Differential inflammatory reactions in microglia and macrophage cells in relation to Alzheimer’s disease specific activators

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Introduction: Activated microglia are neurotoxin-producing immune effector cells causing neurodegeneration in AD. Recent studies support the notion that infiltration of peripheral macrophages into the brain might contribute to AD. Microglia and macrophages differ in their production of cytokines, cell surface immune antigen expression, and ability to promote immune responses. Understanding the differences in the production of pro-inflammatory factors of microglia and macrophage cell lines and comparison to primary cells in terms of their specific inflammatory responses to different stimuli is important for discovery and screening of potential anti-inflammatory drugs.

Aims: Identification of the specific pro-inflammatory properties of various macrophage/microglia cell lines and comparison to human primary cells.

Methods: RAW 264 and J774 murine macrophages as well as WT4 and C8B4 murine microglia cells and human primary microglia cells were activated with LPS combined with IFN-\(\gamma\) and AGEs. Levels of interleukins, TNF-\(\alpha\) and NO were measured in the conditioned media.

Results: All cell lines besides WT4 could be activated with IFN-\(\gamma\)+LPS and AGEs. Activated cells showed significant differences in cytokine and NO levels. The macrophage cells showed similar NO and TNF-\(\alpha\) levels and interestingly, unactivated J774 cells produced 50% less TNF-\(\alpha\) than RAW264.

Conclusion: RAW 264, J774 and C8B4 cells react to inflammatory stimuli, such as IFN-\(\gamma\), LPS and AGEs, in a similar manner to primary cells and therefore may be used as appropriate model systems for Alzheimer's and other brain inflammation research.