On the influence of one thousandth of our body mass on aging.

The Death of Death. August 2018. N° 113.

The numerous billionaires who are doing research into eternal life will soon enable us to live to 200 years old. It will then take relatively few steps before it reaches 1,000 years or before we even become immortal. I have great confidence in these billionaires and I understand their passion.

It is humiliating that life at one point simply pushes you aside. In this sense, death is an excellent technology that allows nature to thrive. After a person has served a purpose, a new one replaces it. But sooner or later, every technology will become obsolete. In the case of our mortality, it will take one or two major breakthroughs.

Manu Joseph, Indian writer and journalist. 17 August 2018, translated.

Theme of the month. On the role of a few very small organs in aging.

Each human being is a universe made up of hundreds of billions of cells but also of bacteria. Each of these entities is in turn a set of structures and corpuscles that we only partially understand.

All of the structures, organs, corpuscles etc. which see to the functioning of our organism are of an extraordinary complexity. The links between the organs, the rhythms, the contacts with the outside, are almost always multidirectional. A glass of water that we drink, a feeling that we feel, an hour more and less sleep... everything has physiological effects.

We know more about our bodies than ever before. At the same time, a vast amount remains to be discovered. There is that which we do not understand. There is what which we still do not even know exists. And there are probably a lot of things we wrongly think we know. For centuries, tobacco was used as a medicinal plant and bleeding was one of the main remedies.

Among the hundreds of organs in our body, some very small ones are essential to our harmonious functioning. This letter discusses the role in longevity of the thymus, thyroid, hypothalamus, pituitary gland and hippocampus, five organs that together represent about one thousandth the weight of an ordinary adult.

Thymus

The thymus is at the centre of the immune system. It is a very small organ located close to the heart. Its maximum weight (about thirty grams) is reached at the end of adolescence.

The thymus specializes in the maturation of T lymphocytes (T for thymus). Its role is to detect cells infected with a virus, or cancer cells, and destroy them.

One of the major aspects of aging is the decrease in the effectiveness of the immune system, which manifests itself in two ways:

- Infected or sick cells that should be destroyed are no longer destroyed
- Healthy cells are attacked (auto-immune diseases)

Allowing the entire immune system to function with reduced senescence is a major challenge. However, the thymus loses its volume throughout our life (the medical term is involution) until sometimes it disappears by being totally replaced by ordinary fat cells. As we age, we become more and more susceptible to contagious diseases.

If we could regenerate the thymus, we could help elderly people to fight infections more effectively. Scientists, including biogerontologist Greg Fahy, are studying ways to achieve this.

Thyroid

The thyroid is a gland located in the neck. It weighs about thirty grams and produces certain hormones (thyroid hormones). These hormones are vital and have an influence on all of the rhythms of the body: cardiovascular, growth and metabolic.

An important aspect of aging is the decrease in the production of certain hormones. Many doctors have long prescribed hormones to combat aspects of aging. Unfortunately, no strong influence seems to have been demonstrated in terms of longevity merely due to taking hormones. As far as the thyroid is concerned, curiously it is reduced activity of this gland that is associated with a higher life expectancy.

The hypothalamus and the pituitary gland

The hypothalamus is a very small part of the brain located at its base. It weighs only about 4 grams but plays a decisive role in many physiological functions

including hormone release and regulating body temperature. It is connected to the pituitary gland, an even smaller organ weighing less than a gram, that produces many hormones, the best known of which is growth hormone.

The influence on longevity of these organs in the event of malfunction is clear and rapid. However, as is almost always the case in longevity research, the results of a modification aiming at an improvement are mixed. Growth hormone has been - and still is - presented as an "anti-aging" product but no studies to date have demonstrated efficacy in terms of average or maximum life span in humans. The effect could even be the opposite.

The hippocampus

The hippocampus is a part of the human brain (and mammals in general) that has a shape similar to a sea horse (Latin name hippocampus). We have one hippocampus per hemisphere, both together weighing only a few grams. The hippocampus plays a central role in memory and orientation in space. In Alzheimer's disease, the effects of the degradation of this organ are usually felt in the hippocampus before affecting the rest of the brain. This is marked by a loss of short-term memory and sense of direction.

We know a lot about the development mechanisms of neurodegenerative diseases and particularly Alzheimer's disease, but we are still very far from a cure. We know that the hippocampus tends to lose volume with age, especially in sick people. But to date, unfortunately, for this organ as for the rest of the brain, no specific effective treatment exists.

And more generally

As discussed at the beginning of this letter, our body is a network of interdependencies of a complexity that no computer environment in the world can yet simulate, even in an approximate way. But the role of certain parts is fundamental, acting in particular on the speed of aging. Knowing these organs better will be useful in advancing our understanding of the mechanisms of aging.

Please note, however, that to enable women and men who wish it to live (much) longer in good health, it is not necessary to fully understand the mechanisms of aging. To draw a parallel, even today, we don't fully understand how anesthesia works.

Even if understanding the body with its components and its functioning will be insufficient, it is indispensable. What is also indispensable is to seek to find out, in particular through experimentation with informed volunteers, what we can do to reduce the suffering and illness caused by senescence.

News of the month. No supercentenarian over 115 years of age alive but human cells have been regenerated

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On July 22, 2018, Ms. Chiyo Miyako, a Japanese woman who was the oldest member of humanity, died aged 117. She is succeeded by another Japanese citizen, Kane Tanaka, but she is only 115 years old. And according to the Gerontology Research Group, there are only 6 people in the world "confirmed" as being more than 113 years old.

But even if this does not yet translate into longer maximum lifetimes, research is progressing. The human body ages, partly because our cells age. British researchers at the University of Exeter are trying to reverse cell senescence. According to a published scientific article, they succeeded in the laboratory, by using resveratrol-based molecules, in reversing part of the aging of certain human cells (fibroblasts).

Note that a few years ago, in France, Professor Jean-Marc Lemaitre and his team had already succeeded in turning cells from centenarian people into stem cells.

For more information:

- *In general, see in particular: heales.org, sens.org, longevityalliance.org and longecity.org*
- *Photo: a cerebral hippocampus and a sea horse*