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Synchrotron X-ray Diffraction Study on the Effect of the Tau protein on the Mechanical Properties of Microtubules MYUNG CHUL CHOI, UCSB / KAIST, URI RAVIV, UCSB / Univ of Jerusalem Israel, HERBERT MILLER, MICHELLE MASSIE, YOULI LI, LESLIE WILSON, STUART FEINSTEIN, UCSB, MAHN WON KIM, KAIST, CYRUS SAFINYA, UCSB — Microtubules (MTs) are 25 nm protein nanotubes used as tracks for intracellular trafficking of biomolecules, for example, those involved in transmitting signals between neurons. In neurons, MTs are long-lived both in axons and dendrites. A distinct member of microtubule-associated-proteins (MAPs) regulates microtubule assembly, although the mechanisms of regulation resulting from different tau isoforms remains to be fully elucidated. Incorrectly phosphorylated MAP tau is implicated in a large number of neurodegenerative diseases where altered tau-MT interactions and MT depolymerization and tangles of taus lead to detrimental consequences for neuronal survival. We will describe our recent finding on the effect of tau isoforms on the mechanical properties of MTs, probed by synchrotron X-ray diffraction. Supported by NSF DMR-0503347, DOE DE-FG02-06ER46314, and NIH GM59288. M.C.Choi received partial support from the Korean Foundation Grant KRF-2005-2214-C00202.

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