Rebuttal to Pro Statements

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READING THE SET PIECES of Drs. Kayser and Yan, it appears we are clearly agreed that sojourners to high altitude have impaired physical and mental powers. And every season in the Himalayas, we see this phenomenon play out when trekkers and climbers go up too high too fast and suffer acute mountain sickness (AMS), HACE (high altitude cerebral edema), and HAPE (high altitude pulmonary edema).

However, the point of the debate is that *all* dwellers of high altitude have mental and physical impairments. Barcroft just did not have enough comprehensive data to make this sweeping statement, even though he knew about the Himalayas and Tibet.

There is a vast difference in the adaptive mechanism between high altitude Tibetans and the recently-settled Han Chinese in the Tibetan plateau (4500 m) (Moore et al., 1992). Tibetan women generally have uncomplicated pregnancies in Tibet compared to the relatively complication-ridden pregnancies of the Han Chinese. In fact, this problem is so acute that many expectant Han Chinese mothers move to lower altitudes for safer delivery. So right from the start, it seems people of Tibetan origin are better adapted to hypoxia.

Furthermore, infants born to Han Chinese parents may have pulmonary hypertension leading to heart failure. This condition is much less often seen in a newborn Tibetan infant (Anand and Wu, 2004). Even in adulthood, the Han Chinese are at a significantly greater risk of suffering from chronic mountain sickness (CMS). CMS is caused by excessive production of red blood cells and may lead to heart failures and strokes due to 'sludging' in the circulation of blood.

From intrauterine life to infancy to adulthood, Tibetans (as opposed to the Han Chinese) seem to have a protective mechanism that helps them cope efficiently at high altitude. And as Dr. Bengt Kayser clearly points out in his set piece with references, there is now a genetic component to altitude adaptation in Tibetans.

My question is, if Barcroft were alive and aware of the relatively sophisticated data about high altitude Tibetans available today, would he have made the statement on which this debate is based?

Finally, Dr. Yan presents conflicting data (Hochachka et al., 1996; Lu et al., 2001) about the mental abilities of the Tibetans and suggests that there may be serious confounding factors in deciphering these results. He is absolutely correct in that nutritional status from pregnancy to birth to adulthood, which is difficult to study, may be the most important determinant of mental ability. It is hard to make any firm conclusions about mental ability with this kind of data.

Clearly, more research on mental and physical abilities of human beings at different altitudes would be very interesting.

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