Universidad de Navarra

Máster en Investigación Biomédica
Facultad de Ciencias

Research Project Proposal
Academic year 2015-2016

Project Nº 15

Title: Neuroinflammation and classical activation vs alternative activation of microglia in Alzheimer's disease: the good, the bad and the ugly?

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Summary

In most cases the cause that produces Alzheimer's disease (AD) is unknown. However, recent studies suggest that neuroinflammation associated with age could be an important factor causing profound changes that may underlie the cognitive impairment of AD.

Neuroinflammation is designated as both endogenous and exogenous essential immune response to protect the body against any damage. However, prolonged and uncontrolled neuroinflammation is potentially detrimental and can result in cell damage.

The presence of multiple phenotypes of microglia is a relatively new concept that is now beginning to gain importance. In general terms, microglia may be activated in two ways: The classical activation (**M1** microglia) characterized by the production of inflammatory cytokines and reactive oxygen species and the alternative activation (**M2** microglia), where microglia adopts an anti-inflammatory phenotype, involved in repairing the damage and finishing the inflammatory response. Therefore, in neurodegenerative diseases such as AD, the alternative M2 activation of microglia could be beneficial for the resolution of the pathology.

The objective of this project is to study the involvement of both microglial phenotypes in AD. For this purpose, using AD human brains and AD murine models, markers of both phenotypes will be studied:

- For M1: inflammatory cytokines such as TNF, IL-6, IL-1β and INFy.
- For M2: anti-inflammatory cytokines such as IL-10, IL-4, IL13, YM1 and arginase-1.

The results obtained in the development of this project may contribute to the understanding of the role of microglial polarization and to the development of new therapeutic strategies for the treatment of AD.
POSSIBILITY OF PhD YES* * (PhD grant required)