Lecture 3

February 17, 2004
EC 2410

Bionanotechnology Lecture Series 2003-2004

The FIU Department of Biomedical Engineering Presents Robert H. Fillingame

Robert H. Fillingame is the Chair of the Biomolecular Chemistry Department at the Wisconsin Medical School. Fillingame has served as assistant professor and associate professor of the Physiology Chemistry Department and as Professor of the Biomolecular Chemistry Department at UW-Madison. His research focuses on the molecular mechanisms of ATP synthesis during oxidative phosphorylation.

Fillingame received his bachelor's degree from Washington State University in 1968 and his doctorate degree in 1973 from the University of Washington. He served as Chair of the Bioenergetics Gordon Conference in 1995 and as Chair of the Protons and Membrane Reactions Gordon Conference in 2000. He is a member of the American Society of Biological Chemistry and Molecular Biology, the American Chemical Society, and the Biophysical Society.

Lecture Topic:

ATP Synthase - The Biological World's Smallest Rotary Motor: Is It Useful?

We now know that ATP (adenosine triphosphate) synthase functions much like the turbine of a hydroelectric dam. The cell membrane provides the structural framework of the dam and proton accumulation behind the cell membrane (dam) provides the force to drive the synthesis of ATP from ADP and Pi. The turbine within the dam is driven by proton transport across the cell membrane. In the process of turning the turbine or rotor, a component of the ATP synthase that is linked to the turbine rotates between three different sites of synthesis to force the tight binding of ADP and Pi at these sites, resulting in the making of ATP. This way, the ATP synthase mechanically converts the energy of the proton force across the membrane to the chemical energy stored in ATP.

This lecture will address the mechanical process by which proton transport through the membrane-traversing turbine is coupled with rotation.

Lecture will be held on Tuesday, February 17, 2004 at 10:00 a.m.
Engineering Center, Room 2410.
10555 West Flagler Street
Miami, FL 33174

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The Department of Biomedical Engineering at Florida International University is constantly undertaking research on protein-based nanotechnology (www.eng.fiu.edu/bmei/renu). This includes a lengthy understanding of protein structure, dynamics, and engineering. Because of its inter-disciplinary nature, protein-based nanotechnology encompasses chemistry, biology, and physics. This seminar series will focus on cutting-edge bionanotechnology and its benefits to society.