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Aβ-Aggregation-Generated Blue Autofluorescence Illuminates Senile Plaques as well as Complex Blood and Vascular Pathologies in Alzheimer's Disease

Abstract:

Senile plaque blue autofluorescence was discovered around 40 years ago, however, its impact on Alzheimer's disease (AD) pathology has not been fully examined. We analyzed senile plaques with immunohistochemistry and fluorescence imaging on AD brain sections and also Aβ aggregation in vitro. In DAPI or Hoechst staining, the nuclear blue fluorescence could only be correctly assigned after subtracting the blue plaque autofluorescence. The flower-like structures wrapping dense-core blue fluorescence formed by cathepsin D staining could not be considered central-nucleated neurons with defective lysosomes since there was no nuclear staining in the plaque core when the blue autofluorescence was subtracted. Both Aβ self-oligomers and Aβ/hemoglobin heterocomplexes generated blue autofluorescence. The Aβ amyloid blue autofluorescence not only labels senile plaques but also illustrates red cell aggregation, hemolysis, cerebral amyloid angiopathy, vascular plaques, vascular adhesions, and microaneurysms. In summary, we conclude that Aβ-aggregation-generated blue autofluorescence is an excellent multi-amyloidosis marker in Alzheimer's disease.

Keywords: Senile plaque; Blue autofluorescence; ·Aβ; · Amyloid aggregation; · Hemoglobin ;· ·Alzheimer's disease

Biography:

Hualin Fu, Assistant Professor in Shanghai Jiao Tong University, grew up in Hubei, China, got his B. Sc from Wuhan University in 1993, M. Sc from Shanghai Institute of Biochemistry in 1997 and Ph. D. from University of Southern California in 2006. He did his post doc training in the UCLA Hillblom Islet Research Center in 2007. His current research interest involves the pathology studies of Alzheimer's disease and gastric cancer.