T_CSUH Special Seminar

Texas Center for Superconductivity at the University of Houston

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How the bc_1 Complex Works: Killing you Softly with a Dance

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Room 102, University of Houston Science Center
12:00 p.m. – 1:00p.m.

Abstract

Redox enzymes of the bc_1 complex family form the central components of all the major energy conversion processes that fuel the biosphere. Oxidation of a membrane-bound quinol (QH_2, - ubihydroquinone in mitochondria and a-proteobacteria) by a higher potential acceptor (cyt c or c_2) is linked to transport of protons across the membrane through a modified Q-cycle. The reaction in which QH_2 is oxidized suffers from a defect. Evolution designed the mechanism before the atmosphere became aerobic, and the intermediate semiquinone (SQ) has a potential suitable for rapid reduction of O_2 to superoxide (SO). As a consequence, the catalytic site (the Q_o-site) is a potential source of SO, which is a precursor of a variety of reactive oxygen species (ROS) that cause damage to DNA and proteins. A substantial literature suggests that the bc_1 complex is the main culprit in ROS-generated damage under a variety of pathological conditions. Under conditions in which the intermediate SQ might be expected to accumulate, a significant rate of SO production can be measured. However, under normal operation, the isolated complex does not generate detectable amounts of SO. I will review the modified Q-cycle, and discuss the mechanism of the Q_o-site of the bc_1 complex, with an emphasis on the molecular ballet at the site through which SO production and other bypass reactions are minimized.

Persons with disabilities who require special accommodations in attending this lecture should call (713) 743-8210 as soon as possible.