



Hayflick limit

[Source: IE](#)

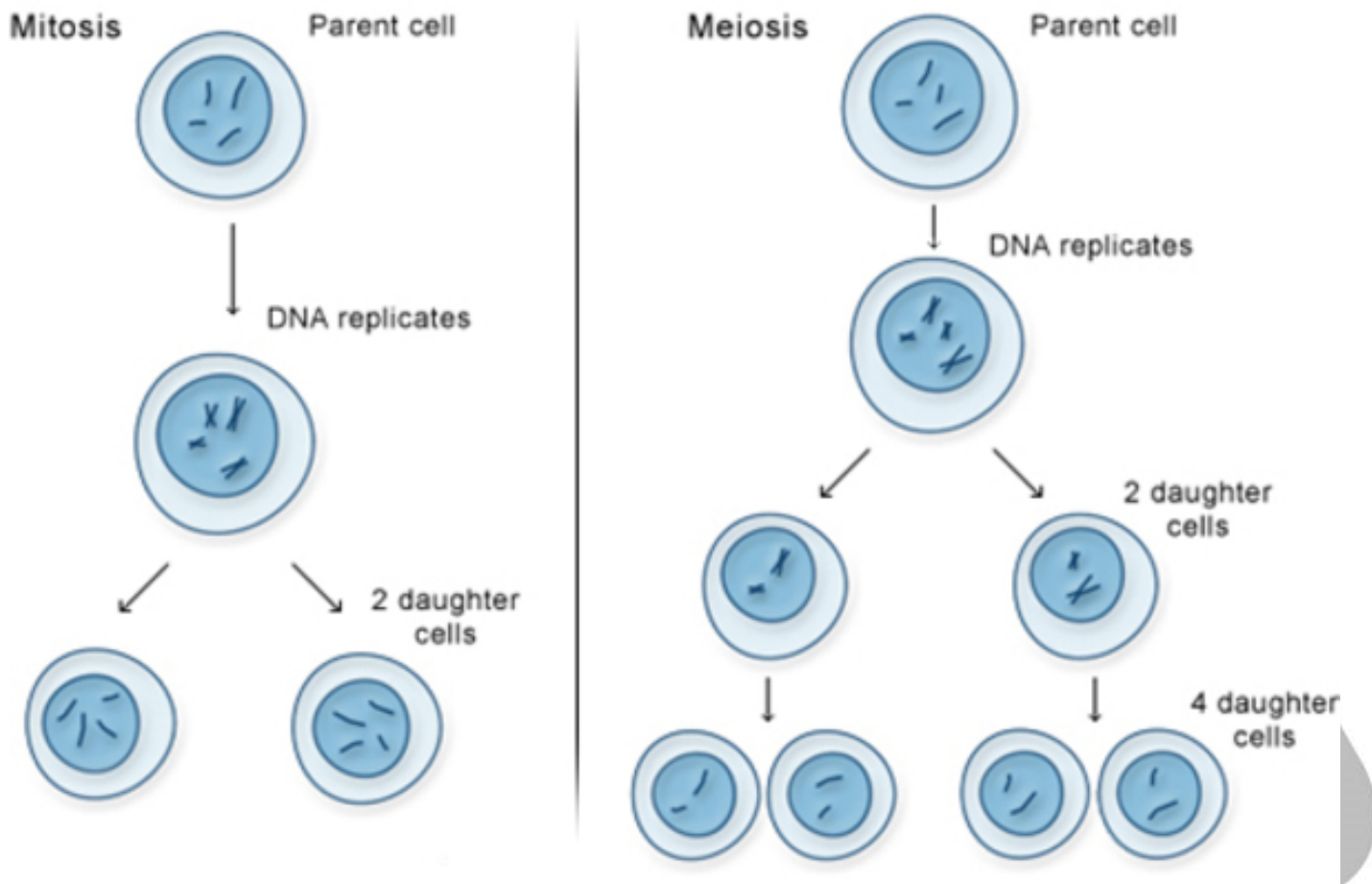
Why in News?

The recent death of **Leonard Hayflick**, a prominent biomedical researcher has brought renewed attention to his groundbreaking **discovery, known as the Hayflick limit.**

- This discovery fundamentally altered the **understanding of ageing, challenging the previous belief that ageing** was solely influenced by external factors such as disease, and environmental conditions.

What is the Hayflick Limit?

- **About:** Leonard Hayflick, in the 1960s discovered that **somatic (non-reproductive) cells** can only divide approximately **40-60 times before they stop dividing**, a phenomenon known as **cellular senescence (those that have stopped dividing)**.
 - This cessation (ceasing) of cell division, which leads to the **accumulation of senescent cells**, is posited to be a key factor in ageing. As more cells stop dividing, the **body begins to age and experience decline.**
 - The Hayflick limit suggests that there is an inherent cellular clock in organisms, including humans, **determining the maximum lifespan.**
 - For humans, this limit is estimated to be around 125 years, beyond which no external factors or genetic modifications can extend life.
- **Comparison of Species:** Hayflick and other scientists documented the Hayflick limits in various animals.
 - For example, cells of **Galapagos turtles**, which can live for over 200 years, divide approximately **110 times before reaching senescence.**
 - In contrast, laboratory mice cells become senescent after just 15 divisions, correlating with their much shorter lifespans.
- **Further Studies: In the 1970s, researchers discovered telomeres, which are repetitive Deoxyribonucleic Acid (DNA) sequences at the end of chromosomes that protect them during cell division.**
 - With each cell division, telomeres become shorter until they reach a critical length, signalling the end of cell division and contributing to ageing.
 - While **telomere shortening is linked to ageing**, the exact correlation between telomere length and lifespan is not straightforward. For instance, Mice have longer telomeres than humans but live significantly shorter lives.
 - Some researchers argue that **telomere loss and the Hayflick limit are not direct causes of ageing but symptoms of the ageing process.**



UPSC Civil Services Examination, Previous Year Question (PYQ)

Prelims

Which one of the following statements best describes the role of B cells and T cells in the human body?(2022)

- (a) They protect the environmental allergens. body
- (b) They alleviate the body's pain and inflammation.
- (c) They act as immunosuppressants in the body.
- (d) They protect the body from diseases caused by pathogens.

Ans: (d)