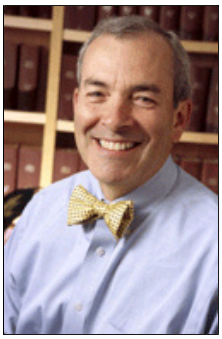

J. Milton Adams

Professor of Biomedical Engineering
Vice Provost for Academic Programs

B.S., Electrical Engineering, Virginia Tech, 1971
Ph.D., Biomedical Engineering, University of Virginia, 1976

Phone: 434- 924-6320
jma@virginia.edu

Research Interests

The focus of our research is to understand how the brain maintains its chemical environment when faced with an acid-base disturbance and how that regulation affects control of breathing. The cells in the brain that control breathing sense CO2 and H+ concentrations in the tissue, so any change in brain acid-base status will affect respiration. The brain protects itself from pH changes that occur in the blood (due to disease or injury) by moving acids or bases across the blood vessels and cells, capillary endothelia and glia. We are studying regulation of the specific transport mechanisms, that is, proteins, which move these acids and bases. This work includes mathematical modeling of gas and ion transport. Our experiments use an analytic electron microscope method to measure cellular concentrations of relevant elements as well as tracer elements to monitor flux by transport proteins. These experiments are performed by inducing pH changes and measuring the effects of inhibiting transport proteins in cultured cells as well as anesthetized animals.

In collaboration with faculty in Internal Medicine and Radiology, we are developing a new imaging technique for the lung based on magnetic resonance imaging with a hyperpolarized gas, helium or xenon, which has the potential to reveal how air moves into a diseased lung and how blood flow allows optimal gas exchange. With faculty in Electrical Engineering, we are developing a new solid-state infrared sensor to measure carbon dioxide exhaled from the lungs and for environmental measurement. We are also collaborating with faculty in Mechanical Engineering to develop a new artificial heart pump with magnetic bearings.

Recent Publications

Shultz SJ, Perrin DH, Adams JM, Arnold BL, Gansneder BM, Granata KP
Assessment of neuromuscular response characteristics at the knee following a functional perturbation.

Patel GM, Horstman DJ, Adams JM, Rich GF
Nitric oxide synthase inhibitors alter ventilation in isoflurane anesthetized rats.

Sullivan MP, Adams JM
Cisternal Na+ transport inhibition and the ventilatory response to CO2.

Schacterle RS, Ribando RJ, Adams JM
A model of brain arteriolar oxygen and carbon dioxide transport during anemia.

Allen AM, Adams JM, Guyenet PG
Role of the spinal cord in generating the 2- to 6-Hz rhythm in rat sympathetic outflow.

More Publications