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Mitopoly

The Mitochondrial drug discovery game

Start
you design your mitochondria-targeted drug (MitoDrug) and off you go to make it

The chemical reactions work like a dream.
Move on three!

Synthesis is more difficult than expected. Spend 6 months developing new reactions to make your class of compounds.
Lose a round!

You have figured out a new way of making your compounds that is better and easier than existing methods. Publish it in a journal and bask in glory.

Purification of your drug is tricky. Spend 2 months trying different ways to get it clean so you can go on to biological testing.
Lose a round!

Success! You have synthesized your drug. Time for biological analysis!

Your compound goes into mitochondria that have been taken out of cells – good design:
Roll again!

Your compound fails to enter the cells. It can never reach the mitochondria this way. You have to modify your design.
Go to square 4!

You have some promising biological results, but work extra hard: your funding is running out.

Your compound is toxic and killed all the cells. This is very bad! Back to the drawing board.
Start again!

All your compound has been used in the biological tests on cells. Go make some more.
Go back to square 6!

WELL DONE!
Your MitoDrug is complete! Or is it? Now you have to show it works in animals and then in people without being toxic!

Nucleus

Mitochondrion

Did you know?!

Mitochondria are the powerhouses of the cell. They convert the energy from the food you eat into a form of energy that the cell can use (ATP).

Mitochondria are also involved in cell signalling, cell growth and cell death.

There are a lot of mitochondria in your muscle cells and nerve cells because these cells need lots of energy to work. There are not so many mitochondria in your fat cells.

Mitochondria are believed to be descendants of bacteria who coevolved with us. They are the only cell organelles in humans that have their own DNA.

You inherit all your mitochondria from your Mum. None come from your Dad.

Why target drugs to the mitochondria?

The four major killers in the UK (heart disease, stroke, neurodegeneration and cancer) all involve mitochondria misbehaving.

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