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Encapsulation of a precisely defined amyloid beta peptide oligomer into the confine environment of ferritin cage

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Abstract: Alzheimer's disease is one of the serious brain diseases caused by the deposition of amyloid beta peptides in the form of amyloid plaques. The oligomeric form of the 42 residues amyloid peptide is considered as the most toxic species which undergoes aggregation to give amyloid fibrils. Therefore, it is necessary to study the amyloid oligomers to know its role in the disease as well as understanding the mechanism of fibril formation. However, transient and heterogenic nature, aggregate formation etc. limits the detail characterization of oligomers in solution. Although several researchers attempted to characterize them by cross-link treatment, encapsulation into micelle etc., it remained challenging to isolate a precisely defined amyloid beta oligomer. This presentation will describe a new strategy in which the confined environment of ferritin cage was used to isolate a 24-mer amyloid beta oligomer. It was found that the encapsulated amyloid beta oligomer was stable inside the cage without affecting the structure of ferritin cage. The beta-sheet content and the dynamic properties of the encapsulated oligomer was characterized by the ThT assay and high-speed AFM, respectively. It is expected that the strategy is useful for developing oligomer specific drugs and understanding the role of oligomers in the disease.

Scheme: Schematic representation of the encapsulation of Aβ oligomer into ferritin cage.

References

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