

Stem Cell Research: An Opportunity for Autism Spectrum Disorders Treatment

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Prevalence rate of autism spectrum disorders (ASDs) is fast increasing [1]. ASDs pathophysiology and defined mechanisms of their pathogenesis remain still unclear, rendering curative therapy very difficult. Current therapy for ASDs can be divided into behavioural, nutritional and medical approaches, however no defined standard approach exists [2]. In addition, pharmacological treatments are direct versus much dysfunctional behaviour, without affecting all core symptoms of ASDs [3]. Given that, further research is needed to define appropriate interventions for ASD patients [4].

Stem cell therapy represents the great real promise for the future of molecular and regenerative medicine. Indeed, a valid approach for curing several untreatable human diseases is offering from the use of several types of stem cells [5].

The epigenetic, neuroimmunological, and environmental studies on ASDs indicate that stem cell therapy could be a potent treatment for autistic syndromes, opening a new era in autism management [6,7]. In proof of principle, self-renewal ability with the capacity to generate more identical stem cells, the capacity to give rise to more differentiated cells, and the paracrine regulatory functions are stem cell properties that make them potential therapeutic agents for ASDs.

How stem cell could work in ASDs requires further investigations. Beneficial effects of stem cells could not be only restricted to cell restoration, but also paracrine and, above all, immunomodulatory effects may represent the possible mechanisms of action of stem cells in ASD pathology [6]. Indeed, the extraordinary characteristics of stem cells are: i) strong immunosuppressive activity that renders them a useful tool for successful autologous, as well as heterologous, transplantations without requiring pharmacological immunosuppression [8]; ii) paracrine actions [9]. Stem cells have the capability to produce a huge array of trophic and growth factors [10]. Through this natural paracrine activity, stem cells are able to produce molecules that activate endogenous restorative mechanisms within injured tissues contributing to recovery of function lost [6].

It is noteworthy that, due to the particular immune and neural system dysregulations observed in ASDs [11], stem cell therapy could offer extraordinary potential as a treatment modality.

Understanding the molecular, biochemical and cellular basis of ASDs could offer a unique advantage for the use of stem cell in these disorders, focalizing the real needs of every patient.

New perspectives for ASDs therapy is provided by stem cells. However, further deep and exhaustive investigations on stem cell biology will be needed before stem cell therapies can become a successful reality for ASDs. In addition, exact stem cell dose, times and sites of injections, as well as eventual side effects and long term safety, need further characterization. Future researches will drive their goal toward this direction [12].

References

1. Russell G (2012) The Rise and Rise of the Autism Diagnosis. *Autism* 2: e104.

2. McCracken JT (2005) Safety issues with drug therapies for autism spectrum disorders. *J Clin Psychiatry* 66: 32-37.
3. Benvenuto A, Battan B, Porfirio MC, Curatolo P (2012) Pharmacotherapy of autism spectrum disorders. *Brain Dev.*
4. Coudry D (2010) Medical treatment of autism spectrum disorders. *Curr Opin Neurol* 23: 131-136.
5. Siniscalco D, Giordano A, Galderisi U (2012) Novel insights in basic and applied stem cell therapy. *J Cell Physiol* 227: 2283-2286.
6. Siniscalco D, Sapone A, Cirillo A, Giordano C, Maione S, et al. (2012) Autism spectrum disorders: is mesenchymal stem cell personalized therapy the future? *J Biomed Biotechnol* 2012: 480289.
7. Vaccarino FM, Urban AE, Stevens HE, Szekely A, Abyzov A, et al. (2011) Annual Research Review: The promise of stem cell research for neuropsychiatric disorders. *J Child Psychol Psychiatry* 52: 504-516.
8. Siniscalco D, Bradstreet JJ, Antonucci N (2012) Cell therapies for Autism Spectrum Disorders. *Autism Spectrum Disorders: New Research*. Nova Science Publishers, Hauppauge, NY.
9. Baraniak PR, McDevitt TC (2010) Stem cell paracrine actions and tissue regeneration. *Regen Med* 5: 121-143.
10. Beyth S, Borovsky Z, Mevorach D, Liebergall M, Gazit Z, et al. (2005) Human mesenchymal stem cells alter antigen-presenting cell maturation and induce T-cell unresponsiveness. *Blood* 105: 2214-2219.
11. Ashwood P, Corbett BA, Kantor A, Schulman H, Van de Water J, et al. (2011) In search of cellular immunophenotypes in the blood of children with autism. *PLoS One* 6: e19299.
12. Siniscalco D, Pandolfi A, Galderisi U (2012) State-of-the-art on basic and applied stem cell therapy; Stem Cell Research Italy-International Society for Cellular Therapy Europe, Joint Meeting, Montesilvano (PE)-Italy, June 10-12, 2011. *Stem Cells Dev* 21: 668-669.

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