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LIVRO DE RESUMOS

Grupo De Estudos
De Envelhecimento
Cerebral e Demência

CO-22 - BACTERIOPHAGES TO TACKLE ALZHEIMER´S DISEASE

Ivone M. Martins[1,2], Alexandre Lima[1,2], Tiago Gil Oliveira[3,4,5], Joana Azeredo[1,2], Helmut W. Kessels[6]

1- Centre of Biological Engineering (CEB), School of Engineering, University of Minho, Braga, Portugal; 2- LABBELS - PT Government Associate Laboratory, Braga/Guimarães, Portugal; 3- Life and Health Sciences Research Institute (ICVS), School of Medicine, University of Minho, Braga, Portugal; 4- ICVS/3B's - PT Government Associate Laboratory, Braga/Guimarães, Portugal; 5- Department of Neuroradiology, Hospital de Braga, Braga, Portugal; 6- Center for NeuroSciences, Swammerdam Institute for Life Sciences, University of Amsterdam, Netherlands

The first stages of Alzheimer's disease (AD) pathology involve the formation of toxic amyloid beta (Aβ) oligomers, which can begin to form up to two decades before symptoms and other known disease markers appear. The ability to detect Aβ oligomers would allow early diagnosis, leading to improved disease management, care and prognosis through the use of therapeutic strategies targeting Aβ before irreparable brain damage occurs.

Peptides with affinity for Aβ may be the answer, as they are known to inhibit Aβ assembly and toxicity. However, peptides are highly unstable and do not cross the blood-brain barrier (BBB). To overcome this limitation, bacteriophages (phages) can be used as vectors for peptide delivery. Phages are viruses that selectively target and kill bacteria, safe for humans, easily modified to display a variety of biomolecules on their surface, and are known to be able to cross most biological barriers, including the BBB.

We have engineered phages to display Aβ-specific peptides and our results showed that the synthetic phages effectively identified Aβ aggregates in brain samples from AD-model mice from several ages, and AD patients, underlining their specificity towards oligomeric Aβ. We are validating the therapeutic potential of this phage-based tool in AD-mice, with promising exploratory results.

The outputs of this project will made available a theragnostic tool for early detection, monitorization and therapy of AD. This will have a positive impact on AD research and consequently on healthcare systems, society and economy, by reducing the overall costs and hurdles associated with this debilitating disease.