

ADHD and The Brain

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**CHILDREN ADOLESCENT AND YOUNG ADULT
CONNECTIONS (CAYAC)**

Objectives

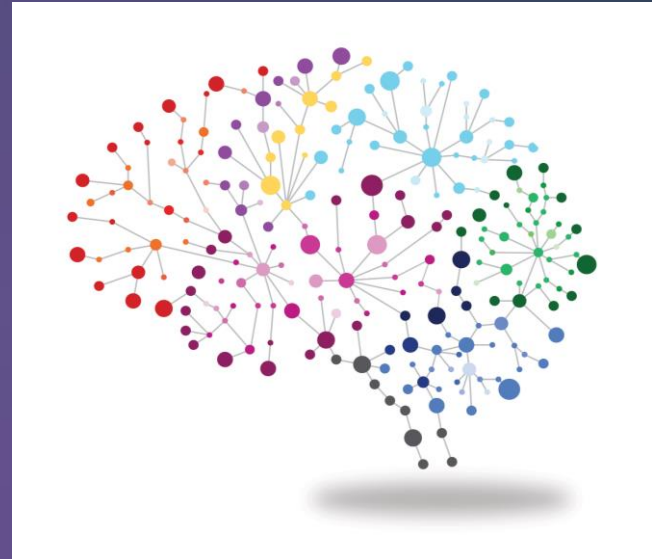
1. Learn the specific **brain structures and neurochemicals** involved in ADHD.
2. Learn how to recognize the specific **symptoms** of ADHD.
3. Learn the concept of **executive functioning** and how it is impacted with ADHD.
4. Recognize **myths** about taking medication for ADHD.
5. Learn **medication options** for ADHD.



Understanding the ADHD Brain

Structural Differences

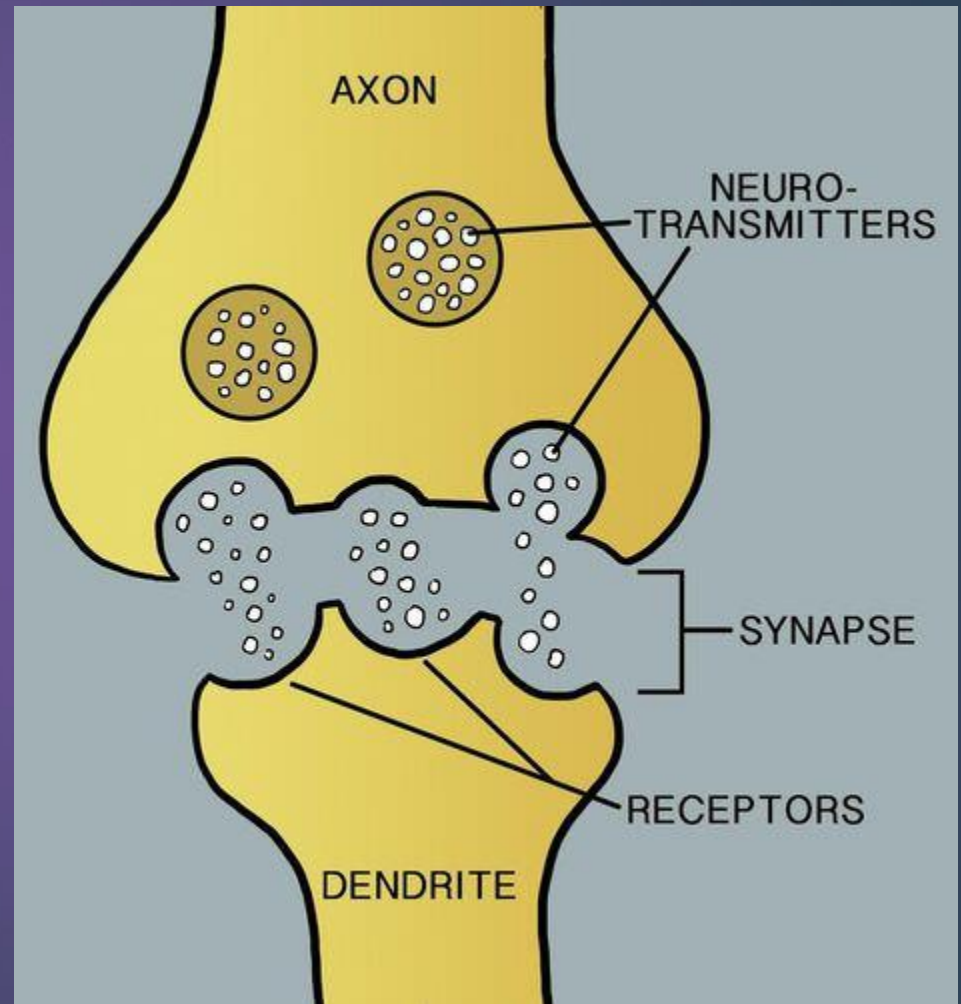
- Frontal Lobes are less developed as compared to “typical” peers



- ***Frontal lobes are not done developing until age 25***

Neurochemical Differences

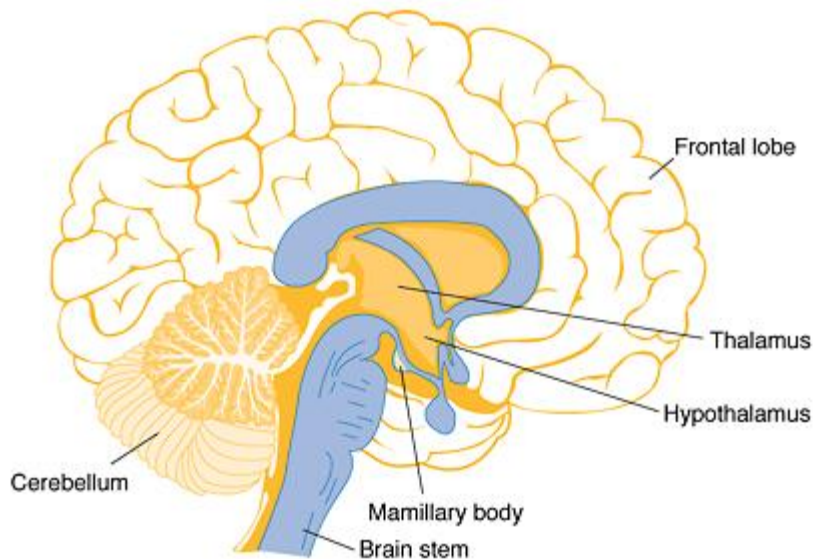
- ▶ Dopamine and Norepinephrine
- ▶ Motivation, reward, focus, planning, attention, and movement



Self-Regulation and the Brain

▶ Automatic Regulation – Bottom Up

▶ Intentional or Deliberate Regulation – Top Down



Automatic Regulation: Bottom Up

- ▶ Alertness to detect sensory information
 - ▶ ADHD brains – less cortical arousal
- ▶ Filtering of information



Deliberate Regulation: Top Down

Working Memory

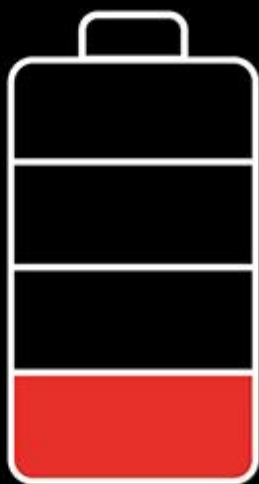
- Short term
- Manipulate Information

Inhibiting Responses

- Delay Satisfaction

Set Shifting

- Seeing things from more than one point of view



Executive Functioning

How it feels to have ADHD...

- ▶ You are in a new city and you only have a new, fast motorcycle to get you to a restaurant to meet your friends. All your other friends are driving cars with passengers to read directions from a map or use your GPS.



Executive Functioning: Your Brain's GPS

- Connecting the dots between actions and consequences
- Organizing information
- Impulse control
- Shifting attention
- Emotion regulation

Executive Functioning Age

True Age	EF Age
5	3.5
6	4
7	5
8	5.6
9	6
10	7

True Age	EF Age
11	7.7
12	8.5
13	9.1
14	9.8
15	10.5
16	11.2

ADHD Symptoms

ADHD: The Symptoms

- ▶ **ADHD is a disorder of the brain**, highly genetically influenced
 - ▶ Self-management skills are underactive
 - ▶ Skills such as planning, remembering, and paying attention are **driven by genetics**
- ▶ What does this mean?

Your child is not doing these behaviors intentionally.

ADHD: The Symptoms

▶ Inattention

- ▶ Forgetfulness
- ▶ Limited attention
- ▶ Easily distracted
- ▶ Difficulty following through on tasks
- ▶ Does not seem to listen when spoken to directly
- ▶ Makes careless mistakes



ADHD: The Symptoms

► **Hyperactivity**

- Often fidgets
- Talks excessively
- Trouble waiting his/her turn
- Interrupts others
- Often leaves seat when expected to stay seated
- “On the go”



Statistics

- ▶ ADHD occurs in 5% of children, 2.5% of adults
- ▶ ADHD is more frequent in males than females
 - ▶ 2:1 in children; 1.6:1 in adults
- ▶ Females are more likely to present primarily with inattentive symptoms
 - ▶ Which may cause ADHD to go undetected until later in development

My child was diagnosed with ADHD, what does this mean?


- ▶ Untreated ADHD can have several unfavorable outcomes:
 - ▶ Delayed motor coordination (60% of individuals)
 - ▶ Greater risk of accidents (4-5x more speeding tickets)
 - ▶ Difficulties with sleep (20-25%)
 - ▶ Lower sense of self-esteem
 - ▶ Impaired relationships with peers
 - ▶ Earlier sexual activity (38% higher teen pregnancy, 16% higher risk of STDs as teens)

My child was diagnosed with ADHD, what does this mean?

However...There is good news!

- ▶ ADHD is one of the most researched psychiatric disorders
- ▶ ADHD **medication** is one of the most researched medications in psychiatry
- ▶ **Treatment WORKS!**
 - ▶ 70-80% of those treated with stimulant medication experience significant relief from symptoms
- ▶ Family and parent strategies and school support are two big components to treatment as well but are far more effective when medication is part of treatment. (Stay tuned for parts 2 and 3!)

Medication



You're telling me that the most effective treatment is medication, but giving my child a medication to manage their behaviors worries me...

Myths about Medication

- ▶ Medications for ADHD are addictive
 - ▶ Only if inhaled or injected
 - ▶ Proper medication treatment reduces likelihood of later substance use disorders
- ▶ Medication will change my child's personality
 - ▶ NO, but it improves their internal experience, helps with development
- ▶ Increase aggression
 - ▶ Actually the opposite



Myths about Medication

- ▶ Causes Tourette's
 - ▶ If someone is already predisposed and has tics, 1/3 increase, 1/3 no change, 1/3 decrease
- ▶ Dosage is often too much
 - ▶ On average, doctors under-dose children
- ▶ Overprescribed
 - ▶ Only 1/2 of all children with ADHD are taking medication



Types of Medication

Treatment

Stimulants

- ▶ Stimulant medication is one of the most researched pediatric medications
- ▶ Helps control hyperactive and aggressive behaviors
- ▶ Medication decisions are made based on:
 - ▶ Individual's responsiveness
 - ▶ Presenting symptoms
 - ▶ Family history

Types of Medication

Treatment

Stimulants

- ▶ Research shows that stimulants help improve:
 - ▶ Social relationships
 - ▶ Academic achievement
 - ▶ Normalize inattention, hyperactivity, and impulsivity

Types of Medication Treatment

Non-Stimulants

- ▶ Non-stimulants are an alternate option to stimulants
 - ▶ However, non-stimulants have **much less** research support
- ▶ Typically decided upon if:
 - ▶ Stimulants found to be ineffective
 - ▶ Comorbidity
 - ▶ Family history

If you are still hesitant about medication use...

- ▶ Consult with a local psychiatrist
 - ▶ There are several in our community who specialize in childhood/adolescent ADHD!
- ▶ Recall the brain chemistry we just reviewed!
 - ▶ Medication helps adjust for brain differences present in those with ADHD (motivation and attention)
- ▶ Refer to the research to get more education about your choices and empirical findings
- ▶ Remember: medication **AND** behavioral treatment
 - ▶ *And medication makes behavioral treatment more effective!*

Questions?

