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Changes in Cell Cycle Activity from Variations on Oxidative Stress in Male Drosophila Germline Stem Cells

Accumulation of reactive oxygen species (ROS) in cells is a hypothesis widely researched as a cause of aging. ROS accumulated in cells through natural metabolism react with lipids, proteins and DNA to deter cellular activity over time. Superoxide dismutase (SOD) is thought to play an important defensive role in ROS stress related aging. It has previously described that changes which occur in male germline stem cells during aging, including a significant slowing of the cell cycle. Accumulation of cellular damage by reactive oxygen species (ROS) is thought to be a major contributing factor. We have begun to investigate to what extent ROS-induced damage contributes to germline stem cell cycle slowing during aging. By exposing flies to sub-lethal concentrations of paraquat we can increase ROS in cells; conversely by ectopic expression of superoxide dismutase (SOD) we can decrease accumulation of ROS, and then measure cell cycle activity using BrdU labeling. We are additionally investigating whether somatic stem cells in the testis are more sensitive to accumulation of aging-related damage than germ cells, which due to their immortality likely contain mechanisms to protect them from such damage.

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