Synthesizing pY Nanotubes: Toward a Phospholipid Bilayer Model

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As more and more information is discovered about proteins, it becomes necessary to use an appropriate model for the phospholipid bilayer to study the function of intermembrane proteins. Nanotubes synthesized from the modified nucleating core of the amyloid ß-protein can create a phosphoprotein membrane similar in size and morphology to the phospholipid bilayer membrane with a more definable and predictable structure. Phosphorylated pYLVFFAL monomers were synthesized and assembled under conditions of 37º C, room temperature, and 4º C. The ß sheet structure, a measure of the degree assembly, was measured over the course of a month using circular dichroism spectroscopy, and images of the assembled nanotubes were taken with TEM. The images and the ß sheet signal from the CD spectroscopy indicated that the assembly of the pY nanotubes at 37º C progressed much faster and more homogenously than the assembly at 4º C, the temperature at which assembly was previously conducted. Moreover, additional tests indicated fluctuations in temperature play a minimal role degree in assembly of the nanotubes. These results indicate that pY nanotubes can be biologically relevant as a model for the phospholipid bilayer.

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