IJAE
Vol. 122, n. 1 (Supplement): 157, 2017
ITALIAN JOURNAL OF ANATOMY AND EMBRYOLOGY

Astrocyte clasmatodendrosis in a transgenic mouse model of Alzheimer's Disease

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Aging is frequently accompanied by a low-grade inflammation (inflammaging); on the other hand, inflammation is considered a prodrome of Alzheimer Disease (AD). Indeed, a distinctive event of both aging and AD is the deposition of beta amyloid (Aß) fibrils within the central nervous system, a condition that has been associated to cognitive decline. In a previous research we demonstrated that, in the hippocampus of aged rats, the fragmentation of astrocyte processes (clasmatodendrosis) is associated with a decrease of their activity in terms of Aß-fibril clearance, thus promoting neuron to neuron propagation of Aß-fibrils and therefore their prion like spread [1]. In this study we show preliminary data on the role of clasmatodendrosis in a double transgenic TgCRND8 mouse model, which overexpresses both Swedish and Indiana mutations in the human amyloid precursor protein, and displays early cognitive decline also in young animals [2]. We performed a 3D confocal analysis on optical volumes acquired in the CA1 hippocampal region of young (3m.)- and middle aged (7m)- TgCRND8 mice. We found that young TgCRND8 mice show Aß-amyloid deposition, astrocyte clasmatodendrosis and a decrease of the astrocyte cytoskeletal marker GFAP. In middle aged animals significantly higher levels of GFAP expression, indicating astrogliosis, were in concomitance with both Aß-amyloid deposition. These data appear to link the onset of early cognitive decline in TgCRND8 mice with astrocyte clasmatodendrosis and provide new perspectives on the role of astrocytes in Aß-amyloid deposition and spreading.

References

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Keywords
Clasmatodendosis, Alzheimer's Disease, Aß-fibril, Astrocytes, TgCRND8 mice

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