Alzheimer's Disease (AD), a neurodegenerative disorder, is characterized by the aggregation of β-amyloid (Aβ) peptide leading to the formation of extracellular senile plaques. The ensuing activation of microglia and astrocytes causes an inflammation and subsequent neuronal loss in AD patients. The liver X receptor (LXR) is a ligand-activated nuclear receptor playing a role in the control of cholesterol homeostasis but also modulating immune and inflammatory responses in macrophages and microglia.

The aim of our research is to study the regulation of the inflammation-associated state of activated microglia by LXR ligands.

We used two cell models: primary mouse microglia and a murine microglial cell line. mRNA and proteins of these cells, treated by Aβ and LXR-ligands, are used for PCR, ELISA assays and Western Blots. Phagocytic capacities of these cells were also investigated.

We observed an LXR-ligand-dependent decrease of the mRNA and protein level of different proinflammatory genes and proteins like TNF-α, IL-1β or COX-2 in primary and microglial cells. However, LXR ligands were not able to increase the expression of anti-inflammatory genes such as Arginase1, CCR2 or Mrc1. We could not see any effect of activated LXR on phagocytic capacities of microglial cells.

These results show that ligand-activated LXR is able to reduce clearly the activated inflammatory state of microglia by reducing the level of proinflammatory molecules. The absence of LXR-induced effects on anti-inflammatory gene's expression and phagocytosis suggest that LXR is not able to induce an anti-inflammatory state of the microglial cells.