Epigenetic Targets in Longevity Control in Drosophila melanogaster (Common Fruit Fly)

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Age-related diseases are resulting in premature aging in humans, and it is reducing society's quality of living. Studying genes related to premature aging will help further research to create or improve new medical treatment for age-related diseases. Despite great progress in our understanding of aging, the functions of many longevity controlling factors remain unknown. I used the Drosophila model system to uncover the functions of uncharacterized genes which regulate aging processes. All target genes were cloned to generate the fusion of their product with green fluorescent protein (GFP). Resulting recombinant proteins were expressed in Drosophila to study their localization and dynamics of their distribution in living cells. Tissues expressing recombinant proteins were dissected from transgenic Drosophila, fixed and stained with DNA-binding dye TOTO3 (to detect nuclei in all cells). The localization of recombinant proteins was examined using a laser confocal microscopy. The signal form GFP fluorescence shown where the unknown gene is located within the cell. All four studied proteins (CG33926-GFP, CG14850-GFP, CG5499-GFP, CG14850-GFP) showed localization in nuclei (soluble nucleoplasm, or chromatin and nucleolus). In addition to nuclei, CG14850-GFP also localized in mitochondria. Identifying localization will help with further studies by understanding the functions of each unknown factor of aging control. Studying longevity will help improve the understanding of premature aging and how to treat or prevent it.