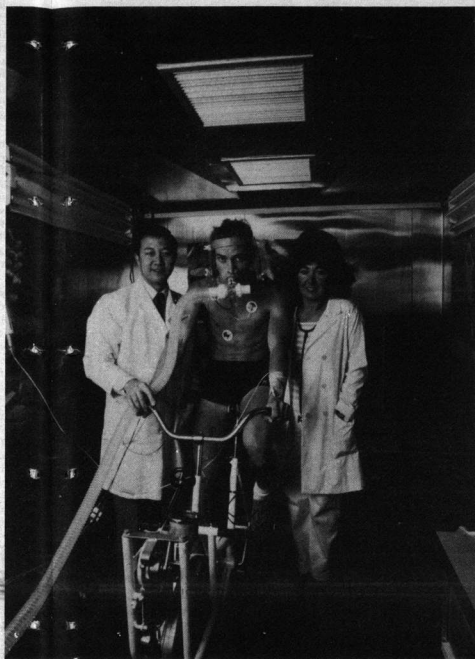


st the cold is imminent



Dr. Wong, assistant and volunteer in coldroom.

body temperature was continuously monitored.

"It was a self-controlled experiment, where the temperature of the cold room was adjusted to suit each subject, so that in the three hour period, his core temperature only dropped a safe one degree," Wang says. The normal cold resistance of the subjects varied greatly, so that the temperature of the cold room ranged from minus two to plus fifteen degrees Centigrade.

The experiments proved fruitful — Wang found that administering theophylline and nutrients could boost the volunteers' cold resistance by about fifty percent. This means that with the drug the core body temperature will only fall half a degree in the time it would normally drop one degree. This may not seem to be a large gain, but it represents a substantial increase in cold resistance, where tiny changes can be critical.

Ira Jacobs of the Defense De-

partment, who is overseeing Wang's work, believes this gain offers the few extra hours that could make the difference between life and death to a stranded soldier or motorist.

Side effects of theophylline should not be a problem, as Wang points out that the drug has been used for years by asthma patients to relax the bronchial tree. Here it is taken in higher doses than he used in his studies.

"It's closely related to caffeine, part of the same family of drugs, and actually has less central body effect, making it less likely to cause the rapid heart beating that can be an effect of caffeine."

Wang goes on to note that if it is marketed, the likelihood that it will be banned from use in competitive athletics is high. The drug appears to improve athletic endurance as well as cold tolerance.

Although it is already being used by prescription for disease

treatment, theophylline will need further testing before it can be sold over the counter. For one thing, females have not yet had the opportunity to be "subjects of this research. The menstrual cycle can change body temperature and make readings unclear, so males were tested first." Now that positive research results are in, it is important to ensure that women gain the same cold protection from the chemical. Wang will be looking for female volunteers for his cold room sometime this spring.

If it turns out that theophylline increases heat production through activation of BAT as well as through a general rise in metabolic rate, there may be implications for weight control in humans.

At St. George's Hospital Medical School in London, Nancy Rothwell and Michael Stock study the role that BAT plays in maintaining a constant body weight in rats. The classic study compares "junk-food" or "cafeteria"-fed rats (that by choice eat twice as much as they need) and chow-fed rats

Junk food rats dispose of their extra calories by producing heat.

(that eat only what they need to maintain health). Instead of becoming grotesquely fat, the "junk-food rats" dispose of their extra calories by producing heat from enlarged brown fat deposits.

As Wang summarizes, "BAT serves as a buffer against excess energy intake and the tendency to become obese — something which would be very disadvantageous to an animal in the wild."

The opinions of researchers vary on the role, or even whether there is a role, of brown fat in adults. Huttunen and co-workers found that BAT is present in larger quantities in outside workers and derelicts than in inside workers. This strongly suggests that humans, like other mammals, can increase brown fat content in response to the cold.

A suggestion that BAT may be involved in weight control lies in

the occurrence of a human disease, pheochromocytoma, that is characterized by enlarged BAT and dramatic weight loss. However, Dr. Paul Trayhurn, of the University of Alberta's Medical Department, says that this symptomatic wasting away of the body has not been clearly linked to the increase in BAT.

Trayhurn studies BAT in mice that have a genetic predisposition to developing obesity without

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overeating in order to understand how weight is regulated in normal mice. He warns that studies on animals may not be applicable to humans, in which diet-induced thermogenesis (heat production) by BAT has not been clearly demonstrated.

If human weight is found to be partially regulated by BAT, the research areas of Trayhurn and Wang could pave the way to help people who gain weight without overeating. It has been suggested that those fortunate people who can constantly overeat without gaining weight may have more efficient or larger deposits of brown fat. Even if this is the case, many years of experimentation will be necessary before a safe BAT stimulant, that might aid in the battle against human obesity, would be marketable.

Regardless, the marketing of a weapon against the cold is imminent. This possibility of increased cold tolerance is a warming thought to Northern Alberta residents, and crucial to those whose lives may be threatened by a vicious environment.

Story by
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