HOW DOES EXERCISE ASSIST WITH ADHD?

While most of us focus on exercise as a way to trim our waistlines, the better news is that routine physical activity firms up the brain -- making it a simple**, alternative ADHD treatment**. "**Exercise turns on the attention system, the so-called executive functions — sequencing, working memory, prioritizing, inhibiting, and sustaining attention,**" says Ratey, author of the forthcoming ***Spark: The Revolutionary New Science of Exercise and the Brain*** (Little, Brown). "**On a practical level, it causes kids to be less impulsive, which makes them more primed to learn."**

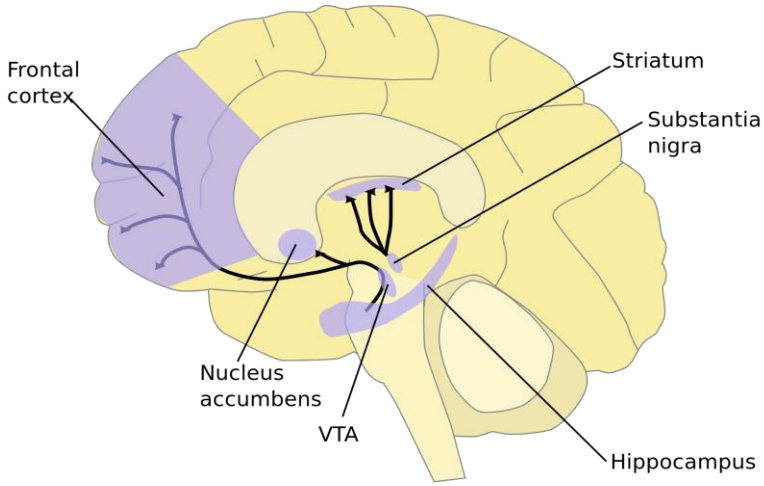
The latest news about exercise is that it helps kids push through past failures and attack things they didn't succeed at before. "The refrain of many ADHD kids is, 'No matter what I do, I'm going to fail,'" says Ratey. "Rat studies show that exercise reduces learned helplessness. In fact, if you're aerobically fit, the less likely you are to learn helplessness."

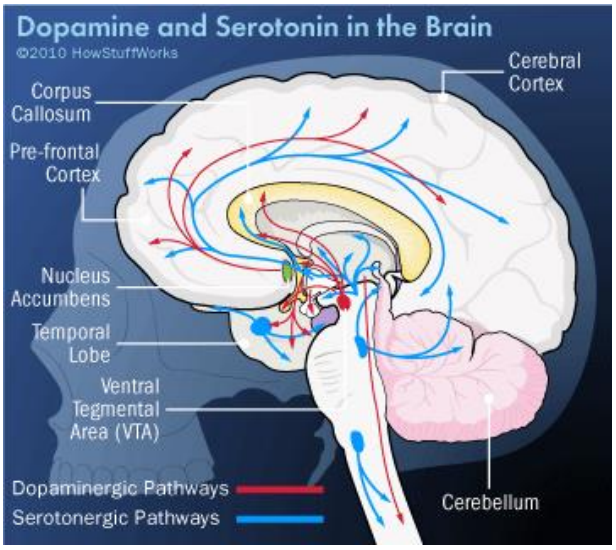
So how, exactly, does exercise deliver these benefits to the ADHD brain? When you walk, run, or do a set of jumping jacks or pushups, your brain releases several important chemicals.

Endorphins, for one, hormone-like compounds that regulate mood, pleasure, and pain. That same burst of activity also elevates the brain's dopamine, norepinephrine, and serotonin levels. These brain chemicals affect focus and attention, which are in short supply in those with ADHD. "When you increase dopamine levels, you increase the attention system's ability to be regular and consistent, which has many good effects," explains Ratey, like reducing the craving for new stimuli and increasing alertness.

Dopamine

In the **brain**, **dopamine** functions as a neurotransmitter—a chemical released by neurons (nerve cells) to send signals to other nerve cells. The **brain** includes several distinct **dopamine** pathways, one of which plays a major role in reward-motivated behaviour.




Dopamine and Serotonin in the Brain
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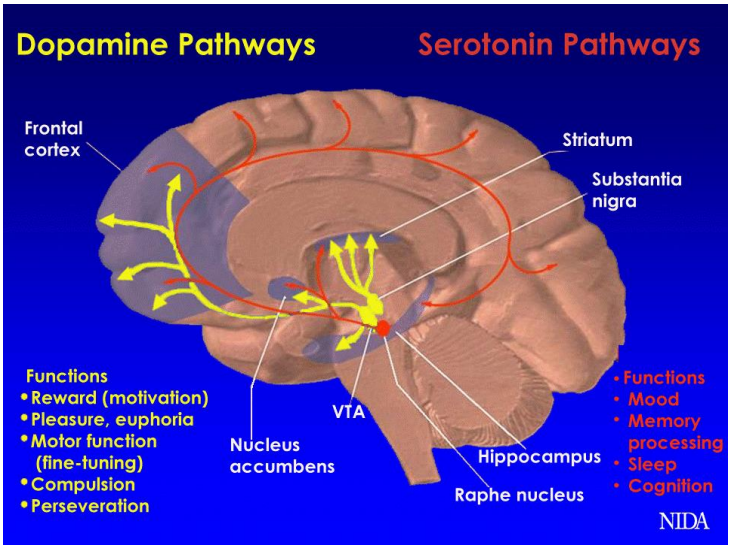
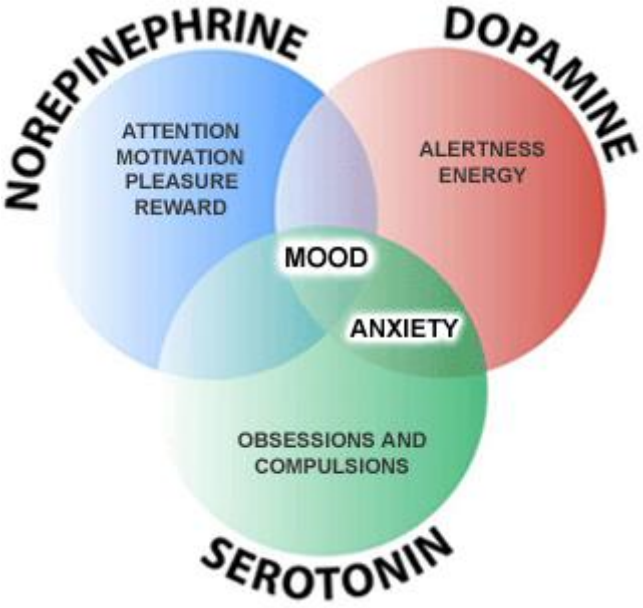
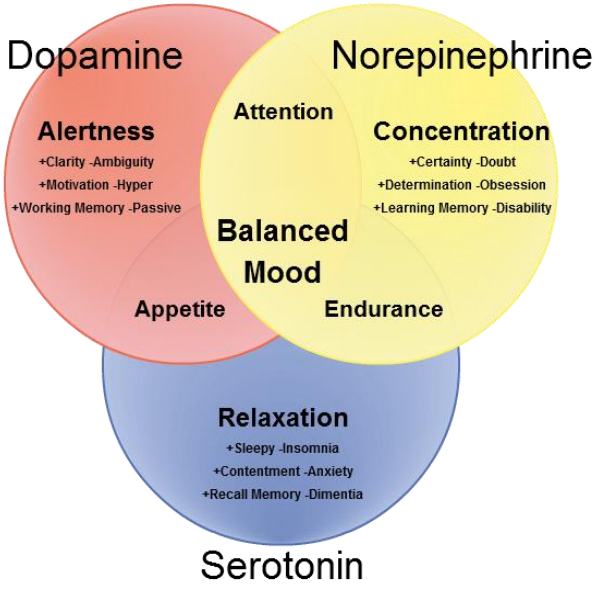
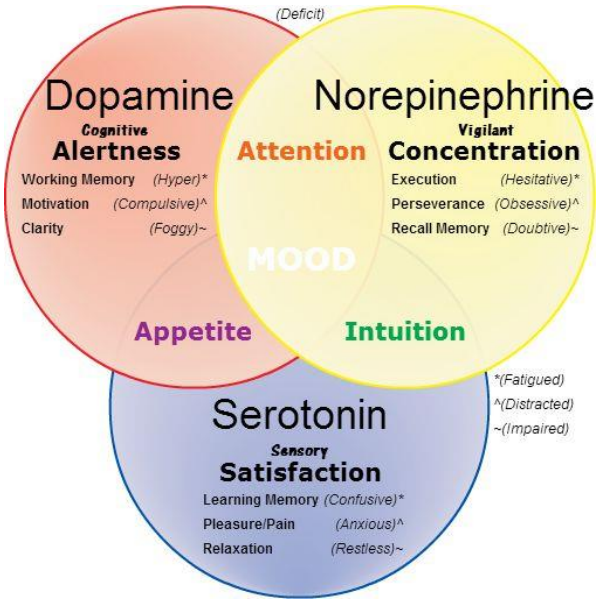
Cerebral Cortex
Corpus Callosum
Pre-frontal Cortex
Nucleus Accumbens
Temporal Lobe
Ventral Tegmental Area (VTA)
Dopaminergic Pathways
Serotonergic Pathways
Cerebellum


Dopamine Pathways
Serotonin Pathways
Frontal cortex
Striatum
Substantia nigra
Functions
• Reward (motivation)
• Pleasure, euphoria
• Motor function (fine-tuning)
• Compulsion
• Perseveration
VTA
Nucleus accumbens
Hippocampus
Raphe nucleus
• Functions
• Mood
• Memory processing
• Sleep
• Cognition
NIDA


NOREPINEPHRINE
DOPAMINE
ATTENTION
MOTIVATION
PLEASURE
REWARD
ALERTNESS
ENERGY
MOOD
ANXIETY
OBSESSIONS AND COMPULSIONS
SEROTONIN


Dopamine
Norepinephrine
Alertness
+Clarity -Ambiguity
+Motivation -Hyper
+Working Memory -Passive
Attention
Concentration
+Certainty -Doubt
+Determination -Obsession
+Learning Memory -Disability
Balanced Mood
Appetite
Endurance
Relaxation
+Sleepy -Insomnia
+Contentment -Anxiety
+Recall Memory -Dimentia
Serotonin


(Deficit)
Dopamine
Cognitive
Alertness
Working Memory (Hyper)*
Motivation (Compulsive)^
Clarity (Foggy)~
Norepinephrine
Attention
Vigilant
Concentration
Execution (Hesitative)*
Perseverance (Obsessive)^
Recall Memory (Doubtive)~
MOOD
Appetite
Intuition
*(Fatigued)
^(Distracted)
~(Impaired)
Serotonin
Sensory
Satisfaction
Learning Memory (Confusive)*
Pleasure/Pain (Anxious)^
Relaxation (Restless)~