

High Altitude Study Questions

How does barometric pressure change with altitude, and why is this a problem for humans (or animals) at altitude. Explain this in terms of oxygen gradients and rate oxygen uptake.

How do cold temperatures exacerbate the challenges of low O₂?

Why do high-altitude climbers hyperventilate? Explain this in terms of O₂ gradients.

What are some costs of hyperventilation? (consider energy expenditure of breathing, effect on water loss, and on pH)

Why do mountaineers drink large quantities of water? What are the main reasons why respiratory water loss is a severe physiological problem at high elevation?

Why is metabolic scope of endotherms very limited at high elevation, and what are the physiological consequences in terms of activity capacity (for example, speed of climbing)? Consider the combined effects of barometric pressure, cold, and wind.

If aerobic scope is limited at high elevation, can climbers use anaerobic metabolism to generate ATP in an emergency?

Prior to the early '80s, physiologists thought the barometric pressure on the summit of Everest was lower than it actually is. The change is small (5%), but has a big impact on climbers. Why does a 5% increase in barometric pressure have a big impact on arterial saturation and on maximum O₂ consumption?

Studies of human mountaineers suggest that the use of supplemental oxygen enhances survival during descent from Everest and K₂. However, these studies are not experimental. Why then should the data be taken with a grain of salt?

What are the problems a human fetus (or infant) faces at high altitude? What is the evidence that development at altitude may cause problems?