

If the environment becomes too cold, we respond with vasoconstriction and with shivering. The vasoconstriction helps to conserve the body heat and the shivering can provide up to three times the resting heat production. If the skin is exposed to the intense cold for any length of time, there is a danger that the prolonged vasoconstriction will lead to frostbite. In the hand region there is an important, built-in, anti-frostbite system. The hands at first respond to intense cold by drastic vasoconstriction; then, after about five minutes, this is reversed and there is strong vasodilation, the hands becoming hot and flushed. (Anyone who has been snowballing in winter will have experienced this.) The constriction and dilation of the hand region then continues to alternate, the constriction phases curtailing heat loss and the dilation phases preventing frostbite. Individuals living permanently in a cold climate undergo various forms of bodily acclimitisation, including a slightly increased basal metabolic rate.

As our species has spread over the globe, important cultural additions have been made to these biological temperature control mechanisms. The development of fire, clothing, and insulated dwelling-houses have combated heat loss, and ventilation and refrigeration have been used against heat gain. Impressive and dramatic as these advances have been, they have in no way altered our internal body temperature. They have merely served to control the external temperature, so that we can continue to enjoy our primitive primate temperature level in a more diverse range of external conditions. Despite recent claims, suspended animation experiments involving special freezing techniques are still confined to the realms of science fiction.

Before leaving the subject of temperature responses, there is one particular aspect of sweating that should be mentioned. Detailed studies of sweating responses in our species have revealed that they are not as simple as they may first appear. Most areas of the body surface begin to perspire freely under conditions of increased heat, and this is undoubtedly the original, basic response of the sweat-gland system. But certain regions have become reactive to other types of stimulation 187