
EXTENDED ABSTRACT

An open access article review on the brain-gut axis via the vagal nerve, neurotransmitter relationship between serotonin and estrogen, and the cognitive decline in depression

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ABSTRACT

Stress or sensory information comes from our environment into our brain from our sight, smell, sound, touch, and taste. The amygdala is responsible decide if any stress or sensory information is dangerous or harmful. The limbic system is the hypothalamus control center to evaluate neurochemicals to perceptions of fear, anger, disgust, sadness, happiness and surprise. When the brain perceptions trigger the amygdala, the autonomic nervous system initiates survival of necessary organs to fight, flee, freeze, or fawn. The kidneys use renin, angiotensin,

erythropoietin, iron, and antidiuretic hormone to maintain fluid and temperature balance in the blood vessels, heart, respiratory system, and lymph system. The pancreas uses glucagon and insulin to regulate glucose as the main source of energy for fight or flight as well as growth and development. The pineal gland uses melatonin and serotonin for regulation of sleep and cognition as well as alertness as awareness in fight or flight. The thyroid and parathyroid regulate all organ systems required for homeostasis of bodily functions at rest and for survival.

Key Words: Neurotransmitter; Estrogen; Hypophyseal

INTRODUCTION

There are twelve endocrine organs: adrenal glands, hypothalamus, hypophyseal portal blood vessel system, pituitary glands, kidneys, thymus, lymph system, gonads (ovaries and testes), pancreas, parathyroid, thyroid, and pineal gland [1].

The hypothalamus stimulates Thyroid Releasing Hormone (TRH), Growth Hormone Releasing Hormone (GHRH), Gonadotropin Releasing Hormone (GnRH), and Corticotropin Releasing Hormone (CRH) to affect the adrenal glands release of aldosterone, corticosteroid, epinephrine (adrenaline), norepinephrine, Dehydroepiandrosterone (DHEA) on the function of the anterior or posterior pituitary glands which enter into the portal vein of the hypophyseal portal system capillary beds to process vasopressin or Antidiuretic Hormone (ADH), adrenaline or epinephrine, Adrenocorticotrophic Hormone (ACTH), somatostatin hormone as well as sex hormones estradiol, progesterone, Follicle Stimulating Hormone (FSH), Luteinizing Hormone (LH), and testosterone [2]. Neuroendocrine biology and chemistry affect the neurotransmitters dopamine, serotonin, and norepinephrine [3]. These

neurotransmitter pathways are a key assessment component along with the cognitive assessment tools for executive functioning, immediate-delayed memory, learning, attention and concentration, and procession-psychomotor speed [4]. Estrogen and testosterone especially have an affinity for serotonin and dopamine which brings about the importance of lifelong learning in a world where we have a 40-50-year learning and work life[5].

Adolescents start working part-time and continue to work, learn, and be productive citizens in United States until early retirement at age 62, but full retirement with Medicare insurance at 70 [6]. It is vital to the economy not only in the United States, but internationally, to recognize that a healthy neuroendocrine system brings about a health digestion and immunity which promotes long and productive quality of life [7-9]. No longer can humanity afford to live long but comorbid lives of poor quality that drain the economy and mental health of family.

Preventative care needs to include yearly cognitive function testing in early education, neuroendocrine education in schools and the workplace, and insurance preventative coverage as wellness care just

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as a wellness physical yearly exam for all ages [10-13].

Importance of the review of neuroendocrine biology, cognition & depression

There is not a gold standard screening tool for cognition deficits in depression. The PHQ-9 screening tool was introduced in 2001. Today, it is a screening tool for depression reimbursed by insurance companies and a self-administered quick and easy to use patient self-assessment.

The PHQ-9 has nine questions that address feelings of failure, lack of energy, restlessness, hopelessness, thoughts of self-harm, lack of pleasure, difficulty concentrating or extremes like sleeping too much or not enough, poor appetite or overeating, speaking slowly or unable to sit still [14-16].

National Institute of Health offers a Cognitive Health Toolbox based on age starting at 3 years to 6 years old, 7 years-17 years old and 18 plus. The missing link is the distinction in cognition with the onset of puberty, the neuroendocrine system development, anywhere from 9 to 17. Teenage suicide, caused by adolescent depression, increased populations in crowded schools, and with development of technology requiring brain development of the neuroendocrine system that is only beginning to develop, but not understood by teachers, parent and clinicians in all disciplines of healthcare and educational settings leaves too many teenagers without leadership and mentorship [17-19]. Internationally, we have for two decades told preteens and adolescents what is wrong with them, their character, their laziness, and blamed parents for being less than the perfect parent; but if we look at the neuroendocrine system, we may just find that humans were not meant to function in the society we have built. Trillions of dollars in research would suggest that probability would benefit humanity to change society based on biology and chemistry. From 3 years to 17 years old, every human can learn their own genetics, personality, brain chemistry, how they learn best and what they need to try harder at to become who they were built to be and merge that with what they want to become. At onset of adulthood, the generations to come will focus on balancing life and work in a society built for humanity based on neuroendocrine biology to improve cognition, balance moods, and maintain energy with balanced nutrition and sleep [20]. Most of all to include exploring their neighborhoods, cities, states, and countries.

Traveling and friendship promotes socialization in real time teaching that social media, news, and marketing promotes an unrealistic view of the world, moments in time but not the ups and downs of a journey like compared to adventure, exploration, and observation of the world; which requires how you respond to fear, anger, anxiety when plans fail during a trip or how accomplishment feels when family and friends communicate to solve a problem in real life like a failed plan on a trip. All these real-life adventures require knowledge of neurology, human fight or flight response system, neuroendocrinology, and tools for dysregulation of fear, anger, anxiety, critical thinking, problem solving, and communication [21].

The National Institute of Health Tool Box includes all these tools to assess

- Executive functioning by inhibitory control, attention span, and dimensional change card sorting tests.
- Memory tests specifically episodic memory with picture sequence, working memory with list making and sorting ability, and immediate recall memory with auditory verbal learning tests.
- Language skills testing with picture vocabulary and oral reading recognition.
- Brain processing speed.

Balance the brain professional corp

The focus is on our similarities as much as our differences to find the balance required to the injustices brought against us as individuals, our families, our communities, societal differences and throughout our own states and countries. Human rights are the company's foundation.

Biography

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Her portfolio can be found on www.linkedin.com/in/kelli-mauric414b8b

Journal publications for “Neuroendocrine biology of cognition in depression”

- Journal of Psychiatry Research and Treatment
- Journal of Psychopathology of Depression
- Journal of Annals of Behavioral Science

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