

# When Smart Children, Teens & Young Adults on the Autism Spectrum have ADHD

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# OUTLINE of this presentation

1. IQ of those on Autism spectrum varies widely
2. Updated understanding of **ADHD and its treatment**
3. **Overlap** of ADHD and Autism Syndrome
4. Other **Disorders that often overlap** with ADHD /ASD
5. **Interventions** for Overlap of ADHD & Asperger Synd.

# IQ and Age of Recognition of ASD

CDC (2018) prevalence estimates are **based solely on children 8 years old** and do not differentiate between various types

Intelligence varies widely among those on the Autism Spectrum

31% IQ= < 70;

25% IQ= 71-85;

 4% IQ= 86-130+ (Asperger Syndrome = avg or above avg IQ)

About 85% of children with ASD are recognized by age 36 months

**BUT many of the 44% with higher IQ are not recognized until much later. They are a vulnerable population!**



# Milder Forms of Autism Spectrum are more common

- The number of children suffering from Asperger Syndrome is double the number of children suffering from Classic Autism.
- Yet, the main thrust of the academic literature has focused on the more severe forms of ASD.
- Comparative little attention has been paid to children and young adults who possess milder forms of the disorder.
  - VanBergeijk, E, Klin, A, Volkmar, F (2008)



# Delayed Recognition for those with Higher IQ

- Higher IQ Individuals with Autism Spectrum often are not recognized and diagnosed with ASD until adolescence or adulthood.
- Yet expectations from self and others are elevated

(Brugha, et al., 2011; Cedarlund & Gillberg, 2004; Hofvander, et al., 2009; Lehnhardt et al., 2011; Marriage et al., 2009.)



# ADHD symptoms in Children with autism spectrum

- Prevalence of ADHD symptoms in individuals on autism spectrum in community samples ranges between 13% and 50%.
- In clinical samples, those diagnosed with autism spectrum, prevalence of ADHD ranges from 20% to 85% depending on study

(Gradzinski, et al 2011)



# Change in Understanding ADHD

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- ◆ **OLD:** ADHD = “disruptive behavior disorder of childhood”
- ◆ **NEW:** ADHD = developmental impairments of brain’s self-management system, its “executive functions”

# When Are ADHD Impairments Noticeable?

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- ◆ Some are obvious very early and are noticeable in **preschool years**
- ◆ Some are not noticeable until middle elementary or **junior high**
- ◆ Some are not apparent until child **leaves home** to go to college or later



# ADHD

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- ◆ is essentially a **developmental impairment** of the brain's management system
- ◆ Its executive functions
- ◆ Its neural networks **for deploying and managing skills**

# Executive Functions

- ◆ Wide range of **central control processes** of the brain
- ◆ **Connect, prioritize, and integrate** cognitive functions—moment by moment
- ◆ Like conductor of a symphony orchestra

# “Will you do it and, if so, how and when?”

(Lezak, 2004)

- ◆ Will you do it?  
Motivation/Activation
- ◆ How will you do it?  
Planning/Organizing
- ◆ When?  
Timing/Remembering

# Executive Functions

## operate in dynamic, integrated ways

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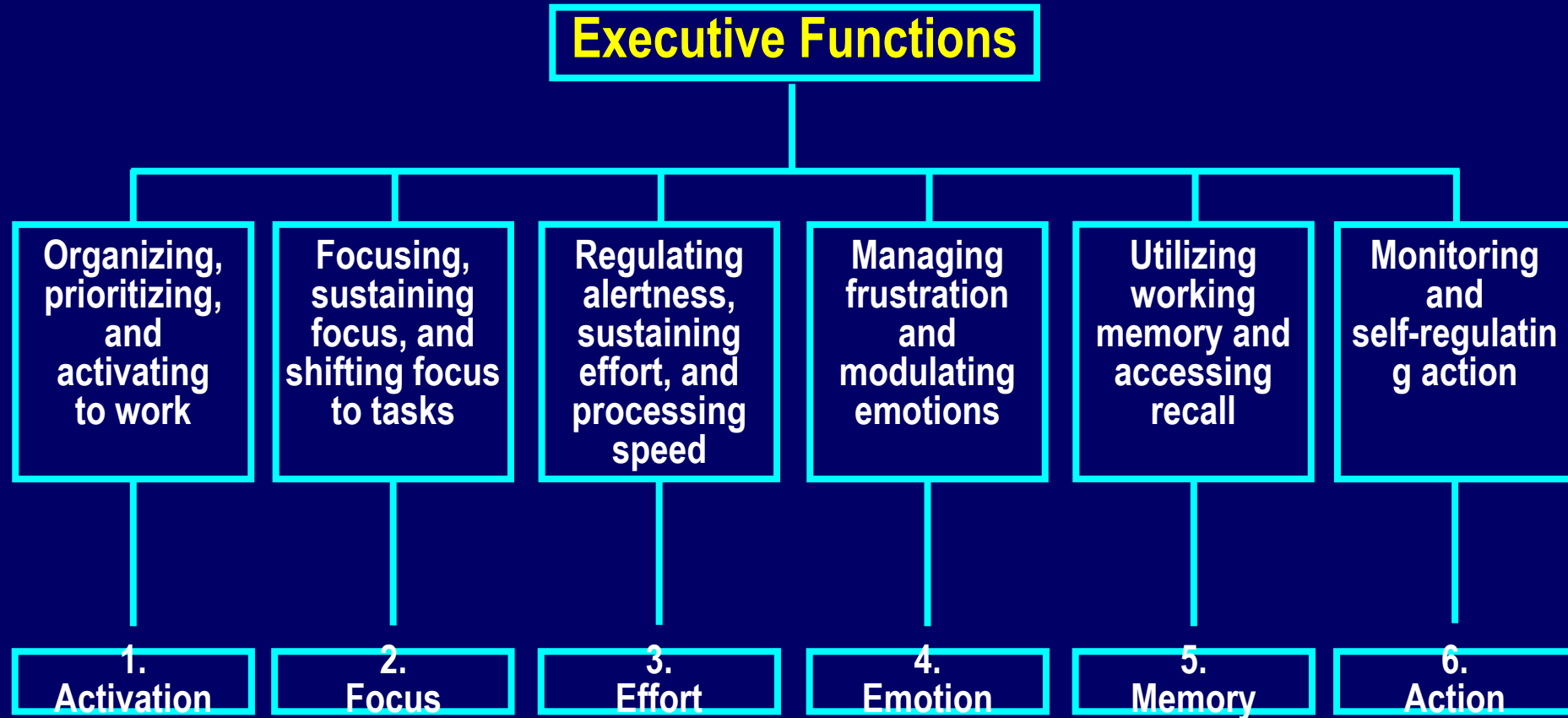
- Most tasks requiring EF require integrated use of multiple aspects of EF
- EF usually operate without conscious deliberation, with automaticity, as in driving a car.
- Measured **not with neuropsych tests**, but with clinical assessment of functioning in daily life across time.

# Characteristics of ADHD Symptoms

- ◆ **Dimensional, not “all-or-nothing”**
  - Everyone sometimes has some impairments in these functions;  
in ADHD: chronic, severe impairment
- ◆ **Situational variability: “If I’m interested”**
  - Most persons with ADHD have a few activities where ADHD impairments are absent

ADHD looks like willpower problem, but it isn't!

# Brown's Model of Executive Functions Impaired in ADHD



# How Can Someone So Smart Have ADHD?

- ◆ 16 yo with **IQ of 136** (v. superior range- 99%)
- ◆ **Honor student until 7<sup>th</sup> grade**, then gradual decline in grades & “motivation”
- ◆ 9<sup>th</sup> and 10<sup>th</sup>: significant drop in grades, now **almost all failing except** for A in math
- ◆ **Teachers:** no behavior problems, sometimes good participation, many missed assignments, poor prep, e.g. doesn't do assigned reading or homework. Appears disorganized.
- ◆ **Parents:** no drugs/alcohol/depression, has friends, v. involved in music/computer. Lost sport eligibility.
- ◆ **Student:** “I know I should and want to do work, but just can't get self to do it. Friends say I have ADD.”

# The Central Mystery of ADHD: Situational Variability of Symptoms

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- ◆ Why focus for this, but not that?  
“If it really interests me” (attraction)
- ◆ Why focus then, but not now?  
“If I feel the gun to my head” (fear)
- ◆ Why is **motivation** in ADHD so variable in one situation to another?



# The central mystery of ADHD

## 2 hypotheses

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“Willpower”

VS

Erectile Dysfunction of the Mind

# Physiology of ADHD Impairments

- ◆ Inherited problem in development of EF infrastructure, (3 yr delay in parts of cortex)
- ◆ Impacts development of networks
- ◆ Impacts communication between networks, (esp. default, working memory)
- ◆ Impacts electro-chemical communication between neurons
- ◆ Out of every 4 with ADHD, 1 has parent with ADHD; other 3 have a sibling, grandparent, uncle, aunt or cousin with ADHD

# 100 Billion Neurons are Intertwined in Complex Networks Within the Brain

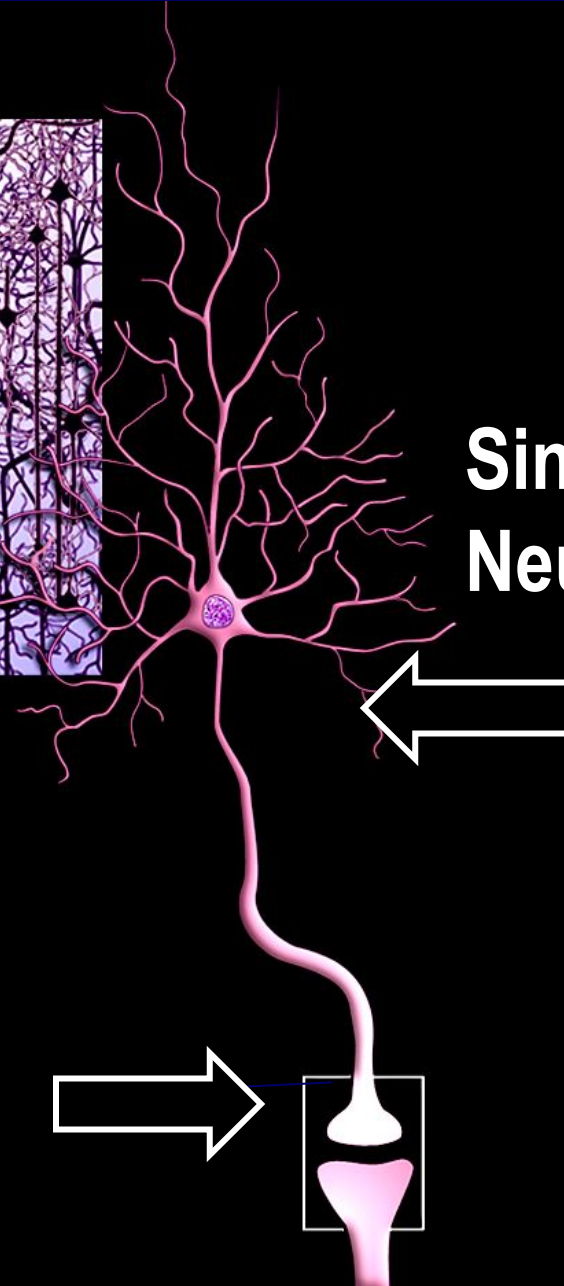


# Transmitter released and reloaded at individual synapses

**Intertwined  
neurons**



**Single  
Neuron**



**Synapse**



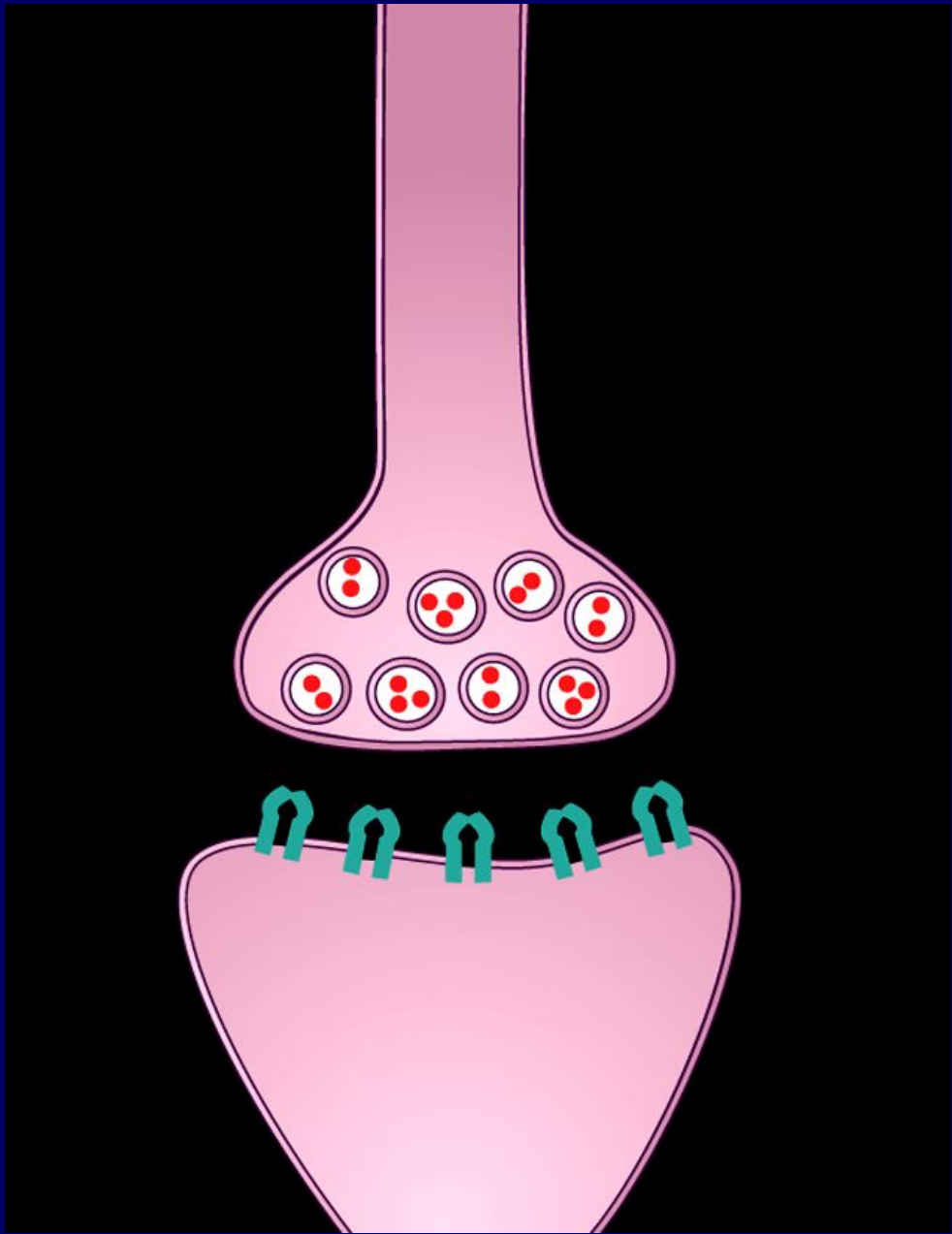
# In the Human Brain

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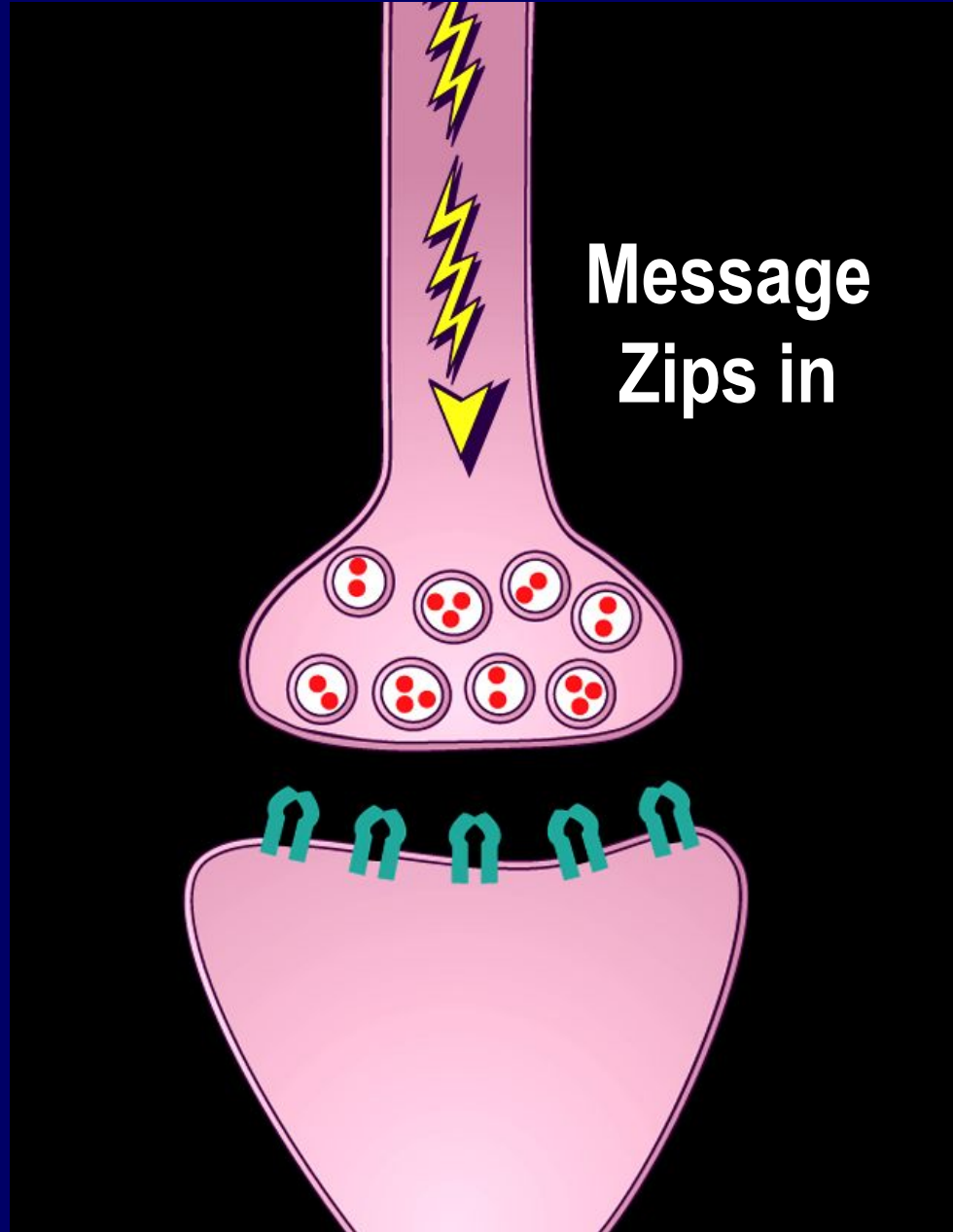
- ◆ 100 billion neurons
- ◆ each one interacts with >1000 others
- ◆ in complex sub-systems
- ◆ that have to “talk to each other”
- ◆ using low voltage electrical impulses
- ◆ that have to jump across gaps
- ◆ so fast that 12 can cross in 1/1000 sec.

# Chemicals Jump the Gaps

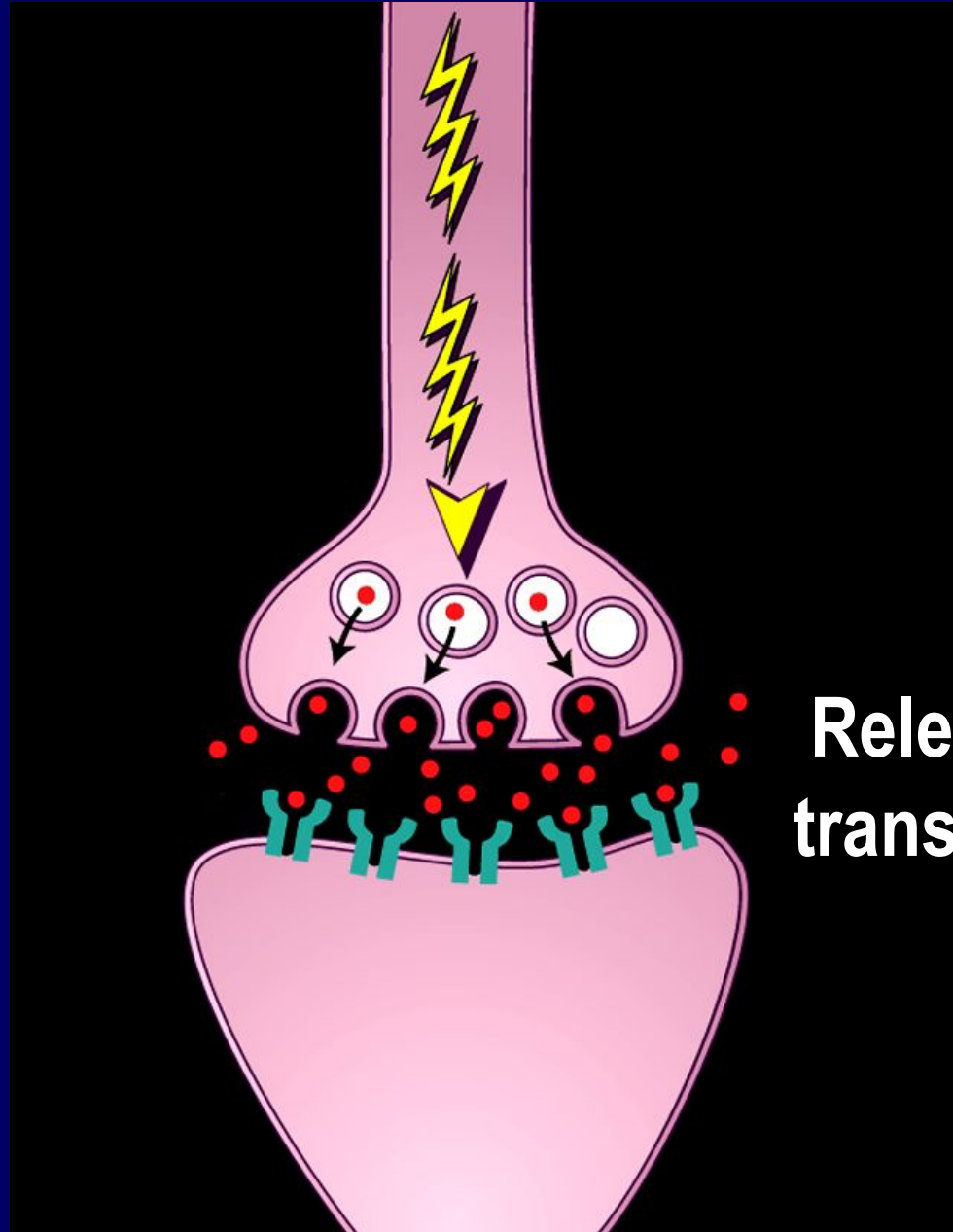
- ◆ Inside brain >50 different chemicals are continuously made
- ◆ every neuron system uses 1 of them
- ◆ stored in little vesicles near tip of neuron
- ◆ when electrical impulse comes, mini-dots of that chemical are released,
- ◆ cross the gap, fire next neuron, then reload in fractions of a second



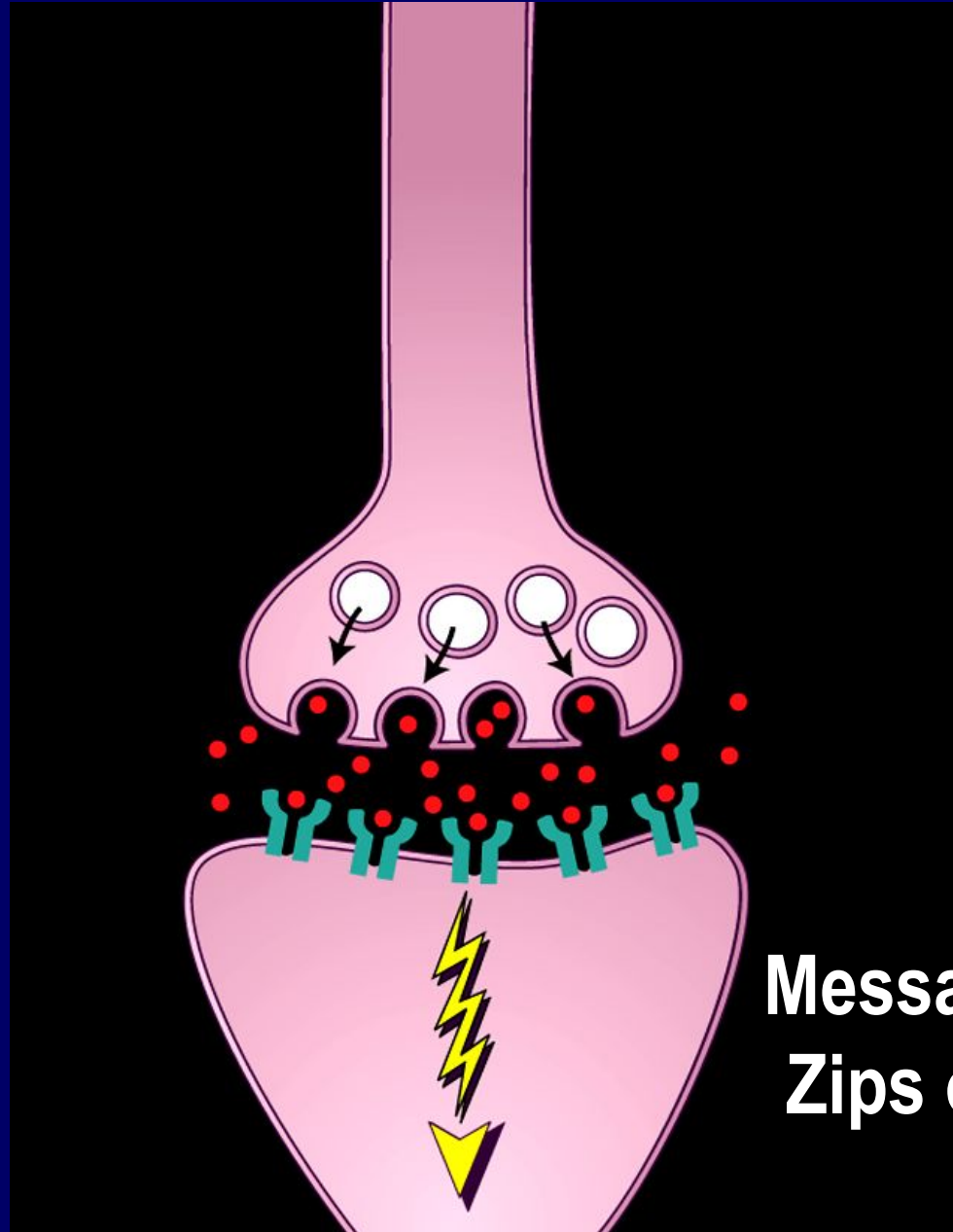
**Message  
Zips in**



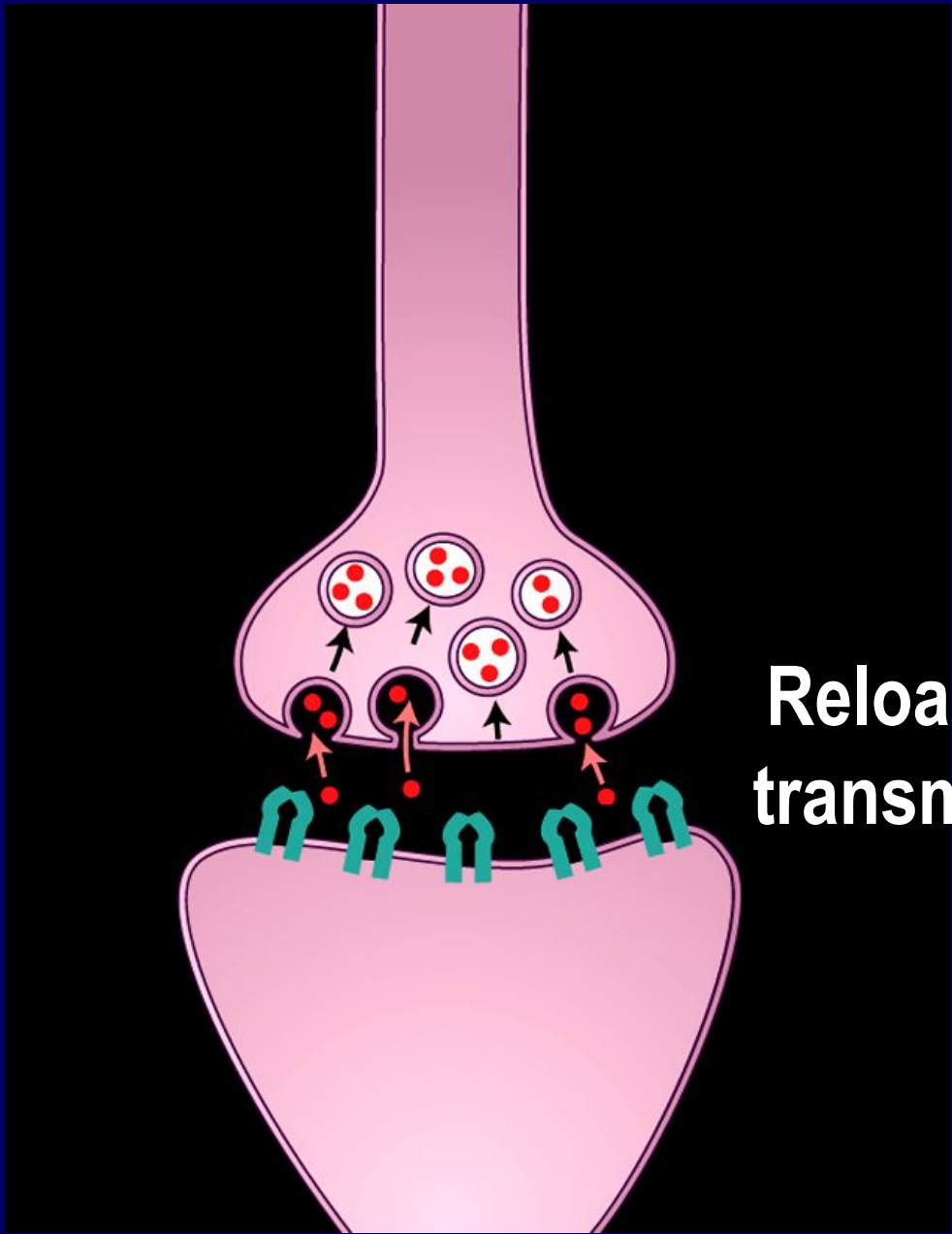




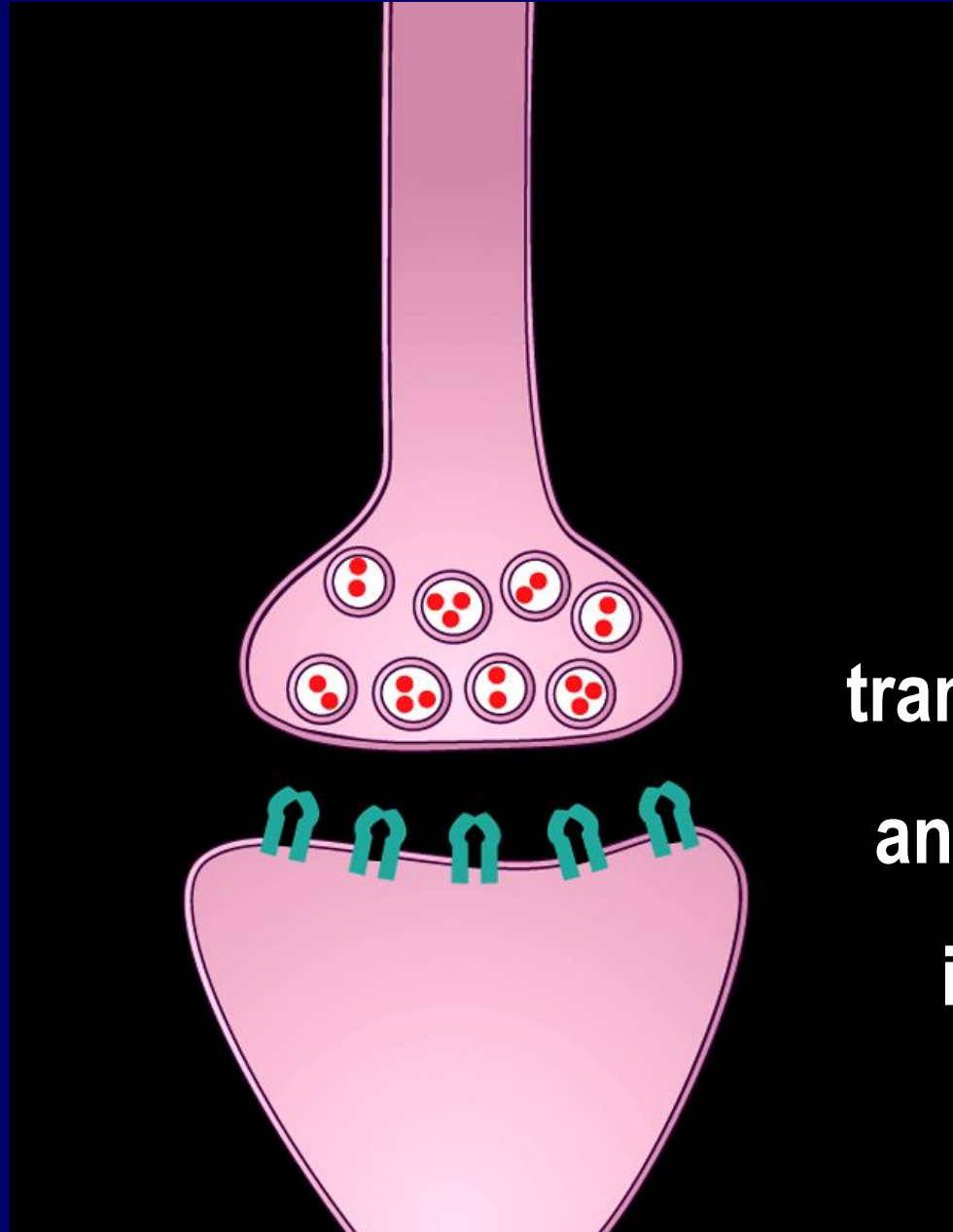
Releasing  
transmitter



Message  
Zips on



**Reloading  
transmitter**



**12**  
**transmissions**  
**and Reloads**  
**in 1 msc**

# A Chemical Problem

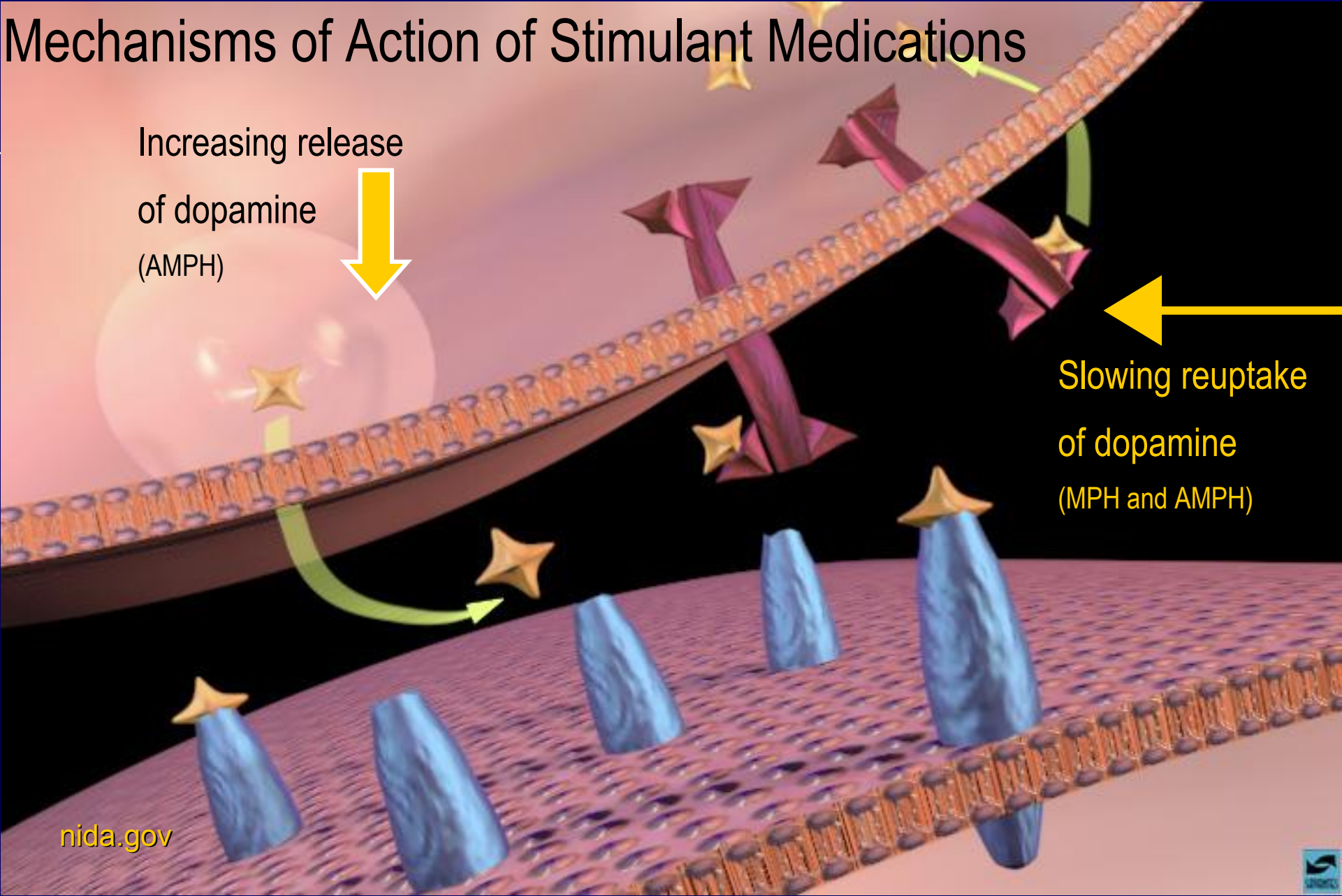
- ◆ ADHD is fundamentally a chemical problem
- ◆ Most effective treatment is to change the chemistry with medication
- ◆ Unless the problematic chemistry is changed, other interventions are not likely to be very effective

# Medications for ADHD Syndrome

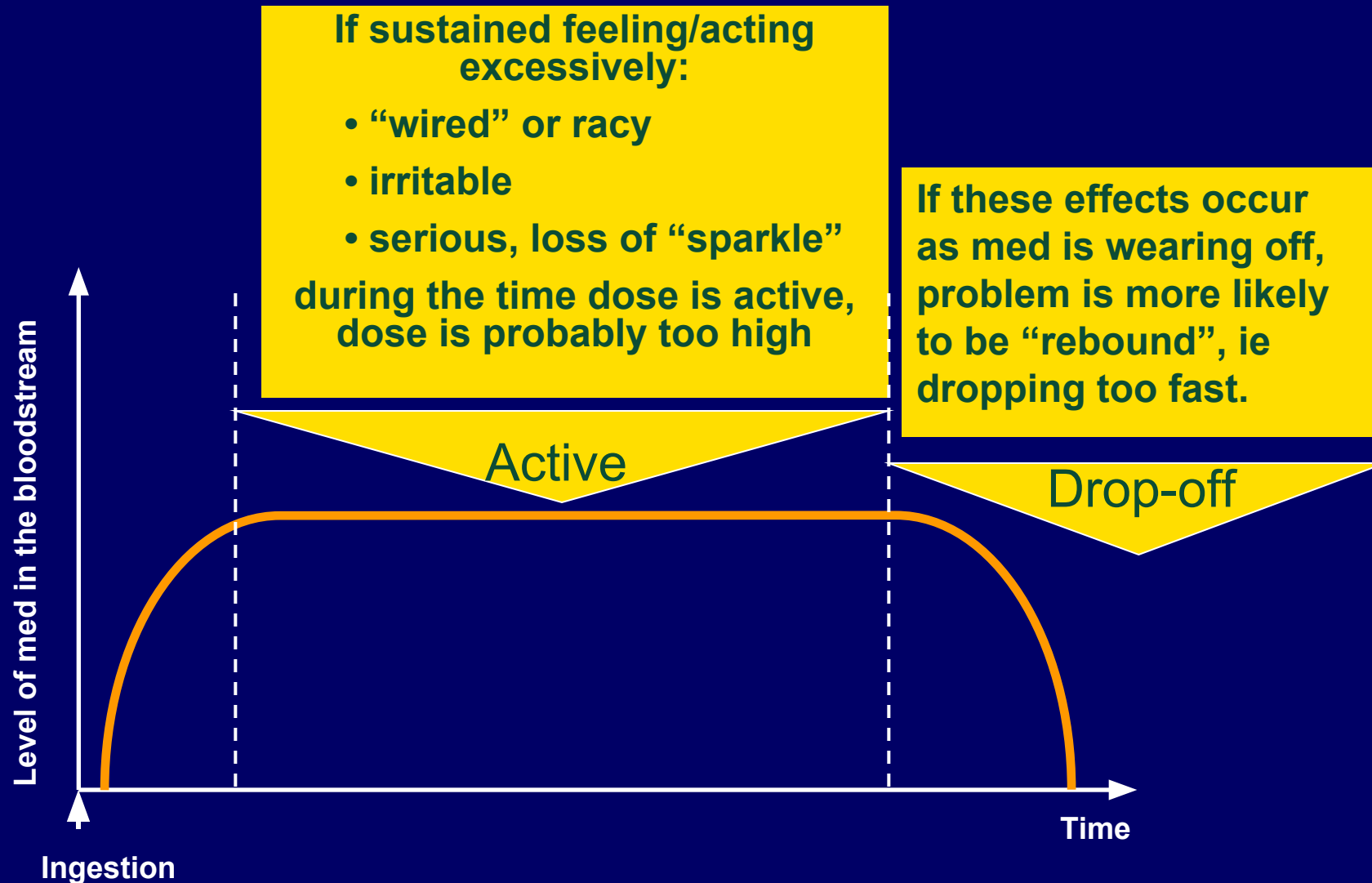
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- ◆ Demonstrated safe and effective
- ◆ Often do not follow mg/kg
- ◆ Effective dose not based on age, wt or severity of sx
- ◆ Require titration and monitoring to “fine tune” to:
  - individual sensitivity
  - time frames for schedule and tasks

# Mechanisms of Action of Stimulant Medications



# Time Frames and Rebound





# Disorders often Co-occurring with ADHD

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- ◆ Specific Learning Disorders
- ◆ Anxiety Disorders
- ◆ Depression and Mood Disorders
- ◆ Oppositional Defiant Disorder
- ◆ Obsessive-Compulsive Disorders
- ◆ Autism Spectrum Disorders
- ◆ Substance Use Disorders

# Asperger syndrome stereotypes in the media



Jim Parsons as physicist-geek  
Sheldon on Big Bang  
Theory show on TV

Leonard Nimoy as Vulcan Science  
Officer of USS Enterprise



# Various Kinds of “Smarts”

- Language Intelligence: oral & written communication
- Musical Intelligence: creating and performing music
- Logical/Math Intelligence: calculating & logical reasoning
- Scientific/Technological Intelligence:
- Visual/Spatial Intelligence: designing and creating shapes
- Bodily-Kinesthetic Intelligence: body actions & movement
- **Personal Intelligence: one's own feelings and self**
- **Interpersonal Intelligence: interpersonal interactions**

(adapted from *Frames of Mind* (H. Gardner, 1983,2004))

# Some well-known people with Asperger syndrome

- Elon Musk (Tesla and Space X co-founder)
- Anthony Hopkins (actor)
- Greta Thunberg (environment activist)
- Jerry Seinfeld (comedian)
- James Taylor (musician)
- Isaac Asimov (science fiction writer)
- Susan Boyle (singer)

# Diversity of Personality Profiles Among Those with Asperger Syndrome

There is considerable diversity among those with Asperger Syndrome  
In both their strengths and their difficulties, many combine profiles.

Fearful and avoidant

Overly dependent, clingy

Arrogant, Know-it-All

Isolated Loner

Little Adults, caretakers

Sideline observer

Intrusive and clueless

Spoiled and demanding

Driven, High Achievers

Fragile, over-reactive

Seeking Intimacy at a distance

Perfectionist, rule-enforcer



# Reported childhood traits of Asperger adults

- tend to be loners, don't know how to interact with peers
- preferred to talk with adults; rarely invited to play at classmates' homes or to their birthday parties,
- Not much social pretend play. more focused on building things or reading factual books.
- pursued their own intellectual interests to high levels, learning many facts, becoming very knowledgeable on a few specific subjects
- but often failed to hand in required schoolwork so they were failing in some academic subjects...

Baron-Cohen, 2003, p.144



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## Joshua 11 yrs old

- I'm in school to work ahead and get to college faster where I can be around others who are very smart like I am and who will share my interests in music and theoretical physics. I don't have friends at this school. I'm lonely there; the other kids aren't like me. But at least I'm not getting bullied like I was at my last school. I used to be pretty depressed and had thoughts of suicide, but that's been better recently. I still worry tho.



## Sam 12 years old

- Our son with ADHD is doing OK in his schoolwork, but he gets teased a lot and makes trouble for himself by being too critical of other kids. Despite what we tell him, he can't keep his opinions to himself. He's always quick to point out when another kid makes a mistake, not only during classes, but also in practices and games with his baseball and basketball teams. He starts middle school in two months. We're really concerned about how he'll get along socially there.

## Bella 13 years old

- I've read about Asperger's and I think I've got it. I don't like any of the kids in my class. I think they're pretentious and rude. They think I'm always in another world, and I am. I like to isolate myself and just read or write stories or songs and play games or my guitar. I used to get good grades, but this year I'm not getting much done. And next year, there's high school.

# Jeremy

- My husband and I can't agree on how to deal with our high IQ son who is now in 10<sup>th</sup> grade. He has ADHD and is missing too many days of school. He complains of having a headache and then his father lets him stay home when he's not really sick. He has no friends and is avoiding school to get away from the work and the kids who tease him. He just reads or plays video games all day. My husband is unemployed so he stays home while I have to leave early to get to my job which is our only income. What can I do?

# Justin

2 years ago my grandson was struggling in middle school. Anytime a teacher pointed out even a minor error in his work or suggested adding more elaboration in a paper, he would start crying and walk out of the class, unwilling to discuss the matter. He was never a trouble maker, but he was painfully shy and withdrawn from other kids. With support from his teachers and medications he has now completed his 1<sup>st</sup> year of high school with all A's and B's and has made several friends.

# Overlap Between ADHD and High-Functioning Autism Spectrum Disorder

- 140 children (6 to 17 yo) referred to specialty clinic at Harvard for Autism Spectrum with IQ >85 and having Autism Spectrum diagnosis were evaluated for ADHD
- 76% of those with Autism Spectrum also fully met ADHD diagnosis
- 41% of those who had both Autism Spectrum and ADHD had received no previous treatment for their ADHD!

Joshi, G, Faraone, S, Wozniak J, et al. 2017



# Medication Treatments for ADHD & Complications

(many have **S.B.C.** \*start with small doses!)

## For ADHD symptoms:

- stimulants
- combination of stim + guanfacine-XR
- atomoxetine

## For excessive anxiety, OCD, mood

- Fluoxetine,
- Sertraline

## For excessive hyperactivity, impulsivity & aggression:

- Guanfacine-XR, Abilify



# Treatment for ADHD with Asperger Syndrome

- ◆ Educate about ADHD and Asperger Syndrome **as needed**: patient, family members and teachers
- ◆ Provide **adequate scaffolding and personal support**, especially with new situations
- ◆ Use “**teachable moments**” to help those with Asperger Syndrome **improve understanding of social interaction**
- ◆ Use “**fine-tuned**” medications to alleviate ADHD and, if needed, for related problems

# Importance of recognizing ADHD in people with Asperger Syndrome

- ◆ ...**failure to recognize ADHD**—especially in intellectually capable youth with autism spectrum disorder **can seriously undermine educational and social functioning**, worsening already compromised social performance and can predispose these youth to increased risk for disruptive disorders, mood dysregulation and substance use disorder....

◆ (Biederman, et al., 2009, 2014)



**On YouTube**

**a 28 minute video  
by Thomas E. Brown, Ph.D.**

**What is Attention Deficit  
Hyperactivity Disorder?**

**8.5 million views**

# Books by Thomas E. Brown, Ph.D.

@

[www.BrownADHDclinic.com](http://www.BrownADHDclinic.com)

