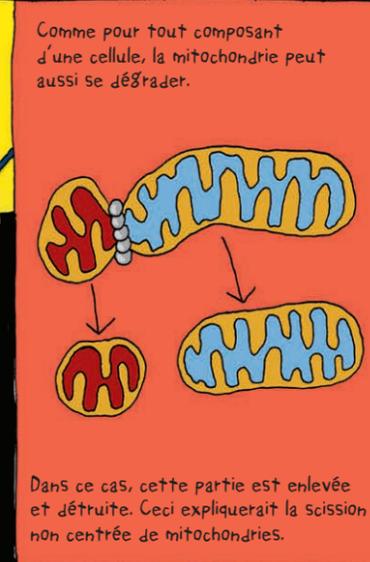
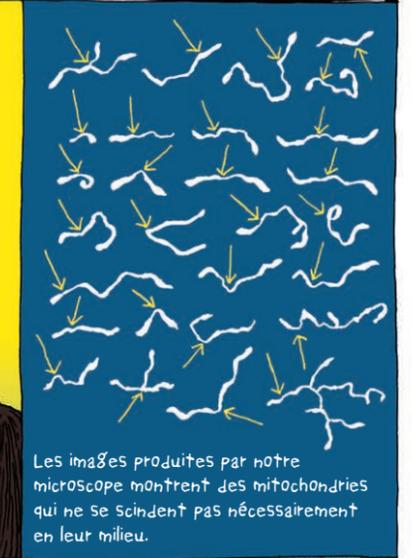
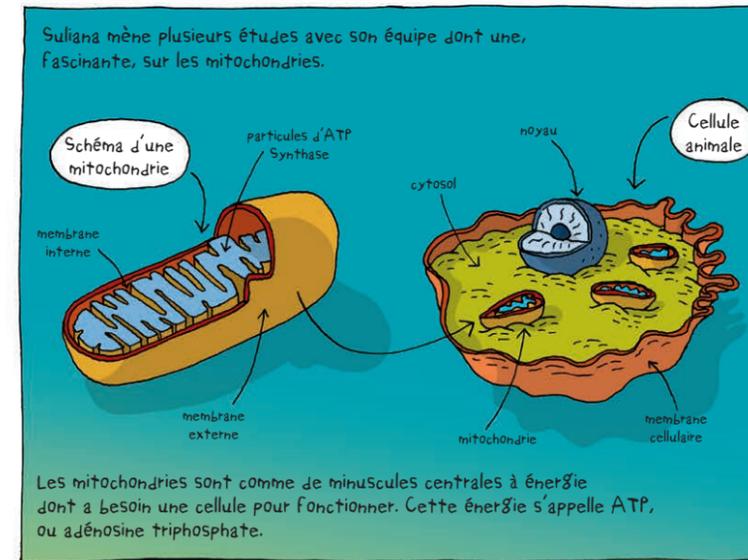
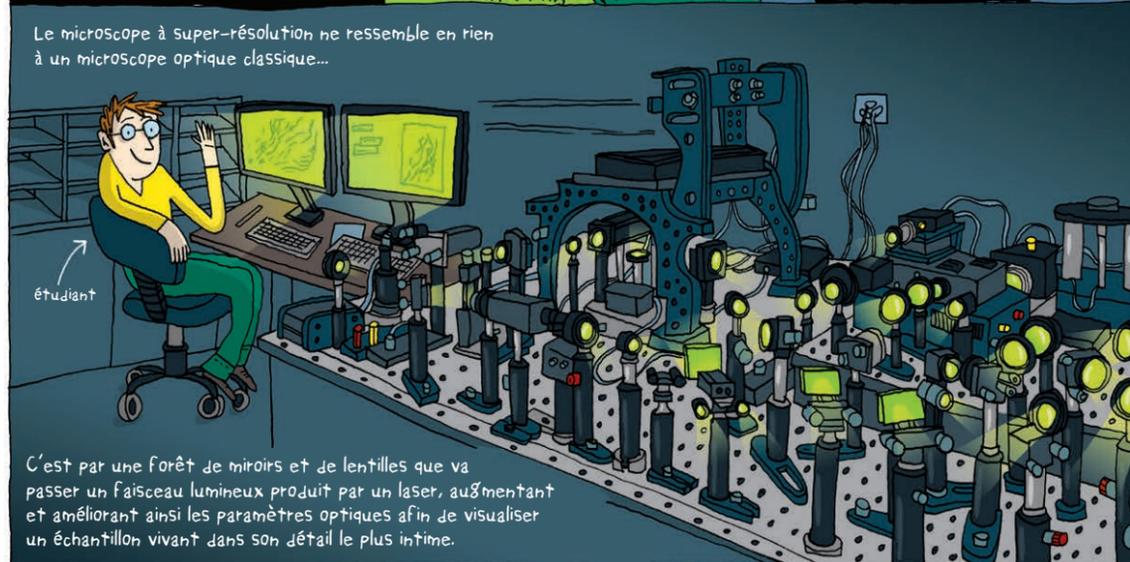
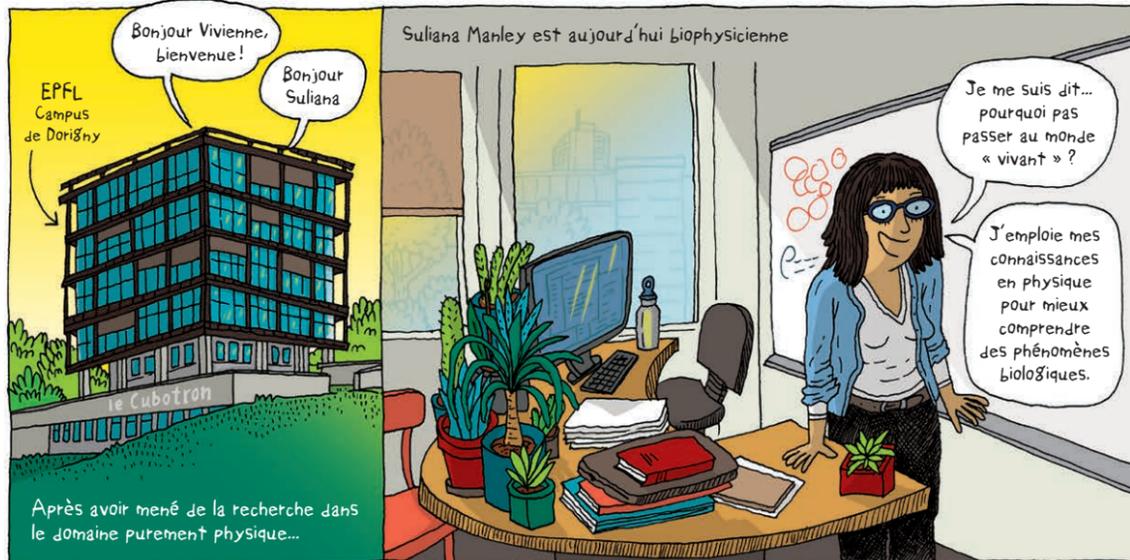
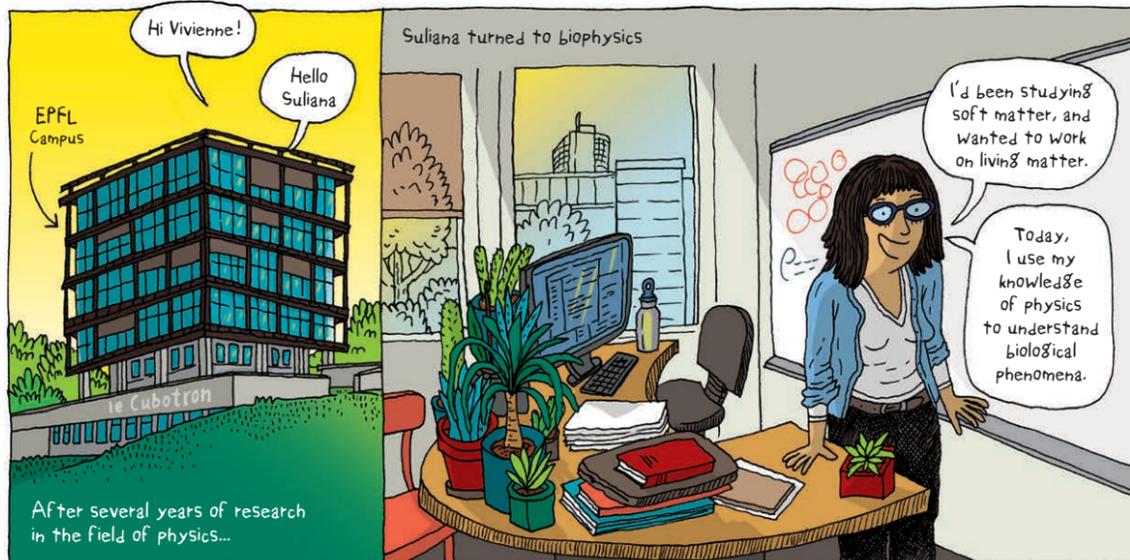


AU LABORATOIRE DE BIOPHYSIQUE EXPÉRIMENTALE
LA BIOPHYSICIENNE SULIANA MANLEY EXPLORE LE MONDE DES MITOCHONDRIES



LABORATORY OF EXPERIMENTAL BIOPHYSICS
 BIOPHYSICIST SULIANA MANLEY LOOKS DEEPER INTO MITOCHONDRIA



After several years of research in the field of physics...

Suliana turned to biophysics



I'd been studying soft matter, and wanted to work on living matter.

Today, I use my knowledge of physics to understand biological phenomena.

Suliana and her team develop super-resolution light microscopes. She takes me down to the basement to see one.



With this microscope, we can see what goes on inside a cell*...

... I mean at the level of proteins ...

*On an average, a cell measures about 0.01 to 0.10mm and can contain up to 42 million proteins

Suliana's microscope is a light microscope.



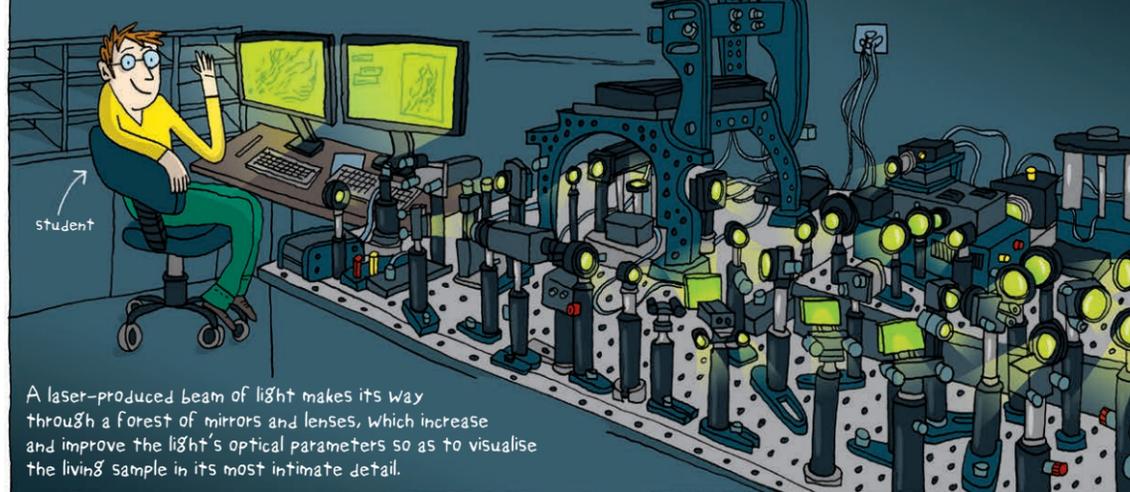
Why not use electron microscopy which is able to magnify far more?

Because I would like to study living matter. Samples for electron microscopes have to be "dead". So conditions are very different.

Suliana opens a door leading into a dark room.

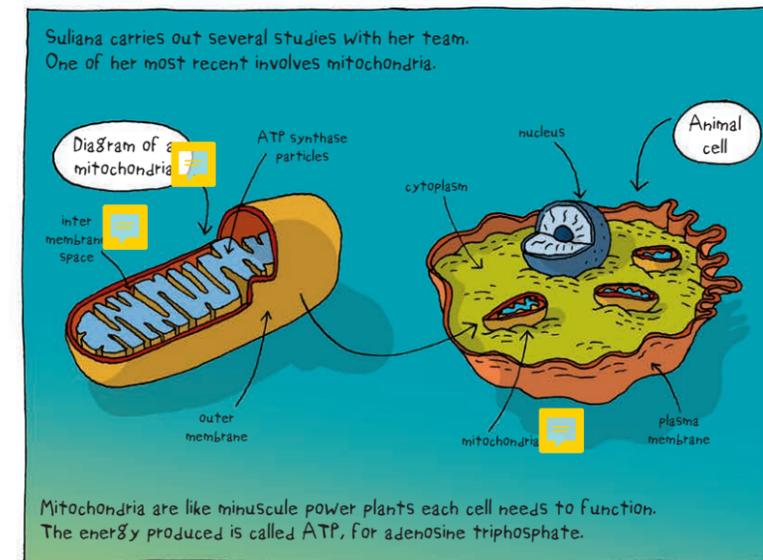


The team's super-resolution microscope bears no resemblance to a classical light microscope...



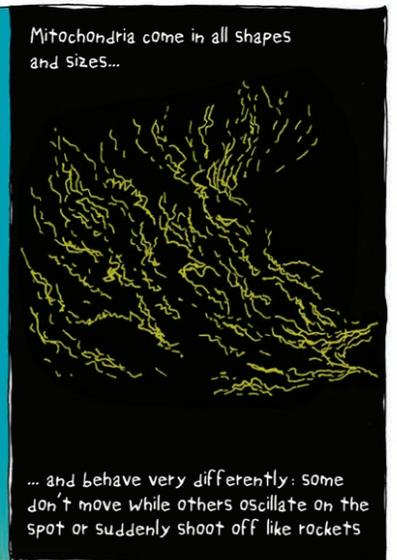
student

A laser-produced beam of light makes its way through a forest of mirrors and lenses, which increase and improve the light's optical parameters so as to visualise the living sample in its most intimate detail.



Suliana carries out several studies with her team. One of her most recent involves mitochondria.

Mitochondria are like minuscule power plants each cell needs to function. The energy produced is called ATP, for adenosine triphosphate.



Mitochondria come in all shapes and sizes...

... and behave very differently: some don't move while others oscillate on the spot or suddenly shoot off like rockets

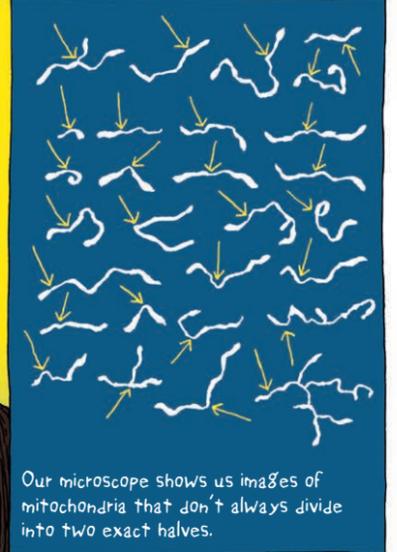
Mitochondria literally use highways to move around! These highways are made out of protein and are part of the cell's cytoskeleton.



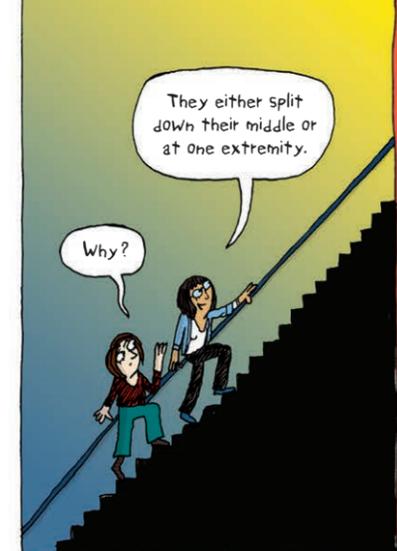
What makes them move?

We don't know... A signal? A change in the environment's physicochemical properties? We need more studies to understand.

Mitochondria divide to increase in number. A sort of ring (made of protein) forms, where a mitochondrion is going to split, and then gradually tightens until division is completed.



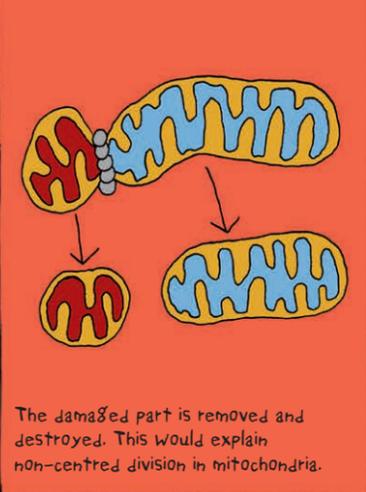
Our microscope shows us images of mitochondria that don't always divide into two exact halves.



Why?

They either split down their middle or at one extremity.

Like any cell component, mitochondria are also prone to damage.



The damaged part is removed and destroyed. This would explain non-centred division in mitochondria.



How do cells know when mitochondria are damaged?

How do the rings know where division is taking place?

Questions that Suliana's microscope will no doubt help to answer.