

# Do ovaries continue to produce eggs during adulthood?

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A compelling new genetic study tracing the origins of immature egg cells, or 'oocytes', from the embryonic period throughout adulthood adds new information to a growing controversy. The notion of a "biological clock" in women arises from the fact that oocytes progressively decline in number as females get older, along with a decades-old dogmatic view that oocytes cannot be renewed in mammals after birth. After careful assessment of data from a recent study published in *PLoS Genetics*, scientists from Massachusetts General Hospital and the University of Edinburgh argue that the findings support formation of new eggs during adult life; a topic that has been historically controversial and has sparked considerable debate in recent years.

Eggs are formed from progenitor germ cells that exit the mitotic cycle, thereby ending their ability to proliferate through cell division, and subsequently enter meiosis, a process unique to the formation of eggs and sperm which removes one half of the genetic material from each type of cell prior to fertilization.

While traditional thinking has held that female mammals are born with all of the eggs they will ever have, newer research has demonstrated that adult mouse and human ovaries contain a rare population of progenitor germ cells called oogonial stem cells capable of dividing and generating new [oocytes](#). Using a powerful new [genetic tool](#) that traces the number of divisions a cell has undergone with age (its 'depth') Shapiro and colleagues counted the number of times progenitor germ cells divided before becoming oocytes; their study was published in *PLoS Genetics* in

February this year.

If traditional thinking held true, all divisions would have occurred prior to birth, and thus all oocytes would exhibit the same depth regardless of age. However, the opposite was found – eggs showed a progressive increase in depth as the female mice grew older.

In their assessment of the work by Shapiro and colleagues – published recently in a [PLoS Genetics](#) Perspective article – reproductive biologists Dori Woods, Evelyn Telfer and Jonathan Tilly conclude that the most plausible explanation for these findings is that progenitor [germ cells](#) in ovaries continue to divide throughout reproductive life, resulting in production of new oocytes with greater depth as animals age.

Although these investigations were performed in mice, there is emerging evidence that oogonial stem cells are also present in the ovaries of reproductive-age women, and these cells possess the capacity, like their mouse counterparts, to generate new oocytes under certain experimental conditions. While more work is needed to settle the debate over the significance of oocyte renewal in adult mammals, Woods and colleagues emphasize that "the recent work of Shapiro and colleagues is one of the first reports to offer experimental data consistent with a role for postnatal oocyte renewal in contributing to the reserve of ovarian follicles available for use in adult females as they age."

**More information:** Woods DC, Telfer EE, Tilly JL (2012) Oocyte Family Trees: Old Branches or New Stems? *PLoS Genet* 8(7): e1002848. [doi:10.1371/journal.pgen.1002848](https://doi.org/10.1371/journal.pgen.1002848)

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