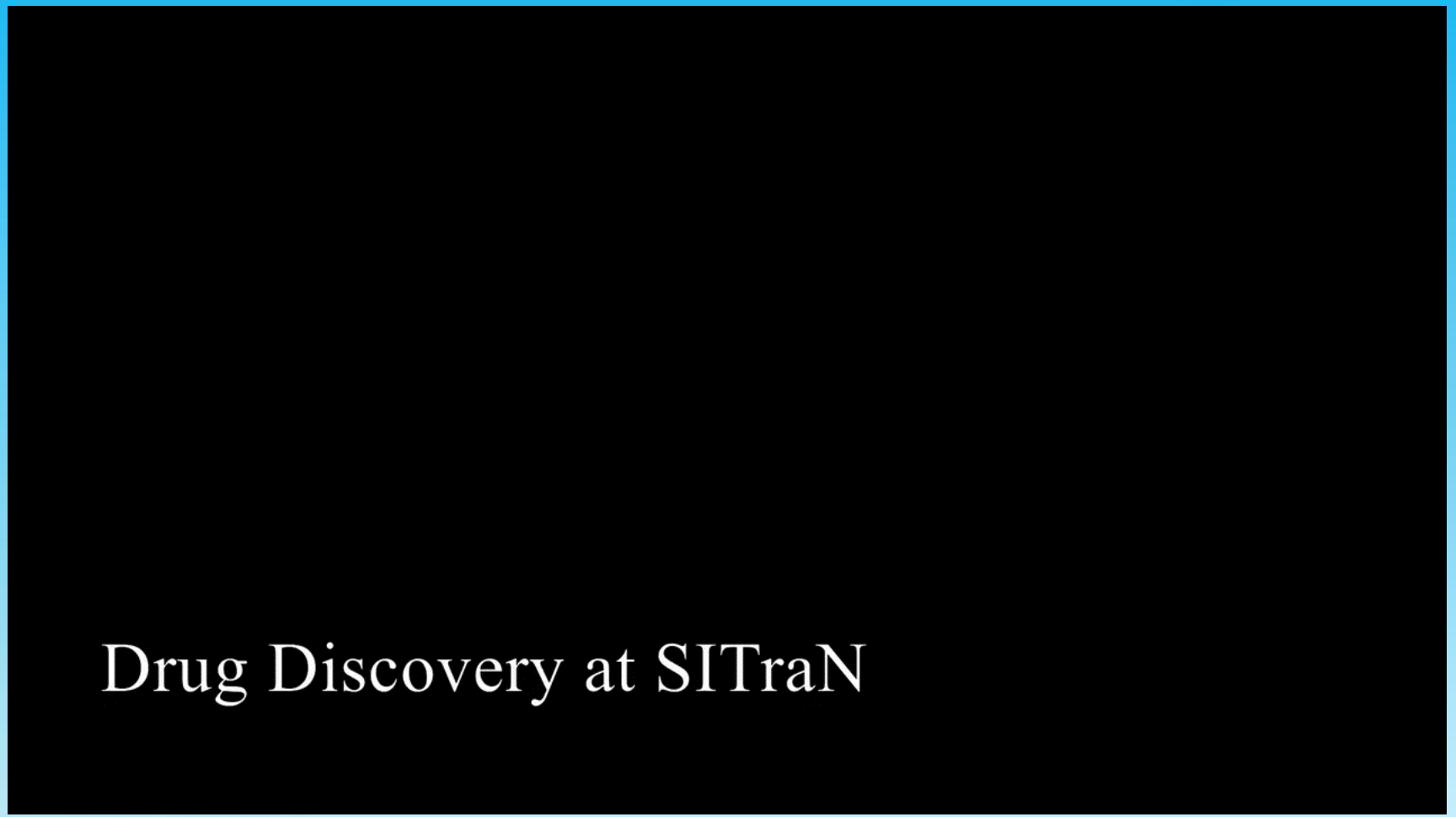
Number

Function

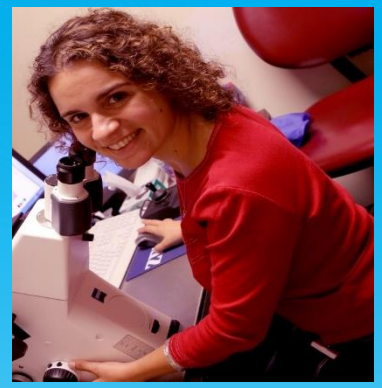
Energy

Size

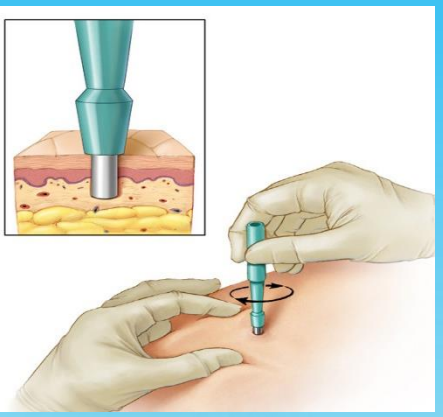
mtDNA

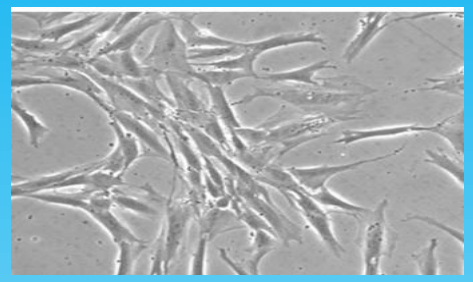

Drug Discovery at SITraN

Direct reprogramming



Laura Ferraiuolo



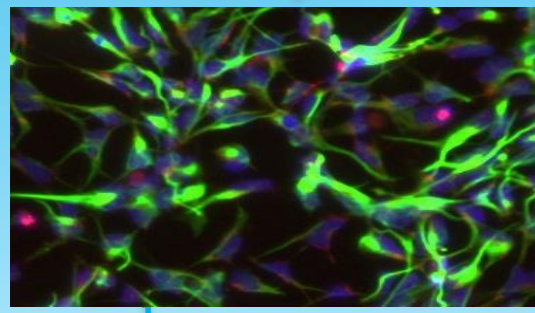


Skin cells

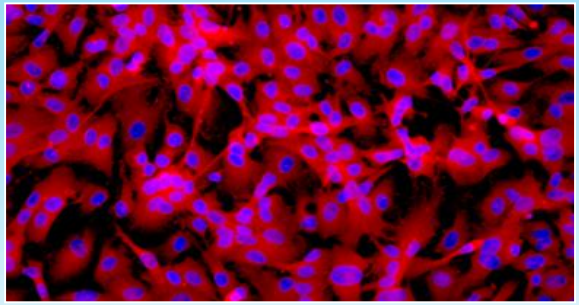
0

30

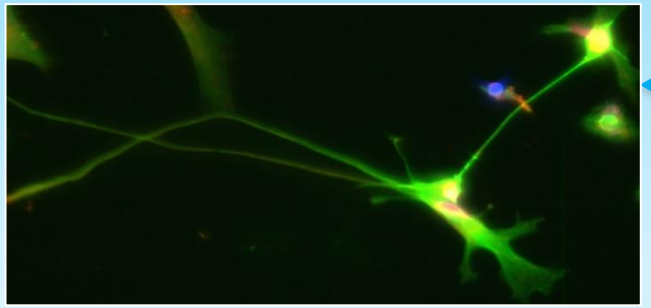
DAYS



Astrocytes

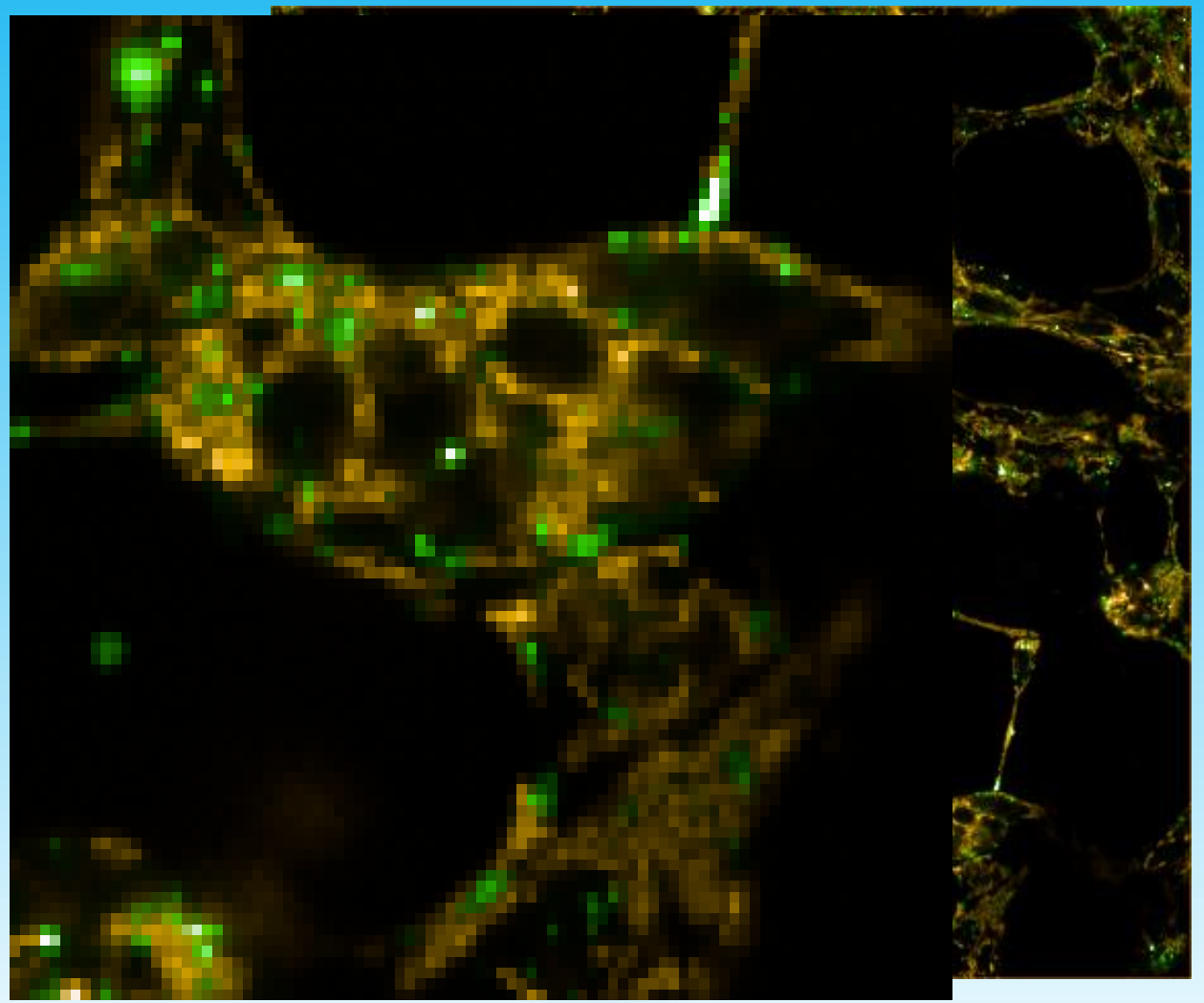


Neurons



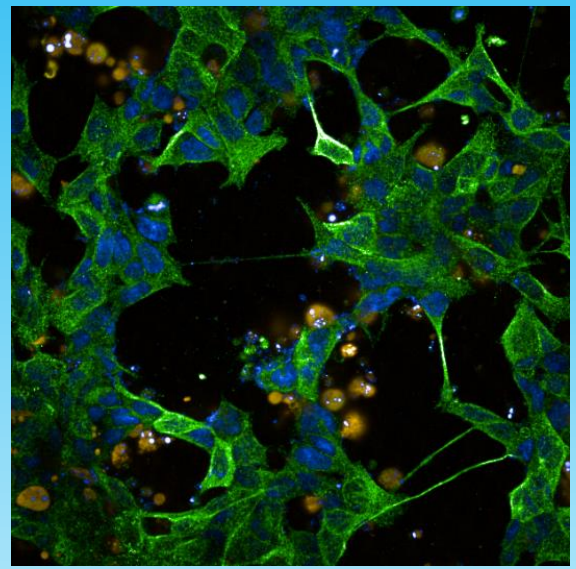
We use these brain cells to investigate mitochondria and neuronal health

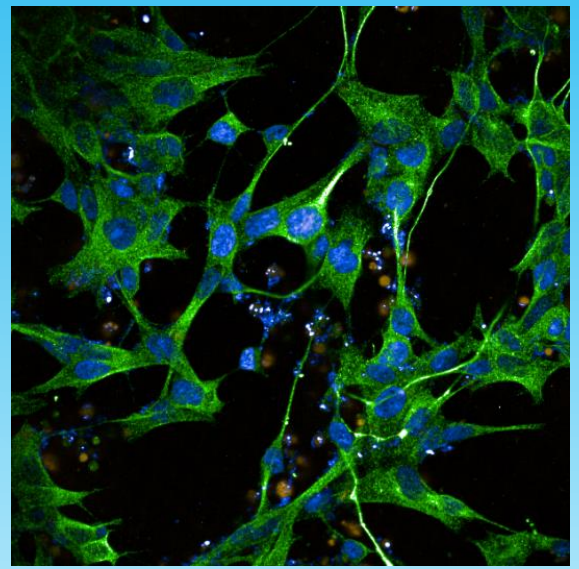
- **Mitochondria that are not working need to be recycled by the cell**
- **This is called mitophagy**
- **This doesn’t work properly in people with Parkinson’s**
- **Can we change the recycling of mitochondria with compounds?**
- **We can boost recycling or take the brakes off the system**



Do any of these mitochondrial effects improve neuron health?

- **A compound which improves mitochondria needs to ultimately improve neuronal health**
- **We can test this by measuring the survival of neurons**
- **Also quantifying the shape of the neurons**
- **As well as the function of the neurons**





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Thank you for listening

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