

Abstract Submitted
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In-Vivo Like Studies of the hIAPP Amyloid Precursors Using Dielectric Relaxation Spectroscopy¹ YUSUKE HIRAI, REEM MAHOMMED ASSIRI, DONAL BARRY, Worcester Polytechnic Institute, FLORIN DESPA, University of California Davis, IZABELA STROE, Worcester Polytechnic Institute — Recent studies show that the amyloid formation in Type II diabetic disease involves aggregation of monomers of the human islet amyloid polypeptide (hIAPP) into oligomers, protofibrils, and fibrils. Here we present data showing that Dielectric Relaxation Spectroscopy is a very sensitive technique to detect the hIAPP precursors. We measured the dielectric response of amyloidogenic hIAPP and non-amyloidogenic rIAPP as a function of frequency (10^{-3} Hz to 10^7 Hz), temperature (193K to 283K), and incubation time (0-120 h). To mimic in-vivo like conditions, the proteins were measured in bovine serum albumin. Our results show that the dielectric signal of amyloidogenic hIAPP shifts towards the dielectric signal of the background, as predicted by theoretical calculations. No similar shift is observed for the non-amyloidogenic rIAPP. In addition, the dielectric signal of both the hIAPP and the rIAPP shows two relaxation processes over the measured temperature range. We used two Havriliak-Negami functions plus conductivity to fit the two relaxation processes we determined the relaxation time for both processes and calculated the corresponding activation energies.

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