

Serotonin & central nervous system fatigue

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Fatigue from voluntary muscular effort is a complex phenomenon involving the central nervous system (CNS) and muscle. An understanding of the mechanisms within muscle that cause **fatigue** has led to the development of nutritional strategies to enhance performance. Until recently, little was known about CNS mechanisms of **fatigue**, even though the inability or unwillingness to generate and maintain central activation of muscle is the most likely explanation of **fatigue** for most people during normal daily activities. A possible role of nutrition in central **fatigue** is receiving more attention with the development of theories that provide a clue to its biological mechanisms. The focus is on the neurotransmitter serotonin [5-hydroxytryptamine (5-HT)] because of its role in depression, sensory perception, sleepiness, and mood. Nutritional strategies have been designed to alter the metabolism of brain 5-HT by affecting the availability of its amino acid precursor. Increases in brain 5-HT concentration and overall activity have been associated with increased physical and perhaps mental **fatigue** during endurance exercise. Carbohydrate (CHO) or branched-chain amino acid (BCAA) feedings may attenuate increases in 5-HT and improve performance. However, it is difficult to distinguish between the effects of CHO on the brain and those on the muscles themselves, and most studies involving BCAA show no performance benefits. It appears that important relations exist between brain 5-HT and central **fatigue**. Good theoretical rationale and data exist to support a beneficial role of CHO and BCAA on brain 5-HT and central **fatigue**, but the strength of evidence is presently weak.