

Siemens Competition

Math : Science : Technology

Regional Finalist

Names: Mahima Shah and Ruby Guo

High School: High Technology High School

Mentor: Yi-Chih Lin

Project Title: *Surface effects mediate self-assembly of amyloid-beta peptides* (Biochemistry; Biology; Biophysics; Chemistry)

Here we look at a novel method for studying how surface effects impact amyloid aggregation. We utilize spin-coating to control factors such as surface concentration and found that the morphologies of self-assembled amyloid-beta peptides are strongly affected by this element. Furthermore, we find that an increase in incubation time allows homogeneous, self-assembled photofibrils to grow longer and form spontaneously. These rates observed are significantly smaller than those in solution, even at decreased concentrations. This points to the possibility that the nucleation stage has been replaced by an alternate pathway. Studying mechanisms related to the formation of amyloid fibrils gives insight into those underlying the polymerization of soluble peptides into mature, insoluble ones. This is especially pertinent to the advancement of therapeutic approaches to stopping or mitigating the formation of amyloid fibrils, which are considered agents in many neurodegenerative diseases.