Heales monthly newsletter
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The Death of Death N°178
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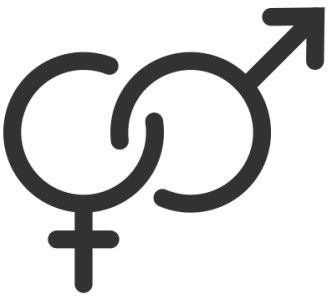
We believe that Reverse Aging is humanity's most incredible quest since the space race.
Dior Manifesto

This month's theme. Reproductive systems and longevity.

Introduction



It is a well-known fact that menopause is a process that totally stops fertility while andropause frequently only diminishes fertility and while many female animals do not stop being fertile until they die.

It is a less-known phenomenon that the fertility of female mice decreases rapidly at the low age of 6 months which could be very useful for studying rejuvenation treatment.

Women

Menopause marks a natural phase in a woman's life, typically occurring around the age of 50, though it can vary. During this transition: The ovaries cease production of estrogen and progesterone. Ovulation stops, meaning pregnancy is no longer possible.

Menstrual periods cease, with menopause confirmed after a year without menstruation. It's advised to continue contraception until this milestone. As hormone levels decline, the reproductive system changes:

Vaginal tissues may become thinner, drier, less flexible, and prone to irritation, potentially leading to painful intercourse.

The risk of vaginal yeast infections may increase. External genital tissues may decrease in size and thin out, sometimes causing discomfort.

These changes are part of the natural aging process and may require adjustments and management for women experiencing them.

Men

As men get older, their bodies go through changes in the reproductive system, which can sometimes lead to feelings of depression, mood swings, and uneasiness. This is called andropause or male menopause. However, unlike for women, fertility generally doesn't stop.

Here are some changes that happen:

- The testes may get smaller and less firm because they make less testosterone, which can lower sex drive.
- Sperm count can go down by about 30% by the time a man is 60.
- The prostate gland may shrink between 50 and 60 years old but could grow larger and possibly have cancer by age 70.
- The glands that make semen become lighter and can't hold as much after 60.

Reproductive system and longevity for humans

Female reproductive aging is a natural process guided by biological pathways, but it has unique aspects. Multiple recent research has uncovered the complex links between reproductive aging and the aging of other body systems, raising questions about cause and effect. It's been found that reproductive aging can affect the aging of cells, tissues, organs, and systems throughout the body. As women reach the end of their reproductive years, they often experience a higher risk of age-related illnesses. On the other hand, the phases of menarche (first menstruation) and menopause, as well as variations in the length of reproductive life, can have social consequences. Depending on the information concerning their fertility status, women may postpone having children. By identifying and using precise aging markers, we can predict when menopause will occur and accurately determine a person's biological and reproductive age.

A decrease in sex hormones like testosterone in men (andropause) and estradiol in women (menopause) is often linked to aging. In men, lower testosterone levels can lead to a decline in muscle and bone mass, as well as physical abilities. In women, the impact of reduced estradiol on bone health is well understood, but it needs to be clarified whether it affects muscle mass and physical function. However, lacking multiple important hormones can indicate poor health and a shorter lifespan in older adults. It's worth exploring if hormone replacement therapies could help manage conditions like age-related muscle loss, cancer-related weight loss, or illnesses. If used carefully in the right patients, hormone replacement therapies prevent or reverse muscle and bone loss, maintain physical function, and support healthy aging and longer life.

Female sex cells, similar to some other cells in the body, have limitations—they can't divide or live for extended periods, leading to the accumulation of DNA damage associated with aging. However, their crucial function is to pass on genetic information to the next generation. Importantly, these aging sex cells don't contribute to the creation of offspring, ensuring that children don't inherit age-related changes. This highlights a distinct way in which sex cells seem to sidestep aging, setting them apart from other body cells.

The reasons behind early and premature menopause, a type of rapid reproductive aging, are diverse. Chronic conditions that lead to ongoing inflammation in the body can play a role, either directly or indirectly. Genetic predisposition, autoimmune disorders, and infectious diseases are commonly associated with premature ovarian insufficiency, a condition linked to early menopause.

Lifespan differences for female and male mice

The Interventions Testing Program (ITP) assesses potential compounds for their ability to delay aging, measured through increased lifespan and/or postponed onset or reduced severity of age-related diseases for mice. We can see a difference in results when both sexes are compared. A study shows that in female mice, the combined administration of both Rapamycin and acarbose did not result in a lifespan that was either longer or shorter than what was previously observed with only Rapa treatment. This outcome might be due to the modest survival advantages observed in earlier groups of female mice receiving Aca alone. Another study showed that Canagliflozin extends life span in genetically heterogeneous male but not female mice and 17-a-estradiol late in life extends lifespan in aging UM-HET3 male mice; nicotinamide riboside and three other drugs do not affect lifespan in either sex. Rapamycin seems to be the only drug that consistently shows an increase in median and maximal lifespan in female mice. A study showed that Rapamycin increases lifespan and inhibits spontaneous tumorigenesis in inbred female mice.

Rapamycin inhibited age-related weight gain, decreased aging rate, increased lifespan (especially in the last survivors), and delayed spontaneous cancer. 22.9% of rapamycin-treated mice survived the age of death of the last mouse in the control group. Thus we demonstrated for the first time in normal inbred mice that lifespan can be extended by rapamycin. This opens an avenue to develop optimal doses and schedules of rapamycin as an anti-aging modality.

There isn't much information available on why we see this difference in the effect of various anti-aging compounds between males and females but speculation is that female sex hormone and uterus functioning have an effect on the rate of aging in these female mice

Conclusion

It could be imagined that the organs around the cells that will be generating the next generation do age slower than the rest of the body or even do not age. This is not the case. Even the cells that will generate a new human will "rejuvenate" after the foundation and the first divisions of cells. One day, we hope, we will be able to learn how to replicate a similar process for all cells.

The good and strange news of the month: Fish Centenarians found in the Desert (buffalofish)

A recent interesting video explains that in 1919, humans that are today all dead, decided to populate an artificial lake with three species of edible fish called buffalofishes.

The fish came from the area of the Mississippi River. The new environment was lakes in a desertic area of Arizona. Today, 90% of buffalofishes captured from the Apache Lake are more than 80 years old, and some of the original buffalofishes from the Arizona stocking in 1918 are likely still alive and in good shape. And there is more: the new environment of those fishes is good enough to enable a very long life (more than twice as long as what was known as the maximal lifespan of those fishes before), but seems not good enough to allow reproduction, at least for many years. Is there a link? An elixir of long life dissolved in the water, but making reproduction impossible. We have to hope for more information.

For more information

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