

Brain Development and Mental Health

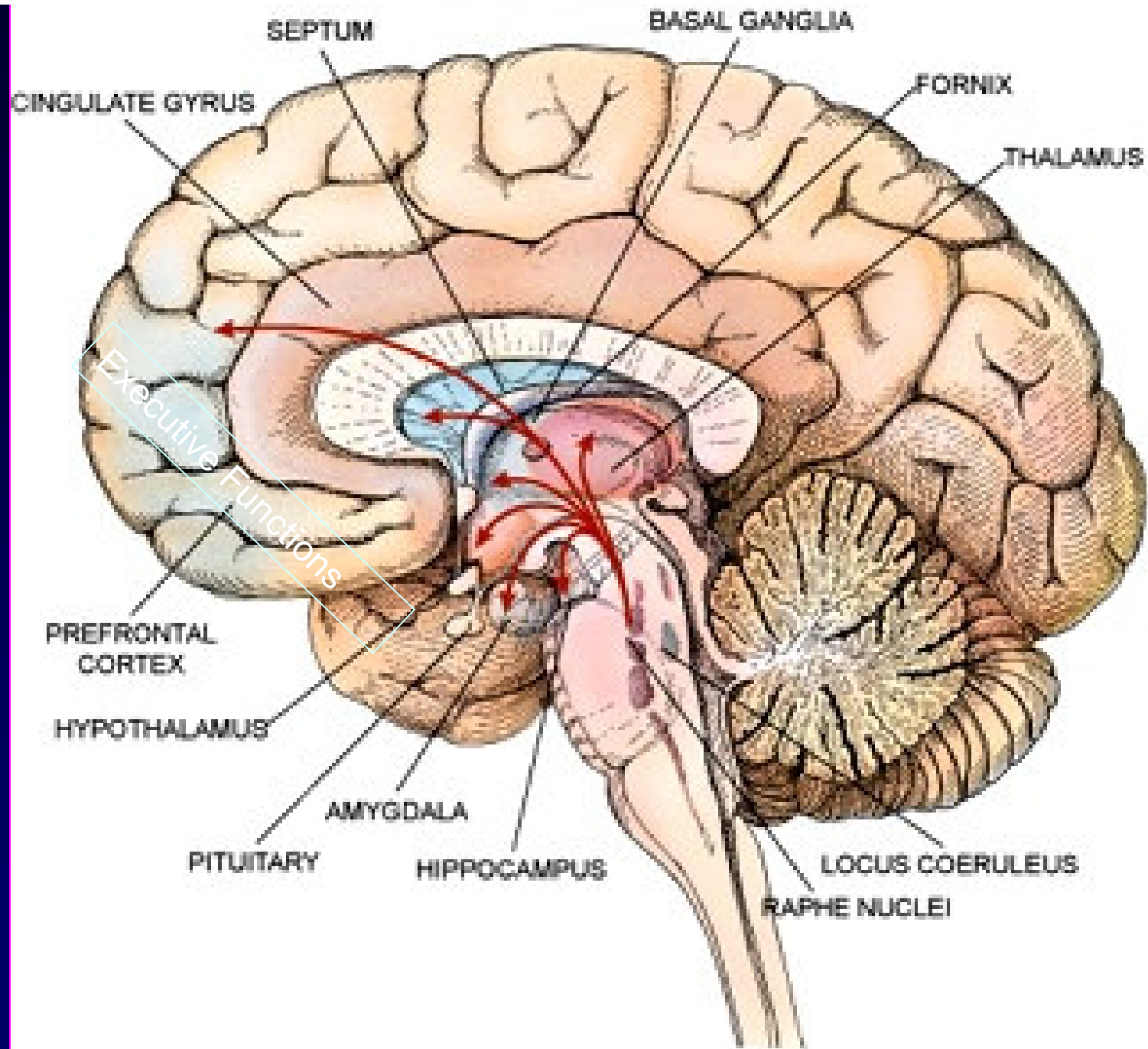
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May 13, 2009

Oakridge Elementary School

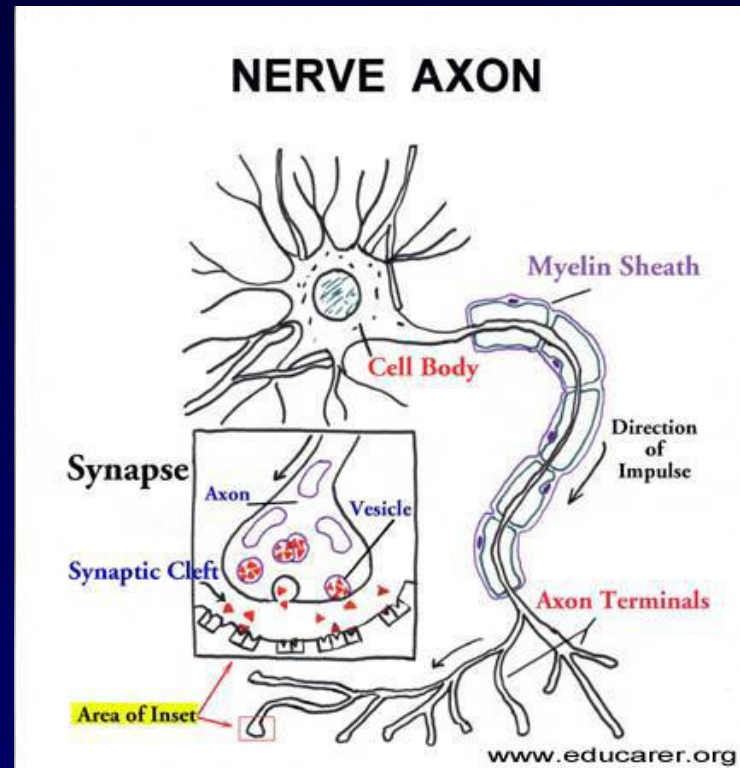
From IOM's *Neurons to Neighborhoods*

- “The purpose of a brain is to store, use, and create information.”
- Humans acquire information primarily from experience, including their systems for thinking, feeling and communicating.



Basic working units of the Brain

- Illustrate how nerve endings come together, how neurotransmitters work.



Maria Montessori wrote about a child's experience of the environment:

“These impressions not only penetrate the mind of the child, but they *form* it. They become incarnated, for the child makes his own *mental flesh* in using the things that are in his environment. We have called this type of mind the absorbent mind and it is difficult for us to conceive *the magnitude of its powers.*”

Insights from Neuroscience

- The role of environment on development of important capacities.
- Capacity for affect regulation, functional circadian rhythm, frustration tolerance.
- The role of stress on brain functioning and how stress affects adaptive functioning.

From IOM's *Neurons to Neighborhoods*

- All children are born wired for feelings and ready to learn.
- Early environments matter.
- Nurturing relationships are essential.
- Concepts of sensitive periods and developmental plasticity.

From IOM's *Neurons to Neighborhoods*

- New experiences trigger new brain growth and this is how memories, knowledge and learning takes place across the life span.
- Genes and environment have delicate interplay (nurture/nature).
- Relationships provide critical transactional variable.

Neuroscience Insights Cont'd

- Large amount of brain dedicated to social-emotional tasks.
- Different systems do not necessarily grow "in sync."

Mental Health as Social-Emotional Intelligence

- Gardner describes emotional intelligence as “the capacity to discern and respond appropriately to the moods, temperaments, motivations and desires of other people.”

Mental Health as Social-Emotional Intelligence (Valliant)

- Criteria for social-emotional intelligence:
 - Accurate conscious perception and monitoring of one's own emotions.
 - Modification of one's emotions so that their expression is appropriate. This involves the capacity to self soothe anxiety and to shake off hopelessness and gloom.
 - Accurate recognition of and response to emotions in others.

Mental Health as Social-Emotional Intelligence (Valliant)

- “The benefits of being able to read feelings from non-verbal cues have been demonstrated in almost a score of countries. These benefits include being better emotionally adjusted, more popular, and more responsive to others. Empathic children , without being more intelligent, do better in school and are more popular with their peers.”

Mental Health as Social-Emotional Intelligence (Valliant)

- Criteria Cont'd:
 - Skill in negotiating close relationships with others.
 - Capacity for focusing emotions (motivation) on a desired goal. This involves delayed gratification and adaptively displacing and channeling impulse.

What Mentally Healthy Children look like:

- Flexible emotional regulation
- Pro-social behavior
- Empathy
- Sense of well-being and self-esteem
- Coherent “life-story”

Helping Kids with Mastery

- Provide a sense of Safety
- Play is important in developing mastery
- Focus on the positive
- Start with success
- Use rewards

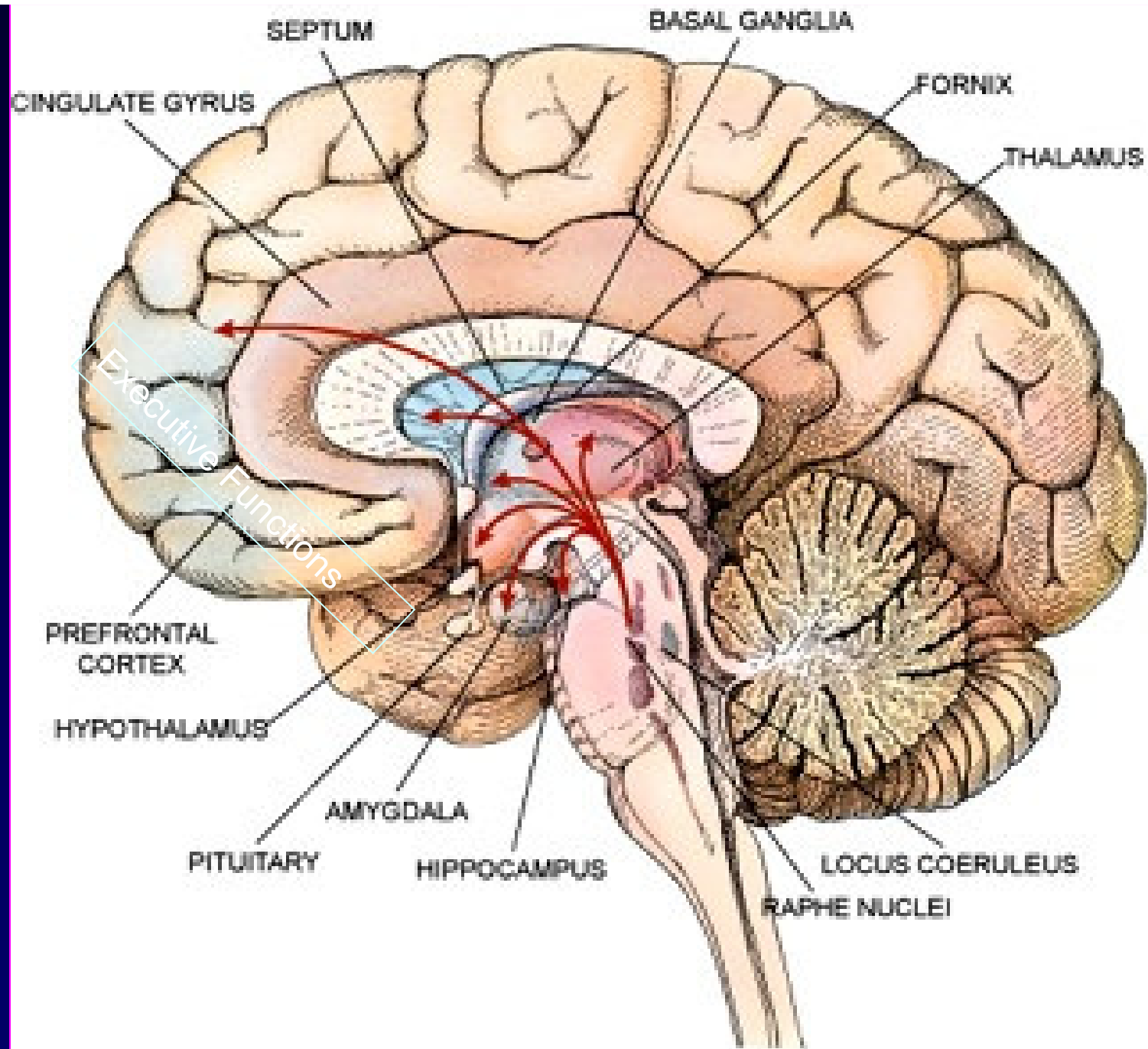
Helping Kids with Mastery

Cont'd

- Consistency
- Rituals
- Predictability
- Build upon the familiar

Insights from Brain Research

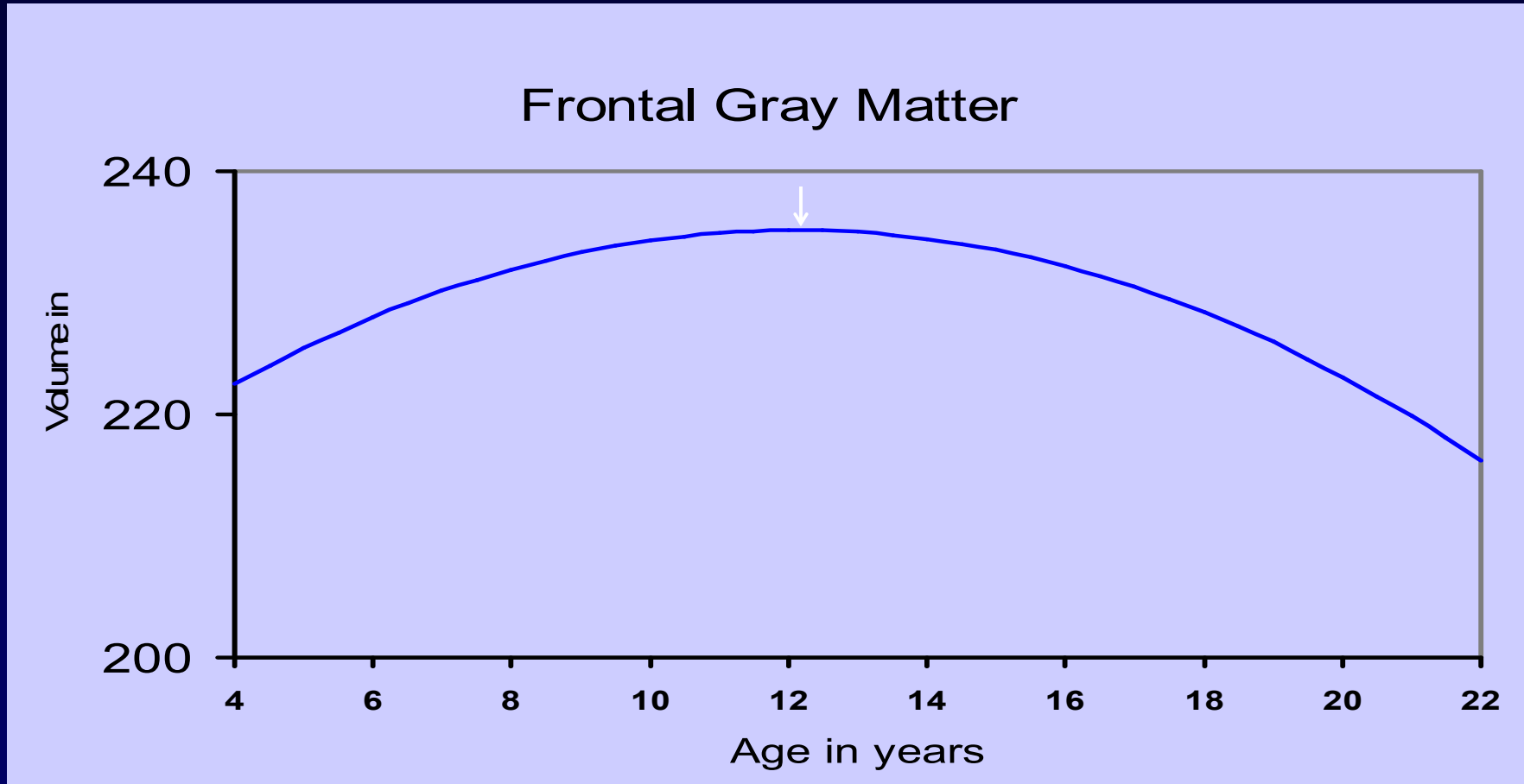
- Frontal lobe rapid growth ages 3 to 6: attention, vigilance, alertness.



Executive Functions

- Organizing
- Prioritizing
- Planning
- Utilizing working memory
- Accessing recall
- Focusing
- Work Initiation
- Sustaining a task
- Shifting attention (transitioning)
- Regulating alertness
- Pacing oneself (time management)
- Managing frustration
- Modulating emotions

Brain Development in Healthy Children and Adolescents: Longitudinal and Cross-Sectional Data (243 Scans from 145 Subjects)



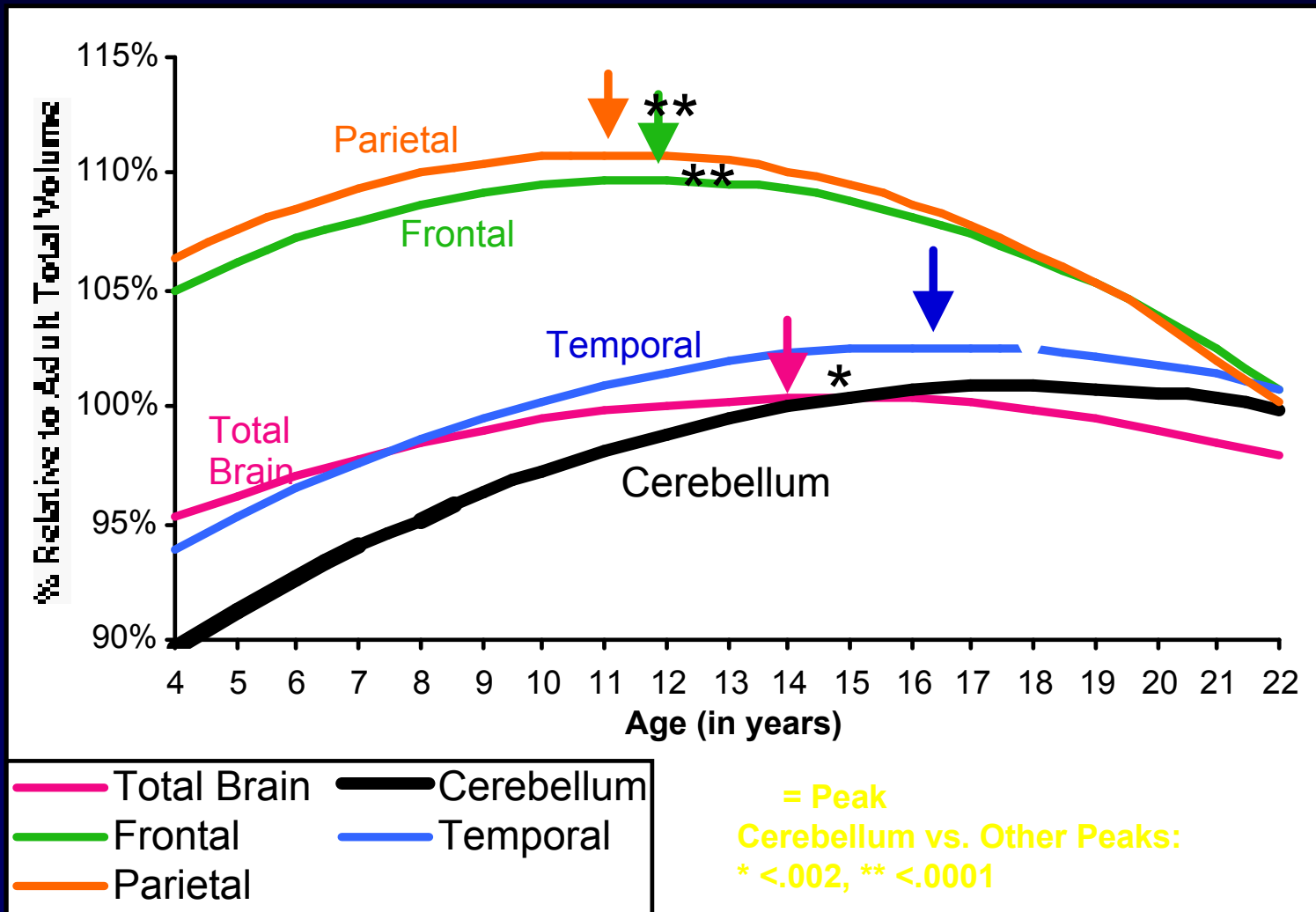


**ADHD IS A
BRAIN BASED DISORDER**

Insights from Brain Research Cont'd

- Temporal/parietal lobes ages 7 to 15 rapid growth with focus on language and mathematics.

Cerebellar Development for 145 Children and Adolescents (Ages 4-22) Based on 243 Brain MRI Scans



Brain development during Adolescence

- Concept of adolescence as “Second Chance.”
- Significant neural maturation takes place during puberty and into late adolescence.

Adolescent Development

- Passage towards adulthood which leads to:
 - Identity consolidation
 - Self efficacy
 - Self agency
 - Autonomy
 - Development of significant intimate relationship

Adolescent Brain Development

- Frontal lobe structures highly affected throughout adolescence and involve:
- regulation of affective behavior
- cognitive/emotional link leading to self-control

Insights from Brain Research Cont'd

- Frontal lobe from age 16 to 20 undergoes dendritic pruning with focus on self control, planning, behavior regulation.

Role of Stress

- Small amounts have neutral effect on memory.
- Moderate amounts facilitate memory.
- Large amounts overwhelm the system and impair memory.

Seigel, 1999

Brain Development & Early Trauma

- Amygdala and role in fear arousal.
- High arousal and its effect on logical thinking and decision making.

The role of environment on development

- **Environmental adversity alters parental care.**
- **Familial transmission of traits & vulnerabilities via non-genomic transmission.**

Michael Meaney,
2003

Impact of Excessive Stress

- Amygdala and role in fear arousal and stress.
- Involved in social/emotional neural network.
- High arousal and its effect on logical thinking and decision making.
- Flight or fight reaction and trauma.

Role of Parents & Environment

- * Family environment can impact upon the developing child.
- Parental interaction regulates the child's own regulatory mechanisms (HPA axis).
- Critical importance of healthy attachment and role in regulation.

RISK FACTORS

- Attachment difficulties: *“The disruption of attachment is itself a primary form of trauma, which may intensify the effects of other stressors, particularly if disruption occurs at critical stages of development.”*
(Bowlby, 1973)

Role of Trauma

- *“The most debilitating disturbances in self-esteem are those resulting from childhood trauma, particularly repetitive traumatization in an abusive family.”*
Elizabeth Waites in Trauma and Survival
1993

RISK FACTORS

- Regulation problems (sleep, impulse control, affect regulation, behavioral regulation).
- Psychosocial stress *in the first two years of life* may have an enduring negative effect on children's brain development, emotional regulation, and social development.
- Stress has suppressive effect on hippocampal neurogenesis (*this may at some point be irreversible*).

Role of Brain Disorders

- Family history of mental illness: genetics and familial transmission of illness.
- Interaction of environment and genes.
- How disorder can affect ways of perceiving and behaving.

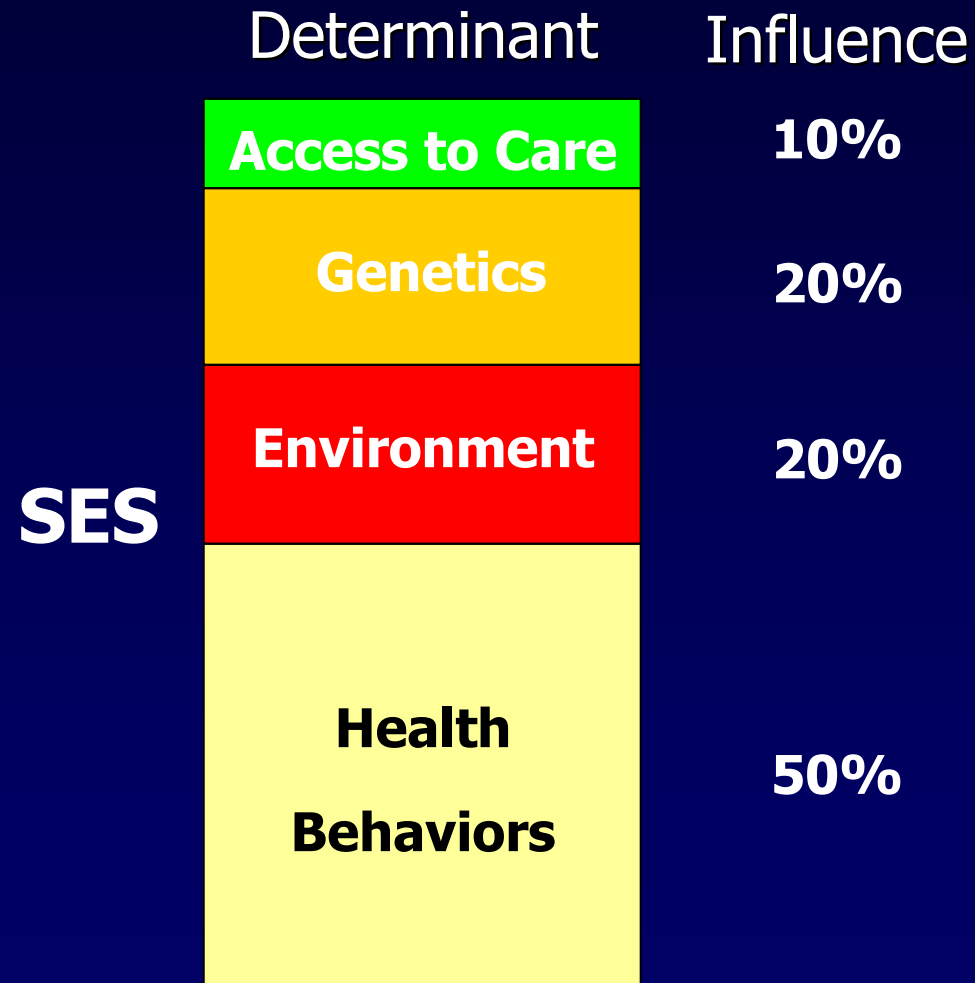
Interventions

- Teach good parenting practices and intervene with negative situations e.g. domestic violence, chronic anger in family, abuse & neglect, substance abuse.
- Support Healthy Families & Healthy School environments.
- Screenings and referrals for intervention.
- Psychotherapy, medication, education and cognitive/behavioral interventions.
- Advocate for provision of basic needs (health, housing, food, education) to all people

From IOM's *Neurons to Neighborhoods*

- Safe and nurturing environments promote healthy physical, cognitive, linguistic, social, emotional, and moral development.

Health Status



Source: CDC, UCSF, IFTF

