

Early neurophysiological correlates of autism: visual attention and EEG rhythms

Results:

The study was focused on functional brain abnormalities associated with autism in 3-8 years-old boys. EEG was recorded 1) under controlled condition of sustained visual attention and 2) during sequential presentation of short novel visual stimuli in two independent samples of boys with autism (BWA) from Moscow (N=21) and Gothenburg (N=23) and a corresponding number of age-matched typically developing boys. EEG spectral power (SP), SP interhemispheric asymmetry, inter-regional coherence within delta, theta, alpha, beta and gamma bands and stimulus-induced EEG alpha oscillatory response were analyzed. The main distinctive features of ongoing EEG in BWA of both samples were the excess of high frequency activity (beta and gamma) and atypical hemispheric asymmetry of slower (delta, theta and alpha) EEG oscillations. The increased amount of fast brain oscillations in EEG of BWA correlated with the degree of developmental delay and may reflect genetically mediated abnormalities of GABA mediator system found in autism. Atypical leftward broadband EEG asymmetry in BWA with a maximum effect over the mid-temporal regions was associated with decreased coherence within the theta band at mid-temporal regions of right hemisphere. Alpha blocking response to novel visual stimuli in BWA was abnormally reduced at higher-order visual areas of right hemisphere. These findings point to a decreased capacity of right hemispheric neural circuits to generate EEG rhythms and may indicate altered regional specialization as well as altered information processing in autism. The concurrent lack of normal leftward asymmetry of mu rhythm suggests that abnormalities in EEG lateralization in autism are regionally/functionally specific.

Published work:

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