

ULTRAVIOLET RAMAN SPECTROSCOPY FOR CHARACTERIZING AMYLOID FIBRIL STRUCTURE AND DYNAMICS.

Igor K. Lednev, Dmitry Kurouski and Ludmila Popova, Department of Chemistry, University at Albany, SUNY, 1400 Washington Ave., Albany, NY 12222.

Understanding fibrillogenesis at a molecular level requires detailed structural characterization of amyloid fibrils. We utilized the combination of deep UV resonance Raman (DUVRR) spectroscopy and postmortem hydrogen-deuterium exchange (HX) for probing parallel and anti-parallel β -sheet in fibrils prepared from full-length A β (1-40) and A β (34-42) peptides, respectively. The application of DUVRR spectroscopy allow us to discover a new protein folding/aggregation phenomenon, spontaneous refolding of amyloid fibrils. Mature fibrils prepared from apo- α -lactalbumin spontaneously refold from one polymorph to another as a result of a mild alteration in solution temperature and salinity. This discovery changes the very concept of the extraordinary stability of amyloid fibrils and presages a new approach for potentially regulating the biological activity of fibrils and their associated toxicity.