The Newsletter of the International Society for Mountain Medicine

Volume 11, Number 1, January 2001

Correspondence with the Society:
Professor Peter BÄRTSCH

Membership applications:
Bruno DURRER
Membership Secretary of the ISMM
3822 Lauterbrunnen, SWITZERLAND
Tel: 41 33 856 26 26
Fax: 41 33 856 26 27
e-mail: B.Durrer@popnet.ch

Correspondence and Submissions for Publication in the Newsletter to:

Erik R. Swenson, MD, Pulmonary Section, S-111-Pulm, VA Puget Sound Health Care System, 1660 South Columbian Way, Seattle, WA 98108, USA. Email: eswenson@u.washington.edu

Your 2001 Subscription is due with this issue see back page for details

International Society for Mountain Medicine

The International Society for Mountain Medicine, founded in 1985, has the following goals: to bring together physicians, scientists and allied professionals interested in mountain medicine; to encourage research on all aspects of mountains, mountain peoples and mountaineers; to organize and co-organize international scientific meetings and publish a newsletter to spread scientific and practical information about mountain medicine around the world.

FROM THE EDITOR

On a balmy afternoon upon arriving in Arica, Chile for the 4th World Congress of Mountain Medicine and Physiology I wandered about the hotel pool deck taking in a magnificent view of the Pacific Ocean and the desert coastline. My reverie was interrupted by a hail from Peter Hackett and Peter Bärtsch, the new and past ISMM presidents leisurely sitting in the shade, enjoying the local beer and plotting our society's future. After warm greetings and the usual catching up on our recent lives and times, my persuasive friends proposed that I should be the new editor of the ISMM Newsletter and help lead it in its transition to a new format. These two friends of mine (knowingly?) caught me in a weak moment. How could I decline the honor and the opportunity to serve the Society?

Thus it is with humility that I assume editorship from Andy Pollard, who has ably guided and shaped the Newsletter over the past three years. As Peter Hackett in his inaugural message relates, the Newsletter will evolve from its present print mailing to a web-based site for announcements,
general ISMM news, membership matters, and future meetings of interest to members. The scientific and scholarly contents of the Newsletter, which have always been of high quality, will move to a peer-reviewed journal that will be available to all members. This journal link will truly enhance the society's visibility and better promote its efforts to disseminate the latest scientific and practical knowledge of mountain medicine to members and the broader community of people interested in enjoying mountains safely and preserving this unique environment for future generations. Our eventual new journal home may well be already decided as you read these pages. As I take on the editorship of a reincarnated ISMM Newsletter and a place on the ISMM executive board, I hope to maintain the quality and scope of the Newsletter achieved by my predecessors. I will look to them for their sage guidance on this next pitch. To all society members, your contributions are heartily welcome, either in articles themselves or suggestions to me for particular subjects and authors. Our new journal association will ensure your writings reach a larger audience, while augmenting your curriculum vitae. I hope you share my great expectations for this new venture and its robust growth.

Erik Swenson, Editor

FROM THE PRESIDENT

I am honored to assume the role of president of the society. First, I want to express my gratitude and admiration to the prior president, Peter Bärtsch. I hope to build upon his work of the previous four years. In addition, I want to acknowledge the wonderful job done by Andy Pollard as editor of the newsletter, and his colleagues who helped him, especially David Murdoch and Jean Paul Richalet.

I liken my role as president to that of leader of a mountaineering expedition. The ultimate goal, the summit, is to make the ISMM a vibrant society recognized as the premier and authoritative resource on mountain medicine. The summit is lofty, the mountain with difficulties. Only a strong team of talented “climbers”

2. **Newsletter.** The ISMM newsletter, as we knew and loved it, is gone. Due to the difficulties soliciting material, and to the cost, ISMM will no longer produce it. However, a new format for a newsletter is being developed. The plan is to distribute a pared-down newsletter on the ISMM web site, and by email, and to move the scientific content and case discussions into a peer-reviewed journal. Submissions will be easier to solicit for an indexed journal, and the cost, depending on the specific journal arrangement, might be less.

3. **ISMM in a journal.** I feel that having ISMM material in an indexed, peer-reviewed journal will greatly improve the society’s visibility and standing. As mentioned above, a relationship with such a journal will also allow our members

working together can accomplish the goal. The team is already in place, composed of the executive committee and the general membership. My leadership style is to make decisions regarding climbing strategy and route by consensus, as much as possible. Like any good expedition, the journey to this summit offers camaraderie and enjoyment.

Prompted by change of officers, and Andy's leaving as newsletter editor, Peter Bärtsch, Bruno Durrer and myself presented various proposals that have generated much discussion over the last few months. At the World Congress on Mountain Medicine in Arica, Chile, the executive committee and the general assembly met and addressed a number of these proposals. These issues below are key to reaching our summit.

1. **ISMM web site.** David Murdoch had relinquished his role as webmaster, and the society gratefully recognized David for his work. The members voted to accept the offer of Tom Dietz to assume the role of webmaster. Tom is a former doctor for the Himalayan Rescue Association, and has had a successful, high quality web site for a number of years (www.high-altitude-medicine.com), which he initially started for the HRA. His site currently receives more than 10,000 unique visitors per month, and the plan is to merge our sites in a way acceptable to ISMM and to Tom, the details remain to be worked out. We have a new web site address, which will be operational soon: www.ismmed.org. This project will entail considerable work, starting with reviewing the material on high-altitude-medicine.com, to give it the ISMM "stamp of approval," and merging the material already on our web site. We plan to have a small "editorial board" to work on this; anyone interested in helping let me know. The web site will also have areas for membership services, including eventually dues subscriptions, and a membership directory, which will be password protected. Many links to other interesting sites will be posted, as well as some publications. I also hope to post the High Altitude Bibliography prepared by Rob Roach and others. The web site offers a tremendous tool for ISMM members to better publishing opportunities, and will also avoid the issue of pre-publication, which was a problem with the newsletter. The general membership agreed, and tasked the executive committee with pursuing the arrangements. We are very lucky to have Erik Swenson, from the University of Washington in Seattle, agree to take on the job of ISMM editor. After weeks of negotiations, we have two wonderful offers. Both Wilderness Environmental Medicine and High Altitude Medicine and Biology are keen to have ISMM associate with their journal. We hope to make a decision in the next few weeks as to which affiliation is best for the society. An increase in dues might be necessary as part of the journal arrangement; the executive committee is carefully considering all the alternatives. Stand by for an announcement…

4. **Clinical guidelines and position papers.** I would like to have ISMM focus on developing clinical guidelines and position papers regarding the practice of mountain medicine. Such an activity fits well with our mission and is an integral part of our climb to the summit. We have the authoritative expertise, and especially in conjunction with a journal and a web site, we have the means to disseminate our statements. Position papers and guidelines will be very valuable to practicing mountain doctors, rescue groups, and mountain users worldwide.

Of course, many other issues deserve attention as well. I would like to see an increase in membership over the next four years, and have set a goal of at least 10% increase per year. ISMM will continue to be very international in scope, and will make particular efforts to recruit members from developing mountainous nations. ISMM will be sensitive to the disparate economies of nations, and do what it can to accommodate those from poorer countries. Accomplishing these goals and reaching the summit requires effort from many individuals. I encourage you to be active in the society - contact myself, others in the executive committee or other ISMM members and pitch in.
Now is the time to climb upward!

communicate with each other, and for ISMM to do business, to educate, and to promote the interests of the society and of mountain medicine around the world.

Peter Hackett, President

SLEEP AT HIGH ALTITUDE: PHYSIOLOGICAL AND PHARMACOLOGICAL CONSIDERATION

A common problem experienced by newcomers to even moderate altitudes is impaired sleep, with complaints of difficulty getting to sleep, periods of awakening, episodes of periodic breathing and a feeling of drowsiness the following day 13, 14, 19. Many attempts have been made to improve sleep patterns, including various pharmacological interventions 6, 9, 12, 18, 20 as well as supplemental oxygen by facemask or room oxygenation 21. While many of these interventions have been shown to be successful, general advice for the prophylaxis and treatment of insomnia at altitude remains somewhat controversial.

Problems associated with sleep at altitude are generally a combination of several factors, including the new environment; e.g. cold and general discomfort, combined with the physiological response to hypoxia and varying levels of acute mountain sickness. A key abnormality during disturbed sleep at altitude is periodic breathing 15. It has been shown that the tendency to periodic breathing may be related to hypoxic ventilatory drive 5, 10, 22 but, the benefit of this is not entirely clear. One suggestion is that inspite of marked desaturations, individuals with more periodic breathing may have higher mean saturations during sleep than those who have less periodic breathing 11, 16, but this is not necessarily borne out in all studies 6. However, individuals who sleep better have less periodic breathing, with an improvement in daytime symptoms of drowsiness and performance 3, 4, 6.

The best solution for many of the sleep problems is adherence to the adage “climb high and sleep low”, whereby gradual exposure to altitudes higher than 2300m is achieved in a stepwise

1) Anholm JD, Powles AC, Downey R, Houston CS ,Sutton JR, Bonnet MH, Cymerman A. Operation Everest II: arterial oxygen saturation during sleep at extreme altitude. AM. Rev. Respir. Dis. 1992; 145 (4 pt 1), 817-26.
2) Barcroft J The Respiratory Function of the Blood, Part 2, Lessons from High Altitude. Cambridge University Press. 1925
3) Bonnet MH, Dexter JR, Arand DL. The effect of triazolam on arousal and respiration in central sleep apnoea patients. Sleep 1990; 13 (1), 31-41.
4) Bonnet MH Performance and Sleepiness following moderate sleep disruption and slow wave sleep deprivation. Physiol Behav 1986;37, 915-8.
5) Dempsey J.A. Ventilatory Regulation in Hypoxic Sleep; introduction, in Hypoxia, Exercise at Altitude.1983 (Eds J.R. Sutton, C.S. Houston and N.L. Jones.), Liss, New York, pp61-3
6) Dubowitz G Effect of temazepam on oxygen saturation during sleep quality at high altitude: randomised placebo controlled crossover trial. BMJ 1998 Feb 21; 316(7131): 587-9.
7) Goldenberg F, Richalet JP, Onnen I, Antezana AM. Sleep apneas and high altitude newcomers. Int. J. Sports Med. 1992; 13 suppl 1, S34-6.
8) Goldenberg F, Richalet JP, Jouhandin M, Gisquet A, Keromes A, Larmignat P. Respiration periodique pendant let sommeil en altitude. Effets d'une benzodiazepine
hypnotique, le loprazolam. (Periodic respiration during sleep at high altitude. Effect of a benzodiazepine hypnotic,
loprazolam). Presse Med. 1988; 17 (10) 471-4.
9) Hackett P.H., Roach, R.C., Harrison, G.L. et al Respiratory Simulants and periodic breathing at high altitude. 1987 Am Rev. Respir. Dis., 135, 896-8
10) Lahiri S and Barnard P. Role of

fashion and better acclimatization is achieved 17. But this is not always practicable and pharmacological interventions may therefore prove necessary.

These interventions may include sedative medications such as benzodiazepines, e.g. temazepam (Restoril) 7.5-10mg at night, or carbonic anhydrase inhibitors such as acetazolamide (Diamox), 125mg at night, Both of these have been shown to alleviate the symptoms of insomnia at altitude. Equally, they are not necessarily safe in all circumstances: Diamox while relatively safe, and effective at improving sleep patterns 9, 18, is a sulphur derived medication and allergy to it is not uncommon. In addition the side effects of paraesthesia and especially diuresis may be counterproductive in trying to produce undisturbed sleep. Some of this can be avoided by dosing earlier in the evening and the diuretic effect tends to diminish on subsequent nights. Low dose, short acting benzodiazepines such as temazepam (Restoril) at night, have been shown in several studies to be effective 6, 12. However there may be some concern about the ventilatory suppression and residual sedation or hangover from these preparations. Much of this stems from the use of relatively high doses of longer acting preparations 17 and does not tend to be a feature of low doses of shorter acting preparations 3, 6, 7, 8, 12. Alcohol, while often used is counterproductive, as it may lead to general ventilatory suppression and dehydration, all of which become exaggerated by the effects of altitude.

In conclusion, disturbed sleep at altitude is common and may be minimized by gradual acclimatization and general measures to ensure good sleeping conditions. When these are unsuccessful descent is the only reliable curative option. Where available, oxygen is very helpful but most often impractical, in which case pharmacological interventions may prove useful. However, as with the use of all medications they should be taken sparingly, with medical supervision or advice and should not be used as a substitute for the prevention, or treatment of

chemoreceptors in breathing during sleep at High altitude in Hypoxia Exercise and Altitude 1983(Eds J. S. Sutton, C.S. Houston and N.L. Jones) Liss, New York, pp75-85
11)Masuyama S Kochiyama S, Shonozaki T Periodic breathing and high-altitude and ventilatory responses to oxygen and carbon dioxide. Jpn J Physiol 1989; 39:523-535
12) Nicholson AN, Smith PA, Stone BM, Bradwell AR, Coote JH. Altitude Insomnia: studies during an expedition to the Himalaya. Sleep 1988; 11(4), 354-61
13) Powles SCP, Sutton JR. Sleep at Altitude. Sem. in Resp. Med 1983; 5 (2), 175-180
14) Ravenhill TH. Some experiences of mountain sickness in the Andes. J Trop Med Hygiene 1913; 16, 313-320
15) Reite M, Jackson D, Cahoon RL, Weil JV. Sleep Physiology at high altitude. Electroenceph Clin Neuophysiol 1975; 38, 463-471-13
16) Salvaggio A, Insalaco G, Marrone O, Romano S, Braghiroli A, Lanfranchi P, Patruno V, Donner CF, Bonsignore G. Effects of high-altitude periodic breathing on sleep and arterial oxyhaemoglobin saturation. Eur Respir J. 1998 Aug; 12(2):40
17) Sutton JR, Gray GW, Houston CS ,Powles ACP. Effects of acclimatization on sleep hypoxaemia at altitude. In West JB, Lahiri S, editors High Altitude and Man, American Physiological Society. 1983
18) Sutton JR, Houston CS, Manuel, AL Effect of acetazolamide on hypoxemia during sleep at high altitude 1979. N. Engl. J.Med, 301, 1329-31
19) Weil JV. Sleep at high Altitude. Clin Chest Med. 1985; 6 (4) 615-21.
20) Weil J.V., Kryger, H.H. and Scoggin C.H. Sleep and Breathing at high altitude in sleep Apnea Syndromes 1978 (eds Guilleminault and W Dement), Liss, New York pp 119-36
21) West JB. Oxygen enrichment of room air to improve well-being and productivity at high altitude. Int J Occup environ Health 1999 Jul-Sep;5(3):187-93
22) West JB, Peters RM, Aksnes G et al. Nocturnal Periodic Breathing at altitudes of 6300m and 8050m. J. Appl. Physiol.1986; 61, 280-87.

acute mountain sickness or other intercurrent medical problems, especially where descent is readily available.

Gerald Dubowitz MB ChB
Dept Anesthesia, University of California San Francisco.

WHO WILL COPE AT HIGH ALTITUDE: IS IT IN THE GENES?

Introduction.

High Altitude and the inherent problems of visiting or living there have long fascinated both physiologists and physicians alike. The spectrum of disease runs from conditions such as Acute Mountain Sickness (AMS) or High Altitude Pulmonary Oedema (HAPE) with an onset measured in days to Chronic Mountain Sickness (CMS), which can manifest over years or decades. What is central to the development of both conditions is hypoxia; ascent above 2500 meters requires a complex interplay of physiological adaptation in a number of homeostatic mechanisms. Hypoxic pulmonary vascular response (HPVR) and hypoxic ventilatory responses have both been implicated in the development of HAPE, and there is renewed interest in the role of sodium transport and fluid shift, but across pulmonary epithelia rather than renal tubular membranes. Physiological observations have formed the backbone of research in this field. Now, however there is the growing body of molecular and biochemical research relevant to high altitude disease generated from work on sea-level conditions such as pulmonary hypertension (PHT), which share similarities with high altitude disease. HAPE sufferers are known to have an exaggerated HPVR and high pulmonary artery pressures (PAP), whereas morphological changes seen in pulmonary vascular bed of CMS sufferers resemble features in post-mortem specimens from pulmonary hypertensive patients. Indeed one of the most important models of PHT is generated by hypoxia in animals. Consequently many of the findings in PHT research may have a direct relevance to high altitude disease and one might argue visa versa.

Administering an ACE inhibitor blocks this remodelling[18]. Angiotensin II, the product of ACE, is known to have vasoactive properties and is a potent vasoconstrictor, however it has also been shown to antagonise the effects of endothelial Nitric Oxide Synthase (NOS). Furthermore Angiotensin IV, a metabolite of Angiotensin II, has been shown to stimulate [19] pulmonary endothelial NOS. In addition Angiotensin receptors have been mapped to regions of the brain and dopaminergic pathways[20], leaving a potential mechanism for interaction with ventilatory responses. Despite the potential to have influences at a pulmonary vascular and ventilatory level ACE inhibitors have yet to be shown to be of any benefit in High Altitude disease.

Who is conducting the orchestra?

The few regulatory systems described above are merely representative of the many pathways that interact to give the observed response to hypoxia. Though the ACE system seems to have an influence on a number of other systems it pales in comparison to the Hypoxia Inducible Factor-1 (HIF-1). This heterodimeric protein has a classic helix-loop-helix configuration and is the transcription factor responsible for many biochemical responses to hypoxia. Initially linked to the archetypal hypoxia response molecule, erythropoeitin, its influence on other systems has become apparent. It is known that HIF-1 promotes transcription of the EPO gene, VEGF (vascular endothelial growth factor), glycolytic enzymes[21], NOS[22-24] and possibly tyrosine hydroxylase[15]. HIF-1 could therefore have an influence on every aspect of oxygen the oxygen chain including ventilation, haemoglobin uptake,

The important question that remains unanswered is: Can we predict which individuals will succumb to high altitude syndromes before placing themselves at risk. Measuring physiological variables, as described above, has been the traditional means of offering some forewarning, however such tests have lacked sufficient reliability to gain widespread acceptance. What is needed is a reliable easy to perform non-invasive test for physiological competence at altitude. Genes may hold the answer to this problem.

Why a genetic answer?

One might ask why should we presume there to be a genetic link to high altitude adaptation? There is sound evidence to support such a proposition. In the first instance we must dismiss any ideas of clear-cut familial inheritance patterns. High altitude adaptation falls into the category of complex disease; it may well involve several different genes and should not be expected to segregate in a Mendelian fashion. The most likely type of genetic mechanism underlying this condition is one of genetic polymorphism in multiple gene loci. A genetic polymorphism is a subtle variation in a gene, which produces minor changes in function. Under normal circumstances this would pass un-noticed with no observable effect, but changes in environment may elicit an unexpected result, for better or worse. It is these subtle mutations, which have probably fuelled the processes of evolution allowing slight advantages for one individual over another and hence conferred an improved chance of survival in times of environmental change. Evidence of the effects of such environmental pressure is evident in high altitude species especially when compared with related sea level species [1]. A more relevant example can be found in man. High altitude races such as Tibetan natives, Nepalese tribes or the Andean Indians have lived at high altitude for many generations, but the Andeans are the relative newcomers. Each race exhibits a varying degree of adaptation. Tibetan and Himalayan races seem to have a remarkable lack of muscularisation of their pulmonary circulation an peripheral and central circulation and finally, at a molecular level, the switch from oxidative to glycolytic respiration. The precise 'oxygen sensor' has yet to be described, and is believed to be a haem based system[25]. In any event the influence of HIF-1 is profound, but its precise role in adaptation to high altitude has yet to be identified.

The Future

It is now clear that there is interplay of biochemical pathways in response to hypoxia, which causes change at the physiological and molecular levels. If we add to this interplay the possibility of genetic polymorphisms, which would allow a variability in the activity of the pathway. We have a system, the nature of which, is complex at best, insurmountable at worst. Our understanding of these interactions is growing daily and appears to be overtaken only by the startling rapidity of gene sequencing and mapping. It may be that we are close to the precise combination of genetic factors that unlock the problem of who will cope at high altitude.

Sameer Patel
Andrew Peacock
Scottish Pulmonary Vascular Unit

Correspondence to:
Dr A.J. Peacock.
Scottish Pulmonary Vascular Unit
Level 8, Western Infirmary
Glasgow, G11 6NT, UK
E-mail: apeacock@udcf.gla.ac.uk

1. Ge, R.L., et al., Blunted hypoxic pulmonary vasoconstrictive response in the rodent Ochotona curzoniae (pika) at high altitude. American Journal of Physiology, 1998. 274(5 Pt 2): p. H1792-9.
2. Groves, B.M., et al., Minimal hypoxic pulmonary hypertension in normal Tibetans at 3,658 m. Journal of Applied Physiology, 1993. 74(1): p. 312-8.
3.Gupta, M.L., et al., Lack of smooth muscle in the small pulmonary arteries of the native Ladakhi. Is the Himalayan highlander adapted?

adaptation suited to life at altitude[2, 3], whereas South American peoples do not exhibit such a degree of adaptation. What is interesting to note is that Tibetan races are presumed to have lived at altitude for at least 30000 years longer than South American high altitude populations, plenty of time for evolutionary processes to effect an appreciable difference between the two populations.

Clues to the puzzle

In assembling a line up of potential physiological systems that might provide possible candidate genes for investigation we are faced with a choice. Do we examine groups of people that have exhibited physiological differences in an attempt to establish a factor that is found only in sufferers of High Altitude disease? Or do we examine the biochemical pathways in attempt to divine a particular protein that might be responsible? The reality is that many of the observed peculiarities of high altitude physiology have been described for some decades or in the case of polycythaemic responses at least a century. Research has now focussed on examining these changes in the light of biochemical insights afforded by recent work.

The Hypoxic Pulmonary Vascular Response has always been viewed as a key feature of HAPE. High pulmonary artery pressures (PAP) have been recorded in sufferers of HAPE[4] and in those susceptible[5-7], however it is not a ubiquitous finding and cannot be relied on to give reliable forewarning of HAPE[8]. The presence of variable PAP responses to hypoxia between individuals does suggest the possibility of genetic polymorphisms. The burgeoning field of cellular and molecular research into diseases like PHT, using hypoxic animal models, has broadened our understanding of hypoxic pulmonary vascular physiology. One advantage of this work has been the insights offered into the pathogenesis of conditions like HAPE and possible biochemical pathways that may offer candidate genes for study. Agents such as Nitric Oxide and Atrial Natriuretic Peptide (ANP) are already known to exert a vasodilator influence on the pulmonary circulation. It has been recently shown that gene

American Review of Respiratory Disease, 1992. 145(5): p. 1201-4.
4. Penazola, D. and F. Sime, Circulatory dynamics during high altitude pulmonary edema. Am J Cardiol., 1969. 23: p. 369-378.
5. Hultgren, H.N., R.F. Grover, and L.H. Hartley, Abnormal circulatory responses to high altitude in sub-jects with a previous history of high-altitude pulmonary edema. Circulation, 1971. 44: p. 759-770.
6. Eldridge, M.W., et al., Pulmonary hemodynamic response to exercise in subjects with prior high-altitude pulmonary edema. Journal of Applied Physiology, 1996. 81(2): p. 911-21.
7. Yagi, H., et al., Doppler assessment of pulmonary hypertension induced by hypoxic breathing in subjects susceptible to high altitude pulmonary edema. American Review of Respiratory Disease, 1990. 142(4): p. 796-801.
8. Naeije, R., C. Melot, and P. Lejeune, Hypoxic pulmonary vasoconstriction and high altitude pulmonary edema. American Review of Respiratory Disease, 1986. 134(2): p. 332-3.
9. Klinger, J.R., et al., Genetic disruption of atrial natriuretic peptide causes pulmonary hypertension in normoxic and hypoxic mice. American Journal of Physiology, 1999. 276(5 Pt 1): p. L868-74.
10. Bender, P.R., et al., Breathing pattern in hypoxic exposures of varying duration. Journal of Applied Physiology., 1987. 60(2): p. 640-5.
11. Burki, N.K., Effects of acute exposure to high altitude on ventilatory drive and respiratory pattern. Journal of Applied Physiology, 1984. 56(4): p. 1027-1031.
12. Hackett, P.H., et al., Abnormal control of ventilation in high-altitude pulmonary oedema. Journal of Applied Physiology, 1988. 64(3): p. 1268-1272.
13. Moore, L.G., et al., Low acute hypoxic ventilatiory response and hypoxic depression in acute altitude sickness. Journal of Applied Physiology, 1986. 60(4): p. 1407-1412.
14. Barer, G., Carotid bodies in animal models of human disease: what do they teach us? Thorax, 1994. 49: p. S14-S18.
15. Norris, M.L. and D.E. Millhorn, Hypoxia-induced protein binding to O2-responsive

knockout mice for the ANP gene develop pulmonary hypertension[9]. Serotonin is known to have a vasoconstrictor role in the pulmonary circulation. Fawn hooded rats have exaggerated pulmonary hypertension in response to hypoxia and central to this is a genetic defect in Serotonin storage peculiar to this strain. Similar dysfunction in Serotonin uptake is evident in hypoxic rat models.

An attenuated HVR has been observed in some sufferers of HAPE and has been proposed as a potential mechanism of pathogenesis. Changes in HVR can cause varying changes in respiratory rate, tidal volume or both. Attempts to assign changes in tidal volume or respiratory rate to susceptibility for HAPE have shown little consistency between studies. In addition some subjects in these studies have shown normal or even heightened HVR but have still developed HAPE, whereas others have demonstrated markedly attenuated responses and have remained asymptomatic[10-13]. There does not appear to be any definite pattern, but the observed attenuation of the HVR in most HAPE susceptible subjects implies differences in carotid body chemosensitivity. The carotid body responds to hypoxia via dopaminergic pathways to higher centres that then mediate an increase in ventilation[14]. The rate-limiting step in dopamine production is tyrosine hydroxylase, an enzyme in the catecholamine synthetic pathway, which is thought to be central in the ventilatory response to hypoxia[15]. The Tyrosine Hydroxylase gene is one of the genes responsive to hypoxia.

The demonstration that elite mountaineers who can climb above 8000 metres have a much greater preponderance of a particular Angiotensin converting enzyme (ACE) polymorphism [16] has excited interest as to the exact mechanism it plays in adaptation to hypoxia. ACE gene polymorphism has been linked to cardiovascular prognosis for some time, however the role of local ACE systems in regulation and response to injury and stress is a more recent finding. ACE has already been implicated in hypoxic pulmonary vascular remodelling there are higher

sequences on the tyrosine hydroxylase gene. Journal of Biological Chemistry, 1995. 270(40): p. 23774-9.
16. Montgomery, H.E., et al., Human gene for physical performance [letter]. Nature, 1998. 393(6682): p. 221-2.
17. Morrell, N.W., et al., Angiotensin Converting Enzyme Expression Is Increased in Small Pulmonary Arteries of Rats with Hypoxia-induced Pulmonary Hypertension. Journal of Clinical Investigation, 1995. 96: p. 1823-1833.
18. Nong, Z., et al., Inhibition of Tissue Angiotensin-Converting Enzyme With Quinalapril Reduces Hypoxic Pulmonay Hypertension and Pulmonary Vascular remodelling. Circulation, 1996. 94(8): p. 1941-1947.
19. Patel, J.M., et al., Angiotensin IV receptor-mediated activation of lung endothelial NOS is associated with vasorelaxation. American Journal of Physiology, 1998. 275(6 Pt 1): p. L1061-8.
20. Zhuo, J., et al., Mapping tissue angiotensin-converting enzyme and angiotensin AT1, AT2 and AT4 receptors. Journal of Hypertension, 1998. 16(12 Pt 2): p. 2027-37.
21. Graven, K.K., et al., Identification of an oxygen responsive enhancer element in the glyceraldehyde-3-phosphate dehydrogenase gene. Biochemica et Biophysical Acta 1447, 1999: p. 208-218.
22. Palmer, L.A. and R.A. Johns, Hypoxia upregulates inducible (Type II) nitric oxide synthase in an HIF-1 dependent manner in rat pulmonary microvascular but not aortic smooth muscle cells. Chest, 1998. 114(1 Suppl): p. 33S-34S.
23. Palmer, L.A., et al., Hypoxia induces type II NOS gene expression in pulmonary artery endothelial cells via HIF-1. American Journal of Physiology, 1998. 274(2 Pt 1): p. L212-9.
24. Jung, F., et al., Hypoxic regulation of inducible nitric oxide synthase via hypoxia inducible factor-1 in cardiac myocytes. Circulation Research, 2000. 86(3): p. 319-25.
25. Zhu, H. and H.F. Bunn, Oxygen sensing and signalling: impact on the regulation of physiologically important genes. Respiration Physiology, 1999. 115: p. 239-247.

levels of expression in hypoxic rat pulmonary arteries[17].

REPORT OF THE 4TH WORLD CONGRESS OF MOUNTAIN MEDICINE & PHYSIOLOGY

Held at Arica, Chile, Oct 1st. to 6th. 2000

The Chilean Physiological Society and in particular Claus Behn were our hosts for this 4th World Congress. Previous meetings were in La Paz, 1994, Cusco 1996 and Matsumoto, Japan 1998. Arica is situated at the northernmost extremity of Chile on the coastal desert. Despite Arica not being the easiest of places to reach, this was more than made up by a warm welcome from our Chilean hosts. On the evening of arrival, Saturday, there was a great out door ceremony in the dramatic setting of the floodlit 300ft rock in the heart of the city. After long speeches in Spanish, the Army treated us to a breath catching demonstration of abseiling and cliff rescue.

The abstracts for the meeting have been published in the Fall number of High Altitude medicine & Biology, Vol 1 No3, p223-275 and are referred to by abstract number in this report.

The Congress was held in the Medical School of the University of Tarapaka. Each day opened with a plenary session followed by up to four parallel sessions. We started at 8.30am on Sunday with an over view of AMS by Peter Hackett. Peter reminded us that not all neurological problems at altitude are HACE. For instance hyponatraemia can present in a very similar fashion. He reviewed the possible mechanisms of HACE and considered that a generalized vascular permeability is unlikely though the jury is still out on that one. He thought that inflammatory cytokines, VEGF or arachidonic acid metabolites might be implicated. Is simple AMS a mild form of HACE? The idea is attractive but MRI studies have not found a good correlation between brain swelling and AMS. The speaker also pointed out that, after a lot of research, corolations between AMS on the one hand and PaO2, SaO2, PaCO2, HVR, haematocrit, etc have not been found to be

In the afternoon amongst the parallel sessions was one on ventilatory response to hypoxia which I attended. Stacy Zamudio reminded us that pregnant women have hypoxic ventilatory responses (HVR) that were about doubled compared to the value when not pregnant. At altitude there tends to be growth retardation of the foetus but the higher the ventilation the less is the retardation of growth suggesting that the increased HVR is beneficial. However a high HVR is associated with pregnancy induced hypertension and with pre-eclampsia. Pre-eclampsia is more common at altitude. Dr Mortola of Canada emphasized the importance of the metabolic state in determining the HVR and Prem Kumar from Birmingham (UK) took us through the changes in hypoxic response as the foetus goes through the neonatal phase towards the adult pattern.

On the Monday, after John West's review of chronic intermittent hypoxia in the plenary session there was a parallel one of that topic alluded to above. However I attended one on pulmonary macro and microcirculation. Janssens from Belgium reported on recent attempts to treat primary pulmonary hypertension with gene therapy using an iNOS gene delivered by an adeno virus. It seemed to work in mice for up to a week but its use in humans is some way off. Gerald Dubowitz told us about the results of echocardiography in a group of subjects at the Valot Lab on Mont Blanc (4382m). There was moderate increase in pulmonary artery pressure which, on day 3, was reversed by oxygen. An index of right ventricular function showed no change at altitude (Abs. 60). Dr Fink (Germany) introduced us to some new techniques which allow screening for the activity of hundreds of genes in tissues. In this way one can compare, for instance, the difference in gene activity in the same tissue under normoxia and hypoxia. Another technique was to use decoy fragments to

close. Perhaps we should be looking at O2 free radicals, Na/K pump regulation or iNOS induced in the brain by hypoxia as suggested by Ian Clark, as mechanisms for AMS and HACE. He was impressed by the recent finding that gingko biloba, which is a good O2 free radical scavenger, protects Na/K pumps and inhibits iNOS, is effective in preventing AMS.

The natural homing instincts of students to discover a "freebee" was proved to be a universal phenomenon, with local medical students who had been invited to attend the lectures also sneaking into the dinners. By the last of the three dinners, however, tickets were checked and delegates enjoyed a very good buffet dinner and Chilean folk music and dance. Similarly, the race for seats as students and delegates jostled together at the start of popular lectures was a close run thing! For those with an ear piece an excellent rapid translation service was provided between Spanish and English, which was very much appreciated.

With parallel sessions your reporter could only attend a fraction of the talks on offer so I can only report on the sessions attended. I have, therefore, as always, to apologise in advance for a great deal of excellent work given but not mentioned here.

After Hackett's opening lecture it was natural to go onto a session on “Advances in AMS and HAPE”. Dr M. Vargas from Chile opened this session with a talk on AMS and HAPE in miners intermittently exposed to high altitude. This might be a suitable point to discuss "intermittent hypoxia". ISMM members are mostly interested in the acute hypoxia experienced by climbers and trekkers going to altitude over a few days. Also there has been for many years an interest in the problems of long term altitude residence for decades or for life. More recently the problems of those whose work requires them to commute to high altitude has been raised. The country where this is most seen is Chile. Here there are mines and other activities at altitude but no indigenous high altitude population to supply the labour needs. Typical of this situation are the miners of

stop the action of certain genes and observe the effect. For instance an HIF (hypoxic inducible factor) decoy will stop the induction of genes induced by HIF (such as erythropoietin gene).

In the afternoon in a session on high altitude haematology W. Schmidt from Germany reported good response to altitude training in a group of biathletes, males and females. They had increased ethropoietic activity leading to higher total haemoglobin and blood volumes at three weeks (Abs 81). Hans-Christian Gunga on the other hand told us that in space flight blood volume and red cell mass were reduced in response to lower erythropoietin levels.

On the Tuesday morning there was session on chronic mountain sickness after a plenary session from Dr Gustavo Zubietta senior giving an overview of the subject. Otto Appenzeller gave us a very well ordered account of peripheral neuropathy in CMS, a new aspect of the condition as far as I was concerned. These patients complain of burning hands and feet and have signs of a peripheral neuropathy similar to that seen in diabetic patients. He showed us the histology of the conditions from biopsies of sural nerves and discussed possible mechanisms. It seems the ATPase activity is low in these nerves. Symptoms recover with descent (Abs. 9).

As well as the strictly scientific sessions there were many public lectures on a great variety of subjects. Amongst those I could attend were: Ignacio Domeyko by Prof. Ryn of Poland. Domeyko was a Polish chemist who spent 50 years in Chile in the latter half of the 19th century exploring the Andes finding mineral deposits in a series of epic travels as well as being Professor of Chemistry and four times president of the University of Chile. Tatiana Serebroskaya gave us a fascinating talk on East-West contrasts in hypoxic science in the Ukraine. Hans-Christian Gunga delivered a learned illustrated lecture on the physiology of dinosaurs which was fascinating from many angles, not least the engineering aspects of how these huge beasts dealt with the problems of gravity on their enormous bulk. I was sorry to

Collahuasi copper mine. The miners and their families live at Iquique on the coast south of Arica. They then commute to the mine offices and residential quarters at 3800m and work at 4400 to 4600m for 7 days. They then return home for 7 days off at sea level and the cycles repeated indefinitely. Thus they never become completely acclimatized but do carry over some acclimatization from one shift to another. A whole new field of altitude questions is thus opened up for study. It is fitting that at this Congress a lot of early work on this topic was presented, much of it by Chilean scientists, often in collaboration with European workers. At this stage there is a bewildering mass of data and it is probably too early to attempt a summary of the effect of intermittent hypoxia on human physiology. This might well be addressed by a review in the Newsletter at some future date. Dr Vargas (who was an author of no less than 16 abstracts at the Congress) reported the incidence of AMS in soldiers going to altitude for the first time to be 28% at 3500m and 60% at 4250m but in these miners after 6 months of commuting to altitude only 2.8% of medical consultations were for AMS.

Other posters presented work on haemoglobin and haematocrit results in these miners. These rise with time to plateau, after 8 months when Hb and Hct are 17.7 g/dl and 50.7 respectively on the 6th day of an altitude shift, a little lower than expected for chronic exposure at that altitude (Cortes, G et al. abs 53). VO2 max is reduced in these miners as we would expect, by 21% after 8 months and 22% after 16 months. However I was surprised by the result that this reduction persisted to day 6 at sea level. (Jimenez, D et al. abs 91) Enthusiasts for altitude training please note! On the other hand the effect of this intermittent hypoxia on pulmonary artery pressure seems to be very little with normal pressures and no increased response to acute hypoxia after 16 months (Antezana, AM et al. abs 7). Jean-Paul Richalet and his group (Abs 152) showed that this form of hypoxic exposure resulted in increased ventilatory response and decreased heart rate response to exercise suggesting increasing acclimatization with time

miss the talk by M. Gassmann (Switzerland) on gene regulation by oxygen which was reported to me as being excellent. Perhaps he could be persuaded to write a version of it for the Newsletter. (Abs 74).

Posters are an important part of these conferences. There were over 200 of these but the time for them to be manned was from 5.30 to 6.30pm. If you have been attending talks since 8.30am you do not feel like working hard at posters at the end of the day especially as there were excellent guest lectures at 7.30pm. Also somehow the positioning of the posters was not conducive to working through them. There was no time for poster discussion on the program. The result was that young researchers got very little if any feed back from delegates, an important reason for these people to come to such conferences. Mark Howarth and Diana Depla had a poster on the effect of altitude hypoxia on the pupil response to light. Using a hand held instrument, they measured this response at Kangchenjunga base camp (5100m) and the effect of oxygen breathing on it. They found a 14% increase in constriction indicating an increase in para-sympathetic activity (Abs 86). Annabel Nickol and others (abs 130) reported results of the effect of carbonic anhydrase (CA) inhibition on the dynamic CO2 ventilatory response at altitude. In subjects who had shown a response with acclimatisation at 5100m they found that acetazolamide abolished the response. The response is thought to be mediated via the carotid body and presumably CA inhibition prevents the oscillating CO2 signal being converted to an oscillating pH signal. Finally Sarah Bakewell and others (abs 204) presented a poster of their latest work on hypoxia and resting bronchial tone. Having shown an increase with acclimatization in the field they now show that this is not due to acute or chronic exposure to cold. Nor was it due to atelectasis or increased bronchial hyperresponsiveness.

On the fourth day we were taken by bus up the highway towards La Paz, into the mountains of the Cordillera and treated to a very good demonstration of mountain road rescue by the

of exposure, unlike the response seen in residents at altitude.

But to return to advances in HAPE; Marco Maggiorini and Eric Swenson reported on recent work by an international team including Bärtsch, Swenson and Gibbs looking at pulmonary artery and capillary pressures and cytokines in BAL fluid and blood in HAPE susceptible individuals and controls. They found only IL6 to be elevated in HAPE patients. Other cytokines were no different from controls. Also they found that pulmonary artery and capillary pressures were elevated. They conclude that the initial leak in the lung in HAPE is not due to inflammation but due to high capillary pressure leading presumably to capillary stress failure (Abs 116 & 117) Chris Imray of the Birmingham Medical Research Expeditionary Soc. reviewed the use of near infra-red spectroscopy for studies of brain oxygenation at altitude (abs 50) and Peter Bärtsch gave us the results of his team's work on AMS and ACE gene polymorphism. In contrast to reported studies suggesting that the homozygous I I allele conferred better performance at extreme altitude, they found no evidence that it was associated with resistance to AMS. In fact the trend was towards less AMS in DD individuals. This reinforces one of my own views that AMS resistance and performance at extreme altitude are two separate attributes (Abs. 18). Work along similar lines was reported in an abstract (Patel S. et al. abs 139) from Glasgow. They looked at ACE genotype and a measure of HVR. They found no significant differences between the subjects with different alleles.

Army. A very realistic crash was enacted involving a bus and a truck on a blind corner. The truck tumbled down the steep hillside leaving bodies strewn about. We only realised as it fell that it was a wood and cardboard mock up. On the other side of the ridge where we were positioned, there was then a demonstration of rescue from a similar steep hillside using stretchers with pulleys on tensioned wire cables. The stretchers were pulled quickly up to the road by attaching the rope to a vehicle and driving away! It was all very well managed for the audience of over 300. We then had a quick visit to the altiplano and Lake Chungara and views of the volcano Parinacota which figured on the Congress poster. On the next two days some delegates made a visit to the Radio telescope at Chajnantor (5000m) and others, including your reporter to the Collahuasi mine (4600m) Where we were well entertained and got some idea of high altitude commuting.

After that some of us stayed on and enjoyed touring in N. Chile, seeing its landscapes and wild life and even climbing Taapaca volcano (5800m).

The next, 5th World Congress is to be in Barcelona, Spain in 2002. See you there!

Jim Milledge,
Chorleywood 31/10/00

JANUARY CASE DISCUSSION

I have some questions about the use or misuse of amphetamines (and other kinds of Doping) in alpinism. The first time I read about the use of metamphetamine ('speed') was in a book, in which the author (no physician) tells a story that he gave metamphetamine on the top of Mt. McKinley to two totally exhausted climbers, who wanted to spend the whole night on summit without a tent in rather stormy weather. The

Oswald Oelz, Switzerland
It is possible that a totally exhausted climber can save his life by taking amphetamines and thus facilitating descent. However, I have no knowledge of those cases although I don't have doubts that this has occurred. The problem with amphetamines is that some people will take them not to facilitate descent but ascent. This has a long history: the French ascent of Annapurna in

effect of this "therapy" was, that they did the descent in a very short time. My question now is, whether it would be successful to give metamphetamine to climbers who are too exhausted to make a descent and who will surely die because of the circumstances. Do you have any experience with these drugs used in such situations?

The other question about amphetamines in alpinism is the question of their misuse. It is well known, that not only competing athletes use Doping but also ordinary people working out at health clubs for the sake of building muscles. It is conceivable, that mountaineers also take drugs to be successful in reaching their summit. Whereas the commonly used drugs as anabolics and erythropoeitin will probably be useless in alpinism, the use of metamphetanine is documented during the first ascent of Nanga Parbat by Herrmann Buhl in 1953. 1 have made an inquiry in the newsletter of the Austrian Society for mountain medicine and asked whether any expedition doctor has experience in Doping in alpinism with amphetamine or other drugs, but I got no positive answer. Yet some secretly told me, that they sometimes gave ephedrine to mountaineers for the summit day and some other alpinists told me, that misuse of amphetamines exists in expedition mountaineering as well as the use of oxygen and other drugs (e.g. dexamethasone, acetazolamide), but no one talks about it. And this is my next question to you: Do you know expedition doctors, who give amphetamines to climbers in order to better their chance to reach high summits? Has anyone examined, whether amphetamine causes serious side effects in mountaineers such as disturbance of equilibrium or development of a pulmonary hypertension that could cause (or even protect from?) HAPE. So as not to be misunderstood, I would like to point out that in my opinion no drugs (neither oxygen nor the normally used drugs to treat acute mountain sickness) should be used in order to reach a summit, but if Doping really exists in alpinism we should talk about the risks and serious side effects. On the other hand I probably would try amphetamine (if I hade it - in Germany it is not legally available) in the case of

1950 was done with the help of Maxidon, a speed medication used at that time in France. In 1953 Hermann Buhl was advised by his expedition leader and doctor Karl Maria Herrligkoffer to take Pervitin and with that help climbed Venga Parbat. In 1962 Herrligkoffer published an article where he stated that Pervitin belongs in the "Rucksack-Apotheke", the little box with medications in the rucksack. He stated that "Pervitin in appropriate doses had stood the test in the fight for the highest peaks of the world". He furthermore mentioned that Pervition could be given to mountaineers "without hesitation". A good number of climbers on Herrligkoffer's expeditions probably followed this advice. One of them was Sigi Löw who fell to his death while descending from Nanga Parbat while relying on Pervitin.
In modern times people use a combination of drugs called 3D apparently favoured by American climbers on Everest and other popular peaks (diamox, dexamethasone and dexedrine). This use or abuse of amphetamines is not restricted to the extreme altitude. H. Röggla et al examined the urine of 253 mountaineers in the Austrian Alps. They found amphetamines in the urine of 7.1 % of climbers at altitudes ranging from 3,300 to 3,797 m. Thus, we are most likely only seeing the tip of the iceberg.

Reference:
Schweiz Zeitschrift für Sportmedizin
1993;41:103

Gustavo R. Zubieta-Calleja, Bolivia
I think that emotional aspects like fear and depresion, can be negative in critical life treatening circumstances. A speeding up of heart rate at high altitude, due to fear, is an extra energy expenditure that is a waste. So I can understand where some drugs can be in fact beneficial. The legal aspects have to be considered, nevertheless.
About EPO being useless in alpinism, I think that it is questionable. We have refered before in an article in the ISMM Newsletter "Increased polycythemia: ally or foe in the conquest of mount Everest?" Vol 9,#2 April 1999, that

the two totally exhausted climbers on the top of Mt.McKinley if their death seemed to be unavoidable.

(Supplied by George Kunze)

Ken Zafren, USA
Metamphetamine is available in the United States under the brand name Desoxyn. Although it is approved only for treatment of attention deficit with hyperactivity and for obesity, it is legal to prescribe medications for "non-approved" indications. It could certainly have had the beneficial effect described on the two exhausted climbers. More commonly in my experience, expedition physicians carry dextroamphetamine (also available in the US under the brand name Dexedrine). I have carried this medication on many expeditions, reserving its use for life-threatening situations to overcome fatigue. Fortunately, I have never had to use it. Anecdotes reflecting a more casual attitude towards this medication include a story about a climbing team of doctors on Citlaltepetl who were using "The 3 D's" (Diamox, Decadron and Dexedrine) on summit day. All amphetamines and amphetamine-like drugs have a high potential for abuse and many possible adverse effects. All can induce psychotic reactions, even at recommended doses. Only under life-threatening circumstances would the benefits be likely to outweigh the risks. The question of "doping" in mountaineering is not only an ethical one. Dexamethasone is now used routinely in summit attempts on Everest, but the risk of psychotic reactions (primarily euphoria) is real and may already have claimed some lives. In one case, a climber described having to consciously prevent himself from acting on the feeling that he could fly.
The same potential for increasing performance at the risk of psychotic reactions exists with the amphetamines.

Buddha Basnyat, Nepal
I have no experience of this drug.
I do not know if any one hands out these drugs in the Himalayas. If they do they are pretty desperate to get to the top and do not belong in increased polycythemia can be of benefit to summit Everest (note: not a handicap).

Michael Yaron, USA
This is an interesting query. Amphetamines enhance the release of endogenous serotonin and dopamine in the central nervous system. This increases alertness and performance. The U.S. military apparently uses these drugs for prolonged special forces operations to increase performance and stamina. I am not aware of any studies looking at amphetamine use at altitude. Significant concern should exist when using these drugs regarding mental status changes including seizures and hallucinations, increased systemic and possibly pulmonary artery hypertension, and increased myocardial work demand.
I do not know how high altitude illness would be affected by amphetamine administration but in a life or death situation where the ability to energize enough to get down the mountain may save a life I believe that amphetamine use is indicated.

Stephen Bezruchka, USA
In the 1960s climbers did carry amphetamines for such circumstances, and I know that they have been used with some success at lower altitudes, and I used to carry some, but never used it. I believe the military has studied their use in such circumstances, and a good bibliographic search might unearth something. Climbers around here take dexamethasone and spring up liberty ridge on Mt. Rainier. Don't know what proportion though. It seems silly, as we disqualify olympic athletes on the basis of urine tests, but no one seems to care for climbers.

Simon Gibbs, UK
I have no experience of using such drugs. Amphetamines might allow exercise to death if the climber is "too exhausted to do the descent" as has been seen in elite cyclists. Indeed amphetamines have the potential to increase high altitude fatalities and cause pulmonary hypertension

Peter Bartsch, Germany

the mountains to jeopardize their own and other precious lives. I would not use it.
If I were a serious mountain climber I would carry good old dexamethasone (a tried and tested drug) in my backpack in case of emergency.

Bernard Marsigny, France
In our area (the Mont-Blanc massif), 95% of rescues are done by helicopter; which means that 5% take place on foot. In these cases, the patients are sometimes able to walk (which is much more effective and easy than lying down in a stretcher). Some of these patients are totaly exhausted and our common solution (after oral rehydration and nutrition) is steroids. We regularly use methyl prednisolone (40 or 120 mg) with good results.

David Hillebrandt, UK
Several different Questions:
1) Would I give amphetamine to somebody who was bound to die high on a mountain due to exhaustion when no other help was available? Yes of course I would, there is nothing to loose and a possible gain. The legality is irrelevant.
2) Is there doping in our sport?
Yes we have all heard of it. The use of "Triple D" was informally discussed at the UIAA Mountain Medicine Conference in Nov 1987 at St Bartholomew's Hospital in London. "Triple D" was used by some climbers on Everest and other mountains and consists of Dexamphetamine, Dexamethasone and Diamox.
Whether we condone its use is another matter. Personally I even have reservations about the use of Acetazolamide for prevention of symptoms especially on commercial treks and expeditions. A slow ascent is proven to work and is not "doping" for sport, glory or personal ambition. I do carry Acetazolamide on trips in case I have to go too high too quickly to treat somebody else. I also carry Dexamethasone to treat HACE but that is not for prevention.

Urs Wiget, Switzerland
During all my expeditions, I have never heard about amphetamines and I know no mountaineer who takes this drug for stimulation. Is this drug really still employed by mountaineers?
The Medical Commission of the International Olympic Committee defines doping as the application of forbidden substances and methods. Thus, in a legal sense, there can be no doping in mountaineering as there are no regulations for it. In a broader ethical sense, one could define doping as an application or use of any substance (artificial or natural) in non physiologic amounts or ways in healthy people with the aim to improve performance. Such a definition includes bottled oxygen but it is also evident that giving drugs to a patient can never be considered as doping. Therefore, I do not see a problem in giving amphetamine to an exhausted and possibly injured or sick climber in order to enable descent when the alternative is to stay high and die. I personally carry it with me on all expeditions but never got in a situation where I had to use it. There is no discussion for me that one must not use it with the intention to mobilize forces for ascent because of ethical reasons and because of safety.

If we add "only" to the definition given above as some attempts for definition do it reads: "application ... with the only purpose of enhancing performance". This definition gives some ethical support for measures that increase the safety of a mountaineer such as supplemental oxygen and perhaps drugs for prevention of acute high altitude illnesses in particularly susceptible individuals.

I only know of one study looking at the prevalence of amphetamine use in mountaineers: G. Roeggla et al., Schweiz. Ztschr. Sportmed. 41:103-105, 1993. This study was performed in the Alps using a screening test for amphetamine detection in urine. It showed that none of 82 mountaineers examined below 2500 m, 2 of 71 examined between 2500 and 3300 m and 7 of 98 examined above 3300 m were positive. 8 of the 9 positive subjects lived at low altitude in non-alpine areas. Although this pattern of intake is compatible with the rationale for amphetamine use, these results must be interpreted with caution, since a non-specific screening test was used that can cross-react with many other substances. The paper does not convincingly

demonstrate that such cross-reactions can be excluded.

BOOK REVIEW

High Altitude Medicine and Physiology. M.P. Ward, JS Milledge, J.B. West. 3rd edition. Arnold 2000. Price £69.00 (approx. US$100)
Deatails from: Fax ++44 20 7873 6325. Website: www.arnoldpublishers.com; email: james.watson@hodder.co.uk

Eleven years after High Altitude Medicine and Physiology was first published, the 3rd edition is here. I have the first 2 editions already, so it was a surprise that this one looks like a different book. It is a larger format than the previous editions and the cover sports a striking colour photograph of Mount Kongur. The new publishers, Edward Arnold, have done a fine job with the production. The layout of the pages is significantly improved as a result of the larger format, and all references are moved to an appendix at the end of the book, which makes them easier to find. With these changes this book is nearly 200 pages shorter than the last edition but there does not seem to be anything significant missing. In fact there are very many new references, some new sections and a wealth of updated information.
As with previous editions, High Altitude Medicine and Physiology III is a broad and authoritative text covering not only the current state of knowledge of the physiology of hypoxia and the pathophysiology of altitude illness and cold exposure but also practical aspects of mountain medicine. Unfortunately, the new sections and the changes in this 3rd edition are not described in the preface making the reviewers' work more difficult! However, a comparison of the contents from this and the 2nd edition suggests that there are new chapters on 'acclimatisation', 'other altitude conditions' and 'women, children and the elderly'. Many sections from the previous edition have been reorganised and sections placed elsewhere. However, the only chapter that is deleted is the chapter on accidents and surgical emergencies. The anaesthesia subsequent chapters. However, it is an illusion of novelty as the contents of this chapter also appeared in the previous edition, split between the 2 flanking chapters rather than in their own. There are a few new references included in the text at the end of the chapter.
The expanded new section describing issues specifically affecting women, children and the elderly at altitude answers to the increased interest in this area generated by recent Hypoxia symposia, and the several groups working in this area. The increase in altitude mining activity is reflected in an expanded chapter on commercial activities at altitude, which will provide an important resource for those concerned for the health of employees at these locations.
Much of the book provides impressive physiological detail and there is a generous helping of sensible practical advice throughout. Some sections could still be expanded to provide more background and depth. For example, the section on asthma ignores the observation that peak expiratory flow is greater at altitude and, in addition to reduced aeroallergens (which are mentioned) it probably leads to a reduction in asthma symptoms. In the section on performance at altitude, I looked carefully, but the authors have not mentioned the association of an ACE gene polymorphism with improved performance at altitude in mountaineers. Given the recent availability of most of the human genome, and the active genome mining being undertaken by several groups, it is likely that the next edition will need to have a new chapter on the genetics of altitude physiology and pathophysiology (see this edition of ISMM News).
It is a shame about the price, which will keep this text off many bookshelves, but if you can afford it, the new edition of High Altitude Medicine and Physiology is a nice book. It is the most up to date text on the subject that is available today and with its sporty new cover, new sections and revised chapters it is worth the upgrade from the

section from this chapter now appears in a new chapter called 'Other altitude related conditions' which includes a mixed bag of neurovascular and ophthalmic conditions and altitude cough. The apparently new chapter on acclimatisation draws together an overview of the detailed physiology that is included in the 2nd edition. I wonder when the Windows version will be released?

Andrew J Pollard, Vancouver, Canada

LATEST REFERENCES

Alvarez R. Terrados N. Ortolano R. Iglesias-Cubero G. Reguero JR. Batalla A. Cortina A. Fernandez-Garcia B. Rodriguez C. Braga S. Alvarez V. Coto E. Genetic variation in the renin-angiotensin system and athletic performance. European Journal of Applied Physiology. 82(1-2):117-20, 2000

Bailey DM. Castell LM. Newsholme EA. Davies B. Continuous and intermittent exposure to the hypoxia of altitude: implications for glutamine metabolism and exercise performance. British Journal of Sports Medicine. 34(3):210-2, 2000

Basnyat B. Subedi D. Sleggs J. Lemaster J. Bhasyal G. Aryal B. Subedi N. Disoriented and ataxic pilgrims: an epidemiological study of acute mountain sickness and high-altitude cerebral edema at a sacred lake at 4300 m in the Nepal Himalayas. Wilderness & Environmental Medicine. 11(2):89-93, 2000

Beall CM. Tibetan and Andean contrasts in adaptation to high-altitude hypoxia. Advances in Experimental Medicine & Biology. 475:63-74, 2000

Berghold F. Diagnosis and therapy of acute altitude sickness. Wiener Medizinische Wochenschrift. 150(8-9):169-74, 2000

Bisgard GE. Carotid body mechanisms in acclimatization to hypoxia. Respiration Physiology. 121(2-3):237-46, 2000

Bonfichi M. Balduini A. Arcaini L. Lorenzi A. Marseglia C. Malcovati L. Bernardi L. Passino C. Spandacini G. Feil P. Keyl C. Schneider A.

Hassi J. Makinen TM. Frostbite: occurrence, risk factors and consequences. International Journal of Circumpolar Health. 59(2):92-8, 2000

Hernandez Lopez JE. Sierra Galan LM. Pichel Perez D. Maximal cardiac rate during treadmill exertion test in 1853 healthy subjects. Its relation with age and under the atmospheric conditions of Mexico City. Archivos del Instituto de Cardiologia de Mexico. 70(3):261-7, 2000

Hirvonen J. Some aspects on death in the cold and concomitant frostbites. International Journal of Circumpolar Health. 59(2):131-6, 2000

Hochachka PW. Monge C. Evolution of human hypoxia tolerance physiology. Advances in Experimental Medicine & Biology. 475:25-43, 2000

Hofmann P. Performance enhancement through training at medium altitude-- from the perspective of sports medicine. Wiener Medizinische Wochenschrift. 150(8-9):182-5, 2000

Insalaco G. Romano S. Salvaggio A. Braghiroli A. Lanfranchi P. Patruno V. Marrone O. Bonsignore MR. Donner CF. Bonsignore G. Blood pressure and heart rate during periodic breathing while asleep at high altitude. Journal of Applied Physiology. 89(3):947-55, 2000

Jansen GFA. Krins A. Basnyat B. Bosch A. Odoom JA. Cerebral autoregulation in subjects adapted and not adapted to high altitude. Stroke. 31(10):2314-8, 2000

Boiardi A. Bandinelli G. Greene RE. Bernasconi C. Haematological modifications after acute exposure to high altitude: possible implications for detection of recombinant erythropoietin misuse. British Journal of Haematology. 109(4):895-6, 2000

Boulos P. Kouroukis C. Blake G. Superior sagittal sinus thrombosis occurring at high altitude associated with protein C deficiency. Acta Haematologica. 102(2):104-6, 1999

Brugger P. Regard M. Landis T. Oelz O. Hallucinatory experiences in extreme-altitude climbers. Neuropsychiatry, Neuropsychology, & Behavioral Neurology. 12(1):67-71, 1999

Buckler DG. O'Higgins F. Medical provision and usage for the 1999 Everest marathon. British Journal of Sports Medicine. 34(3):205-9, 2000

Cauchy E. Chetaille E. Lefevre M. Kerelou E. Marsigny B. The role of bone scanning in severe frostbite of the extremities: a retrospective study of 88 cases. European Journal of Nuclear Medicine. 27(5):497-502, 2000

Cauchy E. Marsigny B. Allamel G. Verhellen R. Chetaille E. The value of technetium 99 scintigraphy in the prognosis of amputation in severe frostbite injuries of the extremities: A retrospective study of 92 severe frostbite injuries. Journal of Hand Surgery. 25(5):969-78, 2000

Christoulas K. Papameletiou V. Vrabas IS. Angelopoulou N. Mandroukas K. Differences in hormonal responses of adolescent male and female cross-country skiers during 'living high and training high' and 'living high and training low'. Journal of Sports Sciences. 18(7):531, 2000

Christoulas K. Vrabas IS. Mandroukas K. Grammatikopoulos A. Zakas A. Karamouzis I. Effects of 'living high and training low' and 'living high and training high' on performance and V [.] O(2max) in adolescent cross-country skiers. Journal of Sports Sciences. 18(7):531-2, 2000

Moore LG. Armaza F. Villena M. Vargas E. Comparative aspects of high-altitude adaptation in human populations. Advances in Experimental Medicine & Biology. 475:45-62, 2000

Moore LG. Comparative human ventilatory adaptation to high altitude. Respiration Physiology. 121(2-3):257-76, 2000

Mukhopadhyay S. Thakur L. Anand JP. Selvamurthy W. Effect of sojourn at altitude of 3,500 m on auditory evoked potential in man. Indian Journal of Physiology & Pharmacology. 44(2):211-4, 2000

Murphy JV. Banwell PE. Roberts AH. McGrouther DA. Frostbite: pathogenesis and treatment. Journal of Trauma-Injury Infection & Critical Care. 48(1):171-8, 2000

Ostojic H. Monge C. Cifuentes V. Hemoglobin affinity for oxygen in three subspecies of toads (Bufo sp.) living at different altitudes. Biological Research. 33(1):5-10, 2000

Ozsoylu S. Elevation of factor VIII during decreased oxygen pressure. Acta Haematologica. 103(3):124, 2000

Paton BC. A history of frostbite treatment. International Journal of Circumpolar Health. 59(2):99-107, 2000

Pedersen ME. Robach P. Richalet JP. Robbins PA. Peripheral chemoreflex function in hyperoxia following ventilatory acclimatization to altitude. Journal of Applied Physiology. 89(1):291-6, 2000

Pyne DV. McDonald WA. Morton DS. Swigget JP. Foster M. Sonnenfeld G. Smith JA. Inhibition of interferon, cytokine, and lymphocyte proliferative responses in elite swimmers with altitude exposure. Journal of Interferon & Cytokine Research. 20(4):411-8, 2000

Ricart A. Casas H. Casas M. Pages T. Palacios L. Rama R. Rodriguez FA. Viscor G. Ventura JL. Acclimatization near home? Early respiratory

Cook S. Duplain H. Egli M. Sartori Cl. Scherrer U. High-altitude pulmonary edema mechanisms and management. Medecine et Hygiene. 58(2309):1520-3, 2000

Cymerman A. Rock PB. Muza SR. Lyons TP. Fulco CS. Mazzeo RS. Butterfield G. Moore LG. Intraocular pressure and acclimatization to 4300 m altitude. Aviation Space & Environmental Medicine. 71(10):1045-50, 2000

Demarchi DA. Claria DM. Dipierri JE. Gardenal CN. Genetic structure of Native Andean populations from Argentina inhabiting different altitudes. Human Biology. 72(3):519-25, 2000

Dimai HP. Ramschak-Schwarzer S. Leb G. Altitude hypoxia: effects on selected endocrinological parameters. Wiener Medizinische Wochenschrift. 150(8-9):178-81, 2000

Domej W. Schwaberger G. Editorial "Alpine medicine updated". Wiener Medizinische Wochenschrift. 150(8-9):162, 2000

Domej W. Schwaberger G. Respiratory adaptation to altitude and risk factors due to respiratory illnesses. Wiener Medizinische Wochenschrift. 150(8-9):163-8, 2000

Dumont L. Mardirosoff C. Tramer MR. Efficacy and harm of pharmacological prevention of acute mountain sickness: quantitative systematic review. BMJ. 321(7256):267-72, 2000

Duplain H. Sartori C. Lepori M. Egli M. Allemann Y. Nicod P. Scherrer U. Exhaled nitric oxide in high-altitude pulmonary edema: role in the regulation of pulmonary vascular tone and evidence for a role against inflammation. American Journal of Respiratory & Critical Care Medicine. 162(1):221-4, 2000

Ervasti O. Hassi J. Rintamaki H. Virokannas H. Kettunen P. Pramila S. Linna T. Tolonen U. Manelius J. Sequelae of moderate finger frostbite as assessed by subjective sensations, clinical signs, and thermophysiological responses. changes after short-term intermittent exposure to simulated altitude. Wilderness & Environmental Medicine. 11(2):84-8, 2000

Rintamaki H. Predisposing factors and prevention of frostbite. International Journal of Circumpolar Health. 59(2):114-21, 2000

Robach P. Dechaux M. Jarrot S. Vaysse J. Schneider JC. Mason NP. Herry JP. Gardette B. Richalet JP. Operation Everest III: role of plasma volume expansion on VO(2)(max) during prolonged high-altitude exposure. Journal of Applied Physiology. 89(1):29-37, 2000

Rodriguez FA. Ventura JL. Casas M. Casas H. Pages T. Rama R. Ricart A. Ibanez J. Viscor G. Endogenous erythropoietin secretion and haematological adaptations to short-term intermittent hypobaric hypoxia. Journal of Sports Sciences. 18(7):546-7, 2000

Roggla G. Moser B. Domej W. Roggla M. Physical exercise impairs the acute stage of adaptation to moderate altitude. Wiener Medizinische Wochenschrift. 150(8-9):195-6, 2000

Rupert JL. Monsalve MV. Devine DV. Hochachka PW. Beta2-adrenergic receptor allele frequencies in the Quechua, a high altitude native population. Annals of Human Genetics. 64(2):135-43, 2000

Sakata S. Shimizu S. Kishi T. Hirai K. Mori I. Ohno Y. Ueda M. Takaki M. Kohzuki H. Okamoto S. Shimamoto I. Yanagi S. Ogoshi K. Sherchand JB. Correlation between erythropoietin and lactate in humans during altitude exposure. Japanese Journal of Physiology. 50(2):285-8, 2000

Sarto P. Bigon L. Ponchia A. Locandro S. Andreatini R. Pelli C. Merlo A. Giunta P. Noventa D. Effects of moderate altitude on motor skills in elite figure roller skaters. Journal of Sports Sciences. 18(7):560, 2000

Schoni MH. Inhibition of renal carbonic

International Journal of Circumpolar Health. 59(2):137-45, 2000

Fiori G. Facchini F. Ismagulov O. Ismagulova A. Tarazona-Santos E. Pettener D. Lung volume, chest size, and hematological variation in low-, medium-, and high-altitude central Asian populations. American Journal of Physical Anthropology. 113(1):47-59, 2000

Fischetti F. Fabris B. Zaccaria M. Biagi A. Calci M. Candido R. Bortoletto M. Carretta R. Effects of prolonged high-altitude exposure on peripheral adrenergic receptors in young healthy volunteers. European Journal of Applied Physiology & Occupational Physiology. 82(5-6):439-45, 2000

Garcia FC. Stiffel VM. Gilbert RD. Effects of long-term high-altitude hypoxia on isolated fetal ovine coronary arteries. Journal of the Society for Gynecologic Investigation. 7(4):211-7, 2000

Goodman T. Basnyat B. A tragic report of probable high-altitude pulmonary edema in the Himalayas: preventive implications. Wilderness & Environmental Medicine. 11(2):99-101, 2000

Green HJ. Roy B. Grant S. Hughson R. Burnett M. Otto C. Pipe A. McKenzie D. Johnson M. Increases in submaximal cycling efficiency mediated by altitude acclimatization. Journal of Applied Physiology. 89(3):1189-97, 2000

Guzel NA. Sayan H. Erbas D. Effects of moderate altitude on exhaled nitric oxide, erythrocytes lipid peroxidation and superoxide dismutase levels. Japanese Journal of Physiology. 50(2):187-90, 2000

Hamlet MP. Prevention and treatment of cold injury. International Journal of Circumpolar Health. 59(2):108-13, 2000

Hassi J. Frostbite, a common cold injury: challenges in treatment and prevention. International Journal of Circumpolar Health. 59(2):90-1, 2000

anhydrase as a respiratory stimulant-- an obsolete indication? Therapeutische Umschau. 57(6):351-4, 2000

Serebrovskaya TV. Karaban IN. Kolesnikova EE. Mishunina TM. Swanson RJ. Beloshitsky PV. Ilyin VN. Krasuk AN. Safronova OS. Kuzminskaya LA. Geriatric men at altitude: hypoxic ventilatory sensitivity and blood dopamine changes. Respiration. 67(3):253-60, 2000

Silber E. Upper limb motor function at 5000 metres: determinants of performance and residual sequelae. Journal of Neurology, Neurosurgery & Psychiatry. 69(2):233-6, 2000

Smith ML. Muenter NK. Effects of hypoxia on sympathetic neural control in humans. Respiration Physiology. 121(2-3):163-71, 2000

Thomas PK. King RHM. Feng SF. Muddle JR. Workman JM. Gamboa J. Tapia R. Vargas M. Appenzeller O. Neurological manifestations in chronic mountain sickness: The burning feet-burning hands syndrome. Journal of Neurology, Neurosurgery & Psychiatry. 69(4):447-52, 2000

Tschop M. Strasburger CJ. Topfer M. Hautmann H. Riepl R. Fischer R. Hartmann G. Morrison K. Appenzeller M. Hildebrandt W. Biollaz J. Bartsch P. Influence of hypobaric hypoxia on leptin levels in men. International Journal of Obesity & Related Metabolic Disorders. 24 Suppl 2:S151, 2000

Van Tilburg C. In-area and backcountry snowboarding: medical and safety aspects. Wilderness & Environmental Medicine. 11(2):102-8, 2000

Veitl V. Optimized nutrition for alpine athletes. Wiener Medizinische Wochenschrift. 150(8-9):191-4, 2000

Yarnell PR. Heit J. Hackett PH. High-altitude cerebral edema (HACE): The Denver/Front Range experience. Seminars in Neurology.

20(2):209-17, 2000

FORTHCOMING MEETINGS

Fourth International Conference "Hypoxia in Medicine", Geneva, Switzerland, 26-28 September 2001

Russian Academy of Medical Sciences (Moscow, Russia), Department of Sport Science, University of Innsbruck (Innsbruck, Austria), Clinical Research Laboratory of "Hypoxia Medical Academy" (Moscow, Russia) are the organizers of the Conference.

Registration Fee:

300$USA for active participants

150$USA for accompanying persons

The main scientific topics of the Conference are:
1. Fundamental research of hypoxia and of adaptation to hypoxia.
2. Normobaric hypoxia (interval hypoxic training) in preventive and clinical medicine, and in sports.
3. Hypobaric hypoxia in preventive and clinical medicine, and in sports.
4. Mountain medicine.

If you wish to participate in the Conference, please contact the Organizing Committee: 10, rue du Conseil-General, 1205 Geneva, Switzerland, Phone: ++41 22 800 20 35; Fax: ++41 22 800 20 37, e-mail: hypomed@hypomed.ch

12th International Hypoxia Symposium, March 10-14, 2001.

Jasper Park Lodge, Jasper, Alberta, Canada. Contact info@hypoxia.net for more information, or visit www.hypoxia.net. Preliminary program will be available online in January 2000.

BOOKS OF INTEREST TO MEMBERS

There are a number of books available covering aspects of Mountain Medicine. If you are an author or publisher please send details of your book to the Editor for inclusion here.

Altitude Illness, Prevention and Treatment (Stephen Bezruchka, The Mountaineers, Seattle,1994), Mountaineers Books Details by fax from 1-206-223-6306 or phone:: 1-800-553-4453.email: mbooks@mountaineers.org

Going Higher: Man, Oxygen and Mountains (Charles Houston, The Mountaineers, 1999) Information from chouston@zoo.uvm.edu

Handbuch der Trekking- und Expeditionsmedizin
Official guidelines of the Austrian Society for Mountain and Altitude Medicine, 4th edition 1999, 171 pg. Details or Order from

David Williams, Oxford University Press, 1995). Details from email: drw@liverpool.ac.uk or fax ++44 151 706 5667

High Altitude Medicine and Physiology 3rd edition (Michael Ward, James Milledge and John West, Chapman and Hall Medical, 2000). Fax ++44 20 7873 6325. Details from www.arnoldpublishers.com, email: james.watson@hodder.co.uk

Hypoxia Symposia: The complete proceedings of the ten Hypoxia Symposia (1981-1997) are available on one CD. Email: studd@fhs.mcmaster.ca

The High Altitude Medicine Handbook 2nd edition (Andrew J Pollard and David R Murdoch, Radcliffe Medical Press, 1998, price £16.95). Details or Order from http://www.radcliffe-oxford.com/ or : email

bergi@eunet.at

High Altitude Medicine (Herb Hultgren, Hultgren Publications, 1997) Details by fax from: (650) 493 4225, phone (650) 857 9574 or email: hultgren@highaltitudemedicine.com

High Altitude Medicine and Pathology (Donald Heath and

contact.us@radcliffemed.com, tel: + 44 1235 528820; fax: +44 1235 528830.

High Life: A History of High-Altitude Physiology and Medicine (John B. West, Oxford University Press, 1998) $65.00, order 1-800-451-7556 US; 1-800-387-8020 Canada; fax 1-919-677-1303

ANNOUNCEMENTS

Hypoxia Symposia:
The complete proceedings of the ten Hypoxia Symposia (1981-1997) are available on one CD. Email: studd@fhs.mcmaster.ca
Sharron Studd, Division of Continuing education, McMaster University, 1200 Main St West, Hamilton, Ontario L8N 3Z5, Canada.

Bibliography of High Altitude Medicine and Physiology
The Bibliography of High Altitude Medicine and Physiology (BHAMP) is online at a new web site, with a faster search engine. The site is still sponsored by the National Radioastronomy Laboratory. You can find the BHAMP online at: http://annie.cv.nrao.edu/habibqbe.htm. As before, you can search to your heart's content, but you cannot download references. For full functionality you must purchase the BHAMP ($75 US + shipping and handling). It comes in formats compatible with all word processors, but for database functionality you must purchase separately one of the popular bibliography management packages (EndNote, Reference Manager, Procite can all import the BHAMP). BHAMP is provided on one CD in several formats. The CD version now includes bonus libraries with all citations from Index Medicus containing the keysords altitude, hypoxia and mountain. On special request, CDs can be provided for Macintosh computer systems. Orders to: BHAMP, PO Box 343, Montezuma, NM 87731 USA. Enquiries to rroach@hypoxia.net.

Austrian Society For Mountain And Altitude
Special Summer Course, 7-13. July 2001
Franz-Senn-Hütte (Stubaier Alpen)
Refresher Course, 6-9. September 2001
Oberst Klinke Hütte (Gesäuse)

Please Contact: Austrian Society For Mountain And Altitude Medicine, Univ.Doz.Dr.Franz Berghold,
A-5710 Kaprun 130, Austria
Tel + 43 6547 8227; Fax + 43 6547 7772
Email bergi@eunet.at

Mountain Medicine Website
Mountain Medicine Website:
www.mountainmedicine.org
This site was installed 1999 by ICAR-MEDCOM. It is a meeting point for mountaineering physicians and rescuers and offers a wide range of mountain medicine information. The homepage is linked to the most important mountain medicine organisations of ICAR, UIAA and ISMM and many others. So you can choose from a lot of different sources in this field. It will be our aim to collect all scientific and practical data about mountaineering medicine and its medical emergency aspects. Furthermore you will find also on this site the homepage of ICAR-MEDCOM, the Commission for Mountain Emergency Medicine. Try it!
Hermann Brugger, Bruneck
brugger.med@pass.dnet.it

Bolivian High Altitude Medicine Course
July 3- July 7, 2000: High Altitude Medicine Course at the IPPA Clinic of the High Altitude Pathology Institute, Dr. G. Zubieta, Av. Saavedra 2302, P.O. Box 2852, La Paz, Bolivia. Tel

Medicine German Society For Mountain And Expedition Medicine International Courses For Mountain Medicine, Programme 2001
Special Winter Course 1, 21-27 April 2001
Franz-Senn-Hütte (Stubaier Alpen)
Winter Course 2, 5-11. May 2001
Franz-Senn-Hütte (Stubaier Alpen)
Basic Course 1, 9-15. June 2001
Adamekhütte (Dachsteingebiet)
Basic Course 2, 23-29. June 2001
Adamekhütte (Dachsteingebiet)

(591-2) 245394. Fax: (1-603) 584-5976 in USA. Further information at
www.geocities.com/Zubietaippa

SUBMISSION OF ARTICLES

Articles covering all aspects of mountain medicine from the academic science of high altitude physiology to the practical management of altitude illness and from treatment issues in hypothermia to practical medicine in mountain rescue will be considered for publication in the newsletter. Articles submitted for publication must be in English and will be subject to editorial review by appropriate members of the editorial and advisory boards. To reduce administrative costs, submissions should be made by email or floppy disc in a Microsoft Word 2000 compatible format, wherever possible. The editor will try to cope with other electronic formats also. Non-electronic submissions by fax or mail will also be considered from individuals who do not have access to a suitable computer. PLEASE ENSURE THAT AUTOMATIC REFERENCING (USING SOFTWARE SUCH AS ENDNOTE OR REFERENCE MANAGER) is converted to plain text. Do not use footnotes. References should be in the *Vancouver* style.

Articles covering the following areas should be submitted to the editor at the address on the front cover:
1) *Original articles on mountain medicine and physiology*
2) *State-of-the-art reviews*
3) *Case Histories which will be discussed by email by an international expert panel.*
4) *Management guidelines for debate.*
5) *Biographies, historical reviews and obituaries.*
6) *Book reviews of English language books on any aspect of mountain medicine.*
7) *Reports on international and local mountain medicine meetings and conferences.*
8) *Information about national societies, courses, future meetings and books of interest to ISMM members.*

MEMBERSHIP SUBSCRIPTIONS

Subscriptions are due on the 1st January each year. A single reminder will be sent to members who forget to pay on time and if fees are still not received by the membership secretary, membership of the society will cease. Where members have difficulty in paying their subscriptions, they may apply in writing to the President of the society for complimentary

Please ensure that you complete the entire back page of the newsletter each January when you renew your subscription, so that we can be sure that we have your correct address. The coordination of newsletter production, is a complicated international process. Please let us know if you experience any problems.
Membership Application

membership.

 Last modified 29-Nov-2001