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Study Links Hypoxia and Inflammation in Many Diseases

ScienceDaily (Feb. 18, 2011) — When the body is deprived of oxygen during a major surgery, the kidneys, heart muscles or lungs can be injured as a result. The problem is that lack of oxygen can lead to inflammation. Yet some athletes deliberately train at high altitude, with less oxygen, so they can perform better. Their bodies adapt to the reduced oxygen.

Now a doctor at the University of Colorado School of Medicine has explored the relationship between lack of oxygen, called hypoxia, and the inflammation that can injure or kill some patients who undergo surgery. In a liver transplant, for example, the surgery and anesthesiology can go perfectly yet the new liver will fail because of hypoxia.

"Understanding how hypoxia is linked to inflammation may help save lives of people who have survived a major surgery only to be faced with potential harm to major organs," says Holger K. Eltzschig, MD, PhD.

Eltzschig's exploration of the relationship between hypoxia and inflammation was published Feb. 17 in the *New England Journal of Medicine*. His work was supported by more than $1 million from the National Institutes of Health.

Those high-altitude athletes figured into the research. How do their bodies adapt to low levels of oxygen? And how can that information help patients?

The answer appears to lie at the molecular level. The body can signal a helpful response to deal with low oxygen levels. To do so it uses what's called hypoxia-inducible factor (HIF). This is a protein that sends complex signals to help the body defend itself.

Eltzschig says that research now should focus on understanding more about the way these signals function.

"By focusing on the molecular pathways the body uses to battle hypoxia, we may be able help patients who undergo organ transplants, who suffer from infections or who have cancer," says Eltzschig, a professor of anesthesiology, medicine, cell biology and immunology.

"We know the body can do this. Our research goal now is to find out exactly how."