The brain and its susceptibility for *Chlamydia pneumoniae* infection

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Introduction: Recently *Chlamydia pneumoniae* (Cpn) infection has been associated with cerebral inflammation with subsequent neuronal damage/death and cognitive decline. Nevertheless, it is unclear which cell types or brain areas are susceptible for Cpn infection.
Material and methods: Murine microgial and astrocyte cells were exposed to Cpn (MOI 5) for 1 hour and cultured for another 72 hours. Thereafter, cells were fixed and stained with a Cpn antibody. We also determined whether cells contained and/or produced infectious Cpn. Medium was collected from infected cells and transferred to Hep2 cells (susceptible cell line). Furthermore, infected cells were homogenised, centrifuged and the supernatant was transferred onto Hep2 cells. Cpn antigens in these cells were determined after 72 h by immunostaining. Also more complex brain aggregates (spheroids isolated from rat embryos) were exposed to Cpn. Spheroids were cultured for 4 weeks, exposed to Cpn for 1 hour and fixed 72 h later for immunohistochemical evaluation. Furthermore, mice were infected intranasally and the presence of Cpn DNA was determined by PCR in specific brain areas.
Results: Approximately 95% of all astrocytes compared to <10% of all microglial cells showed signs of infection at 72 h. Both incubation medium as well as the supernatant from both cell types contained viable Cpn as shown by positive immunostaining in Hep2 cells. Furthermore, Cpn could be detected in spheroids although not all cells were infected. *In vivo* experiments demonstrated that Cpn DNA could be detected in the bulbus olfactorius and hippocampus but not in other parts of the mouse brain.
Conclusion: Cpn is able to infect murine cell lines with a preference for astrocytes. Cpn is also able to replicate in these cell types as infectious elementary bodies could be identified with our detection system. Aggregates can be infected as well but further investigation concerning the specificity of infected cells is required. I*n vivo* data also indicate a preference for specific brain areas.

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