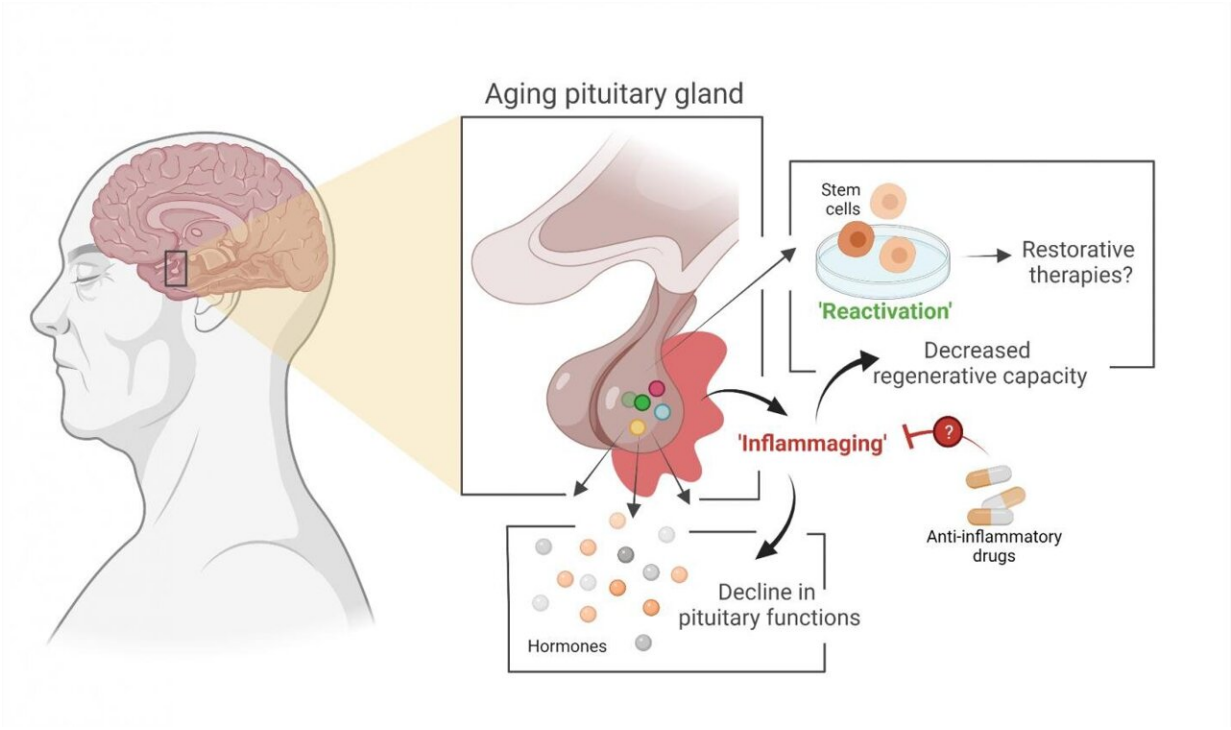
Pituitary gland aging can potentially be slowed down

June 15 2021



Stem cell biologist Hugo Vankelecom (KU Leuven) and his colleagues have discovered that the pituitary gland in mice ages as the result of an age-related form of chronic inflammation. It may be possible to slow down this process or even partially repair it. Vankelecom and his colleagues studied the pituitary of mice, so further research is required to demonstrate whether their findings also apply to humans. Credit: KU Leuven - Emma Laporte

Stem cell biologist Hugo Vankelecom (KU Leuven) and his colleagues

have discovered that the pituitary gland in mice ages as the result of an age-related form of chronic inflammation. It may be possible to slow down this process or even partially repair it. The researchers have published their findings in *PNAS*.

The pituitary gland is a small, globular gland located underneath the brain that plays a major role in the hormonal system, explains Professor Hugo Vankelecom from the Department of Development and Regeneration at KU Leuven. "My research group discovered that the pituitary gland ages as a result of a form of chronic inflammation that affects tissue and even the organism as a whole. This natural process usually goes unnoticed and is referred to as '*inflammaging*'—a contraction of *inflammation* and *aging*. Inflammaging has previously been linked to the aging of other organs." Due to the central role played by the pituitary, its aging may contribute to the reduction of hormonal processes and hormone levels in our body—as is the case with menopause, for instance.

The study also provides significant insight into the stem cells in the aging pituitary gland. In 2012, Vankelecom and his colleagues showed that a prompt reaction of these stem cells to injury in the gland leads to repair of the tissue, even in adult animals. "As a result of this new study, we now know that stem cells in the pituitary do not lose this regenerative capacity when the organism ages. In fact, the stem cells are only unable to do their job because, over time, the pituitary becomes an 'inflammatory environment' as a result of the chronic inflammation. But as soon as the stem cells are taken out of this environment, they show the same properties as stem cells from a young pituitary."

Chance of recovery?

This insight opens up a number of potential therapeutic avenues: would it be possible to reactivate the pituitary? This wouldn't just involve

slowing down hormonal aging processes, but also repairing the damage caused by a tumor in the pituitary, for example. "No fewer than one in every 1,000 people is faced with this kind of tumor—which causes damage to the surrounding tissue—at some point. The quality of life of many of these patients would be drastically improved if we could repair this damage. We may be able to do so by activating the stem cells already present—for which our present study also provides new indications—or even by transplanting cells. That said, these new treatment options are not quite around the corner just yet, as the step from fundamental research to an actual therapy can take years to complete. For the time being, our study sets out a potential direction for further research."

The study also suggests another interesting avenue: the use of anti-inflammatory drugs to slow down pituitary aging or rejuvenate an aging pituitary. "Several studies have shown that anti-inflammatory drugs may have a positive impact on some aging organs. No research has yet been performed on this effect in relation to the pituitary."

From mice to humans

Vankelecom and his colleagues studied the pituitary of mice, so further research is required to demonstrate whether their findings also apply to humans. Vankelecom comments: "Mice have a much greater regeneration capacity than humans. They can repair damaged teeth, for instance, while humans have lost this ability over the course of their evolution. Regardless, there are plenty of signs suggesting that pituitary processes in mice and humans are similar, and we have recent evidence to hand that gene expression in the pituitaries of humans and mice is very similar. As such, it is highly likely that the insights we gained will equally apply to humans."

More information: Annelies Vennekens et al, Interleukin-6 is an

activator of pituitary stem cells upon local damage, a competence quenched in the aging gland, *Proceedings of the National Academy of Sciences* (2021). DOI: 10.1073/pnas.2100052118

Provided by KU Leuven