The aging brain: insights from FTIR-spectroscopy

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Aging is associated with a decline in cognitive function. In the nervous system, grey matter contains the nerve cell bodies and white matter contains the nerve cell projections. These specialized cell projections that carry the electrical impulses are wrapped in an insulating layer called myelin. White matter degeneration has been correlated with deficits on cognitive tasks. Here, we present finding from our animal model showing a similar trajectory of white matter degeneration in humans and rodents. A multidisciplinary approach is taken to better understand the relationship between physiological, cellular and biomolecular alterations in the aging brain. Transmission electron microscopy (TEM) allows for ultrastructural characterization of myelin, while Fourier transform infrared (FTIR) spectroscopic imaging provides information on biochemical composition in situ. We continue to explore novel synchrotron-based microspectroscopy techniques, such as polarization-dependent measurements, to gain further insight into age-related neurodegeneration.

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