



## MIND AS MGBA-DATA-BASED ALGORITHM AND BRAIN PARTS AFFECTING INTERNAL BALANCE AND AUTISM

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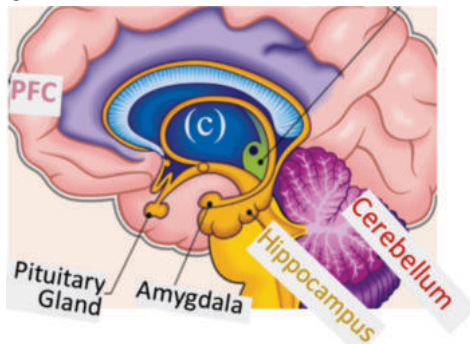
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**ABSTRACT** Roles of brain's 86 billion neurons and mind as MGBA data-based algorithm in health are very important. As a decision maker for what a human does, the mind plays an important role in human longevity, body balance, falls and partially autism. The decision making depends on amygdala and hippocampus memories which are unique to every human including children of the same parents. The mind can avoid diseases, slips, falls and partially autism.

### KEYWORDS :

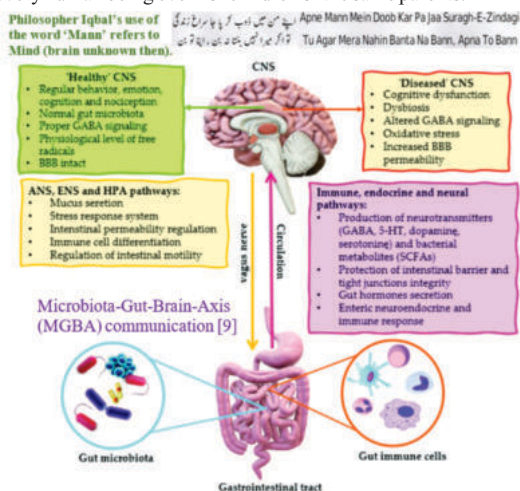
#### I. INTRODUCTION

Roles of mind (Amygdala Scripts and Hippocampus memories) and brain in health, longevity, and happiness are important. The information stored in amygdala and hippocampus in a certain sequence, called algorithm, is specific to every human being including children of the same parents. This algorithm is called the mind that is specific to a human being. Understanding their roles is important for a healthy life. Mind as MGBA-data-based algorithm and brain parts affecting internal balance and autism are discussed.



**Fig. 1** Brain parts, Amygdala and Hippocampus, important for childhood memories affecting personality and mind of a human.

**II. Amygdala Scripts and Hippocampus Memories Affecting Mind** Human embryo development [1] [2] contributes to childhood memories that are unique to every human. Reducing mother's stress during pregnancy leads to healthy embryo developments [3]. As shown in Fig. 1, the information is stored in amygdala and hippocampus in a certain sequence called algorithm that is specific to every human being. This algorithm is called the mind that is specific for every human being even for children of the same parents.



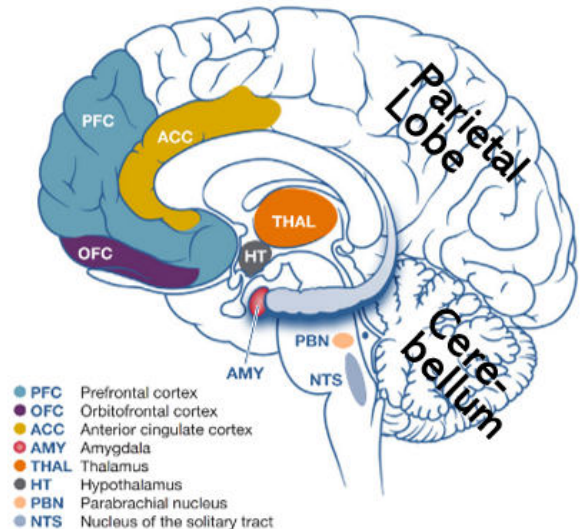
**Fig. 2** Mind defined as an algorithm based on data generated along Microbiome Gut Brain Axis (MGBA) [9]. Role of MGBA and Cerebellum in science of human stress, autism and falling.

As seen in Fig. 2, Philosopher Allama Iqbal uses 'Mann' meaning self. If one can study this 'Mann' one can study a person's life, feelings, problems and strengths [4]. 'Mann' is the mind based on latest research defining mind [5] as an algorithm based on data generated within Microbiome-Gut-Brain-Axis (MGBA) as seen in Fig 3.

Interoception refers to the representation of the internal states of an organism, and includes the processes, controlled by brain, by which it senses, interprets, integrates, and regulates signals from within itself as shown in Fig. 4. This review presents a unified research framework and attempts to offer definitions for key terms to describe the processes involved in interoception. These definitions are elaborated through illustrative research findings. Brief overviews of central aspects of interoception, including the anatomy function of neural and non-neural pathways, diseases and disorders, manipulations and interventions, and predictive modeling are provided.



**Fig. 3** Model of mind affected by AS (Amygdala Scripts), hippocampus and cerebellum that are impossible to change/ control as they are based on childhood memories .



**Fig. 4** Brain controlled processes by which brain senses, interprets, integrates, and regulates signals from within itself.

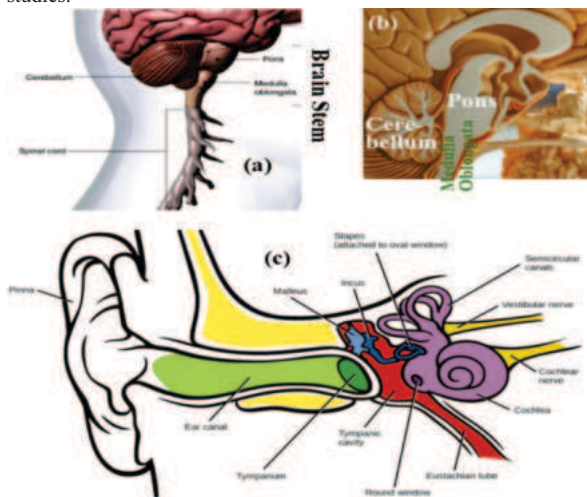
### III. Mind, Brain, Cerebellum and Hippocampus Roles in Human Health, Longevity and Falls

The goal of the brain is survival, and the mind, guided by Amygdala Scripts (AS) and Hippocampus (H) memories, is the decision maker for everything a human does. The role of stress, in addition to health, in human falling has been studied. Depending upon the mind of a human, the human can do good/healthy or unhealthy things affecting personal health and health of people in this person's environment. It is therefore important for this person to understand that everyone has unique/different AS and H memories. However, it is important to quantify everyone's AS and H memories using brain scans. Both hippocampus and amygdala scripts are involved in working memory [6]. Working memory is a form of childhood memories. In addition to its role in motor functions cerebellum is also involved in anxiety behavior [7].

Abnormal cerebral cortical activation and connectivity in patient populations have been studied. The specific role of cerebellar output circuitry, specifically the dentate nuclei (DN), in adolescent anxiety disorders remains largely unexplored [8].

The Cerebellum is the brain's internal balancer [9]. Roles of ear and brain stem are shown in Fig. 5 which explains the Science of slips, trips, and falls. The brain parts important for balance and equilibrium are (a) brain stem, cerebellum and spinal cord, (b) related to the science of falling and (c) parts of ear [9]. Resting-state functional connectivity analyses have parcellated the Dentate Nuclei (DN), the major nuclei of the cerebellum, into three functional territories (FTs) that include default-mode, salience-motor, and visual networks.

In addition to cerebellum's role in motor functions, recent evidence shows its involvement in an array of non-motor functions. One non-motor function by cerebellum is anxiety behavior as shown by recent studies.



**Fig. 5** The Science of slips, trips, and falls. The brain parts important for balance and equilibrium are (a) brain stem, cerebellum and spinal cord, (b) related to science of falling and (c) parts of ear [9].



**Fig. 6** Study of science of slips, trips, falls and autism using MUSE-2 EEG headset [10].

### IV. Study Science of Falls Using MUSE-2 EEG Headset

As shown in Fig. 6 [10], MUSE-2 with its 7 electrodes can help study interoceptive senses. Are some of interoceptive senses involved in balance and falls for a human? Can MUSE-2 EEG headset predict

balances and falls for a human? Accidents involving slips, trips, or falls happen every day. They can cause injuries and pain. But many accidents can be prevented knowing the factors involved in slips, trips, and falls. Forces involved in slips, trips, and falls are friction, momentum and gravity.

It is important to understand the science of slips, trips, and falls. There's friction between shoes of walker and the ground. Without enough friction, the walker can slip and fall. With enough friction, a walking person can move safely and stay balanced. The more momentum a walker has (the more mass and speed) in case of being overweight, the more serious an injury could be in the case of trip and fall. The less momentum a walker has, the less likely the walker will hurt in case of fall. When something falls on humans, gravity is the force that pulls a human down to the ground. Without gravity, objects would float instead of fall. The body has three systems for keeping its balance; (a) eyes keep track of visual clues, (b) inner ear (see vestibular system in Fig. 5) notices a change in your position (c) nerves (proprioceptive system) sense where your body is and how it's moving.

Keeping a human's balance often involves supporting human's center of gravity. Imagine there's a string in the middle of the body. At the bottom of the string is a weight. The top of the string is the human center of gravity. The weight is the direction one's center of gravity is being pulled. To stay balanced, one needs to keep the center of gravity supported.

### V. Brain Parts Involved in Autism

Prefrontal cortex, amygdala, hippocampus, and cerebellum are involved in autism. While the neurons in amygdala, hippocampus, and cerebellum can't be changed, can neurons in prefrontal cortex be activated for partial autism treatment? Recent research on autism addresses "Reversing valproic acid-induced autism-like behaviors through a combination of low-frequency repeated transcranial magnetic stimulation and superparamagnetic iron oxide nanoparticles" [11]. Evidence suggests that the hippocampus plays a crucial role in the pathophysiology of autism and social interactions [12]. Can MUSE-2, with its 7 EEG sensors, be used to study autism and predict probability of autism healing? That would be an exciting/unique topic to study and the author of this paper is planning to address this in his next paper.

### VI. CONCLUSIONS

Roles of brain's 86 billion neurons and mind as MGBA data-based algorithm in health are very important. As a decision maker for what a human does, the mind plays an important role in human longevity, body balance, falls and partially autism. The decision making depends on amygdala and hippocampus memories which are unique to every human including children of the same parents. The mind can avoid diseases, slips, falls and partially autism.

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