

Interaction of A β peptide with vitamin B12: Implication for the therapy of Alzheimer's disease

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Introduction

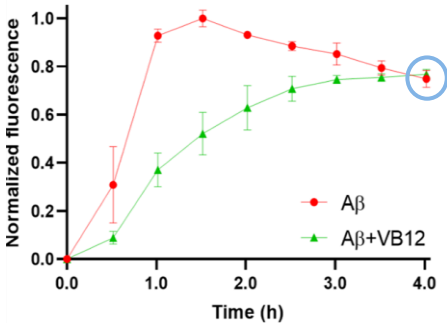
Alzheimer's disease (AD) is a neurodegenerative disease triggered by the abnormal aggregation of amyloid beta (A β) peptide. Molecules with the ability to inhibit the A β aggregation and/or to disrupt fibrils are thus assumed to be an attractive strategy to the AD therapy.

Aim

To evaluate the ability of the vitamin B12 (VB12) in inhibiting A β_{1-42} aggregation and in disrupting mature fibrils in simulated biological conditions.

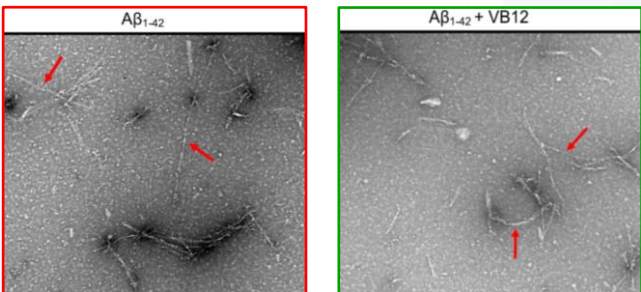
Results

Aggregation assays



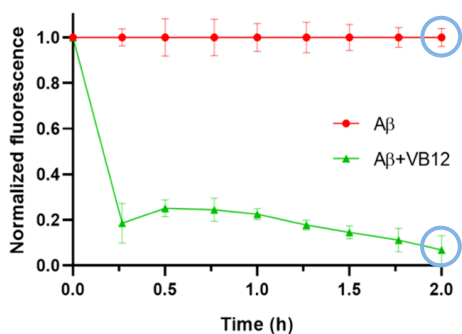
Aggregation kinetic of A β_{1-42} monomers (8 μ M) upon incubation with VB12 (800 μ M) (PBS, pH 7.4, 37 $^{\circ}$ C), through the ThT fluorescence method

- ↑ of the elongation phase (by 2-fold) in presence of VB12
- ↓ of the A β fibril amount (22 \pm 2%) in presence of VB12



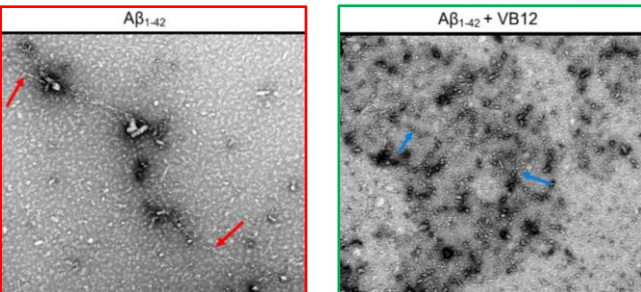
TEM images of A β_{1-42} peptide, 4 h of incubation, with and without VB12

Disaggregation assays



Aggregation kinetic of A β_{1-42} fibrils (8 μ M) upon incubation with VB12 (800 μ M) (PBS, pH 7.4, 37 $^{\circ}$ C), through the ThT fluorescence method

- ↓ of the amount of A β fibrils (91 \pm 8%)
- x no fibrils observed after their incubation with VB12



TEM images of A β_{1-42} fibrils, 4 h of incubation, with and without VB12

Conclusion

- ✓ VB12 delays A β fibrillation
- ✓ VB12 decreases the content of fibrils
- ✓ VB12 disaggregates mature fibrils

VB12 is a promising drug candidate to prevent and cure AD patients

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