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Body temperature and its effect on leukocyte mobilization, cytokines and markers of neutrophil activation during and after exercise.

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We investigated the influence of rectal temperature on the immune system during and after exercise. Ten well-trained male cyclists completed exercise trials (90 min cycling at 60% [Formula: see text] time trial) on three separate occasions: once in 18 degrees C and twice in 32 degrees C. Twenty minutes after the trials in 32 degrees C, the cyclists sat for approximately 20 min in cold water (14 degrees C) on one occasion, whereas on another occasion they sat at room temperature. Rectal temperature increased significantly during cycling in both conditions, and was significantly higher after cycling in 32 degrees C than in 18 degrees C ($P < 0.05$). Leukocyte counts increased significantly during cycling but did not differ between the conditions. The concentrations of serum interleukin (IL)-6, IL-8 and IL-10, plasma catecholamines, granulocyte-colony stimulating factor, myeloperoxidase and calprotectin increased significantly following cycling in both conditions. The concentrations of serum IL-8 (25%), IL-10 (120%), IL-1 receptor antagonist (70%), tumour necrosis factor-alpha (17%), plasma myeloperoxidase (26%) and norepinephrine (130%) were significantly higher after cycling in 32 degrees C than in 18 degrees C. During recovery from exercise in 32 degrees C, rectal temperature was significantly lower in response to sitting in cold water than at room temperature. However, immune changes during 90 min of recovery did not differ significantly between sitting in cold water and at room temperature. The greater rise in rectal temperature during exercise in 32 degrees C increased the concentrations of serum IL-8, IL-10, IL-1ra, TNF-alpha and plasma myeloperoxidase, whereas the greater decline in rectal temperature during cold water immersion after exercise did not affect immune responses.