Autism - Open Access
ISSN: 2165-7890

Manukonda, Autism Open Access 2018, 8:3
DOI: 10.4172/2165-7890.1000e143

Editorial Open Access

New Developments in Autism Treatment

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Autism spectrum Disorder (ASD) is a complex developmental disorder that impairs the individual's ability of social interaction/communication. Having high genetic heterogeneity and complex etiology of the disorder among the ASD patients impede the advancement of strategies to cure this social stigma. However, current meagre medications can help a few people with ASD function better. But the research shows that the early intervention treatment can significantly enhance child's development [1,2]. According to the centre for Drug Control (CDC) the ASD incident rate increased from 1 out of 68 in 2016 to 1 out of 59 eight years old in 2018 [3]. Novel treatment targets and approaches are emerging out despite the complex nature of this ailment. But the research collaboration across the genomics, neuroimaging and intervention science will hold a significant impact on understanding the mechanism of ASD development and evaluate effective treatment for ASD.

The advent of genomics and neuroscience fields as well as the large collaborations of research centres around the world has collected the data on families affected by ASD and identified that the copy number variation (CNV) in the ASD individuals is a major source of *de novo* and inherited risk factor for Autism and it recommends that all children with ASD should be offered chromosomal micro array analysis during the diagnosis [4,5]. Current statistics suggest that at least 5% of children with ASD have one or more CNVs as a major contributor to the onset of this disorder [6]. Collaborative research of neuroscience and genomics has identified that the majority of the mutations in ASD has been attributed to specific genes or potential network pathways that involve chromatin remodelling, synaptic function and transcription regulators [7-9].

Several genes associated with the brain development and function such as neurexins, neuroligins (involved in synaptogenesis and pruning), HOAX1. PTEN genes involved in brain growth and genes affecting neural signalling such as that affecting calcium homeostasis are implicated in ADS [10]. Neuroimaging studies reported that altered architecture, growth and functions of neurons in ASD cases [11]. Many of the existing neuroimaging technics such as MRI, fMRI, MEG and ERP illustrate the affected areas of the brain in ASD, but can't provide information about brain structure and function, whereas functional brain imaging techniques provide structure-function relation of specific parts of the brain and how the neural pathways are deficient and damaged. In summary, both structural and functional neuroimaging techniques are still evolving and are important for unravelling the structural, physiological and development brain abnormalities in children with ASD.

Early detection of ASD and effective intervention is paramount to achieve best possible prognosis for the child. Recent advances in the early detection of ASD lead to the development and evolution of ABA-based models (Applied Behaviour Analysis) designed for use with children as young as six months. ABA encourages positive behaviours and discourages negative behaviours and teaches new skills and those skills can be applied to new situations. There are no approved medications available for the treatment of restricted/repetitive behaviours and social communication deficit in ASD. However, medications are used to treat ASD patients associated with emotional and behaviour disturbances. Recent findings by Dr. Kim from UNMC and Creighton University identified that the cognitive and social deficits induced by an arid b mutation in mice are reversed by pharmacological treatment with a GABA receptor modulating drug, a possible therapeutic fix to autism and intellectual disability [12]. The future research innovations to address ASD will involve synchronize efforts of genetics, neuroimaging and intervention science.

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Received: October 25, 2018; **Accepted:** October 26, 2018; **Published:** November 01, 2018

Citation: Manukonda V (2018) New Developments in Autism Treatment. Autism Open Access 8: e143. doi:10.4172/2165-7890.1000e143

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