

muscle physiology lecture 35

tryptophan and fatigue and serotonin metabolism

although brain function is not determined by one single neurotransmitter, the balance between serotonin and dopamine seems to determine a lot. they are huge players in human performance, there is a recipe for being in the zone.

if you favor dopamine by increasing the amount of it in your synaptic cleft, you can increase or prolong arousal and performance (strength,

acceleration, reaction time, stamina) cocaine inhibits the reuptake of

dopamine and serotonin. favoring serotonin results in tiredness,

accelerates the onset of fatigue. central fatigue theory becoming popularized.

most of our serotonin is in our guts. fourteen different serotonin receptors have been identified. they mediate both excitatory and inhibitory neurotransmission,

don't know all of serotonin's functions. increasing serotonin in the brain will

affect the central nervous system's function, which can contribute to fatigue

and impair exercise performance. serotonin is synthesized from tryptophan.

although tryptophan in the brain does make you tired, eating tryptophan

will not get it into the brain because of the blood-brain barrier. tryptophan

has to get into the brain via a large neutral amino acid transporter. they

shuttle your neutral amino acids like BCAAs and AAAs. with fewer BCAAs

monopolizing the transporters, the brain would see more tryptophan. exercise

can eliminate the amount of BCAAs because they are oxidized at an accelerated

rate while working out. so, during exercise, although the amount of tryptophan

you have is the same, you have fewer BCAAs and more free tryptophan

that are not bound to albumin. this combination allows more tryptophan

to enter the brain and increase serotonin concentration. during the start

of exercise, you have an adrenal response that probably overpowers

serotonin related fatigue. later in a workout session or even afterwards,

higher levels of serotonin concentrations might be a considerable

mechanism of fatigue