



The Science of AuDHD

with Prof James Brown

Doors: 7pm | Talk Starts: 7:30pm

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@adhdadult_james



WHY DOES THE SCIENCE MATTER?

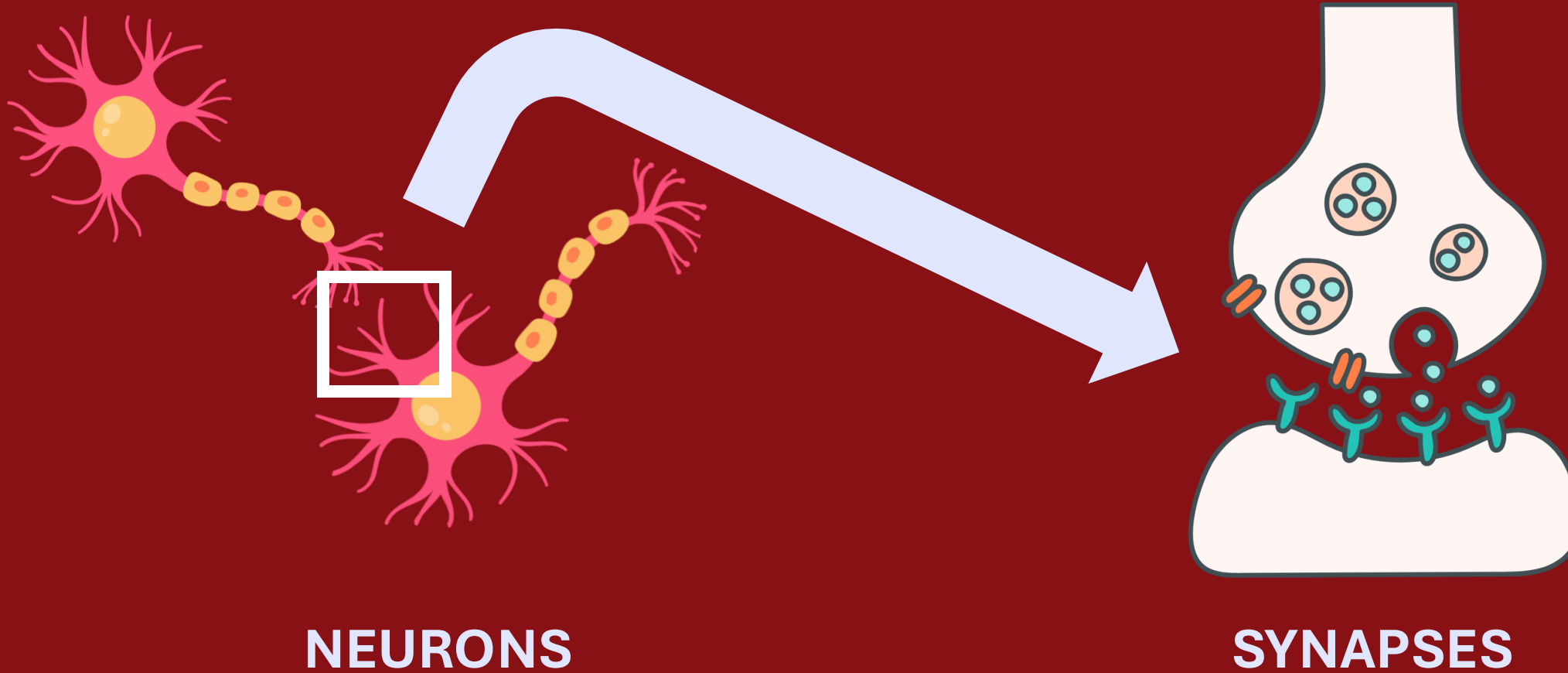
- **Informs support:** knowing the biology helps match strategies to how the brain actually works.
- **Reduces stigma:** these conditions are neurodevelopmental differences, not personal failings.

WHERE I LEARNED MOST ABOUT AuDHD

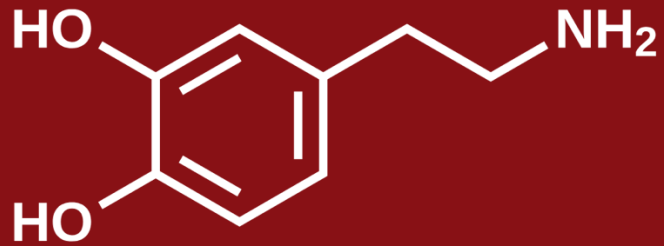


THE BRAIN AND BRAIN DEVELOPMENT

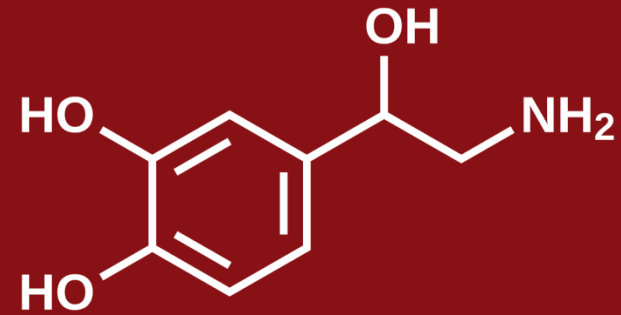
NEURONS & SYNAPSES



NEUROTRANSMITTERS

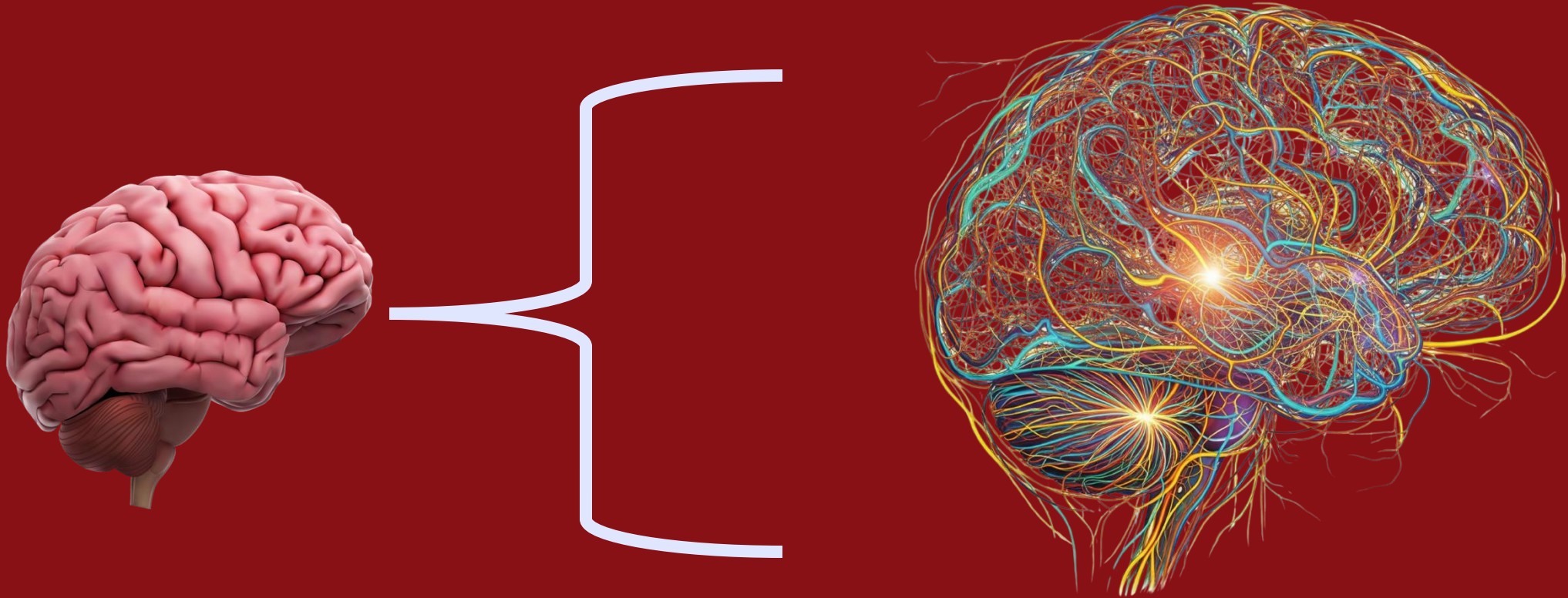


DOPAMINE

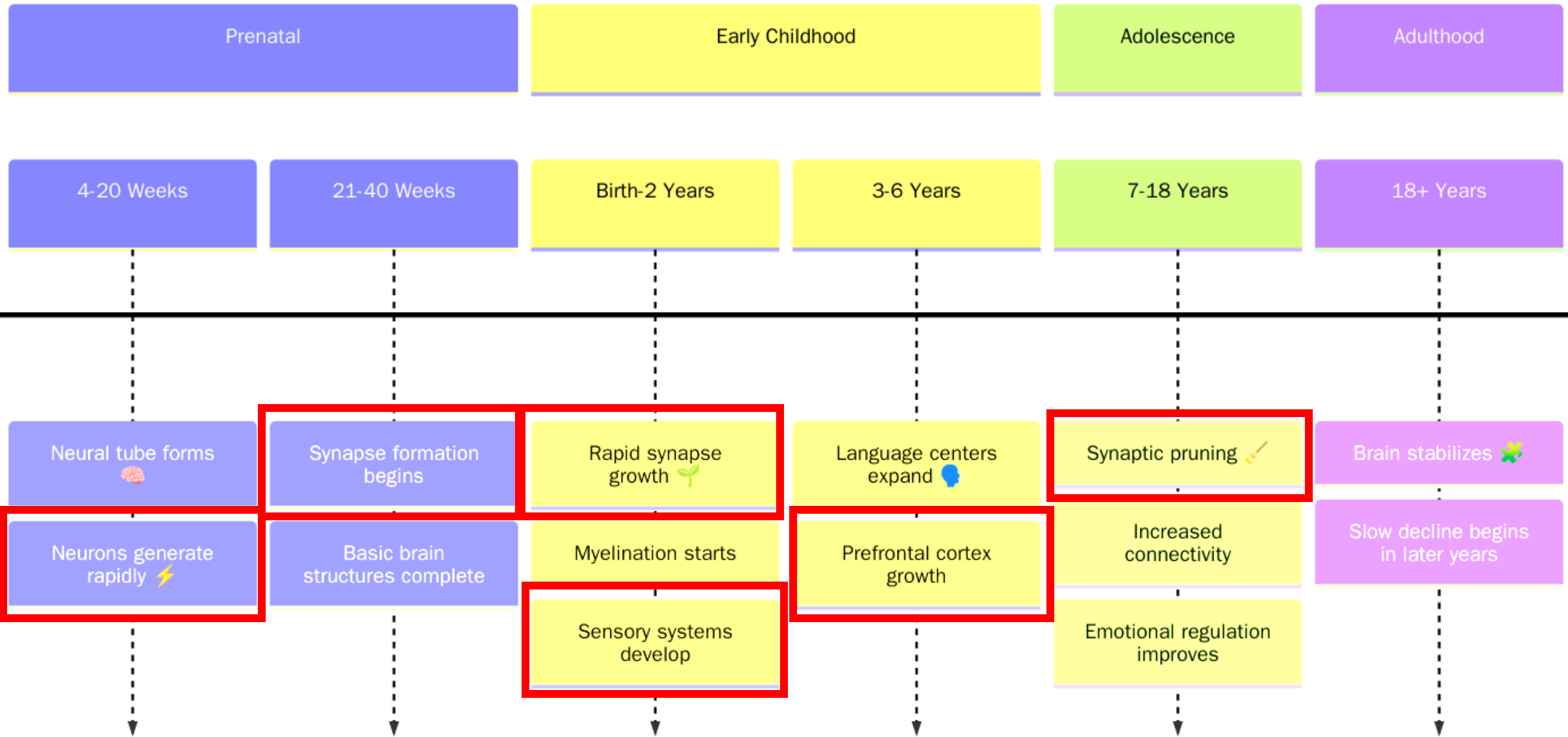


NORADRENALINE

BRAIN NETWORKS



Brain Development Over Time

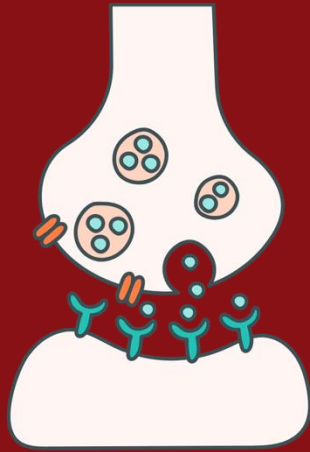


THE SCIENCE OF ADHD

ADHD

- **Attention-Deficit Hyperactivity Disorder.**
- **A neurodevelopmental condition affecting ATTENTION, IMPULSE CONTROL, EMOTIONS and MOTIVATION.**
- **Differences in the brain cause 'EXECUTIVE DYSFUNCTION'.**

ADHD NEUROBIOLOGY



**ALTERED
NEUROTRANSMITTERS**



**ALTERED NETWORK
CONNECTIVITY/ACTIVITY**

EXECUTIVE FUNCTION

THREE CORE EFs



**WORKING
MEMORY**

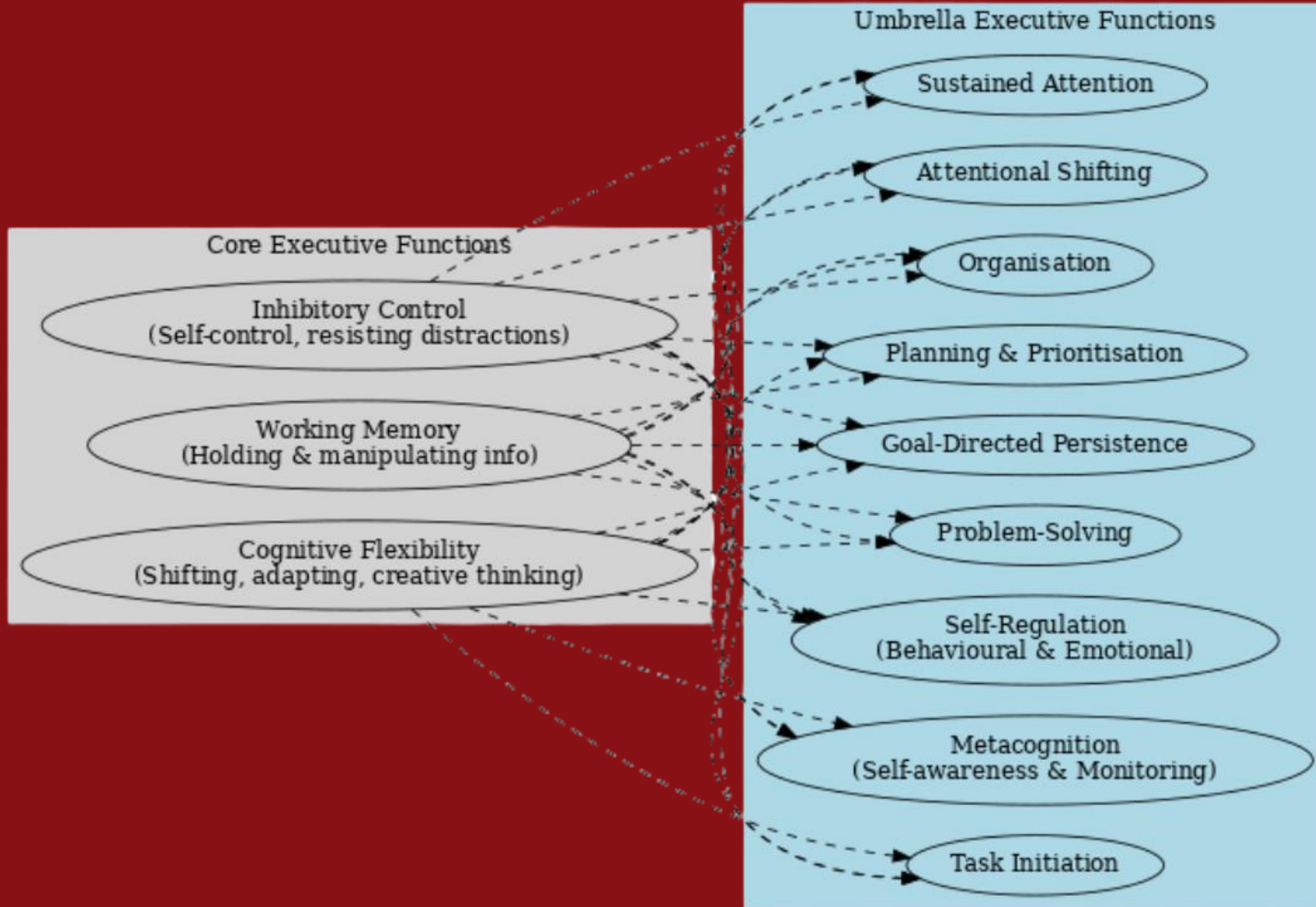


INHIBITION



**COGNITIVE
FLEXIBILITY**

FURTHER EXECUTIVE FUNCTIONS



DIAGNOSIS

- **5/9 symptoms of inattentiveness and/or hyperactivity/impulsivity**
- **Symptoms as a child (<12)**
- **Symptoms having moderate impact on two domains of life**

TREATMENT



MEDICATION

INCREASES
NEUROTRANSMITTER
AVAILABILITY

THE SCIENCE OF AUTISM

AUTISM/ASD/ASC

- **Autism Spectrum Disorder (ASD)**
- **A neurodevelopmental condition affecting SOCIAL COMMUNICATION, SENSORY PROCESSING, and PATTERNS OF BEHAVIOUR.**
- **Differences in brain structure, connectivity, and chemistry underlie these traits.**

AUTISM NEUROBIOLOGY



**ALTERED BRAIN
GROWTH**



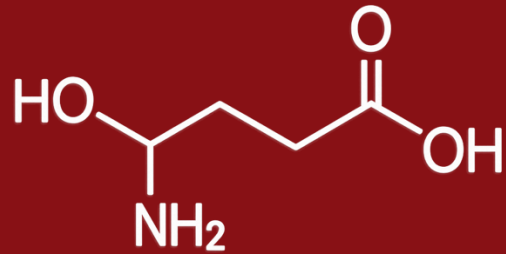
**CHANGES IN CORTICAL
ORGANISATION**



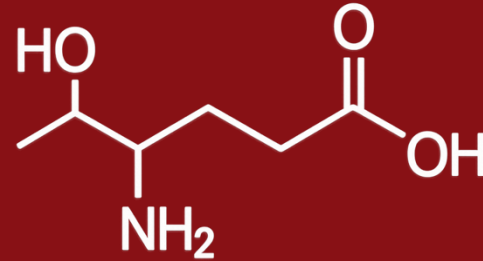
**ALTERED NETWORK
CONNECTIVITY/ACTIVITY**

NEUROTRANSMITTERS & AUTISM

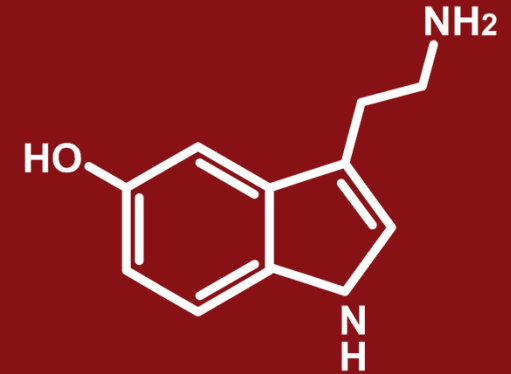
- Neurotransmitter imbalances



GABA



GLUTAMATE



SEROTONIN

EXECUTIVE FUNCTION

- In ADHD, EF difficulties are more often tied to SUSTAINING ATTENTION, RESISTING IMPULSES, and SELF-MOTIVATION.
- In autism, challenges may be more evident in COGNITIVE FLEXIBILITY and planning than in pure inhibitory control.

DIAGNOSIS

Communication

1. Deficits in social-emotional reciprocity
2. Deficits in nonverbal communicative behaviours
3. Deficits in developing, maintaining, and understanding relationships

Behaviour

1. Stereotyped or repetitive movements, use of objects, or speech
2. Insistence on sameness, inflexible routines, or ritualised patterns
3. Highly restricted, fixated interests
4. Hyper- or hypo-reactivity to sensory input or unusual interest in sensory aspects of the environment

C. Symptoms must be present in the early developmental period (but may not become fully manifest until social demands exceed limited capacities or may be masked by learned strategies in later life).

D. Symptoms cause clinically significant impairment in social, occupational, or other important areas of current functioning.

TREATMENT

- **No 'Treatment', but therapy and education help**
- **Medical cannabis in the early days...**

WHAT IS AuDHD?

WHAT IS AuDHD?

- **An informal term for people who are both autistic and have ADHD.**
- **Combined traits from both conditions can interact in complex ways.**
- **Not just ADHD + Autism!**

AuDHD - FROM "COMORBIDITY" TO DISTINCT PROFILE

- **DSM-IV: autism and ADHD couldn't co-exist.**
- **DSM-5 (2013): rule removed.**
- **Clinical reality catches up to lived experience.**

HOW COMMON IS AuDHD?

- **50 – 70% of autistic people meet ADHD criteria.**
- **15 – 40% of ADHDers show signs of autism.**
- **High overlap ≠ coincidence.**

DIAGNOSIS

- ????

THE BIOLOGY OF AuDHD

CONVERGENCE OF ADHD AND AUTISM





**NOT 'DOUBLE':
UNIQUE NEUROTYP**

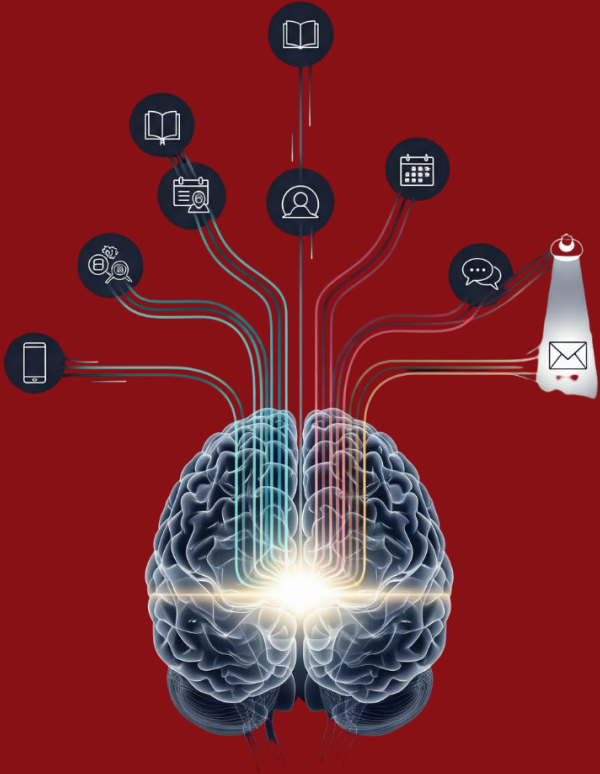
SHARED GENETICS OF ADHD/ASD

- Dopamine system - DRD4
 - Explains overlap in attention, motivation & executive function issues
- Serotonin system - SLC6A (SEROTONIN & GABA transporter)
 - Linked to challenges common in both conditions
- Neural connectivity genes - Cadherins & neurexins
 - Suggests shared differences in how the brain is built and functions

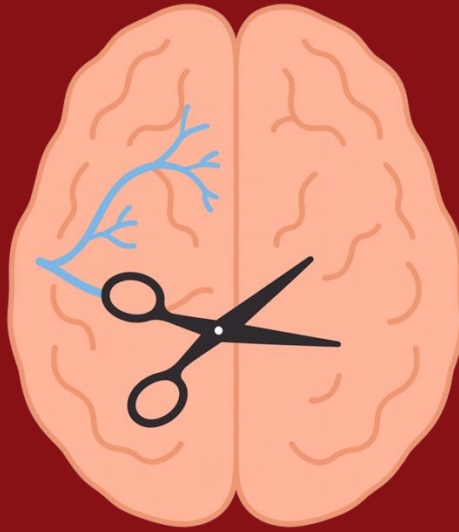
THE UNIQUE 'AuDHD BRAIN'

- AuDHD is associated with reduced cortical synapses.
-  Autistic features associated with  synaptic density.
- Long-range UNDERCONNECTIVITY, local OVERCONNECTIVITY.
- Not a mix — a remix

'ADHD/ASD CONVERGENCES'



PFC - EF & ATTENTION



NEURAL PRUNING

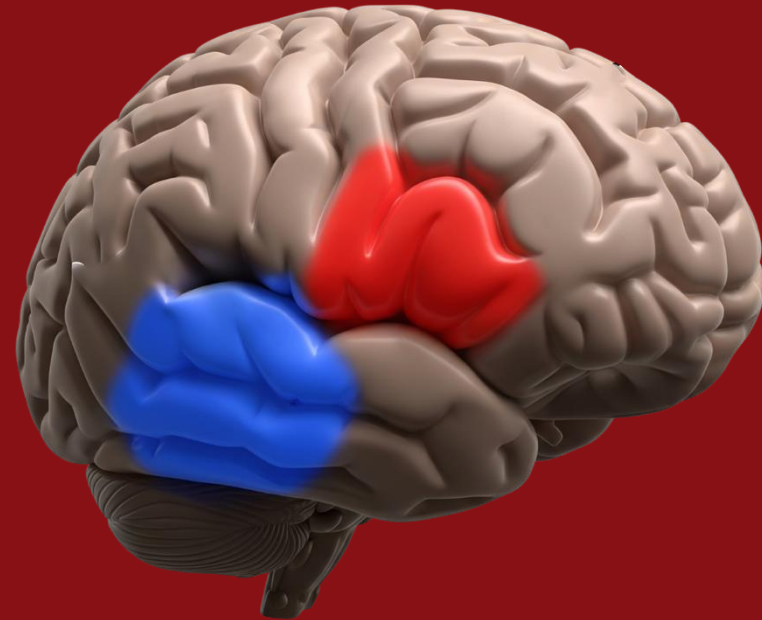


LIMBIC SYSTEM

‘ADHD/ASD DIVERGENCES’



ADHD - REWARD SYSTEM



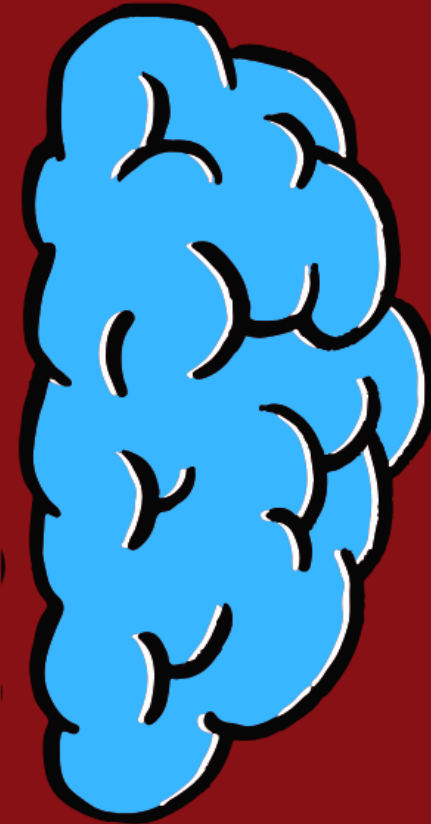
**AUTISM: LANGUAGE/SOCIAL
COGNITION CIRCUITS**

BUT IN AuDHD?

AuDHD = both/all (AKA: choose your chaos)

TREATMENT – ADHD MEDICATION

ADHD
TRAITS



AUTISTIC
TRAITS



REWARD & MOTIVATION

CAKE NOW?



NOW

OR



NEXT WEEK

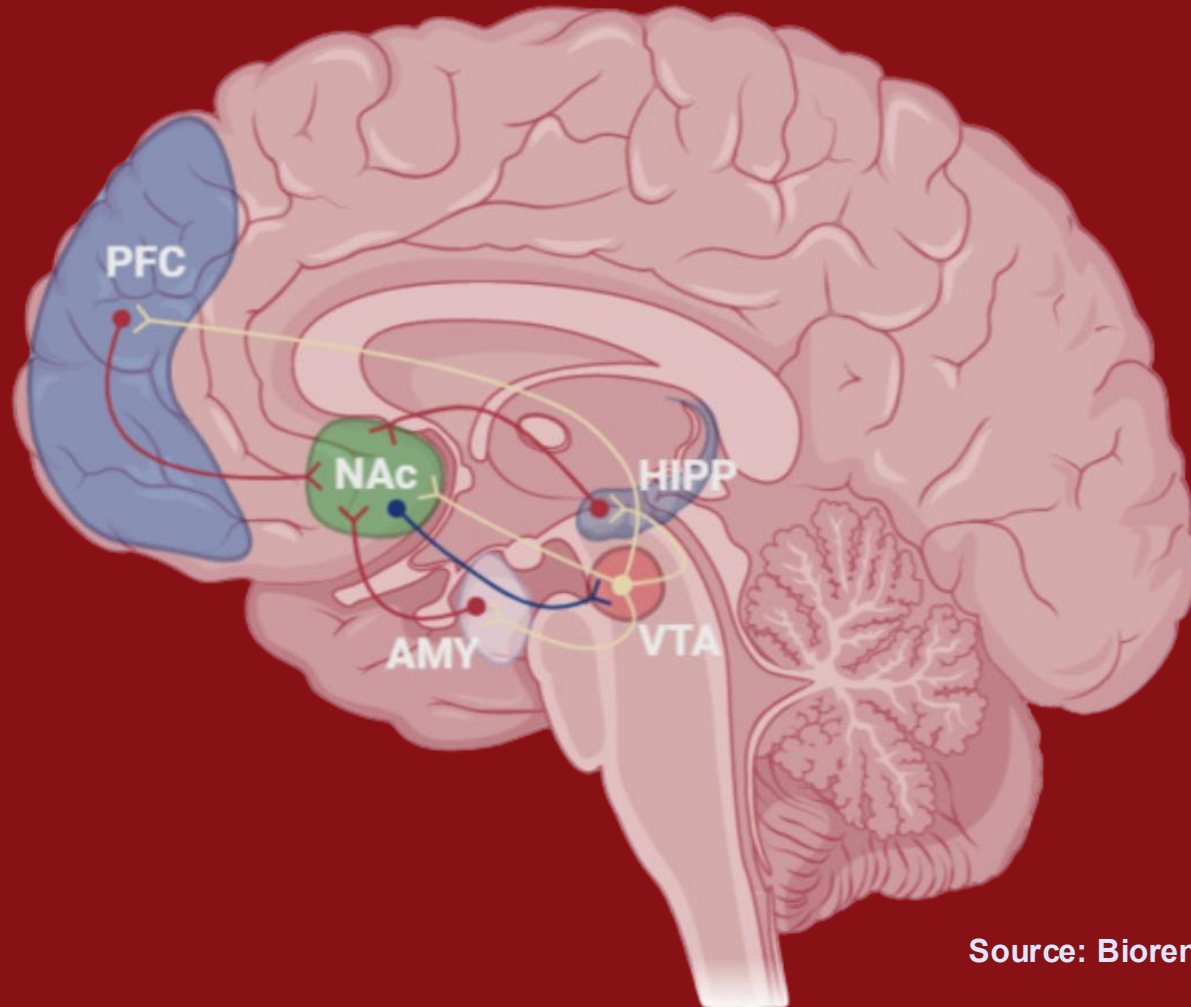
WHAT IS 'REWARD'?

- **Natural brain process:**

Diverse stimuli (substances, situations, events, activities) associate with a positive or desirable (or at least winnable) outcome.

- **Increases motivation to repeat.**
- **Reward can be *anticipatory* or *experiential*.**
- **Not 'Liking', but 'Wanting' or 'Resolving'.**

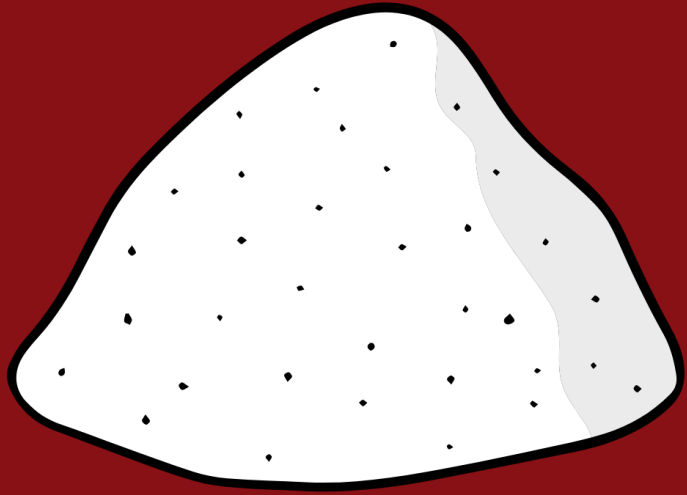
REWARD AND THE BRAIN



Source: Biorendor.com

REWARD IN ADHD

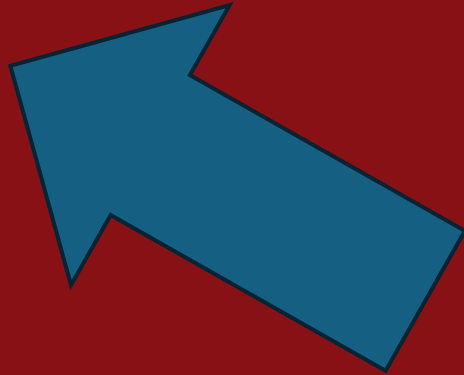
ENGAGING WITH UNREWARDING TASKS IS
LIKE TRYING TO PUSH TWO MAGNETS
TOGETHER AT THE WRONG ENDS.







**SMALL
IMMEDIATE REWARD**



**LARGER
DELAYED REWARD**

MONOTROPISM & REWARD IN AuDHD

REWARD IN AUTISM

- Autistic reward systems respond differently:
 - Strong reward from **interests/special topics**
 - Weaker reward from **social cues** (e.g., praise, small talk)
 - Predictability and sameness can be rewarding
 - “Wanting” can be highly concentrated on *specific interests*.

WHAT IS MONOTROPISM?

- A theory of autistic attention.
- Attention is drawn into a *narrow, intense focus*.
- Deep flow → can feel rewarding, hard to disengage.
- Outside tasks may feel *unreachable* or *unrewarding*.

***“It’s like having one open tunnel
at a time... other tunnels exist,
but are dark until the light is
switched.”***

WHAT'S HAPPENING IN THE BRAIN?

- **Reward pathways work differently than in ADHD:**
 - **Autistic brains show altered responses to novelty vs predictability**
 - **Sensory comfort and safety can act as *strong reinforcers***
- **Reward is often tied to reducing uncertainty, not just chasing novelty.**

PUTTING IT TOGETHER

- **ADHD:** Reward system favours novelty, immediacy, stimulation.
- **Autism:** Reward system favours depth, predictability, special interests.
- **AuDHD:** A mix of both (novelty-seeking + deep focus) = push-pull conflict

FINAL THOUGHTS

- **More research needed...**
- **ADHD + Autism \neq AuDHD**
- **We need a separate, specific neurotype for AuDHD.**
- **The brain in AuDHD works in a unique way, with ADHD/ASD traits combining/conflicting.**

Resources

Charity



Website: ADHDadult.uk

Social media: @adhdadultuk

Online magazine: Focusmag.uk

Discord: [theadhdadults](https://theadhdadults.com)

Podcast



Website: TheADHDAdults.uk

Social media: @theadhdadults

www.jbhd.uk

ADHD UNPACKED

**"The definitive
ADHD text."**



**"The Best ADHD Book
I've Found
(Pretty sure I've read
them all!)"**

**"A great combination of
science, lived experience,
humour and compassion."**

**"★ I expected it to
Be waterproof."**

Alex Conner & James Brown
THE FOUNDERS OF THE ADHD ADULTS PODCAST



Unpacked

Everything you need to know to survive
and thrive as an adult with ADHD

TONIC