Lipid Droplets in the Aging Brain

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Aging is a process which adversely affects humans, particularly in the brain. However, aging is not well characterized. This study sought to investigate the changes in neuronal lipid droplets in the brain due to aging. Lipid droplet number per cell and size were used to represent lipid droplet density. Lipid droplet average distance from the center of the cell and average distance between each lipid droplet in a cell were used to represent lipid droplet distribution. A difference in lipid droplet size based on brain region was found at each age, with hippocampal lipid droplets being smaller than lipid droplets in other brain regions. Interestingly, when comparing aged, mature and young brains, a noticeable increase in lipid droplet size and number per cell was observed in both aged and young brains relative to the mature brains for all tested brain regions except for the CA1. A similar trend was noticed in lipid droplet distribution, as noticeable changes in average distance from the center of the cell and average distance between lipid droplets were observed in both aged and young mice, but not mature mice, in the cerebral cortex and dentate gyrus. Altogether, these findings reveal that neuronal lipid droplets vary in both density and distribution, with age. The results presented also uncover the varying density and distribution of lipid droplets in different brain areas. These discoveries provide insights into the understanding of metabolic regulation of aging, and the development of potential therapeutic strategy for preventing neuronal degeneration.

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