Direct Observation of Amyloid Fibril Growth and Propagation

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Amyloid fibrils form through nucleation and growth. To clarify the mechanism involved, direct observations of both processes are important (1, 2). First, seed-dependent fibril growth of β2-microglobulin (β2-m) and amyloid β peptide was visualized in real-time at the single fibril level using total internal reflection fluorescence microscopy combined with the binding of thioflavin T, an amyloid-specific fluorescence dye (3-5). Second, using atomic force microscopy, ultrasonication-induced formation of β2-m fibrils was shown, indicating that ultrasonication is useful to accelerate the nucleation process (6). Third, with the proteolytic fragment of β2-m, propagation and a transformation of fibril morphology was demonstrated (7). These direct observations indicate that template-dependent growth and structural diversity are key factors determining the structure and function of amyloid fibrils.

References

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