

ALZHEIMER'S DISEASE: ANALYSIS OF A MATHEMATICAL MODEL INCLUDING THE ROLE OF PRION

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ABSTRACT. In this presentation we introduce a model accounting for the in vivo dynamics of Alzheimer's disease including the role of the prion protein onto memory impairment in the disease. We use a size-structured equation to describe the formation of β amyloid plaques coupled with three differential equations on the concentration of $A\beta$ -oligomers, PrP^C proteins (prion) and $A\beta$ - \times - PrP^C complex since this latter has been considered, in some recent findings, to be responsible for the synaptic toxicity. We prove well-posedness of the problem and stability results of the unique equilibrium, when the polymerization rate of β -amyloid is constant and then it is described as power law.

Finally, we discuss about possible implications of this model in drug design and an experimental validation.

Keywords: Prion; Alzheimer; Size-structured equation; Well-posedness; Stability

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