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1: [Aging Cell](#). 2008 Feb 11 [Epub ahead of print]


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Age-related changes of germline stem cell activity, niche signaling activity and egg production in *Drosophila*.

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Adult stem cells are important in replenishing aged cells to maintain tissue homeostasis. Aging in turn may exert profound effects on stem cell's regenerative potential, but to date the mechanisms of such stem cell aging are poorly understood, and it is not clear to what extent stem cell aging contributes to tissue or organ aging. Here we show in female *Drosophila*, that germline stem cell (GSC) division rate progressively declines with age, which is accompanied by reduced decapentaplegic (dpp) niche signaling pathway activation within GSCs. Egg production also rapidly declines with age, which is accompanied by both decreased stem cell division and increased incidence of cell death of developing eggs, especially in the oldest females. Genetically increasing dpp expression delays GSC activity decline and transiently increases egg production. We conclude that age-related decline of reproduction is caused by both decreased GSC activity and increased incidence of cell death during oogenesis, while decreased GSC activity is attributed to declined signaling from the regulatory niche. We suggest that niche functional decay may be an important mechanism for stem cell aging and system failure.

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