

GRAND TETON GUIDE no. 3

AN AMATEUR'S REVIEW OF BACKPACKING TOPICS

FOR THE

2008

T254 EXPEDITION TO GRAND TETONS / YELLOWSTONE

HIGH ALTITUDE PHYSIOLOGY

Acute Mountain Sickness (AMS)

As discussed in the second issue of this guide, it is the adaptive transfer of ventilatory control from the predominant central (brainstem) CO₂/pH receptors to the peripheral (aortic/carotid body) O₂ chemoreceptors that characterizes acclimatization to increased altitude. This adjustment takes a variable amount of time and individuals vary in their ability to acclimatize. Interestingly, an individual's level of physical conditioning / fitness does not predict readiness of acclimatization or tendency to develop AMS.

As it turns out, the altitudes that we will be experiencing in Yellowstone and the Grand Tetons are just at the borderline where AMS might be considered likely. It would be different if we were planning ascent of Grand Teton peak (13770 ft.), at which altitude, AMS symptoms of some degree might be expected in >25% of people.

So, what is AMS, what causes it, what are the symptoms, how can its likelihood be diminished? Hypoxemia (relatively low O₂ levels in the blood) is the abnormality that results in the changes that cause AMS symptoms. As mentioned, there is a period of acclimatization to altitude during which hypoxemia (low O₂ in the blood) is not sufficient to drive the ventilatory rate upward to correct the problem, since the CO₂/pH regulation dominates control of ventilation.

Symptoms include headache, fatigue, dizziness, decreased appetite, nausea, and fluid retention. Difficulty sleeping and a sensation of shortness of breath or a dry cough may occur. Treatment of mild symptoms includes stopping ascent, resting, and acclimatizing at same altitude. Descending in altitude will help. Acetazolamide (Diamox) may be used.

The mainstay of avoiding these problems is extending the acclimatization phase at moderate altitudes before ascending to the more extreme levels. Fortunately, our trip begins in the moderately high elevations of the Yellowstone Plateau (7900 ft.), where we will spend the first three days, during which altitude acclimatization can occur. Adequate fluid and calorie intake and rest are also advised. Fluid intake is important additionally to compensate for the substantial insensible fluid losses that occur during exertion at high altitude.

I trust all this information will be of interest to you. I suspect that all will go well in this regard, though some may experience some minor symptoms. I also hope that none of this serves to elicit symptoms in those of you with suggestible minds. ;)