Characteristics of Sulfhydric Acid (H2S) Interactions with Lysozyme Amyloid Fibers

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Amyloid fibrils are conformations of misfolded proteins with a stable β-sheet structure. They are believed to be the main cause of neurodegenerative disorders such as Alzheimer's and Parkinson's disease. It is of fundamental importance to find a way to degrade the formation of these aggregates, so treatments can be developed for the terrible ailments they cause. Amyloid fibers can be formed by applying extreme conditions of temperature and pH to a protein. This research was trying to prove that by adding sulfhydric acid (H2S), amyloid fibers can be degraded. The hypothesis was that sulfhydric acid will degrade lysozyme amyloid fibers. Six samples containing 1 mL of a lysozyme protein solution were elaborated to form the fibers. The samples also contained 20% of acetic acid and 0.1M of NaCl. Three of these samples had 6.99mM of H2S. All were put in an oven at a temperature of 60°C for 48 hours. Thioflavin T (ThT) was added to the samples to analyse them via fluorescence spectroscopy. In the samples without H2S, amyloid intensity was observed. However, in the samples with H2S, the fluorescence incremented greatly. Theory suggests that this can be due to the compound degrading the fibers, exposing more superficial area. Therefore, the results indicate that H2S has some kind of effect on the formation of amyloid fibers. Furthermore, a more exhaustive analysis is needed to prove this. Knowing this fact allows further investigation into the mechanism responsible for fibril formation, and brings the possibility of using H2S to treat amyloidosis.