Disconnected Kids, Understanding and Correcting Functional Disconnection in Autism

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Dr Robert Melillo
- Is the creator of the Brain Balance program TM, is an internationally recognized author, professor, researcher with expertise in neurology, rehabilitation, neuropsychology, and childhood developmental disorders.
- He holds a Masters in Neuroscience, Masters in Clinical Rehabilitation Neuropsychology, PhD in Clinical Rehabilitation Neuropsychology, Diploma in Chiropractic, Diplomate in Neurology, Fellow of American College of Functional Neurology, Fellow of American Board of Chiropractic Developmental Disabilities. Former Associate Professor Functional Neuropsychology Touro College, Professor Clinical Neurology and Childhood Developmental Disorders, Executive Director FR Carrick Research Institute and Children’s Autism Hope Project. President International Association Of Functional Neurology and Rehabilitation, Co-Editor Of Peer Reviewed Journal Functional Neurology, Rehabilitation And Ergonomics. Author “Disconnected Kids” as well as several texts and scientific papers. Utilized in many graduate courses in Medicine, Psychology, and education. He is the Co-Founder Brain Balance Achievement Centers.

What is Autism?
- Can you describe any of the leading scientific theories of what is actually happening in the brain of an autistic child?
What is the Brain Balance program?

- Brain Balance Centers are specialized supplemental learning centers that are focused on helping children with specific learning disabilities and behavior problems.
- Our goal is to help improve and optimize each child’s ability to learn academically and socially.
- The Brain Balance Program is a comprehensive individualized program that focuses on identifying a child’s specific weaknesses in all aspects of sensory detection and processing, motor planning and coordination, cognitive skills, behavior, and academic achievement.
- We also assess the child’s unique feeding behavior, diet and nutritional needs.
- All of this is individualized to the child and focused on addressing the actual underlying cause of all of these issues, a Functional Disconnection.

THE EPIDEMIC

- 10 years ago Autism was considered a rare disorder diagnosed in approx 1 out of 10,000 children.
- Most recent CDC study places prevalence at 1 in 110 and 1 in 70 boys.
- Most recent studies out of Korea with a more extensive population based study shows prevalence to be 1 in 38.
- According to researchers, “The results of the study indicated a prevalence estimate for ASD to be 2.64% of the population; a number nearly three times previous estimates.”
- It is believed that a population based study in the US would reveal even a higher number of children than seen in the Korean study.

THESE PROBLEMS ARE NOT GENETIC, THEY ARE ENVIRONMENTAL or EPIGENETIC!!!

- Epimutations are inheritable which is why these issues run in families.
- This means that they are potentially Correctable!!!!

A CHILD IS BORN WITH ONLY 25% OF BRAIN, IT WILL GROW TO 90% OF ADULT SIZE BY 3 YRS. ENVIRONMENTAL FACTORS TURN ON GENES THAT INCREASE THE SIZE OF THE BRAIN. THIS IS NOT DUE TO INCREASING THE NUMBER OF CELLS.

NEUROPLASTICITY

- NEUROPLASTICITY CAUSES GROWTH OF THE BRAIN, EACH CELL BECOMES LARGER AND MORE INSULATED
- MAJORITY OF GROWTH IS DUE TO INCREASED FUNCTIONAL CONNECTIVITY
- WHY ARE HUMANS SO MUCH MORE INTELLIGENT THAN ANY OTHER ANIMAL ON THE PLANET?
- GENES?
- LARGE BRAIN PER BODY SIZE?
- WHAT IS THE UNIQUE ABILITY OF THE HUMAN/BRAIN THAT GIVES RISE TO INTELLIGENCE, CONSCIOUSNESS AND SELF AWARENESS?
- 1. TIMING and COORDINATION

BRAIN DEVELOPMENT, SYNAPTOGENESIS AND FUNCTIONAL CONNECTIVITY

- As the neurons become larger and more insulated by glial cells, they increase the speed of their impulse transmission;
- more networks can be activated simultaneously increasing the coordination and integration of large cortical networks;
- initially this increased coordination occurs with short range intracortical connection to increase integration and coherence within the individual hemispheres.
2. THE ASYMMETRICAL HUMAN BRAIN

LATERALIZED FUNCTIONS
Combining: Taking advantage of each hemisphere's unique intellect

Brain Development, Synaptogenesis and Functional Connectivity
- As this coordination and synaptogenesis continues, long range connections will form.
- And this will increase the size of the corpus callosum where many of these fibers will cross to connect with areas on the opposite hemisphere.
- This is all part of the normal process of cortical maturity. We think this is the process that is affected and delayed in most if not all neurobehavioral disorders.

What is the actual Problem?
- Recent research has shown that ASD, ADHD, Dyslexia, LD, OCD etc., are all the result of a common single underlying problem.
- That problem is known in the scientific community as a Functional Disconnection. It has also been referred to as developmental disconnection, de-synchronization and underconnectivity and weak central coherence.
- In a sense the same thing, the primary problem in all of these disorders lies in the inability for large cortical networks to coordinate and bind in time and space.
- This poor coordination leads to the inability to integrate and bind information from multiple areas of the brain simultaneously.
- The reason for this is an underlying processing imbalance where certain cortical networks are processing information at a much faster speed than other networks.
- The networks that are processing quickly function at a normal to above normal level, while information from other slower networks is essentially ignored.

Left and Right Cortex
- Two cooperating hemispheres usually connected by corpus callosum

What is the actual Problem?
- This leads to a anatomical imbalance where certain areas of the brain are physically larger or more mature than others.
- Areas that cannot synchronize and bind in space and time cannot share information therefore they do not develop connections so they appear underconnected.
- The most significant disconnection appears to be between the two hemispheres themselves in that the most underdeveloped and underconnected area of the brain is the actual corpus callosum.
- However, there is no sign of any pathology, injury, degeneration or localized lesion of any kind. Inflammatory changes are distributed equally which seem to make the inflammation a result of the Functional Disconnection, not the cause.

What is the actual Problem?
- The makeup of all of the child’s issues can be explained by a combination of unusually strong skills in one hemisphere combined with unusually weak skills in the other hemisphere.
- ADHD, ASD, OCD, Tourette's are a result of a weak right hemisphere.
- Dyslexia, LD, processing Disorders and Language disorders are a result of a weak left hemisphere.
Socioeconomic Inequality in the Prevalence of Autism Spectrum Disorder: Evidence from a U.S. Cross-Sectional Study

Aim of this study was to evaluate the hypothesis that the prevalence of autism spectrum disorder (ASD) was significantly stronger in children with versus without a pre-existing diagnosis.

Methods:
- The study included children with and without a pre-existing diagnosis.
- The prevalence of ASD was compared between the two groups.

Results:
- Significant SES gradients were observed for children with and without a pre-existing ASD diagnosis.
- The stronger SES gradient in ASD prevalence in children with versus without a pre-existing diagnosis was significantly stronger in children with high SES.

Conclusions:
- The study provided evidence for the increased prevalence of ASD in children with high SES.
- This finding supports the hypothesis of socioeconomic inequality in the prevalence of ASD.

References:
Top Down VS Bottom Up

- There are two major theoretical groups in regard to most neurobehavioral disorders
- Top Down theory (Central)
- Bottom up theory (Peripheral)

Left Hemisphere Under Activation

- Fine motor problems (handwriting, manipulation)
- Poor Reading (decoding)
- Poor object identification (visual or tactile)
- Poor verbal communication skills
- Poor spelling skills
- Poor memory for details, facts, figures
- Poor self-esteem
- Miss small details
- Poor self-esteem

Right Hemisphere Under Activation

- Delayed speech or articulation issues
- Poor verbal communication skills
- Poor spelling skills
- Poor auditory processing
- Poor math operations
- Task avoidance (especially with academics)
- Poor motivation
- Decreased immune response (gets sick often)
- Natural Killer Cells
- Evidence has accumulated to demonstrate important bidirectional communications between the nervous immune system. The anatomic pathways of communication include the commissural and commissural areas in the regulation of immune functions. Neuropeptides appear as critical mediators of neuroregulation of function of diverse immunocompetent cells. Biochemicals secreted by immunocompetent cells mediate the effects of the immune system on the nervous system. We provide suggestive evidence that the above-mentioned effects are under a lateralized control of the neocortex. Furthermore, the neocortex has a lateralized influence on the immunomodulating effects of sodium dithiono diethylthiocarbamate (methionyl), which compounds selectively increases T cell number and activities, and acts on cholinergic pathways. Thus, a major hemispheric asymmetry in the response to a drug is revealed. These results point to an important influence of respective cell number and function of immunocompetent cells, which site can be modified.

Brain modulation of the Immune system

The Role of the Cerebral Cortex

Development of T Helper Cells

Immature T Cell (T Helper -0)

Macrophages

Development of Immune System

- Macrophages
- Polymorphonuclear Leukocytes
- Eosinophils
- Basophils

White Blood Cells

NK Cells

Regulatory T Cells

Cytotoxic T cells

CD8+ T cells

CD8+ T cells

Macrophages

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Macrophages
Antigenic Autoimmunity?
• First step is to identify and remove antigen
• Antibody tests
• Treat chronic infections
• Elimination diet / Challenge
• Question: What do you eliminate when the antigen is your own body?
• 1. Modify brains control of immune response
• 2. Must address the immune system directly by modifying immune response directly
  • Th1 / Th2 Balance

What supports regulatory T cells?
• Vitamin D
• EPA/DHA
• Glutathione
• SOD

TH-1 and TH-2 Support

TH-1 Support
- Astragalus
- Echinacea
- Glycyrrhiza
- Melissa Officinalis
- Maitaka Mushroom
- Beta-glucan mushroom

TH-2 Support
- Pine Bark Extract
- Grape Seed Extract
- Green Tea Extract
- Resveratrol
- Pyrroline
- Caffeine
- Lycopene
- White willow bark

Adrenal Cortisol Release is Modulated By
• Hypothalamus-Pituitary-Arenal Axis
  • Quantity of the release
  • Coordination of the circadian release
  • Coordination of circadian release

Cortisol circadian rhythms and response to stress in children with autism

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Summary
Background: Autism is a severe neurodevelopmental disorder characterized by impairment in communication, social interaction, repetitive behaviors and difficulty adapting to novel experiences. The Hypothalamic-Pituitary-Adrenocortical (HPA) system responds consistently to perceived novel or unfamiliar situations and can serve as an important biomarker of the response to a variety of different stimuli. Previous research has suggested that children with autism may exhibit dysfunction of the HPA system, but it is not clear whether altered neuroendocrine regulation or altered responsiveness underlies the differences between children with and without autism. In order to provide preliminary data concerning HPA regulation and responsiveness, we compared circadian rhythms and response to a non-social, environmental stressor in children with and without autism.

Methods: Circadian rhythms of cortisol were estimated in children with (N=12) and without (N=10) autism via analysis of salivary samples collected in the morning, afternoon and evening on 2 consecutive days. HPA responsiveness was assessed by examining the time course of changes in salivary cortisol in response to a mock MRI.

Results: Both groups showed expected circadian variation with higher cortisol concentration in morning than in the evening samples. The children with autism, but not typical children, showed a more variable circadian rhythm as well as statistically significant elevations in cortisol following exposure to a novel, non-social stimulus.

Conclusions: The results suggest that children with autism process and respond idiosyncratically to novel and threatening events resulting in an exaggerated cortisol response.

Keywords: Autism; Cortisol; Circadian variations; Stress; LHPA
Nutrition is not a substitute for sensory and motor based activation of cellular immediate early gene responses leading to plasticity.
Brain Balance Program

- 1. Multimodal (Most comprehensive)
- 2. Hemisphere specific (addresses primary problem)
- 3. Individualized (Specific Stimuli)
- 4. Same Time Integration (Precise Timing)
- 5. Repetitive (Frequency of Stimulation)
- 6. Progressively Challenging (To limit but not beyond)
- 7. Quantitative (Based on Daily Functional assessment)
- 8. Reproducible (Protocol Driven)
- 9. Safe (All natural)
- 10. Long term effectiveness (yearly follow up testing)

How do you learn more?

- Attend Neurobehavioral courses through The Carrick Institute For Graduate Studies
- CarrickInstitute.org
- Complete Training when awarded Franchise of Brain Balance Child Achievement Centers
- Complete turnkey operation that includes Training in Brain Balance Program, Business operations, Marketing and Advertising, Staff Recruitment and training, Proprietary Software, ongoing support and research and National and Global Branding.
- To find out more go to brainbalancecenters.com or contact Dr. Melillo at 631 471 1900 or email him at rmelillo@brainbalancecenters.com