

Current Findings and Research Prospective in Autism Spectrum Disorders

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The definition of Autism Spectrum Disorders (ASDs) indicates a diverse group of complex heterogeneous neuro-developmental conditions influencing the ability to relate to and communicate, as they are characterized by a wide range of cognitive, emotional and neuro-behavioural abnormalities. Indeed, the main core symptoms include impairments in social skills and communication, restricted interests, repetitive and stereotypic verbal and non-verbal behaviours [1,2]. They are enigmatic conditions having their origins in the interaction of several genes and environmental factors. More in depth, ADS are multifactorial and polygenic disorders, as they result from a complex combination of genetic, epigenetic, environmental (i.e. air pollution, organophosphates, heavy metals), and immunological factors [3]. The ASDs aetiology, pathophysiology and defined molecular and cellular mechanisms of pathogenesis remain still unclear. There is no effective pharmacotherapy for treatment of core symptoms of ASDs and current drug options target specific symptoms, without addressing the basic underlying etiologies [4,5]. Defined standard treatments to treat ASDs do not exist; however, current available approaches for autism can be divided into: behavioural, nutritional, psychotherapeutical and pharmacological therapies [5]. Pharmacological options are only direct versus neuropsychiatric disorders (i.e. irritability, depression, anxiety and obsessive-compulsive behaviours) co-associated with ASDs. More and complete research is needed to define appropriate interventions for ASD children [6].

Nowadays, ASDs are being recognized as a real public health problem [7]. Their frequency is dramatically increasing in the last years [8], until to present rates of 11.3 per 1,000 (one in 88) children aged 8 years in US, according to Center for Disease Control [9]. The estimated total lifetime societal cost of caring for one individual with autism is \$3.2 million US dollars [10].

Unfortunately, too often ASDs are underestimated and affected children are poorly addressed. The autism diagnosis is suffering by the lack of a specific biomarker for autism, making these pathologies very difficult to be diagnosed. Indeed, despite many research efforts, currently there are no biomarkers for an exact ASD diagnosis. A correct and an early diagnosis is required for future ASD management.

Novel findings in genetics and neuroscience are achieved in order to better elucidate the molecular, biochemical and cellular basis of ASDs, focalizing the real needs of every patient. Novel treatments are strictly related to these findings in order to design new strategies in the pharmacotherapy of ASDs [11].

Newest research projects are being performed: the involvement of stem cells as possible therapeutic option in ASDs [2,5,7,12]; gluten and casein antibodies production related to gluten and casein sensitivity in ASDs; involvement of glutamatergic and GABAergic neurotransmission signals; changes in vitamins levels and their link with the cellular oxidative state; gene expression changes in ASDs; interleukins and cytokines expressions; role of immune system in ASDs are only some examples of new research ways in exploring ASDs.

Taken together, all these new strategies are offering novel

perspectives in ASD research and possible treatment options, opening the way for a better ASD management and care.

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