

THE FIRST STUDY OF THE THREE-DIMENSIONAL ARCHITECTURE OF CORPORA AMYLACEA IN THE BRAIN

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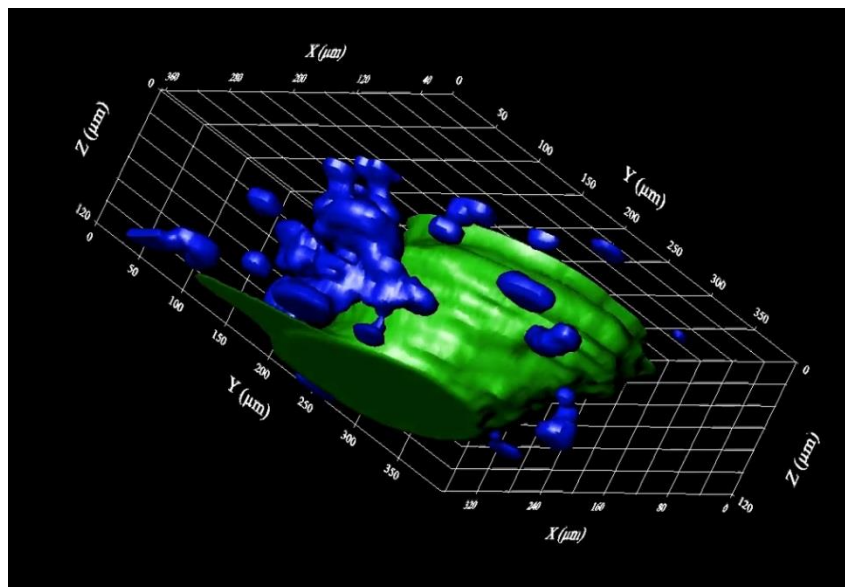
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Background: Corpora amylacea (CA) are glycoprotein-based bodies that accumulate in different organs with increasing age, especially in the aging central nervous system (CNS) and consecutive to neuro-degenerative diseases. Although described as round basophilic entities based on bi-dimensional observations, it is still not clear what their origins and functions are. The aim of this work was to evaluate the three-dimensional morphology of these bodies in the CNS in normal aging.

Materials and methods: We utilized here brain tissue from six aged patients (72, 89, 77, 81, 80 and 79 years old), and performed a histological stereological analysis of the perivascular and intraparenchymal CAs based on either thin seriate sections, or 50 μm -thick sections. The thin seriate sections have been counter-stained with Hematoxylin and Eosin, while the thick sections have been double-stained for ubiquitin and GFAP/collagen IV or aquaporin 4. Large three-dimensional renderings were obtained after aligning the serial sections, while high-resolution z-stacks were constructed after deconvolution image analysis on the thick sections. Results: Most of all CAs revealed to be in fact parts of larger aggregates, where the flattened individual spheroids branched and connected with other similar bodies in a complex pattern (Figure), with budding of small CAs from larger bodies. Astrocyte GFAP and aquaporin 4 surrounded CAs, but without any colocalization with their cores, and perivascular CAs were sometimes enclosed in pockets of the basement membranes. In conclusion, as far as we know, this is the first study to describe the three-dimensional lattice-like complexity of corpora amylacea in the CNS.



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