

Image processing developments and Alzheimer's disease

S. Scheres

MRC, Laboratory of Molecular Biology, Structural Studies Division, GB - CB2 2QH Cambridge, UK,
scheres@mrc-lmb.cam.ac.uk

Recent advances in direct-electron detectors and advanced image processing algorithms have resulted in cryo-EM structure determination to near-atomic resolution for a wide range of macromolecular complexes. I will discuss some of these advances and illustrate their potential by presenting our latest structures related to Alzheimer's disease (AD). AD is defined by the presence of abundant neurofibrillary lesions and neuritic plaques in cerebral cortex. Neurofibrillary lesions are made of paired helical and straight Tau filaments (PHFs and SFs). I will present the atomic structures of PHFs and SFs from the brain of an individual with AD, as imaged by cryo-electron microscopy. Besides revealing the seed for templated aggregation of Tau, our findings also demonstrate that cryo-EM allows atomic characterization of amyloid filaments from patient-derived material, and thereby pave the way to study a range of neurodegenerative diseases.