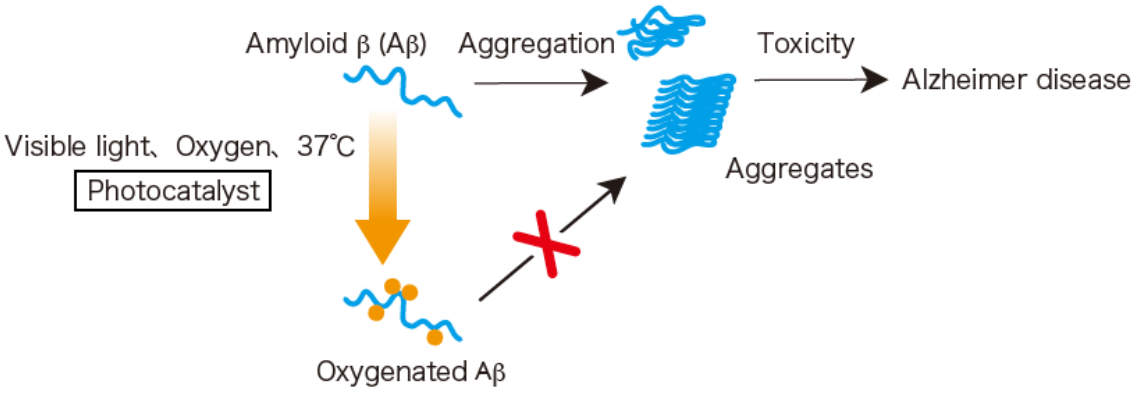
Oxygenation attenuates aggregation and neurotoxicity of amyloid beta (Aβ) peptide
~New Therapeutic Strategy for the Treatment of Alzheimer's Disease~

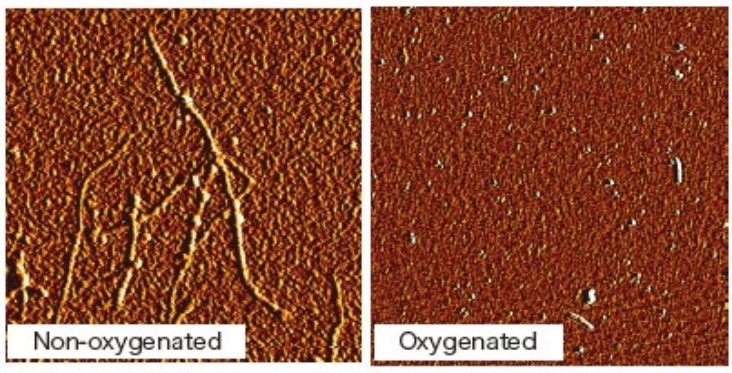
Summary;

Neurotoxicity of aggregated amyloid beta (Aβ) peptide is considered to be the pathogenesis of Alzheimer's disease. Although therapeutic approaches targeting Aβ have been intensively studied, the disease is currently incurable. Thus, a new approach should be developed to overcome the disease. A research group at The University of Tokyo designed and synthesized a new photocatalyst that can selectively oxygenate Aβ. The oxygenated Aβ exhibits remarkably low aggregation activity and neurotoxicity, indicating that photooxygenation of Aβ is able to attenuate Aβ toxicity. Improvement of such a photocatalyst toward biological application will lead to a new therapeutic strategy for the treatment of Alzheimer's disease.



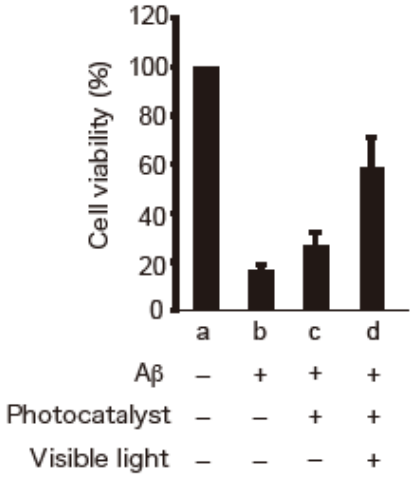
<Figure 1> Concept of photooxygenation reaction for Aβ.

Aggregation of Aβ (blue) is inhibited by photocatalyzed oxygenation. Aβ is converted to oxygenated Aβ by binding with oxygen atoms (orange circles).



<Figure 2> Atomic force microscope (AFM) images of non-oxygenated (left) and oxygenated (right) Aβ.

Fibrillar Aβ aggregates are observed when Aβ is not oxygenated (left), while they are not observed when Aβ is oxygenated (right). Thus, oxygenated Aβ is not aggregative.



<Figure 3> Attenuation of Aβ toxicity by photocatalyzed oxygenation.

Cell viability is decreased due to Aβ toxicity when the neuronal cells are treated with non-oxygenated Aβ (Compare a and b). On the other hand, cell viability recovered due to attenuated Aβ toxicity when Aβ is oxygenated by visible light irradiation in the presence of the photocatalyst (Compare b, c, and d).

Journal Information;

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