The Effects of Aging on Nucleolar and Ribosomal Function in Drosophila melanogaster

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The ribosomal production of the nucleoli of cells control metabolism (rate of protein production) as an organism ages. This experiment was designed to show the relationship between the age of cells and the size of their nucleoli as a gauge for their functionality. I hypothesized that nucleolar size (and therefore metabolic function) would decrease with age. The population of the experiment were female w11118 mutation Drosophila Melanogaster fruit flies, a common stock with a simple and similar genome in comparison to the human genome. I took tissue samples periodically throughout the population's lifespan by dissecting a couple of the files and staining them with the anti-fibrillarin protein and DAPI stain, which allows for the nucleolus/nuclei to be easily recognized using fluorescent light microscopy. Then using Advanced Spot 5.4 software, I measured the surface area and perimeter of nucleoli of Midgut and Malpighian tubule tissues. I organized this data and tracked the nucleolar size from other samples collected as the flies aged. The results of this experiment are that as an organism ages, their nucleoli expand in size, which contradicts my hypothesis, suggesting that metabolism increases with age. These findings are counter-intuitive, as the body’s ability function decline with age, why would it require higher rates of protein production? Aging research is significant to understanding mortality and finding cures age-related diseases like Progeria.

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