Stem Cell Exosomes Therapy: a Promising Non-Invasive Treatment for Autism

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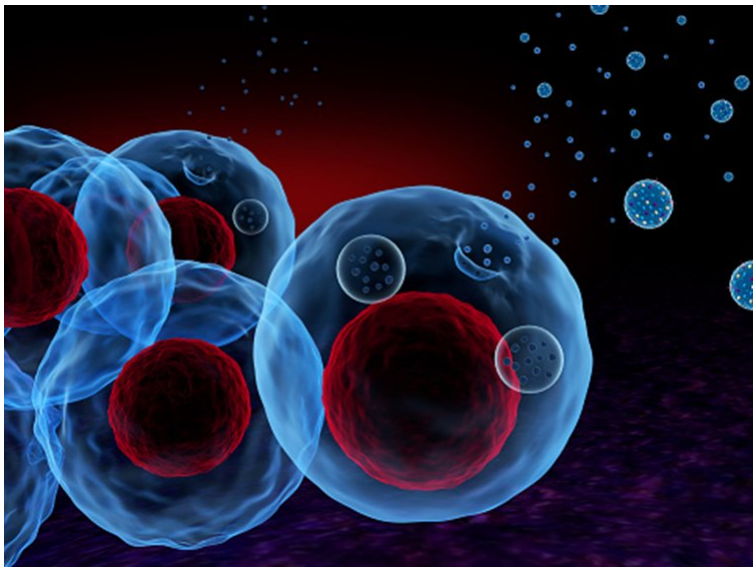
Autism is a lifelong neurodevelopmental disorder with a wide range of symptoms. The disorder is characterized by issues with social interaction, communication ability, and the presence of repetitive or stereotyped clusters of behavior and interests. The etiology of autism is complicated by genetic and environmental variables, which are yet unknown. However, there has been a significant increase in autism spectrum disorder (ASD) epidemiology in the last decade. In affluent nations, the current frequency is believed to be at least 1.5 percent.

The increasing frequency of autism and autism spectrum disorder necessitates the development of new biomarkers and pharmacotherapies. It is supposed that ASD is caused by neuroinflammation and dysregulation of neuro-immune cross-talk, suggesting that stem cell treatment might be used to manage this disorder. In the article, you will learn about the use of stem cells and their exosomes in the treatment of autism.

What are exosomes derived from stem cells?

Exosomes are tiny extracellular vesicles released from cells into neighboring cells or tissues for intracellular signaling thereby producing a change in their function and behavior. They operate as shuttles, carrying nucleic acids as well as proteins between cells and facilitating cell-to-cell contact and the exchange of molecules between near and far cells.



Stem cells secreting exosomes that can be used in exosome therapy for autism

Exosomes secreted by stem cells might mediate stem-cell-related therapeutic actions. Recent advances in stem cell therapy have given hope to those suffering from autism. For example, mesenchymal stem cell (MSC) transplantation helps manage autism spectrum disorder symptoms in both animal trials and clinical investigations.

MSC-produced exosomes are organelles that transport bioactive chemicals that are critical for the therapeutic benefits of ASD therapy. Researchers found that exosomes derived from human umbilical cord mesenchymal stem cells (hUC-MSCs) that efficiently enter the brain tissue via the intranasal route restore social ability in mice and correct repeated stereotypical behaviors and other abnormal behaviors phenotypes in mice with autism-like symptoms. This motivates us to investigate the administration of

MSC exosomes by intranasal route for the treatment of ASD.

Therapeutic effects of exosomes

Exosomes may be beneficial in the treatment of patients with autoimmune disorders, chronic inflammation, and other chronic degenerative illnesses due to regulating regenerative processes inside our bodies. The anti-inflammatory action of MSC exosomes may be credited for at least part of the therapeutic effectiveness. Some of the therapeutic effects of exosomes are outlined below:

1. **Brain:** This might be because exosomes can cross the blood-brain barrier (BBB), encouraging neuronal differentiation and development while reducing inflammatory processes in the brain tissue.
2. **Heart:** Exosomes' anti-apoptotic and pro-survival effects on cardiomyocytes allowed them to prevent myocardial ischemia. The involvement of exosomes in cell signaling in a complex system like the heart and the equilibrium of physiological cardiac processes has piqued interest in cardiovascular medicine.
3. **Kidney:** Exosomes aid in the recovery of ischemia-reperfusion damage caused by acute kidney injury (AKI).
4. **Orthopedics:** Exosome treatment is also being utilized to heal orthopedic injuries and regulate age-related conditions, showing that exosomes are becoming more widely employed in regenerative medicine.

As a cell-free therapy to ameliorate autism-related symptoms, the therapeutic effect of mesenchymal stem cells-derived exosomes indicates a viable route for treating neurological impairments, including autism spectrum disorder.

Expected results of stem cell exosomes treatment in autism

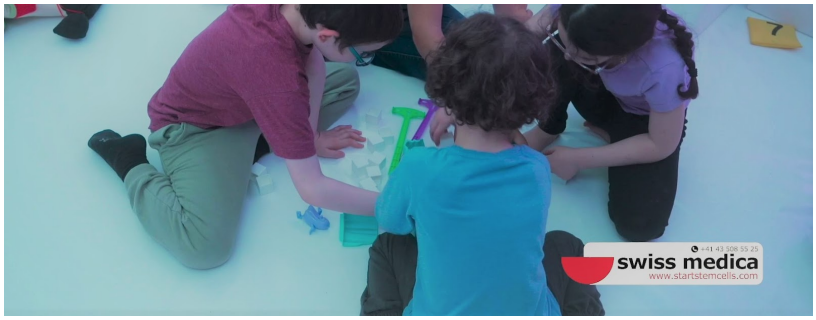
Owing to the fact that no unique biological sign has been established in autism, the disorder is diagnosed in early life via observation of behavior. However, the genetic and cellular alterations that underpin autism have laid the groundwork for exosomes in autism treatment. Specifically, their actions on neighboring cells and their immunomodulatory activities have paved the path for practical uses in the treatment of autism.

As bioactive substances created and released by stem cells, exosomes affect a variety of other cell types and may trigger endogenous repair pathways in wounded organs, restoring their functions.

Several molecular pathways damaged by autism might be restored by delivering exosome cargo (RNA as well as proteins) to recipient cells. In addition, exosomes have anti-inflammatory properties in neurological disorders, most likely because they stimulate the generation of anti-inflammatory cytokines. In this regard, their use in resolving the high pro-inflammatory state associated with ASD might be beneficial.

Some of the expected outcomes may include:

- Eye contact with the autistic child should be more intense since they are more likely to fix their gaze or keep eye contact.
- More acceptable conduct at home and outdoors: less hyperactivity and violence, less minor obsessions, repeated behavior, or obsessive motor mannerisms; greater attentiveness, particularly to instructions, rules, and demands from parents.
- Improved ability to communicate verbally: children that are yet non-verbal show a tendency to start exploring sounds and syllables. Some begin then pronounce words and gradually increase their vocabulary.
- Better attention span and focus and improved learning capacity. Their writing abilities increase or develop.
- Patients become better at self-care, and they are more likely to express their requirements and perform hygiene regimens independently and consistently.
- Fear of loud sounds, strangers and bright colors is reduced or eliminated (gradual improvement). In addition, fear of new people and places is often diminished or eliminated.
- Gastrointestinal (GI) issues are also frequent in ASD patients. Exosomes might reduce inflammation in ASD patients, which could enhance GI function in individuals who have GI issues linked to inflammation.
- Sleeping habits are also likely to improve.



Stem cell exosomes treatment provides better interaction and communication in a child with autism

Clinical trials with exosomes for autism

The study of exosomes and their uses in ASD is still in its early stages. There are quite a few experimental investigations that haven't been completed. However, a preliminary study has shown encouraging outcomes.

Exosomes have a modest size (30–150 nm) and are made up of a lipid bilayer, allowing them to traverse the blood brain barrier easily. As a result, exosomes produced from bone marrow MSCs can move and home in on distinct targeted brain locations in many murine brain diseases, including autism, when administered intranasally. This feature seems to be comparable to stem cell homing, in which stem cells are able to travel toward the injured region in response to the local chemical environment. In addition, because autistic children have impaired BBB integrity, this characteristic is relevant to prospective autism therapy.

Therapeutic exosomes might be given intravenously to ASD patients, which as well will contribute to an alleviating effect on brain neuroinflammation and thus relieving symptoms.

What is the procedure for stem cell exosomes treatment?

Stem cell exosomes treatment is a kind of biological therapy, with a specific dose and administration frequency, according to the individually tailored treatment protocol.

Treatment for autistic patients is divided into phases viz:

1. Pre-treatment phase

Here, online consultations with physicians and medical advisors are offered. A patient with autism's health is analyzed, and an individualized treatment plan is created. At this point, vials with stem cell exosomes in the form of intranasal drops together with instructions are delivered. You will administer drops to the child as a preliminary step prior to admission to the Clinic to maximize the efficacy of eventual inpatient therapy. This also reveals how the kid reacts to stem cell exosome treatment, allowing for the prediction of whether or not the treatment will be beneficial.

2. The Clinic's treatment

At this stage, the patient arrives and stays with his or her parents at the facility. Several ways for delivering stem cell exosomes are involved at the autism and ASD therapy during the treatment at the Clinic:

- Intravenously (via IV drip)
- Intramuscularly
- Inhalations (daily)
- Intrathecal (optional)

It may be feasible to employ sedation to conduct various operations that assist in alleviating stress in a patient, based on the patient's health and the parent's preferences. In addition, Intracellular metabolism recovery (IMR) treatment, speech therapy, and other complementary therapies for autistic patients are available.

3. Post-discharge phase

You will get an exosome-based home therapy after leaving the Clinic for a given period. Often, this is via nasal drops or inhalation with a nebulizer — this aids in prolonging and enhancing the effects of the Clinic's treatment.

How to enter a treatment program for autism

At our facility, we work to enhance the lives of children from all over the globe who have difficulty communicating, interacting and learning new skills. Our mission is to assist parents in raising happy children with improved health and mental state using stem cell exosomes. You can learn more about the

expected results of this cutting-edge treatment for your specific case.

Contact us

Please, schedule a no obligation online appointment with one of our physicians to learn more about the treatments, predicted outcomes, duration, and cost.

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Medical Advisor, Swiss Medica doctor

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Though the extent of these outcomes tends to vary with individuals, it's crucial to remember that despite their mending abilities, stem cells and exosomes are not a cure-all. The efficacy of the treatment is determined by a number of variables, including the patient's starting condition, age, lifestyle, genetic predisposition, diet, emotional support, and supplementary therapies. For best outcomes, an integrated treatment (diet together with educational programs) is advised. Stem cell treatment assists in laying the foundation for excellent habits, conduct, communication, and learning.

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Our primary task is to make your own cells treat your own body. We use advanced technology to activate mesenchymal stem cells derived from adipose tissue, bone marrow, etc. Donated cells can also be used. Introduced to the patient's body, these cells help to regenerate damaged tissue. Symptoms become less obvious and/or disappear.

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