

عنوان مقاله:

(A Hierarchical Model for Autism Spectrum Disorder (HMASD

محل انتشار:

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خلاصه مقاله:

Background: Autism spectrum disorder (ASD) is a severe behavioral disorder characterized by pervasive impairments in social interactions, deficits in verbal and nonverbal communication, and stereotyped, repetitive patterns of behaviors and interests. Despite recent advances in identifying some genes that may cause autism, its underlying neurological mechanisms are uncertain. ASD is best conceptualized by considering the neural systems that may be defective in autistic individuals. **Objectives:** Here, we aim to describe a potential Hierarchical model for ASD. This interesting presented model is based on excitatory and inhibitory characteristics of cortico-cortical networks. **Methods:** Jason model is one of the models applied to produce EEG in cortical areas. In this model, a cortical area is modeled with three subpopulations including: excitatory pyramidal cells (output), excitatory interneurons groups, input inhibitory interneuron groups by means of output connections (output connections are limited to cortical planes). The presented hierarchical model for autism spectrum disorder (HMASD) is based on Jason model. HMASD is a hierarchical model of cortico-cortical networks as well as an excitation/inhibition model in sensory, mnemonic, social and emotional systems. In HMASD there are three kinds of outer connections including forward, backward and lateral connections, that their power is controlled by coupling parameters. **Results:** HMASD raises the possibility that ASD is related to excitation/inhibition imbalance in cortico-cortical networks. HMASD parameters are possible way for quantization imbalance quality. **Conclusions:** The most effected parts in ASD are lateral connections of HMASD. Two-sided connections which are completely symmetric become more active, and cause extra synchronization. On the other hand, due to special characteristic of two-sided connections and their ability to simulate the same phased dynamics, they cause unnatural asymmetry in children's EEG signal. These results are consistent with previous findings suggesting the association of EEG abnormalities in ASD with functional impairment of information interacted in cortical

کلمات کلیدی:

Autism Spectrum Disorder, Hierarchical Model, Brain Behavior, Asymmetry

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