

March 5, 2005

## **Report compares and contrasts patterns of cardiopulmonary response in reptiles**

A recent report focused on prioritization of oxygen delivery during elevated metabolic states.

According to the report from the United States, "The principal function of the cardiopulmonary system is the matching of oxygen and carbon dioxide transport to the metabolic requirements of different tissues. Increased oxygen demands, VO<sub>2</sub>, for example during physical activity, result in a rapid compensatory increase in cardiac output and redistribution of blood flow to the appropriate skeletal muscles. These cardiovascular changes are matched by suitable ventilatory increments."

J.W. Hicks and A.F. Bennett of the University of California in Irvine continued, "This matching of cardiopulmonary performance and metabolism during activity has been demonstrated in a number of different taxa, and is universal among vertebrates. In some animals, large increments in aerobic metabolism may also be associated with physiological states other than activity. In particular, VO<sub>2</sub> may increase following feeding due to the energy requiring processes associated with prey handling, digestion and ensuing protein synthesis. This large

increase in VO<sub>2</sub> is termed 'specific dynamic action' (SDA)."

"In reptiles, the increase in VO<sub>2</sub> during SDA may be 3-40-fold above resting values, peaking 24-36 hours following ingestion, and remaining elevated for up to 7 days. In addition to the increased metabolic demands, digestion is associated with secretion of H<sup>+</sup> into the stomach, resulting in a large metabolic alkalosis (alkaline tide) and a near doubling in plasma [HCO<sub>3</sub><sup>-</sup>]. During digestion then, the cardiopulmonary system must meet the simultaneous challenges of an elevated oxygen demand and a pronounced metabolic alkalosis," the researchers reported.

The authors said that their report "compare and contrast the patterns of cardiopulmonary response to similar metabolic increments in these different physiological states (exercise and/or digestion) in a variety of reptiles, including the Burmese python, Python morulus, savannah monitor lizard, Varanus exanthematicus, and American alligator Alligator mississippiensis."

Hicks and colleagues published their study in Respiratory Physiology & Neurobiology (Eat and run: prioritization

of oxygen delivery during elevated metabolic states. *Respir Physiol Neurobiol*, 2004;144(2-3):215-224).

For more information, contact J.W. Hicks, University of California Irvine, Department of Ecology & Evolutionary Biology, Irvine, CA 92697, USA.  
jhicks@uci.edu

Publisher contact information for the journal *Respiratory Physiology & Neurobiology* is: Elsevier Science BV, PO Box 211, 1000 AE Amsterdam, the Netherlands.

The information in this article comes under the major subject areas of Exercise, Postprandial, Metabolism, Maximum O Uptake, Oxygen, Maximum Uptake, Reptiles, Crocodylians, Shunt, Cardiovascular, Cardiology, and Pulmonary Medicine.

This article was prepared by Heart Disease Weekly editors from staff and other reports. Copyright 2005, Heart Disease Weekly via NewsRx.com & NewsRx.net.