# Intro:

If we had the choice, how long would we want to live?

You are made of tiny things that we call cells; they have to handle a lot of specific tasks and in order to do so, they use something we call proteins. We are not going to explain in detail how proteins work but you only need to know that it’s the “language of life”, everything happening inside you is thanks to proteins.

# What is aging?

There are three things that are linked to aging: Senescent cells, Stem Cells and NAD +

Senescent cells:

Type of cells that stop multiplying but don't die off when they should. They can release chemicals that can trigger inflammation

When your cells divide, they copy your chromosomes, but in doing so they lose tiny bits at the ends.

To delay this erosion, your DNA is equipped with telomeres located at the end of chromosomes.

While aging, the number of senescent cells increase because the immune system of an aging person is less efficient than a younger person.

To cure senescent cells, we can use a type of drug named "Senolytics" that remove senescent cells from the body and in a clinical study, Senolytics showed their ability to restore damaged tissues to prior levels function.

Stem Cells:

Type of Cells from which all other cells with specialized function are generated. They have a general purpose not like neurons for example

However, their purpose is to specialize into a specific kind of cell, that is why as we age, we can see the body deteriorates

With time, the amount of stem cells decreases and so the ability of the body to repair itself

NAD+: It's a coenzyme that can keep cells in a good state.

This coenzyme is extremely important because without this, we would be on the fast track to death. Its primary function/purpose is to convert food to energy and maintaining the integrity of DNA.

As we age, the amount of NAD + decrease. This implies that DNA accumulate damage and can trigger age-related disease like Alzheimer.

1. Senescent cells

Your cells are made of many things, but the most important one is DNA. It is a long molecule that encodes information: 1% is for genes that are a sort of protein dictionary, they help manufacture and understand proteins. The rest is like a set of rules. If we were to use an analogy, it would be like the instruction manual of Ikea furniture: how to assemble, with how many screws, and the order of steps.

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In some cases, when the telomeres are gone, cells become zombies, they refuse to die and start to build up. Not only that, but they also harm surrounding tissues and are linked to many diseases such as diabetes and kidney failure.

Scientist attempted to genetically engineer mice so that they gained the ability to get rid of senescent cells more easily. They observed that they were more active, with their heart and kidneys working better and they had less chance to develop cancer.

1. NAD+

Inside of your cells, there is a bunch of complex machineries that needs maintenance. Parts of those machines needs to be destroyed, cleaned up and rebuilt, otherwise things don’t work. These machines are used to produce whatever they need but as we age those products are no longer produced in the quantities required or even not at all. We can take for example NAD+, a coenzyme that guide cells to keep themselves in a good state.

But with age we produce fewer of those, to be more precise we only have half of them at age 50 than at age 20. Some studies have linked low amounts of NAD+ with diseases like skin cancer, Alzheimer, Heart disease and multiple Sclerosis.

A 2016 study on mice showed that mice who received additional NAD+ were rejuvenated: They displayed an increase of the multiplication of cells of skin, brain and muscles.

Stem Cells

Stem Cells are the first kind of cells that will constitute you, they have a general purpose and are not as specialized as neurons or muscles. However, their purpose is to specialize into a specific kind of cell, that is why as we age, we can see the body deteriorates. Indeed, without anything to replace what has been damaged, the body will eventually be unable to sustain itself with what it has left. Stem cells’ number decline over time and so the ability of the body to repair itself.

Scientists observed in mice that the dwelling number of stem cells in their brain could be linked to diseases. To verify this, they took stem cells in the brain of baby mice and injected it into the brain of middle-aged mice.

Their conclusion is that stem cells allowed old cells to be reinvigorated and the effects took longer to be visible.

# Bibliography:

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