SIMPOSIO 2: BIOMEDICINA, MEDICINA REGENERATIVA Y BIOMATERIALES

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Título:
Engineering of specific bacteriophages for early diagnosis of Alzheimer's disease

Autores:
Martins Ivone M., Silva Ana, Kessels Helmut W., Kluskens Leon D.
Centro de Trabajo:
Centre of Biological Engineering, University of Minho
Email:
ivone.martins@ceb.uminho.pt
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Comunicación:
Alzheimer's disease (AD) is the most common neurodegenerative disease affecting a large proportion of the human population worldwide with great impact on social and economic level. At molecular level, AD is characterized by an increased deposition of plaques, which consist of amyloid-beta however, it is not the amyloid-beta in plaques, but amyloid-beta in soluble oligomeric form that impairs synaptic function and memory encoding.
The limitations imposed by the blood-brain barrier (BBB) have hindered the development of new diagnostic/therapeutic techniques. Also, AD-treatments that target plaques have proven to be ineffective, therefore it is important to find diagnostic and therapeutic tools that selectively target amyloid-beta in oligomeric form.
Peptie ligands that selectively recognize AB-oligomers are available, however they are not able to cross the BBB. To overcome this limitation, the development and application of viruses has become a very interesting tool. Bacteriophages (or phages – virus that only infect bacterial cells) can bypass the BBB and can be genetically and chemically manipulated in order to recognize and target specific biomarkers commonly used for AD diagnostic.
The present work describes the development of a bacteriophage-based system that can be capable of diagnose AD at an early stage by shuttling amyloid-beta specific ligands across the BBB. Phages were genetically engineered with two peptide sequences described to selectively recognize amyloid-beta oligomers in order to target and visualize amyloid-beta aggregates in the brain.
Future work will be devoted to test this system in AD-mouse models for diagnosis purposes at an early stage of the disease. If successful, this approach will provide the neuroscience community with a promising tool for AD early diagnose.