PREVENTATIVE HEALTH AND BIOLOGICAL RESEARCH

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Summary of Research.

Dr. Garlid's laboratory works on mitochondria, which are the energy factory of all cells (for example, our heart cells contain 40% mitochondria). Mitochondria are essential for life, and they also play an important role in the mitigation of disease. Two of the research projects are on the study of a potassium channel in mitochondria. It turns out that this ion channel plays an essential role in protecting the heart and brain from irreversible damage after a heart attact or stroke. This is the leading laboratory in the world working on this problem, and Dr. Garlid is focusing on the mechanisms by which this channel is cardio- and neuro-protective. The other two research projects deal with a group of mitochondrial proteins called the uncoupling proteins (UCPs). When these proteins are activated, the mitochondria become short-circuited and can no longer conserve energy for use by the cell. They are energy-dissipating mechanisms that may be considered Nature's way of causing weight loss! These studies are of interest because of the current epidemic of metabolic syndrome - obesity, atherosclerosis, hypertension, and diabetes. Thus, both areas of biomedical research are highly relevant to current problems in clinical medicine.

Potential for Commercialization and Job Creation

The work has potential for commercialization because of the possibility of a therapeutic target. What is required is characterization and cloning of the mitochondrial potassium channel.

Total Research Funding

Dr. Garlid has four research grants from the National Institutes of Health. These awards support research at the rate of about $878,500 per year, and the total awards are about $3,741,000. Keith Garlid is the Principal Investigator or Project Leader of all these projects: 1) NIH - R01 HL067842 - "The Mitochondrial ATP-Sensitive K+ Channel in Heart" 06/01/2002 - 05/31/2006 --$1,420,000; 2) NIH - PO1 HL36573-06 - "Project IV: Cardiac Mitochondrial KATP Channel and Ouabain Signaling." Subproject of "Control Mechanisms of Cardiac Proteins and Enzymes" --$1,135,000; 3) NIH - R01 DK56273 - "Function and Regulation of Uncoupling Proteins 2 and 3" 08/01/1999 - 07/31/2007 -- $1,045,200; 4) NIH - R03 TW001487 - "Regulation of Novel Mitochondrial Uncoupling Proteins"08/01/2002 - 07/31/2004 -- $140,800 (This grant supports a collaboration with a scientist in Prague, Czech Republic).

Student Involvement

Dr. Garlid supports 3 PhD students, and 2 more graduate students are expected to join this research in the Spring. Dr. Garlid also employs 3 to 5 undergraduates in order to introduce them to biomedical laboratory research. Each of these students is working on a key component of one of the research problems described above.

Website
http://web.pdx.edu/~garlid/