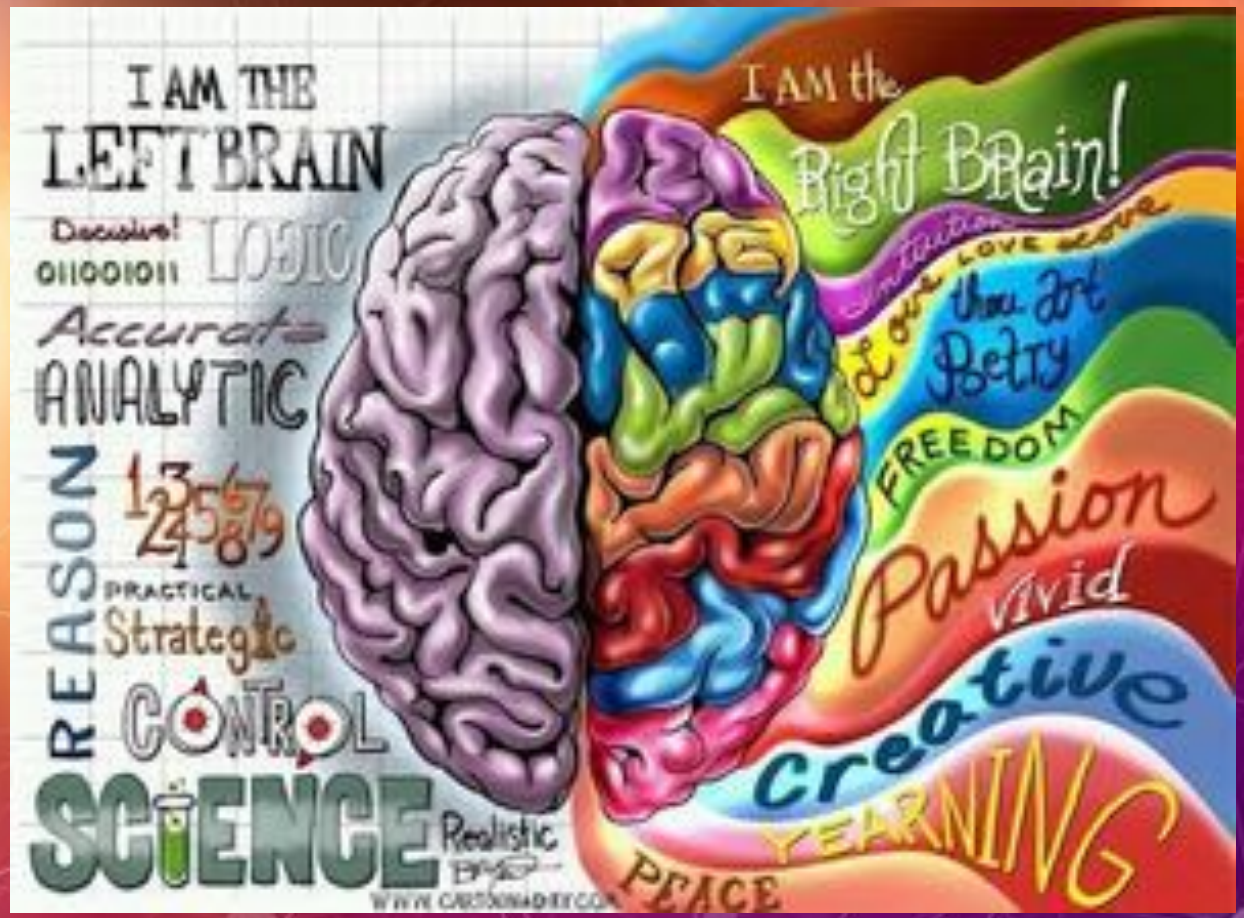


Genevieve Dharamaraj

THERE'S NO CEILING TO HOPE

Above the Atlas lies 2 Hemispheres

Dr Genevieve Dharamaraj

B.Sc.M.Chiro. M.Chiro(Paeds)
FIBFN-CND

My Why!

- Paediatric Chiro finishing my Masters in Paeds, I was seeing a lot of " Alphabet Kids". When I first worked as a Chiro, this was very rare.
- Autism 30 years ago was a rarity, 1 in 10 000
- Today: I in 5 kids are diagnosed with some form of learning issue!!!!
- It's a toxic world, with technology dependence, lack of physical movement and packaged foods.
- My kids are coming in CRISIS, stressed and anxious

Dark Moments

. February 7th 2014 : Ryan in ICU

Handed in my Masters of Paeds in 2013

Training for Ironman 1st March 2014, Taupo

Right Brain : Guilt and Fear as I had failed my own child

Genevieve Dharamaraj

THERE'S NO CEILING TO HOPE

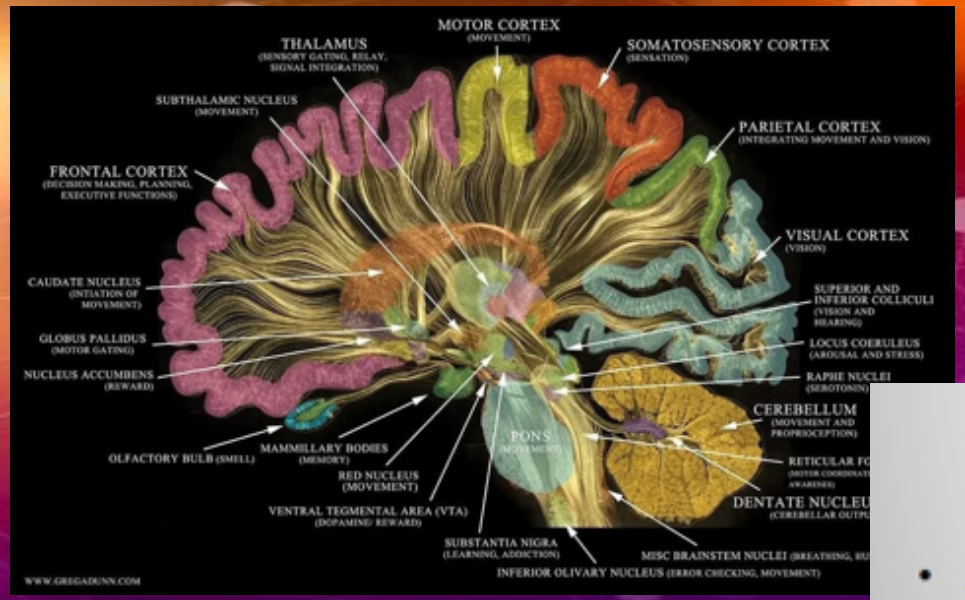
Dr Robert Melillo

For Me It All Starts With One Primary Question

- What is actually happening in the brain of someone with a Neurobehavioral Disorder or Mental Health Issue like?
- ADHD
- Autism
- OCD
- Tics
- Depression
- Anxiety
- Psychosis
- Etc

Also how does these relate to other health related issues,hormonal,immune, digestive and other biomedical and sensory/motor issues?

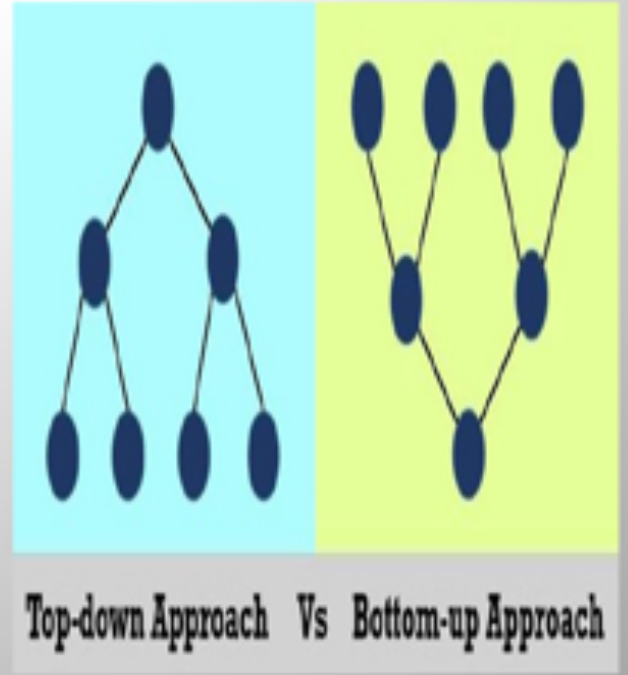
Geneviève Dharamaraj
THERE'S NO CEILING TO HOPE



Why 2 Hemispheres?

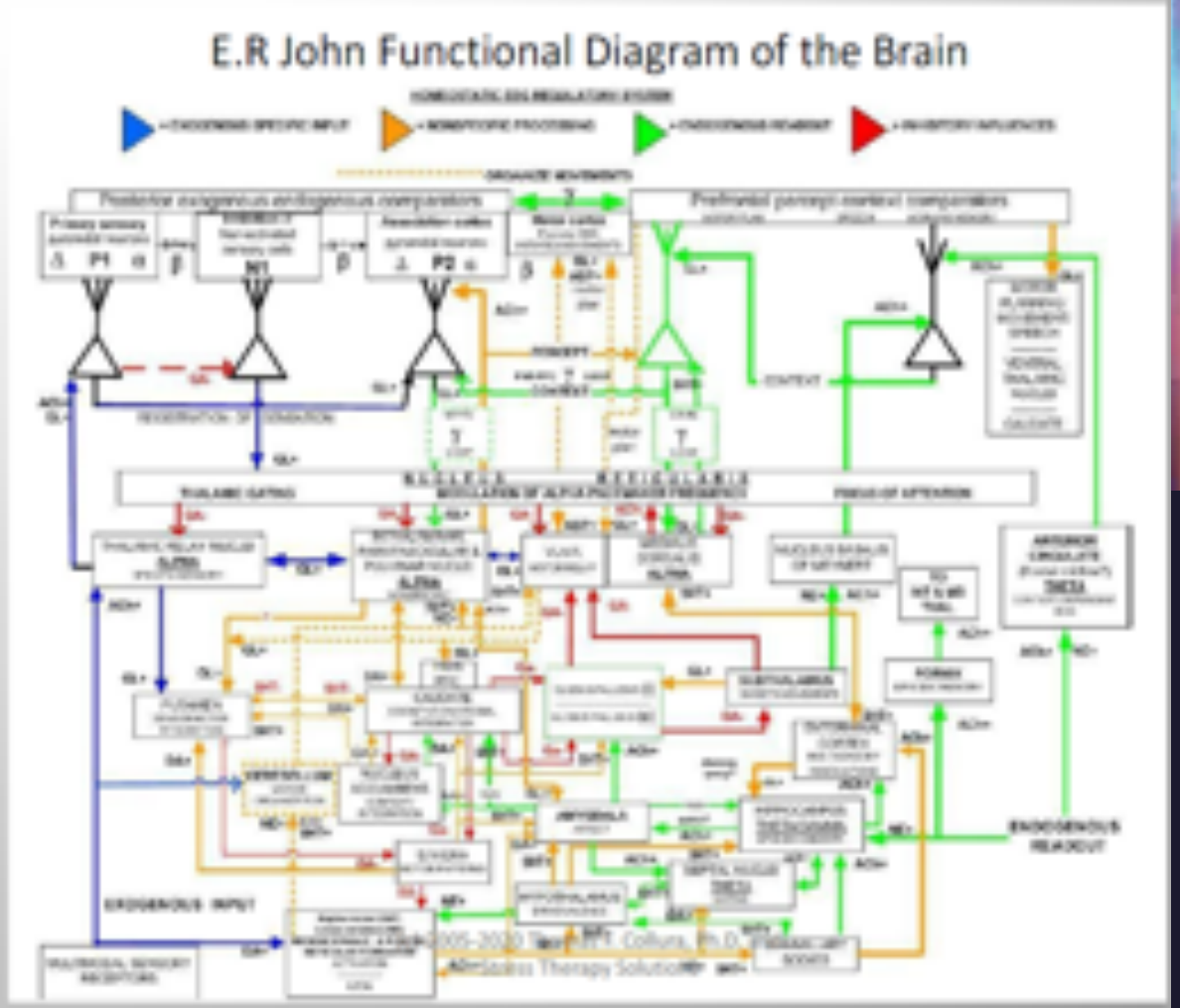
Building Complex Systems

- According to complexity theory 2 things are required to create a complex system such as a brain
- Differentiation
- Integration
- Differentiation meaning lots of smaller parts doing different things ,the more parts the more complex the system.
- This is exactly what we see in the human brain it is the most highly differentiated and lateralized brain on the planet and it is the most complex .
- Lateralization essentially doubles the differentiation and complexity



Building A Complex System

- With lack of Differentiation we have lack of complexity
- Lack of differentiation in the human brain is almost always a result of lack of maturation.
- The more mature the brain the more differentiation
- Maturation is also directly connected to integration and synchronization.
- With lack of synchronization we have lack of integration and lack of complexity
- Lack of differentiation is known as rigidity,lack of integration is known as chaos in complexity theory ,both are as a result of delayed or unbalanced maturation of the brain.



Neuron

Review

Ontogenesis of Lateralization

Onur Güntürkün[1,2,*] and Sebastian Ocklenburg[1]
[1]Department of Biopsychology, Institute of Cognitive Neuroscience, Ruhr-University Bochum, 44780 Bochum, Germany
[2]Stellenbosch Institute for Advanced Study (STIAS), Wallenberg Research Centre at Stellenbosch University, Stellenbosch 7600, South Africa
*Correspondence: onur.guentuerkuen@rub.de
http://dx.doi.org/10.1016/j.neuron.2017.02.045

The brains of humans and other animals are asymmetrically organized, but we still know little about the ontogenetic and neural fundaments of lateralizations. Here, we review the current state of understanding about the role of genetic and non-genetic factors for the development of neural and behavioral asymmetries in vertebrates. At the genetic level, the Nodal signaling cascade is of central importance, but several other genetic pathways have been discovered to also shape the lateralized embryonic brain. Studies in humans identified several relevant genes with mostly small effect sizes but also highlight the extreme importance of non-genetic factors for asymmetry development. This is also visible in visual asymmetry in birds, in which genes only affect embryonic body position, while the resulting left-right difference of visual stimulation shapes visual pathways in a lateralized way. These and further studies in zebrafish and humans highlight that the many routes from genes to asymmetries of function run through left-right differences of neural pathways. They constitute the lateralized blueprints of our perception, cognition, and action.

Ontogenesis Of lateralization

"Studying asymmetry can provide the most basic blueprints for how the brain is organized," says lead author Onur Güntürkün, of the Institute of Cognitive Neuroscience at Ruhr-University Bochum, in Germany. "It gives us an unprecedented window into the wiring of the early, developing brain that ultimately determines the fate of the adult brain." Because asymmetry is not limited to human brains, a number of animal models have emerged that can help unravel both the genetic and epigenetic foundations for the phenomenon of lateralization.

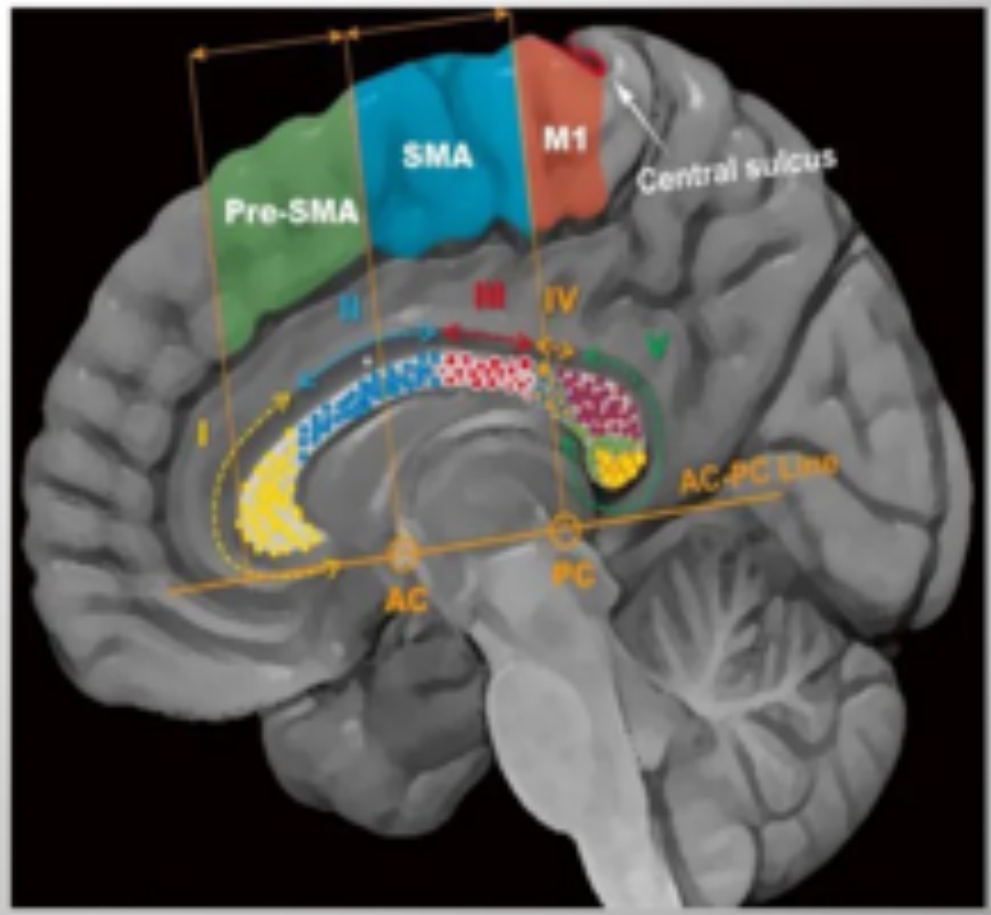
Güntürkün says that this research can provide insight into the effects of asymmetry on brain conditions in humans. "There are almost no disorders of the human brain that are not linked to brain asymmetries," he says. "If we understand the ontogeny of lateralization, we can make a great leap to see how brain wiring early in the developmental process may go wrong in these pathological cases."

Brain Asymmetry

- Greek Physicians in the third century BC held that the right hemisphere was specialized for perception and the left for understanding.
- The physician Arthur Wigan published his thoughtful study ,The duality of the mind in 1844,prompted by his fascination with a handful of cases he stumbled across where individuals who had remained apparently unremarkable in life was found post mortem to have one cerebral hemisphere destroyed by disease. He concluded that each hemisphere on its own could support human consciousness, and therefore we must "have two minds with two brains",with mental disease resulting when they are in conflict.
- **Dr Ian McGillchrist The Master and His Emissary**

Why do we have a right and left Hemisphere?

- How do the right and left brain come to be specialized? Not parallel but in series
  Receptors that are active
  The environmental stimulation available
- The timing and activation of the hemisphere Experiences at different stages of life
- There are a number of articles stating that the Right /Left brain is a Myth
- Is that True?



COGNITIVE STYLE PROFILES

LEFT BRAIN

- ***Analytical***
- ***Good with details***
- ***Organized***
- ***Particular, slightly OCD***
- ***Literal***
- ***Logical***
- ***Good with numbers***
- ***Good memory***
- ***Not great at reading people***
- ***Prefers to be alone***
- ***Likes school and academic pursuits***
- ***Likes to do one step at a time***
- ***Usually reads directions before doing anything***

This Photo by Unknown Author is licensed under CC BY

RIGHT BRAIN

- Very social
- Very sensitive to others emotions
- Very aware of what others are thinking
- Spatial, likes to move and play sports
- Intuituve
- Gets bored easily
- Hates details
- Imaginative
- Good common sense
- Likes fashion, cares about the way they look
- Don’t like school that much, more spiritual, social
- Poor memory for facts, names details

Functional Disconnection

The Melillo Method Neurodevelopmental Blueprint

Hemispheric Model of Healthcare

Basic Principles of Developmental Functional Neurology:

There is a basic blueprint for all brain development. This blueprint must progress in the right stages and at the right time. If this does not occur the brain will almost never self correct and properly develop.

Must be able to go back to the point that the blueprint was not followed or altered; this identifies where there was a deviation from normal development.

The Melillo Method
Neurodevelopmental Blueprint

Hemispheric Model of Healthcare

Basic Principles of Developmental Functional Neurology:

Once there is deviation from normal development the trajectory of normal development is altered; this alters the development of functional connectivity. ***Development and integration of networks will not be optimal and may be significantly disabled.***

The Melillo Method
Neurodevelopmental Blueprint

Hemispheric Model of Healthcare

Basic Principles of Developmental Functional Neurology:

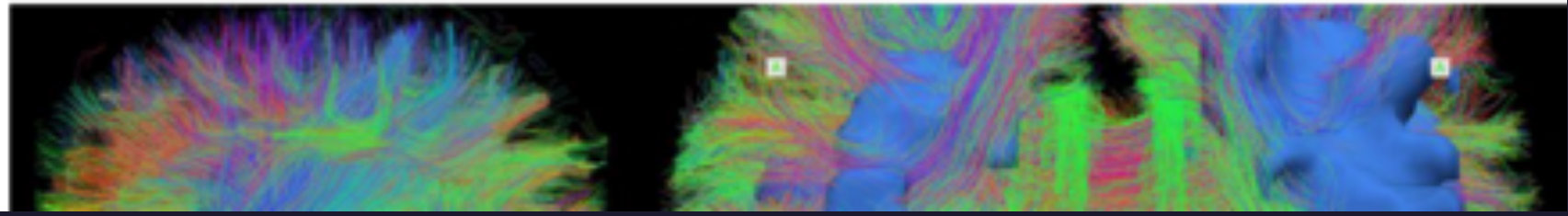
The most common reason for this to occur is a developmental asynchrony, which is primarily epigenetic. This alters bottom up & top down development, but is correctable at ***ANY*** age, but only with proper intervention from a developmental perspective.

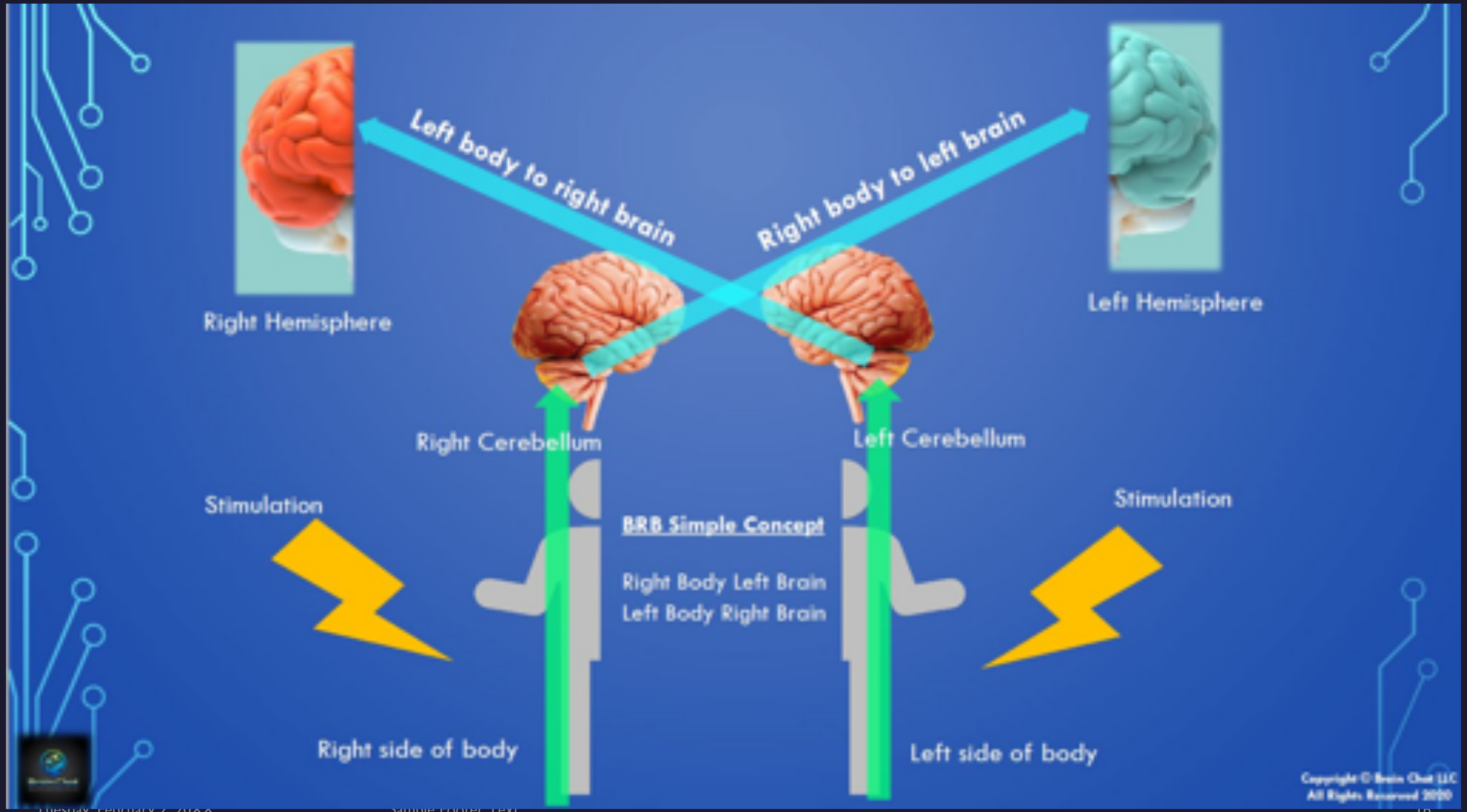
Functional Disconnection Syndrome

What is a brain imbalance?

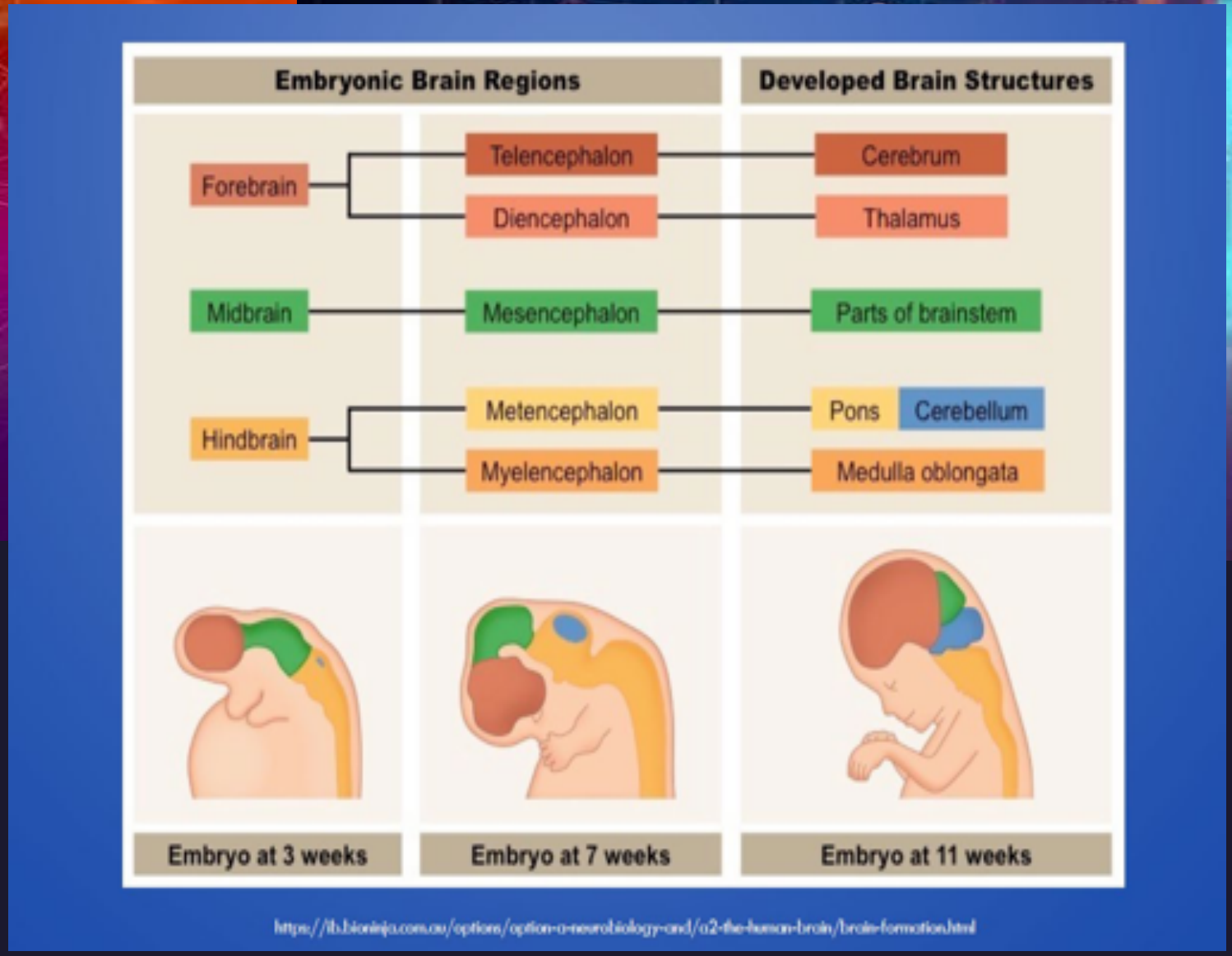
The most common brain imbalance occurs between the two hemispheres of the brain. Essentially this is a lack of connection, communication, and integration between the networks in the brain. ***This lack of integration is most commonly a result of a developmental imbalance, delay or asynchrony***. This means that one side of the brain was slower to develop, and this caused the other to grow and mature faster. This difference in growth/development prevents the two sides from properly integrating.

Cortex

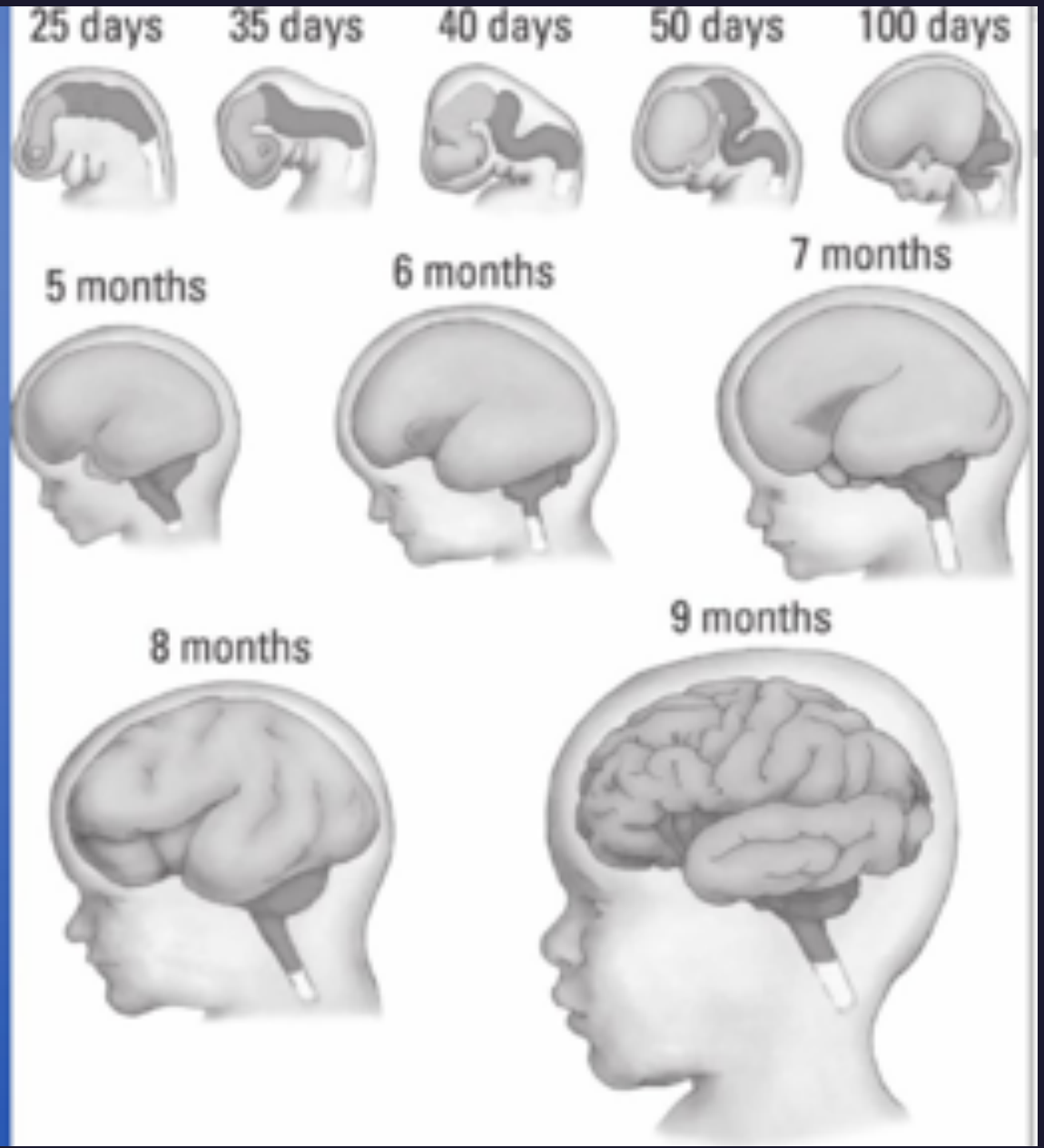



Left body to right brain
Right body to left brain
Right Hemisphere
Left Hemisphere
Right Cerebellum
Left Cerebellum
Stimulation
Stimulation
BRB Simple Concept
Right Body Left Brain
Left Body Right Brain
Right side of body
Left side of body
Copyright © Brain Chat LLC
All Rights Reserved 2020

Developmental Neurology



INCREASED FOLDS (GYRI) = INCREASED SURFACE AREA = BIGGER BRAINS!



Neurosystem

In what order does the Brain Develop?

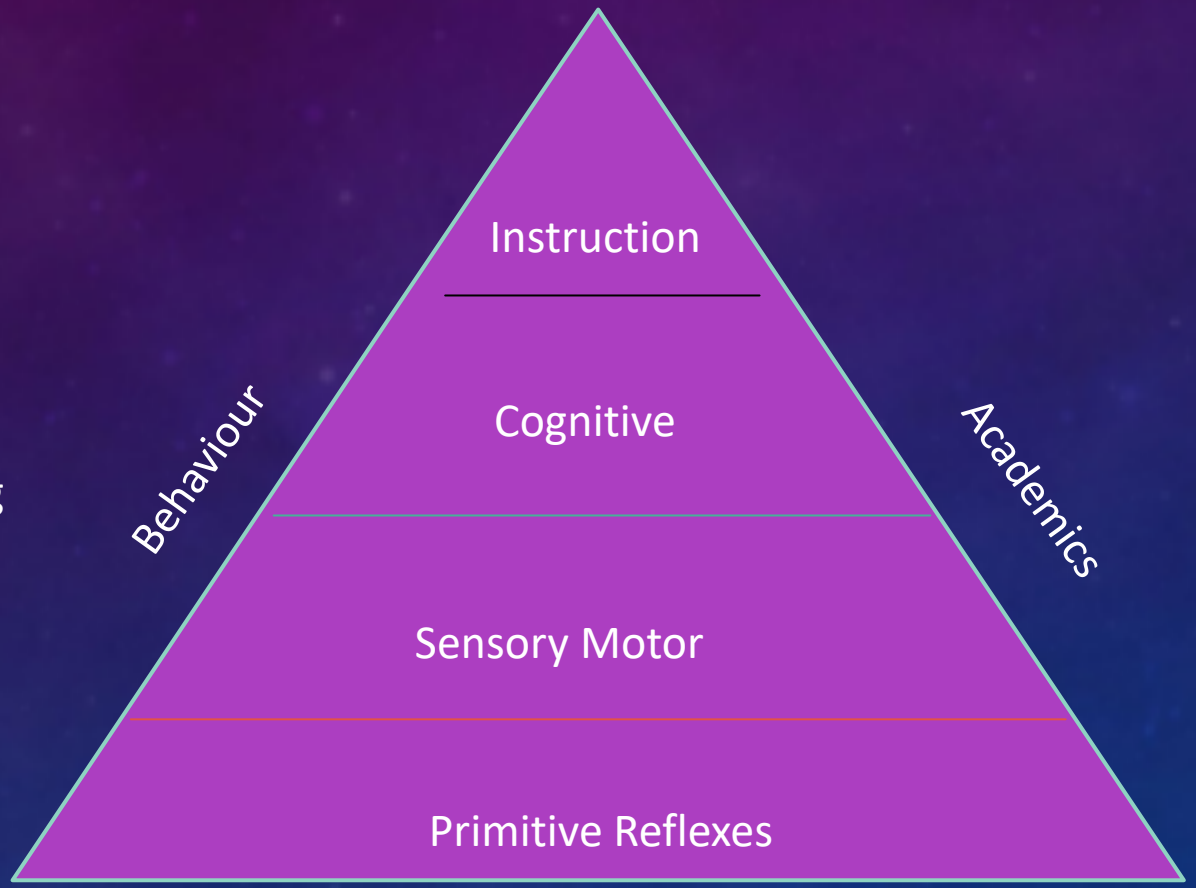
Answer: In utero (highly vestibular) -> post birth Bottom up -> Top down regulation

In what order does the Brain Degenerate?

Answer: Not so clear, depends on pathology and other factors - but will typically loose top down regulation first

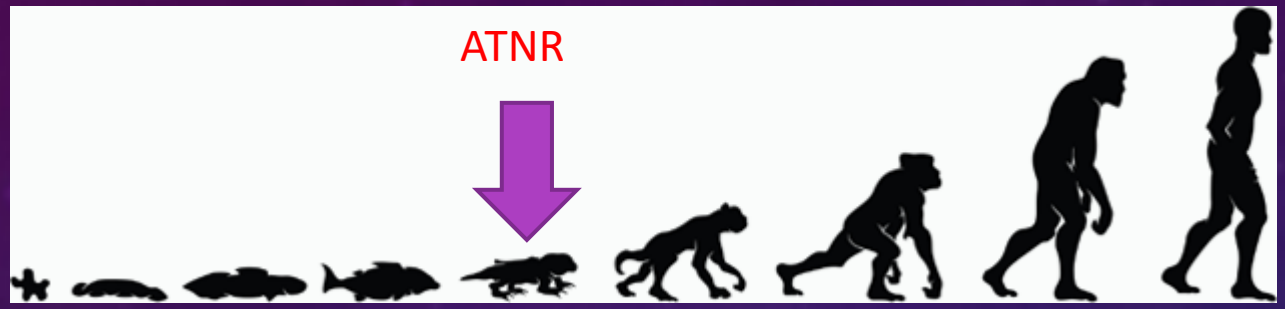
COGNITIVE STAGES FOR CHILD DEVELOPMENT

- Stages of learning

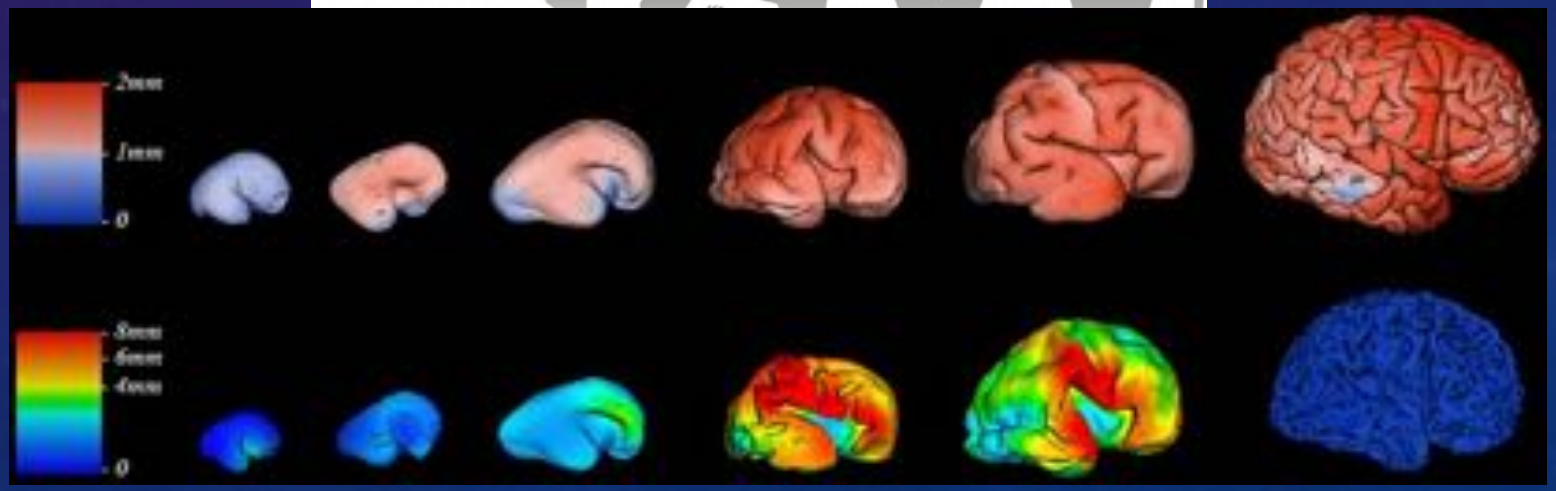


Genevieve Dharamaraj
THERE'S NO CEILING TO HOPE

EVOLUTION



This Photo by Un



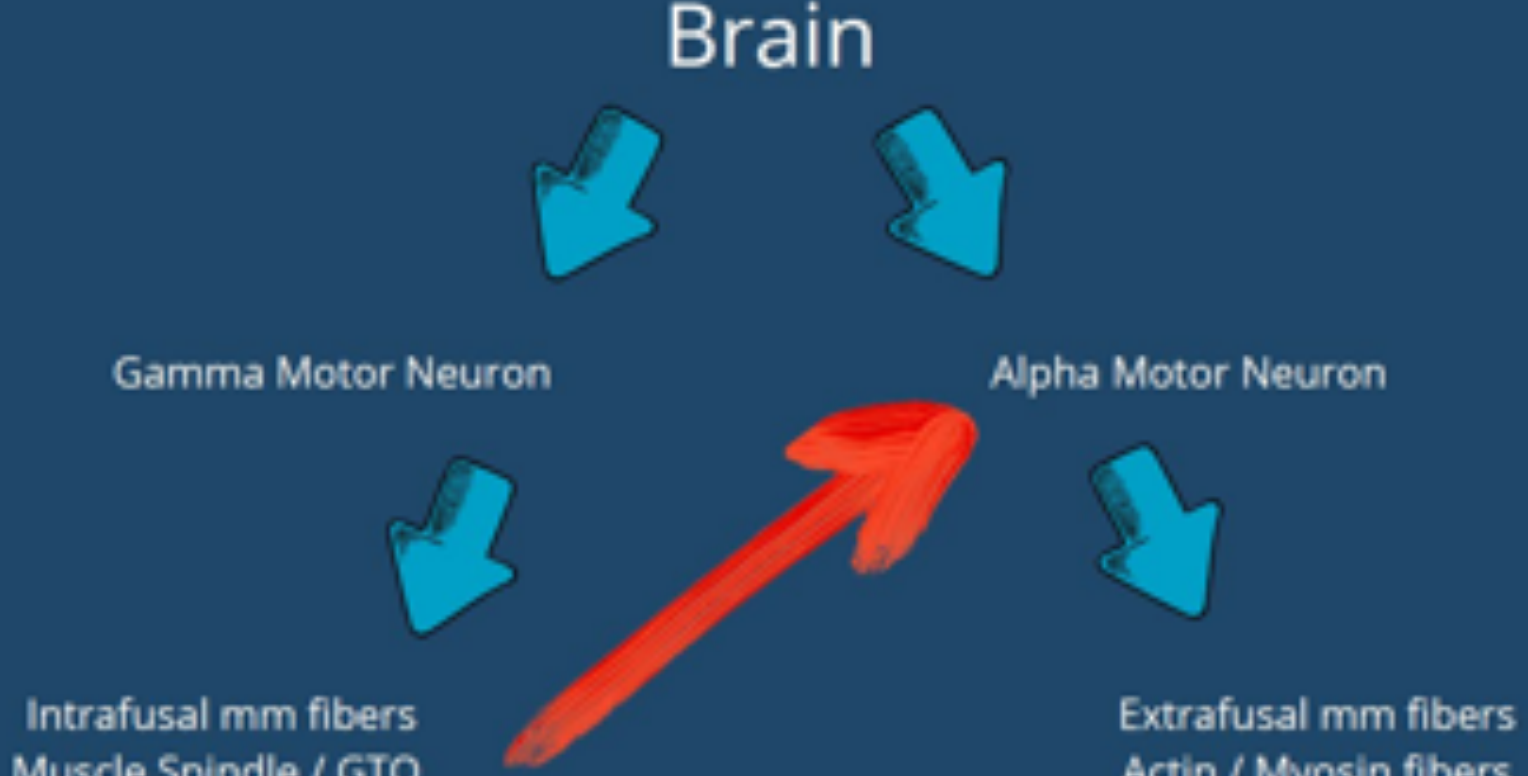
Tone

Muscle Tone Review

Voluntary muscle movements are built on the foundation of involuntary muscle TONE.

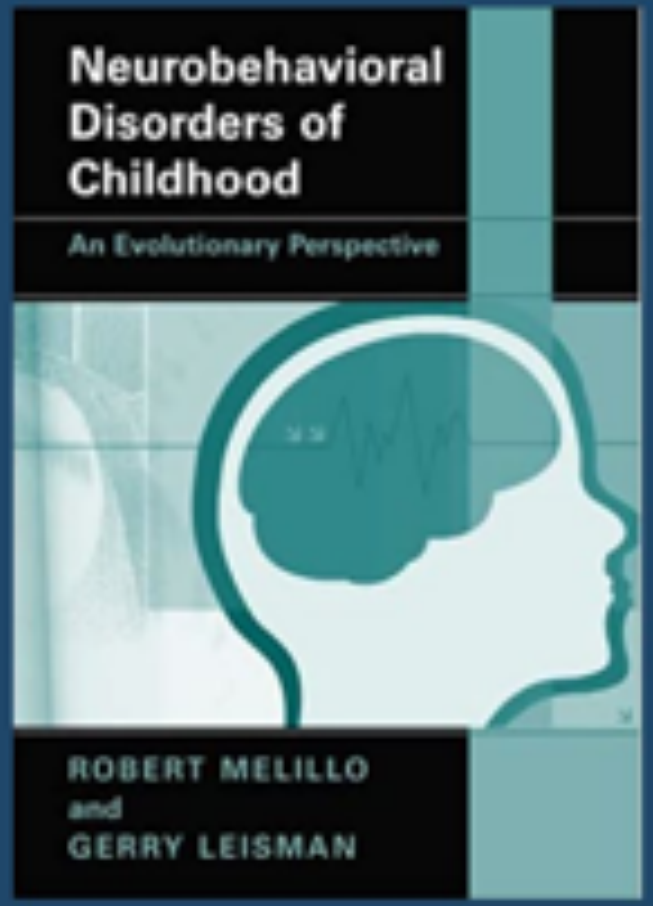
Muscle Tone Review

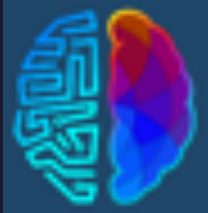
Neurosystem



"...decreased neo-cortical frontal lobe activation can result in primarily IPSILATERAL decreased inhibition
of the sympathetic nervous system by at least two pathways. One is loss of direct inhibition of the hypothalamus and the second is loss of stimulationby brainstem vagal centers that inhibit the sympathetic activity."

Neurobehavioral Disorders of Childhood, an Evolutionary Perpsective
by Dr. Robert Melillo & Gerry Leisman





Neurosystem

Consider the frontal / prefrontal lobe as a dam holding back the stress response

If this dam is broken, weak or not fully functional the stress response will then escape down the body IPSILATERALLY

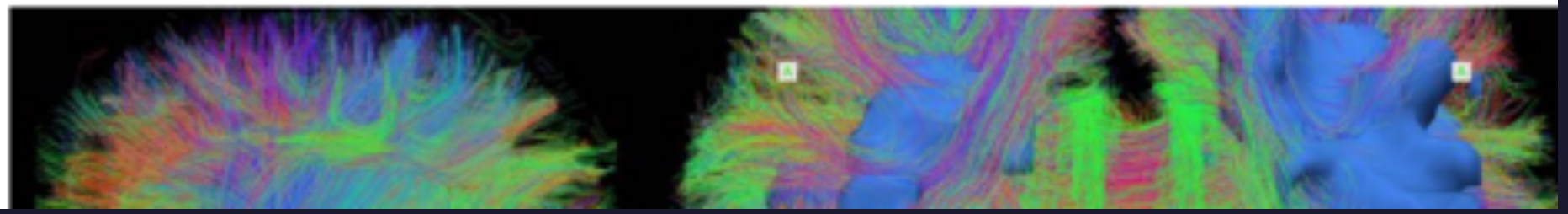
This stress response will influence the adrenal cortex, which will release epinephrine / noreipnepherine and cortisol which will then cause a systemic stress response as well

Functional Disconnection Syndrome

Decreased cortex development / function = Increased sympathetics & fight or flight.

This makes it difficult to function and properly heal.

Cortex

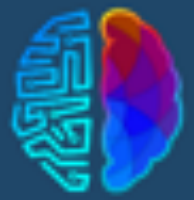


Neurosystem

2 Most Important Factors to Examine

Muscle tone

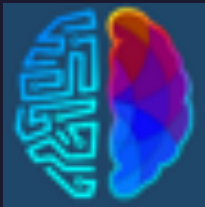
Asymmetry



Neurosystem

Hard Pyramidal Signs: See a distruption of the Corticospinal and / or Corticobulbar pathways. These signs are CONTRALATERAL to the injury / lesion.

Soft Pyramidal Signs: See lack of functional integrity of the brainstem and / or frontal / prefrontal integrity and therefore the stress response escapes down the body. These signs are IPSILATERAL to the injury / lesion.

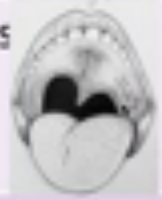


1. Neurological Postural Assessment
2. Head Tilt / Rotation
3. Facial Asymmetry
4. Pupil Asymmetry
5. Sensory Asymmetry, Hearing, Smell, Touch
6. Elbow / Wrist Angulation
7. Hip / Knee Angulation
8. Muscle Testing Asymmetry

Facial Tone


POP! GOES SCHOOL SODA ■ EXCLUSIVE: NINTENDO'S NEW GAME
TIME
NEW INSIGHTS INTO THE HIDDEN WORLD OF
AUTISM
BY CLAUDIA WALLIS

PHYSICAL BRAIN IMBALANCE

Left		Right
Left	Head Tilt 	Right
Left	Eye Balance (Scleral Show) 	Right
Left	Pupil Imbalance (Anisocoria)	Right
Left	Facial Muscles (Nasolabial fold) 	Right
Left	Soft Palate Weaknes 	Right
Left	Tongue Deviation 	Right

Vagal: Buzz word

Published: 21 November 2012

The vagus nerve and the inflammatory reflex—linking immunity and metabolism

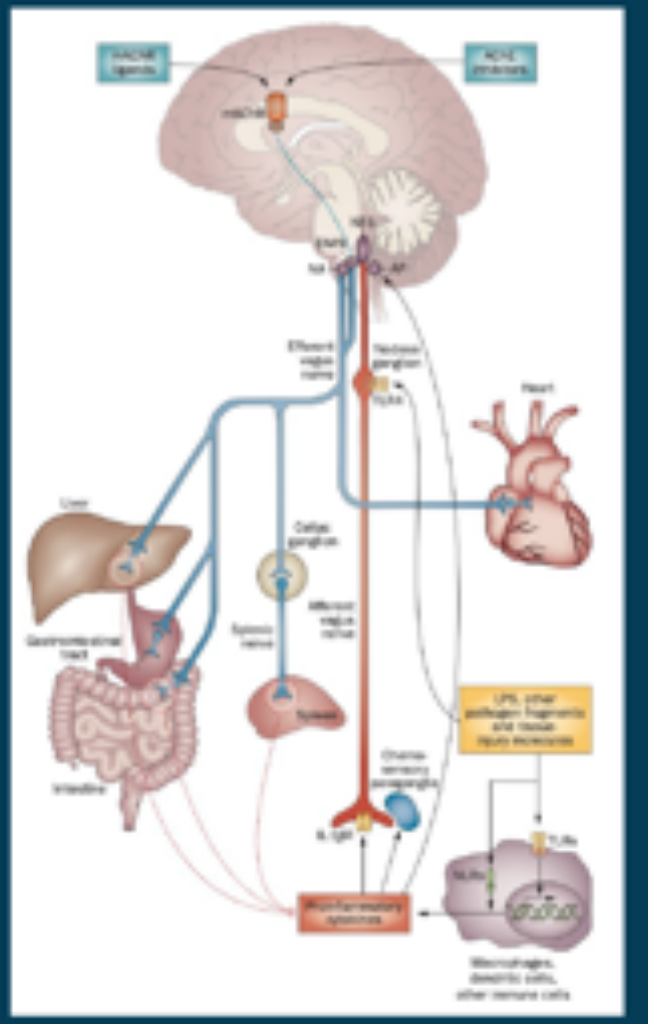
Valentin A. Pavlov ✉ & Kevin J. Tracey

Nature Reviews Endocrinology 8, 743–754 (2012) | Cite this article

7226 Accesses | 419 Citations | 55 Altmetric | Metrics

Abstract

The vagus nerve has an important role in regulation of metabolic homeostasis, and efferent vagus nerve-mediated cholinergic signalling controls immune function and proinflammatory responses via the inflammatory reflex. Dysregulation of metabolism and immune function in obesity are associated with chronic inflammation, a critical step in the pathogenesis of insulin resistance and type 2 diabetes mellitus. Cholinergic mechanisms within the inflammatory reflex have, in the past 2 years, been implicated in attenuating obesity-related inflammation and metabolic complications. This knowledge has led to the exploration of novel therapeutic approaches in the treatment of obesity-related disorders.

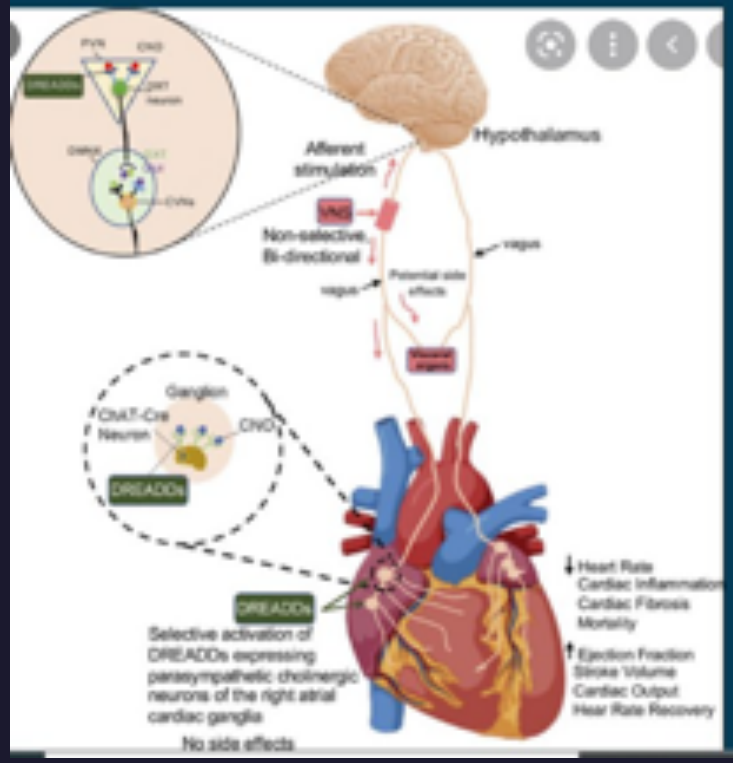


Review | Cardiovascular Neurohormonal Regulation

Novel approaches to restore parasympathetic activity to the heart in cardiorespiratory diseases

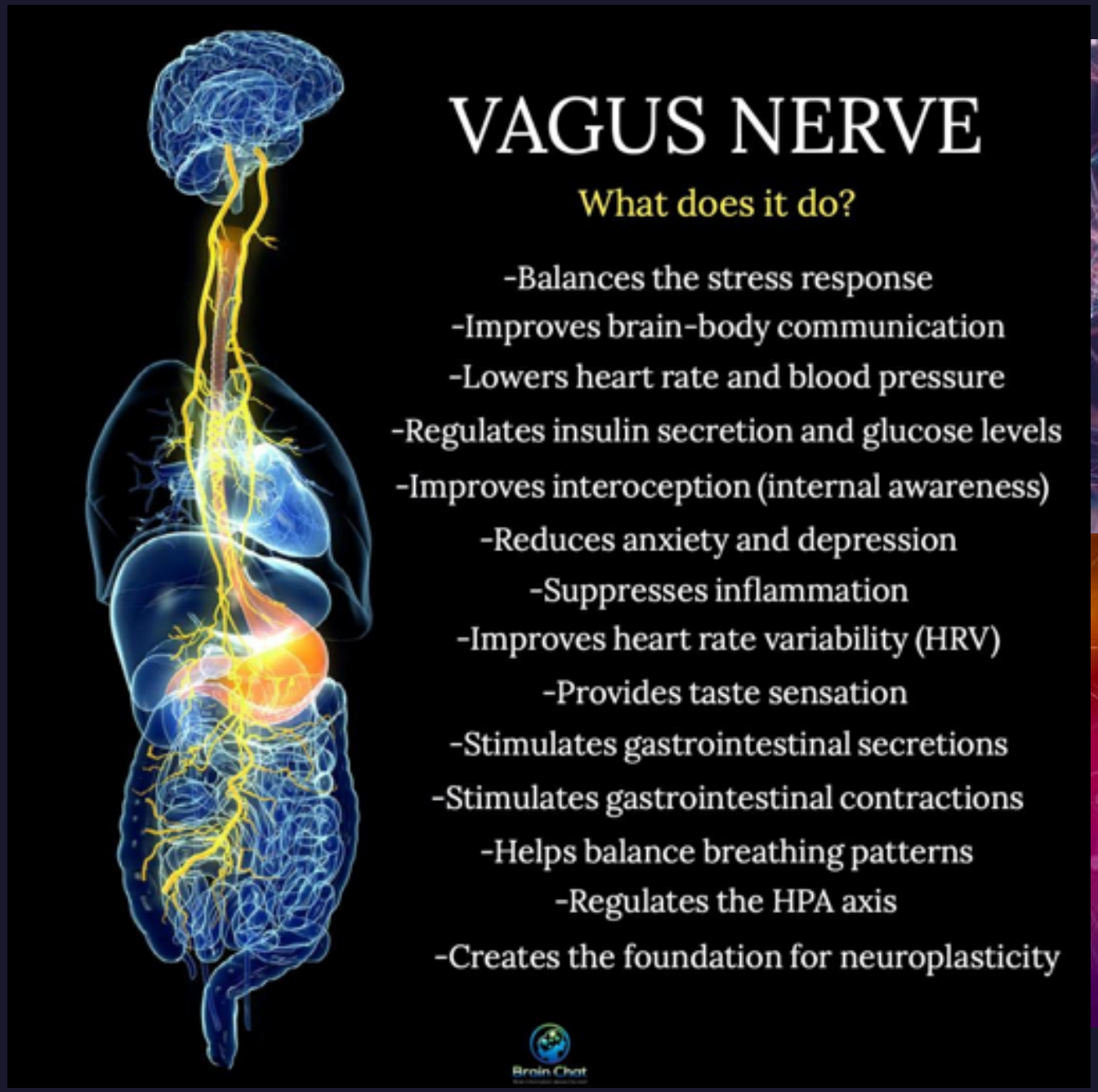
Jhansi Dyavanapalli

16 NOV 2020 // https://doi.org/10.1152/ajpheart.00388.2020



Right Brain: controls SA node for heart and affects the rate of heart.
Tachycardia

Left Brain controls AV node which is rhythm, see Arrythmia


VAGUS NERVE
What does it do?
-Balances the stress response
-Improves brain-body communication
-Lowers heart rate and blood pressure
-Regulates insulin secretion and glucose levels
-Improves interoception (internal awareness)
-Reduces anxiety and depression
-Suppresses inflammation
-Improves heart rate variability (HRV)
-Provides taste sensation
-Stimulates gastrointestinal secretions
-Stimulates gastrointestinal contractions
-Helps balance breathing patterns
-Regulates the HPA axis
-Creates the foundation for neuroplasticity
Brain Chat

Vagus setting

frontiers in Neuroscience

REVIEW

Critical Review of Transcutaneous Vagus Nerve Stimulation: Challenges for Translation to Clinical Practice

Jonathan Y. Y. Yap[†], Charlotte Keatch[†], Elisabeth Lambert[†], Will Woods[†], Paul R. Stoddart[†] and Tatiana Kameneva[†]*

[†] ARC Training Centre in Biodevices, Swinburne University of Technology, Hawthorn, VIC, Australia, [†] Faculty of Science, Engineering and Technology, Swinburne University of Technology, Hawthorn, VIC, Australia, [†] School of Health Sciences, Swinburne University of Technology, Hawthorn, VIC, Australia, [†] Iverson Health Innovation Research Institute, Swinburne University of Technology, Hawthorn, VIC, Australia, [†] Department of Biomedical Engineering, The University of Melbourne, Parkville, VIC, Australia

Several studies have illustrated that transcutaneous vagus nerve stimulation (tVNS) can elicit therapeutic effects that are similar to those produced by its invasive counterpart, vagus nerve stimulation (VNS). VNS is an FDA-approved therapy for the treatment of both depression and epilepsy, but it is limited to the management of more severe, intervention-resistant cases as a second or third-line treatment option due to perioperative risks involved with device implantation. In contrast, tVNS is a non-invasive technique that involves the application of electrical currents through surface electrodes at select locations, most commonly targeting the auricular branch of the vagus nerve (ABVN) and the cervical branch of the vagus nerve in the neck. Although it has been shown that tVNS elicits hypo- and hyperactivation in various regions of the brain associated with anxiety and mood regulation, the mechanism of action and influence of stimulation parameters on clinical outcomes remains predominantly hypothetical. Suppositions are largely based on correlations between the neurobiology of the vagus nerve and its effects on neural activity. However, tVNS has also been investigated for several other disorders, including tinnitus, migraine and pain, by targeting the vagus nerve at sites in both the ear and the neck. As most of the described methods differ in

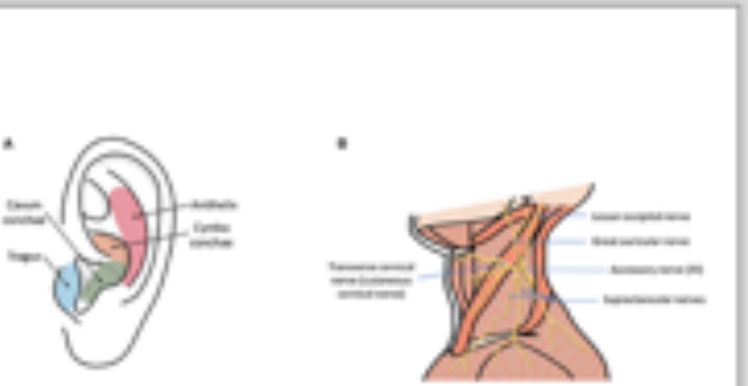
OPEN ACCESS

Edited by:
Tianruo Guo,
University of New South Wales, Australia

Reviewed by:
Peijing Rong,
China Academy of Chinese Medical Sciences, China
Xiaohong Sui,
Shanghai Jiao Tong University, China

***Correspondence:**
Tatiana Kameneva
tkameneva@swin.edu.au

[†] These authors have contributed



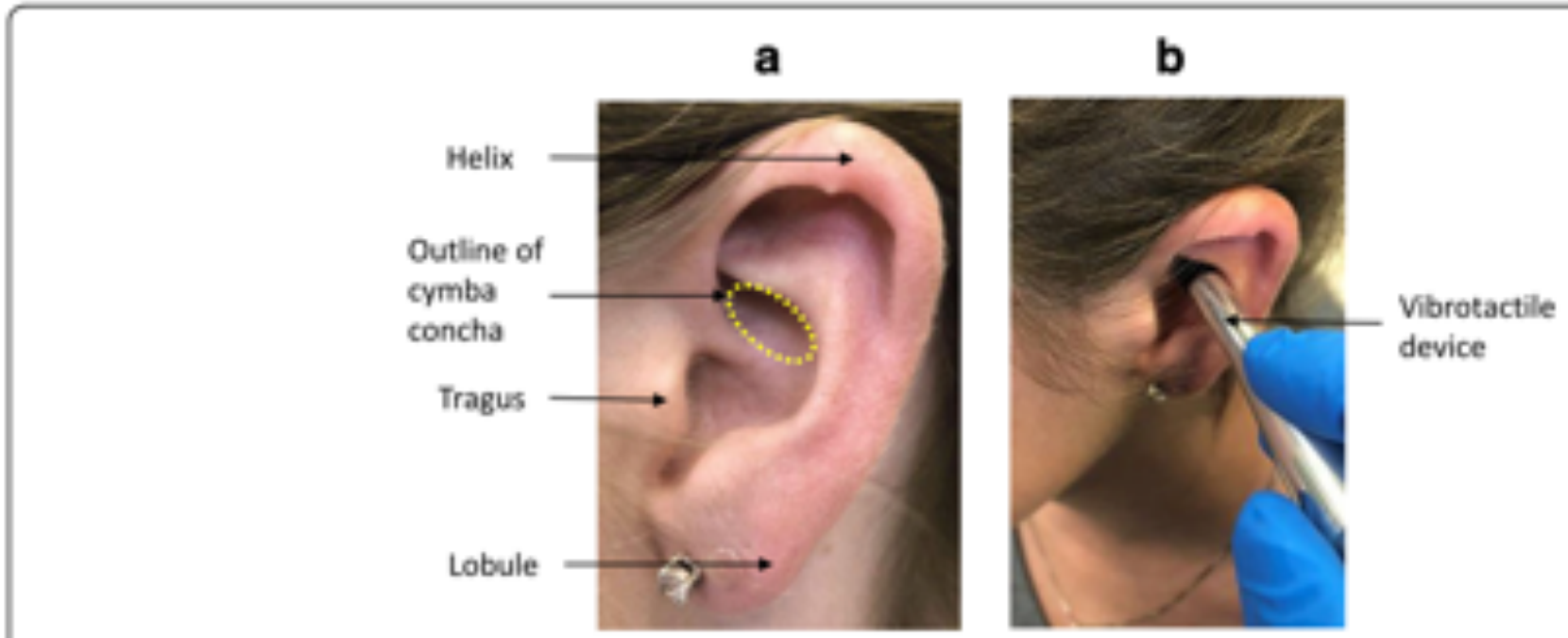


Fig. 1 Site of application of vibrotactile device to the cymba concha of the ear. (**a**) Major anatomical landmarks of the external ear (pinna) with approximate outline of the cymba concha. The cymba concha is a highly-conserved anatomical feature of the external ear that was identified by the device operator. (**b**) Representative device placement of the vibrotactile device in contact with the cymba concha

PRIMITIVE REFLEXES : WHY ARE THEY IMPORTANT?

- Primitive reflexes are the basic necessities a newborn need for survival. Baby has little brain and very little muscle tone
- Give babies the instinct to breathe, to feed when hungry, to squirm and cry when uncomfortable, to coo when cuddled
- Important even before birth for birthing! Breech is sign that they may not be activated, and C section means, the baby misses opportunity to use them
- Muscle movement prompts genes to build to build brain, and grow connections.
- New connections eventually inhibit the more primitive baby movements, setting the stage for more complex postural reflexes to develop
- Postural reflexes allow a both sides of the body to move in perfect synchrony and cooperation

Neurosystem

Simply stated, what is the purpose of a primitive reflex?

1. Sensory stimulus
2. Motor response
3. Drives brain growth, maturation, integration and plasticity
4. Top-Down Regulation Achieved! (until it's not...)

frontiers | Frontiers in Neurology

REVIEW
published: 07 July 2022
doi: 10.3389/fneur.2022.922322

"We are proving the retained primitive reflexes can be documented at all ages and that when they are retained they signify a maturational delay. We are also showing that we can integrate reflexes and we can change the brain. So there is a lot more original research coming." Dr Robert Melillo

Retained Primitive Reflexes and Potential for Intervention in Autistic Spectrum Disorders

Robert Melillo[1], *Gerry Leisman*[1,2*], *Calixto Machado*[3], *Yanin Machado-Ferrer*[3], *Mauricio Chinchilla-Acosta*[3], *Shanine Kamgang*[4], *Ty Melillo*[5] *and Eli Carmeli*[1]

[1] *Movement and Cognition Laboratory, Department of Physical Therapy, University of Haifa, Haifa, Israel,* [2] *Department of Neurology, University of the Medical Sciences of Havana, Havana, Cuba,* [3] *Department of Clinical Neurophysiology, Institute for Neurology and Neurosurgery, Havana, Cuba,* [4] *Department of Neuroscience, Carleton University, Ottawa, ON, Canada,* [5] *Northeast College of the Health Sciences, Seneca Falls, New York, NY, United States*

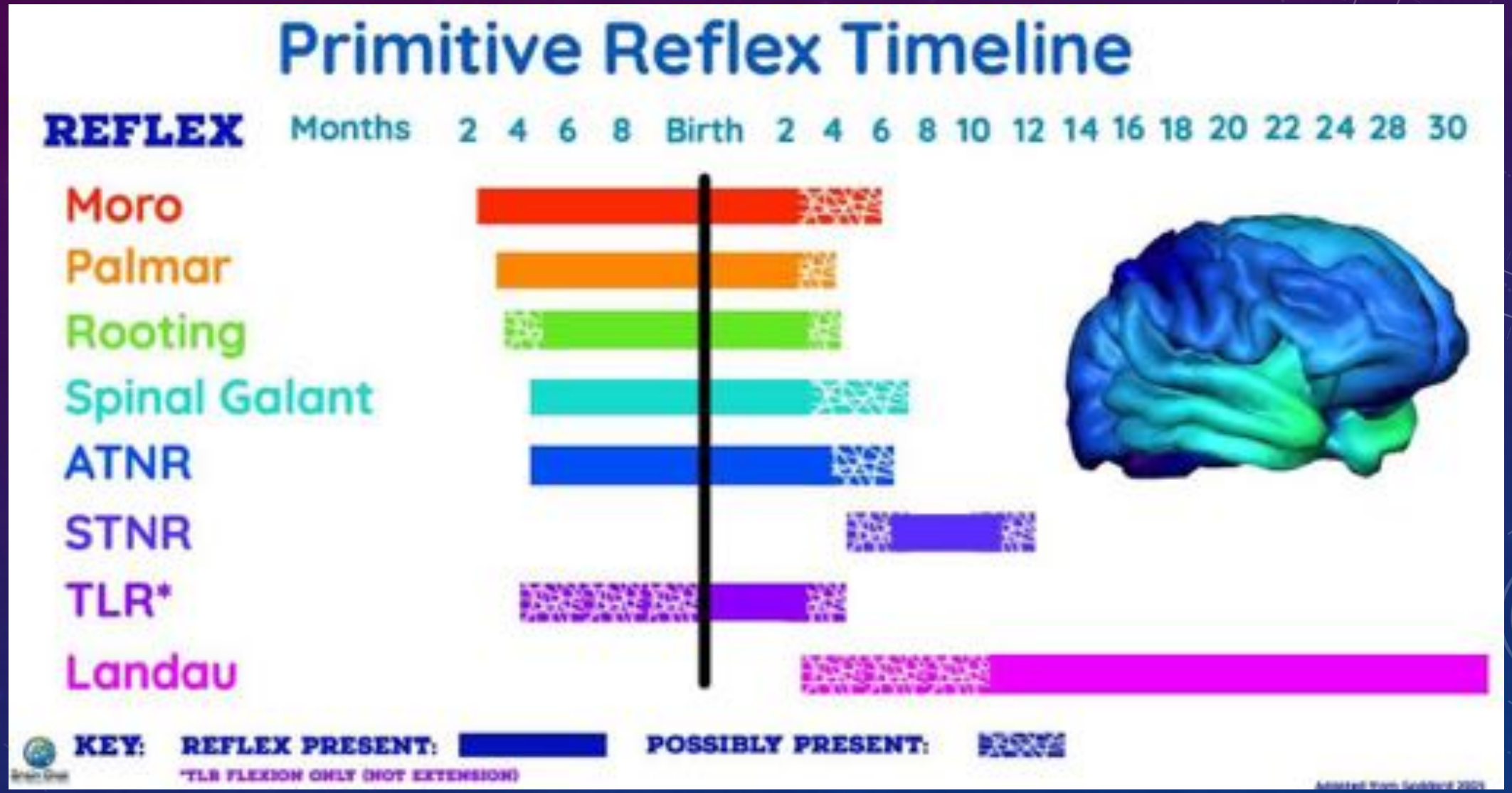
We provide evidence to support the contention that many aspects of Autistic Spectrum Disorder (ASD) are related to interregional brain functional disconnectivity associated with maturational delays in the development of brain networks. We think a delay in brain maturation in some networks may result in an increase in cortical maturation and development in other networks, leading to a developmental asynchrony and an unevenness of functional skills and symptoms. The paper supports the close relationship between retained primitive reflexes and cognitive and motor function in general and in ASD in particular provided to indicate that the inhibition of RPRs can effect positive change in ASD.

OPEN ACCESS

Edited by:
Hong Ni,
Children's Hospital of Soochow University, China

Reviewed by:

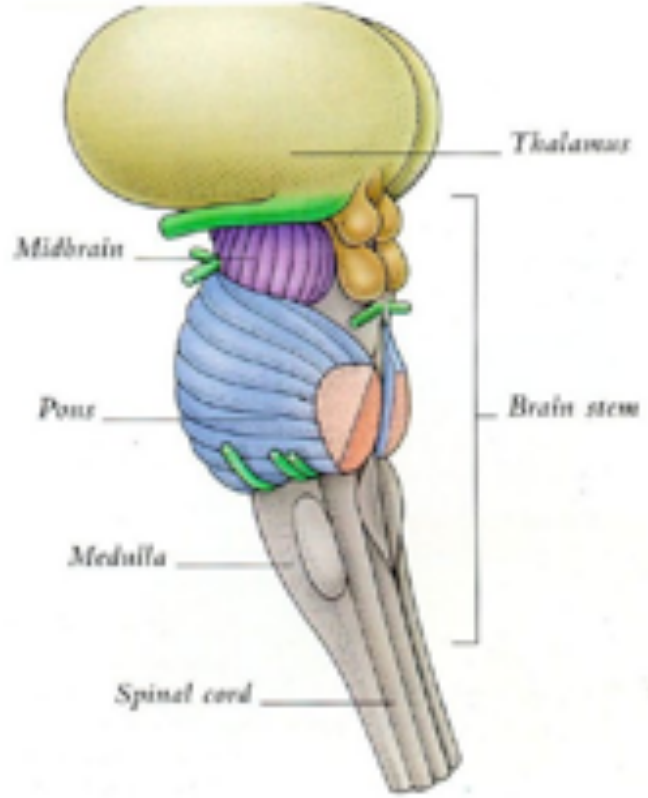
Primitive Reflex Timeline



Primitive Reflexes

Primitive Reflexes in the Midbrain / Mesencephalon

- Moro / Startle



THE MORO REFLEX

- Emerges at 9 weeks in uterp, "fight/flight" reaction to stress, fully present at birth. Gone 2-4mths
- Emotional, presence of adrenalin/cortisol
- **Withdrawal:** from difficult situations, difficulty socialising, not affectionate or
- **Becoming Aggressive:** highly excitable, overreactive and dominating
- **ADULT:** free floating anxiety, mood swings, tense, difficulty making decisions

THE MORO REFLEX

DESCRIPTION	AGE DEVELOPS	AGE INHIBITED	SIGNS AND SYMPTOMS OF RETENTION
1. Considered the fight or flight response 2. Triggered by sudden unexpected sound or movement 3. Arms and legs move outwards with quick inhalation, then freeze and slowly move back in as child exhales 4. Accompanied by possible outburst of cries	Begins to develop 9 weeks in utero	2-4 months of life	1. Hypersensitive and/or reactive 2. Poor impulse control 3. Motion sickness and poor coordination 4. Physically timid 5. Visual perception problems 6. Sensitivity to light 7. Sensitivity to sound 8. Dislike changes and surprises

Brain Chat

Startle Reflex

The infant startle reflex is also known as the Moro reflex. When a baby is startled by a loud noise or sudden movement, they will suddenly extend their limbs outward and arch their back, before drawing their limbs back toward and in front of their body. The baby might also gasp or cry.

A retained startle reflex may lead to:

- hypersensitivity and overreaction to sudden noise, movement, or light
- mood swings with aggressive outbursts
- dislike of change or anything new
- feelings of constant anxiety

Integration Exercise: Starfish

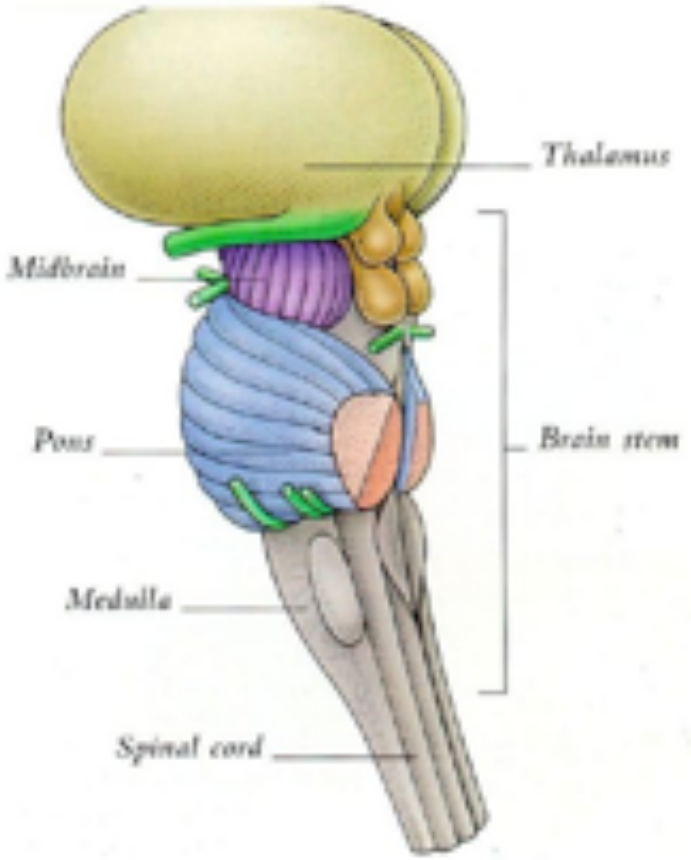
- While sitting, have the child extend their arms and legs open like a starfish, with their head tilted slightly back as they breathe in.
- As they breathe out, get them to slowly lower their head toward their chest while they cross their legs and arms, with the right leg and right arm on top. Their arms should be crossed over their chest like an "X".
- On their next breath in, get them to do the starfish, then on the breath out, cross their arms and legs, this time with the left arm and left leg on top.
- Do this 5 times for each side, twice a day.


" Starfish "
Right on top
" Starfish "
Left on top

Primitive Reflexes in the Medulla / Pons:

Primitive Reflexes

- Babinski
- Palmar Grasp
- Rooting
- Tonic Labrynthine
- Asymmetric Tonic Neck
- Symmetric Tonic Neck
- Spinal Galant / Perez



THE ROOTING REFLEX

DESCRIPTION	AGE DEVELOPS	AGE INHIBITED	SIGNS AND SYMPTOMS OF RETENTION
1. Searching, sucking and swallowing reflex 2. Light touch of the cheek or stimulation of the edge of the mouth will cause the baby to turn their head toward the side of stimulus and open the mouth in preparation for sucking	Begins to develop 24-28 weeks in utero	3-4 months of life	1. Hypersensitivity around the lips or mouth 2. Tongue may be positioned too far forward in the mouth 3. Speech and articulation problems 4. Poor manual dexterity (Babkin response)

Brain Chat

Rooting Reflex

The first primitive reflexes a baby adapts at birth are the rooting and sucking reflexes. The rooting reflex is triggered when the skin around a baby's mouth is stimulated by touch, causing them to open their mouth and turn towards the stimulus. This reflex helps a baby find a source of food, either a breast or a bottle, and start feeding successfully.

A retained rooting reflex may lead to:

- speech issues
- involuntary tongue or mouth movements when writing or drawing
- chewing or biting lips constantly

Integration Exercise

- Lightly stroke the child's face horizontally inward from the ear toward the lips 3 times on each side. Make sure you touch the corner of the lips.
- Lower the starting point by about ½ inch each time.
- Use a make-up brush as if you are painting cat whiskers, or your fingers if the child is super sensitive.
- Do this exercise twice a day.

THE PALMAR REFLEX

DESCRIPTION	AGE DEVELOPS	AGE INHIBITED	SIGNS AND SYMPTOMS OF RETENTION
1. Light touch or pressure in the palm of the hand will cause the fingers to close and “grasp”	Begins to develop 11 weeks in utero	2-3 months of life	1. Poor manual dexterity and/or fine motor skills 2. Poor writing skills (messy writing or pressing too hard) 3. Speech difficulties (hand and mouth relationship via the Babkin response)

Brain Chat

Palmer Reflex

From the moment of birth, an infant will grasp your finger and hang on for dear life when you stroke the palm of their hand. This is normal for the first few months of life. However, if it does not integrate, it will impact individual finger movements.

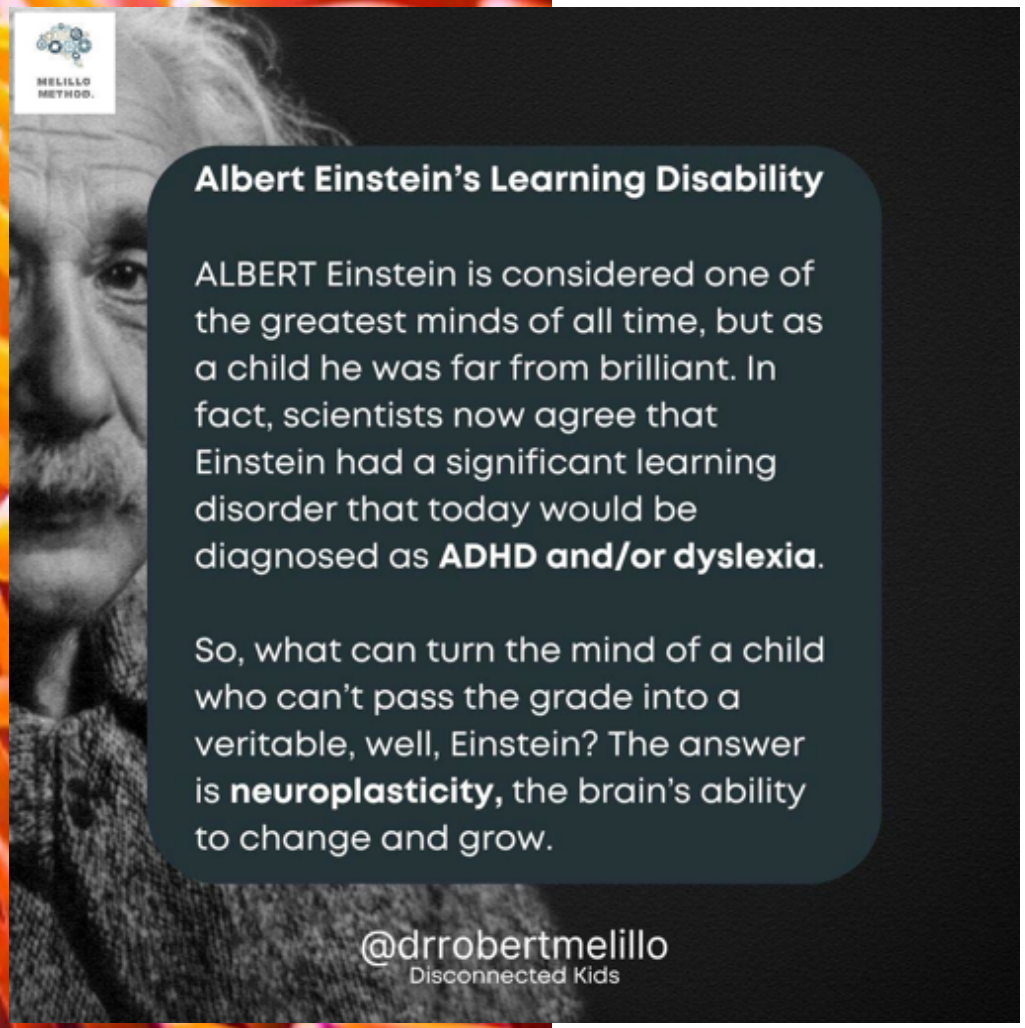
A retained palmer reflex may lead to:

- poor fine motor skills
- inappropriate, immature pencil grip
- poor or messy handwriting

Integration Exercise

- Have the child hold a small squishy ball in their hands.
- Get them to squish the ball with all their fingers and thumb in a slow controlled motion.
- Get them to squish the ball between their thumb and each finger separately.
- Do this 5 times for each hand, twice a day.

ALBERT EINSTEIN

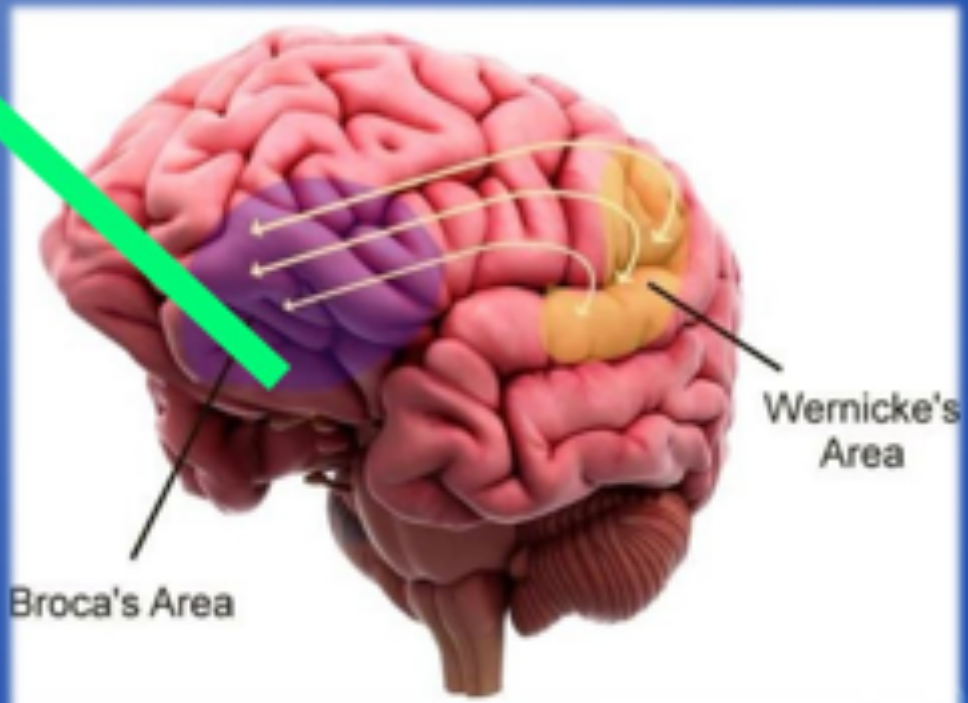


- Albert Einstein did not speak until he was around age seven and did poorly academically all the way through college. When he failed to get into graduate school at the age of twenty, he became a clerk in the Swiss Patent Office. But he did not give up his cerebral pursuits. Just six years later he published the first draft of his scientific Theory of Relativity, which won him the Nobel Prize ten years later.
- When Einstein's brain was examined after he died in 1955, it appeared basically the same as everyone else's. It was roughly the same size and shape as most brains and had the average number of brain cells. One scientist, however, discovered something uniquely different about Einstein's brain: It possessed an enormous number of connections, or synapses, between brain cells. While at one time this could have been credited to good genes, we can now see that a great deal of Einstein's genius was the result of the unique way he used his brain.

SPEECH IS IN THE BRAIN

Broca's Area is located in the region of the pars opercularis and pars triangularis of the frontal lobe of the dominant hemisphere (typically left). Broca's is involved with speech production, language comprehension, speech associated gestures and action recognition.

BROCA'S AREA



LANGUAGE CENTER

BROCA'S AREA

- Broca's area is located in the inferior Frontal Gyrus, mostly in the left Side of the Brain.
- Major function is Producing Coherent language of any form (Speaking & Writting) - Motor function
- Broca's Aphasia is a result of a damage to Broca's area. Broca's Aphasia cause problems in Person's ability to Produce a language - Speech is slow & Broken
- Anatomically Broca's area is Connected to Wernicke's area through Arcuate Fasciculus

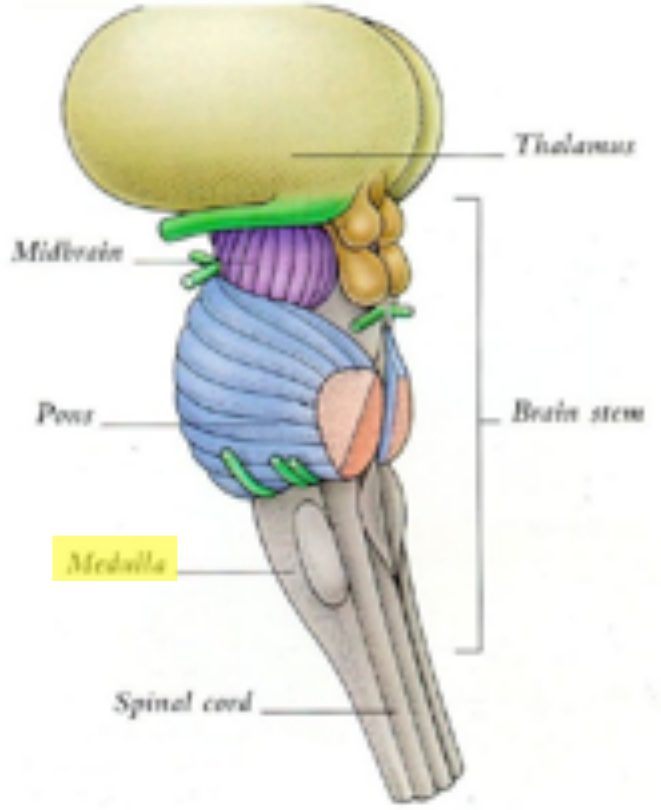
WERNICKE'S AREA

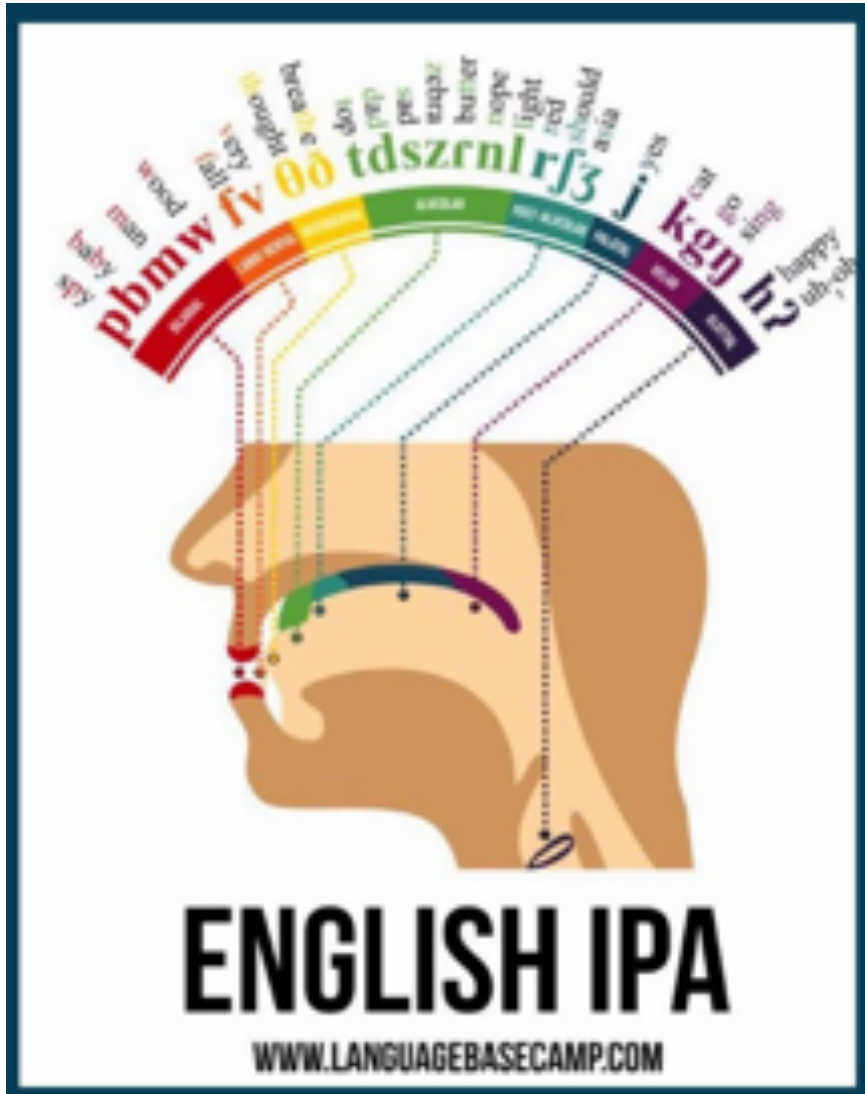
- Wernicke's area is located in the Posterior-Superior Temporal Gyrus, mostly in the left Side of the Brain.
- Major function is to help Process & Comprehending language of any form (Spoken or written)
- Wernicke's Aphasia is a result of a damage to Wernicke's area. Wernicke's Aphasia cause problems in Person's ability to Process & Comprehend language
- Anatomically Wernicke's area is Connected to Broca's area through Arcuate Fasciculus

Brainstem - Medulla

Main nuclei in the Medulla:

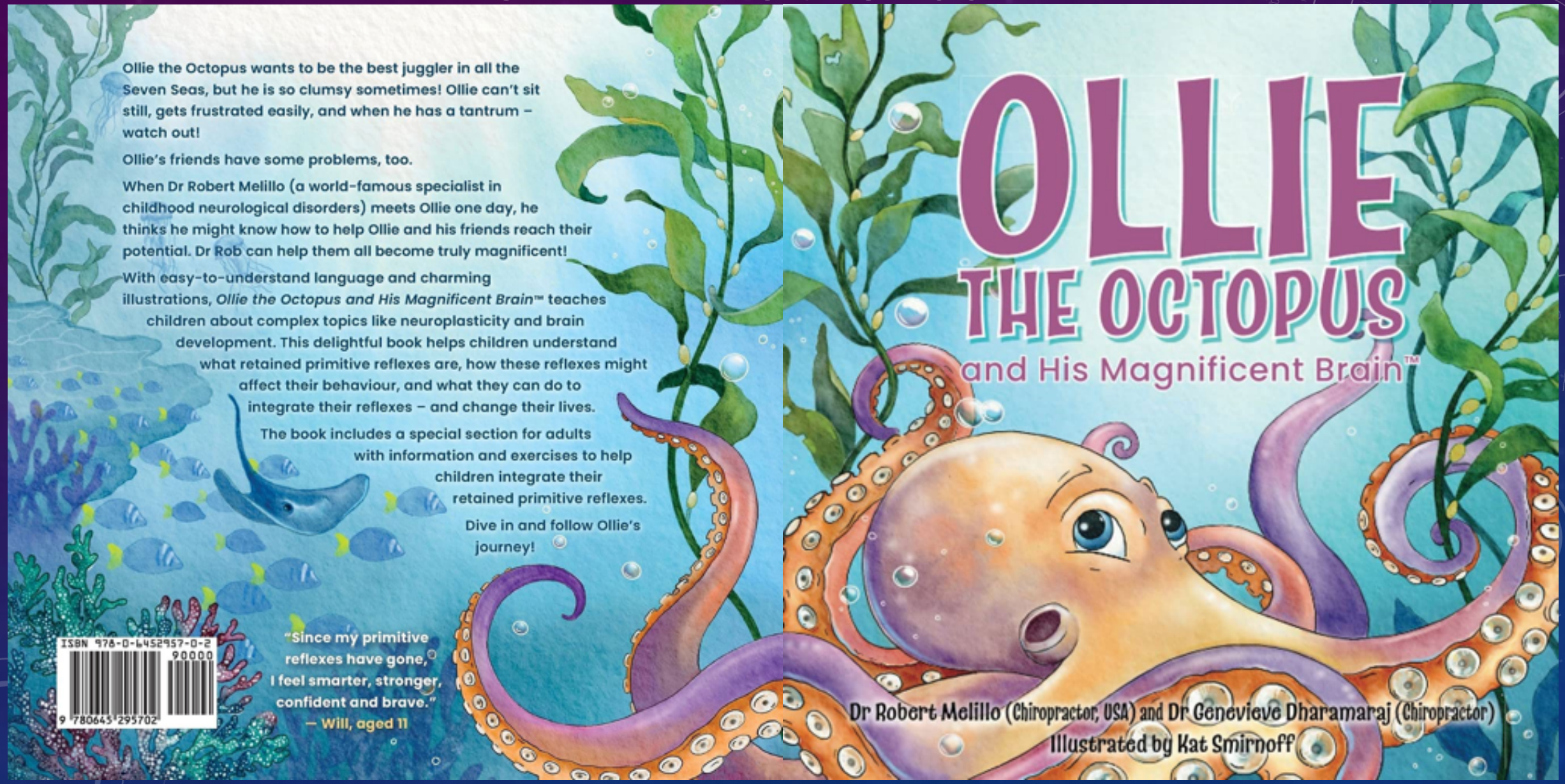
- **Solitary Nucleus:** Taste, gag reflex, carotid reflex.
- **Trigeminal Nuclei:** Vibration on the face / mouth, muscles of mastication.
- **Cochlear Nuclei:** Acoustics / Music





Red Lenses
Right hand vibration
Tens: right paraspinal
Rosemary: left nostril
Laser:
Left Vagus
Left Prefrontal
Right Cerebellum
Left Cerebellum

OLLIE THE OCTOPUS



Neuron

CellPress

Article

Plasticity and Spontaneous Activity Pulses in Disused Human Brain Circuits

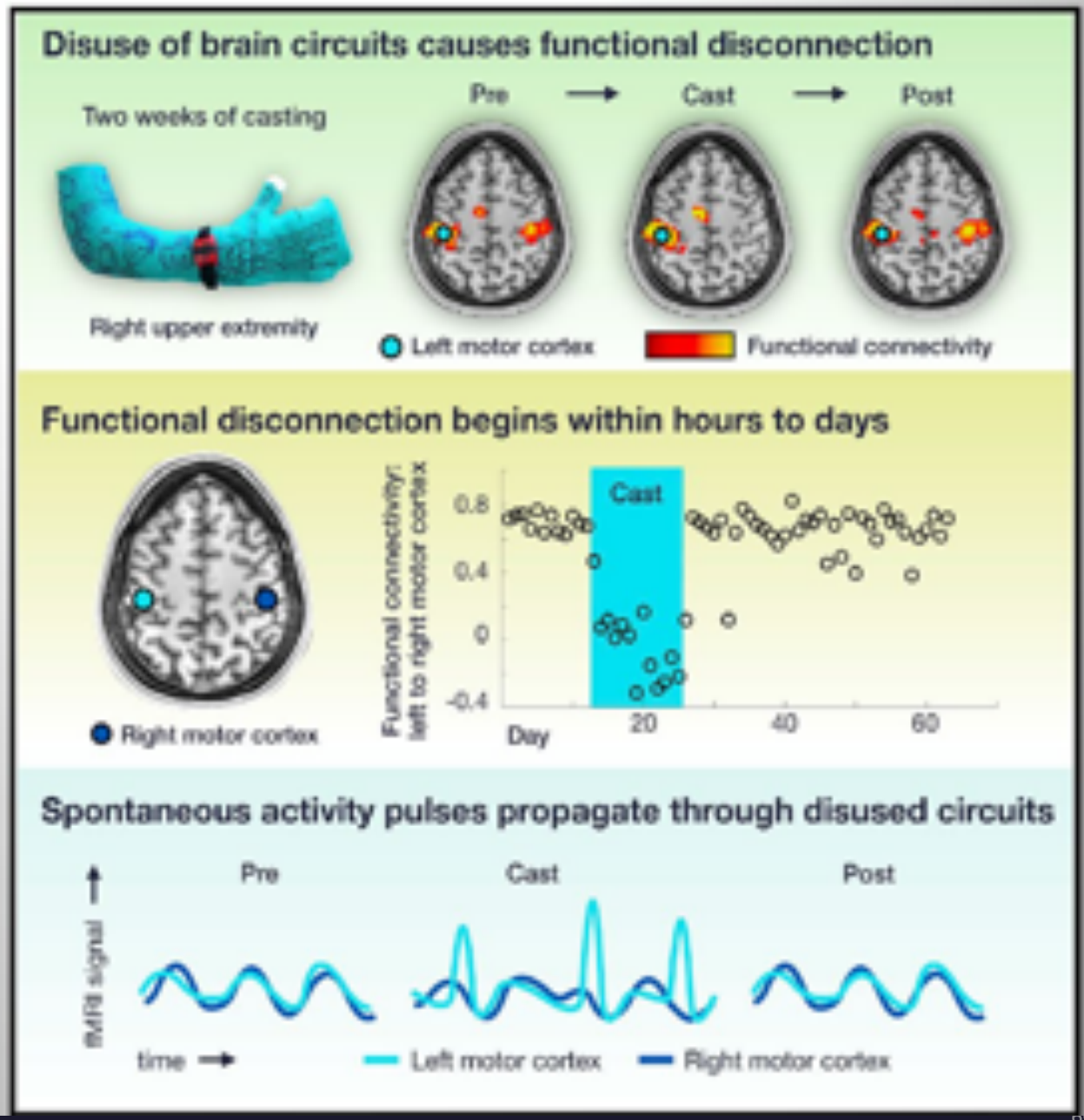
Dillan J. Newbold,[1,17,*] Timothy O. Laumann,[2] Catherine R. Hoyt,[3] Jacqueline M. Hampton,[2] David F. Montez,[1,2] Ryan V. Raut,[4] Mario Ortega,[1] Anish Mitra,[4,5] Ashley N. Nielsen,[1,6] Derek B. Miller,[1] Babatunde Adeyemo,[1] Annie L. Nguyen,[1] Kristen M. Scheidter,[1] Aaron B. Tanenbaum,[1] Andrew N. Van,[1,7] Scott Marek,[1] Bradley L. Schlaggar,[1,8,9,10] Alexandre R. Carter,[1,3] Deanna J. Greene,[2,4] Evan M. Gordon,[11,12,13] Marcus E. Raichle,[1,4] Steven E. Petersen,[1,4,7,14,15] Abraham Z. Snyder,[1,4] and Nico U.F. Dosenbach[1,3,4,7,16,*]

[1]Department of Neurology, Washington University School of Medicine, St. Louis, MO 63110, USA
[2]Department of Psychiatry, Washington University School of Medicine, St. Louis, MO 63110, USA
[3]Program in Occupational Therapy, Washington University School of Medicine, St. Louis, MO 63110, USA
[4]Department of Radiology, Washington University School of Medicine, St. Louis, MO 63110, USA
[5]Department of Psychiatry, Stanford University, Stanford, CA 94305, USA
[6]Institute for Innovations in Developmental Sciences, Northwestern University, Chicago, IL 60611, USA
[7]Department of Biomedical Engineering, Washington University in St. Louis, St. Louis, MO 63110, USA
[8]Kennedy Krieger Institute, Baltimore, MD 21205, USA
[9]Department of Neurology, Johns Hopkins University School of Medicine, Baltimore, MD 21287, USA
[10]Department of Pediatrics, Johns Hopkins University School of Medicine, Baltimore, MD 21287, USA
[11]VISN 17 Center of Excellence for Research on Returning War Veterans, Waco, TX 76711, USA
[12]Center for Vital Longevity, School of Behavioral and Brain Sciences, University of Texas at Dallas, Dallas, TX 75080, USA
[13]Department of Psychology and Neuroscience, Baylor University, Waco, TX 76706, USA
[14]Department of Neuroscience, Washington University School of Medicine, St. Louis, MO 63110, USA
[15]Department of Psychological and Brain Sciences, Washington University in St. Louis, St. Louis, MO 63130, USA
[16]Department of Pediatrics, Washington University School of Medicine, St. Louis, MO 63110, USA
[17]Lead Contact
*Correspondence: newbold@wustl.edu (D.J.N.), dosenbachn@wustl.edu (N.U.F.D.)
https://doi.org/10.1016/j.neuron.2020.05.007

SUMMARY

To induce brain plasticity in humans, we casted the dominant upper extremity for 2 weeks and tracked changes in functional connectivity using daily 30-min scans of resting-state functional MRI (rs-fMRI). Casting caused cortical and cerebellar regions controlling the disused extremity to functionally disconnect from the rest of the somatomotor system, while internal connectivity within the disused sub-circuit was maintained. Functional disconnection was evident within 48 h, progressed throughout the cast period, and reversed after cast removal. During the cast period, large, spontaneous pulses of activity propagated through the disused somatomotor sub-circuit. The adult brain seems to rely on regular use to maintain its functional architecture. Disuse-driven spontaneous activity pulses may help preserve functionally disconnected sub-circuits.

- Highlights
- Casting the dominant upper extremity for 2 weeks caused disuse and weakness
- Disused brain circuits functionally disconnected from the rest of the motor system
- Connectivity within disused circuits was maintained throughout casting
- Disuse-driven spontaneous activity pulses propagated through disused circuits



FOLLOW ON INSTA

- Dr Robert Melillo
- Nurturing Brain Potential
- Dr Kyle Daigle
- Bcrawforddc
- Brainchat

Genevieve Dharamaraj

THERE'S NO CEILING TO HOPE

Thank You

hello@nurturingbrainpotential.com.au