

# Insoluble proteins: molecular assassins of neuronal cells

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How long can a man live?

While constantly trying to increase the average lifespan, human attempts have always come to face newer natural obstacles, represented by the spreading of more complex and yet incurable types of diseases. In developed countries, one of the main obstacles now is represented by neurodegenerative disorders, such as Alzheimer's Disease and Parkinson's Disease.

Interestingly, despite being very diverse in symptoms and characteristics, neurodegenerative disorders have been discovered to share a common feature at the molecular level. In fact, such diseases are all particular instances of a general process that drives proteins in a cell out of their normal, soluble condition. As a result, various non-functional, toxic structures called aggregates are formed, and presence of these insoluble proteins eventually leads to cell death.

In this talk, I will give some hints on the biophysics of protein aggregation, its connection with neurodegenerative diseases, and the controversy over protein solubility. Finally, I will present a computational tool that we have developed, based on a new Neural Network algorithm, to predict protein solubility from its building constituents. This tool could provide vital insights into protein aggregation and misfolding related diseases.

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