

Light up ADHD: II. Neuropharmacological effects measured by near infrared spectroscopy: is there a biomarker?

Silvia G, Maddalena M, Alessandro C, Eleonora M, Massimo M, Paolo B, Maria N.

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Abstract

BACKGROUND:

Attention deficit/hyperactivity disorder (ADHD) is a neurodevelopmental disorder characterized by deficits in self-controlling attention, behavior, and emotions. In recent years, noninvasive optical techniques, such as near infrared spectroscopy (NIRS), have been used to measure the neural correlates of pharmacological-therapy outcomes in children and adolescents with ADHD.

METHODS:

We reviewed a short series of articles that investigated the results of functional NIRS (fNIRS) on developmental-age ADHD. The review was limited to fNIRS studies that investigated the cortical responses that occurred during neuropsychological tasks in ADHD patients who received methylphenidate or atomoxetine.

RESULTS:

The majority of the reviewed studies revealed the presence of increased oxygenated hemoglobin concentrations in the prefrontal cortex following pharmacotherapy in ADHD samples. A higher frequency of right-lateralized results was found.

LIMITATIONS:

The considered studies are characterized by substantial methodological heterogeneity in terms of the patients' medication status and washout period, explored cerebral regions, and neuropsychological tasks.

CONCLUSIONS:

fNIRS seems to be a promising tool for the detection of pharmacological-treatment biomarkers in samples of children and adolescents with ADHD.