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Stem cell therapy

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Why is in news? Court allows stem cell therapy for two autistic kids: What is this treatment? Can it be used to treat autism?

The Delhi High Court on August 31 permitted two children with **autism spectrum disorder** (ASD) to undergo stem cell therapy for treatment of their condition.

The order came in a petition moved by family members of the two children, challenging a December 6, 2022 **recommendation of the Ethics and Medical Registration Board** (EMRB) of the National Medical Commission (NMC) against the use of stem cell treatment for ASD.

Autism spectrum disorder:

Autism spectrum disorder is a **neurological and developmental disorder** that affects how people interact with others, communicate, learn, and behave.

The people with ASD often have difficulty with communication and interaction with other people, restricted interests and repetitive behaviours, and symptoms that affect their ability to function in school, work, and other areas of life.

Currently, **there is no cure for ASD** – treatments and therapies are geared towards managing symptoms and helping someone with ASD lead a happy and functional life.

Conventional therapies include social skills training, early intensive behaviour therapy, applied behaviour analysis, speech therapy, and occupational therapy.

Psychotropic drugs and trans-cranial magnetic stimulation are also commonly used.

Can stem cell treatment be used for ASD?

According to some experts, ASD has potential to be a good candidate for stem cell therapy because evidence exists that some types of stem cells, given intravenously, can improve the overall regulation of the immune system and the neural connectivity in the brain.

However, stem cell therapy is not typically used for treating ASD yet, and initial clinical trials have shown mixed results.

Currently, the **treatment is very much in an experimental stage** and there is simply not enough data to make definitive claims.

Stem cells:

They are cells from which all other cells, with their **respective specialized functions**, are generated.

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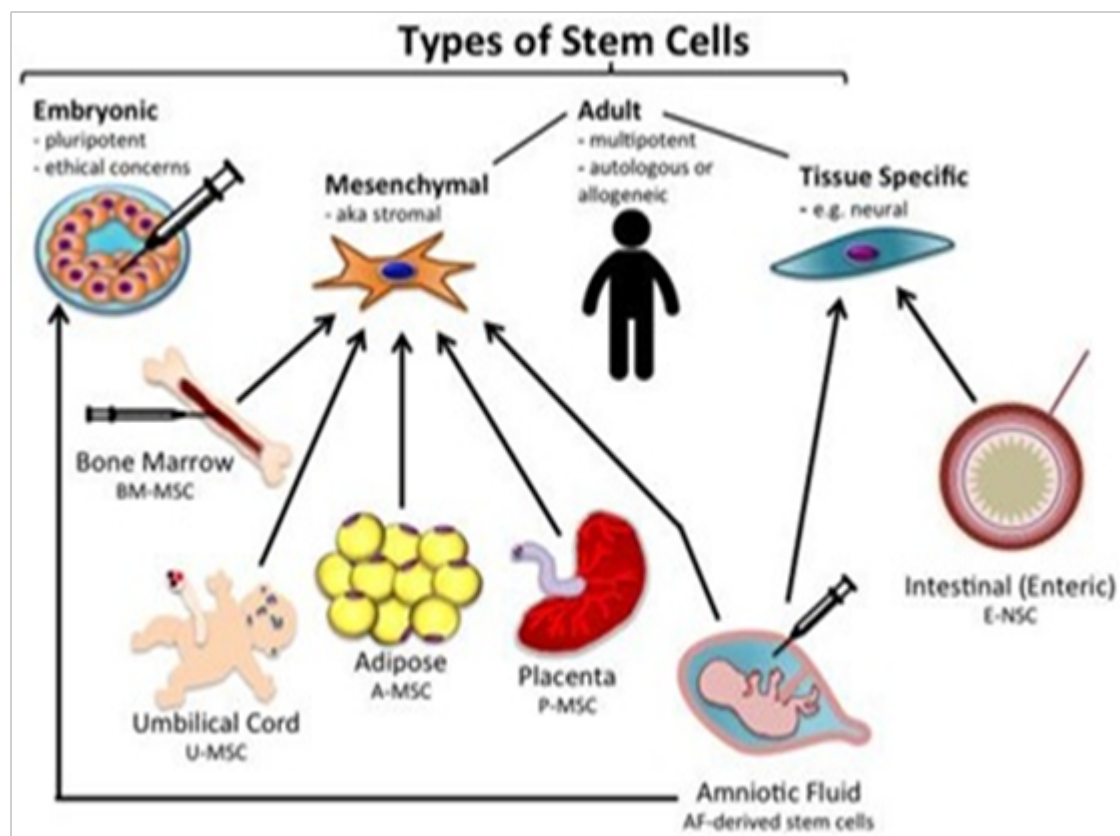
The stem cells “divide” to **either create new stem cells or cells with specific functions**, such as blood cells, brain cells, bone cells, muscle cells, etc.

Stem cells are undifferentiated biological cells that can differentiate into specialized cells and can divide to produce more stem cells.

Treatments or therapies are used stem cells to prevent or treat any disease are known as **stem cell therapy**.

Stem cell therapy promotes the reparative treatment of diseased, dead or injured tissue.

There are two main categories of stem cells: **pluripotent stem cells**, or cells with the ability to differentiate into all of the cells of the adult body, and **adult stem cells**, which are tissue or organ-specific and regenerate to form cells only of that particular organ.



How stem cells therapy works?

Stem cell extraction: The basic process of stem cell therapy starts with taking out of stem cells containing bone marrow and processing the stem cells in a lab.

Specialisation: Then stem cells are specialized into the necessary adult cell type. These stem cells are manipulated to specialize into specific types of cells, such as heart muscle cells, blood cells or nerve cells.

Implantation: Then, those mature cells replace tissue that is damaged by disease or injury.

This type of treatment could be used to:

Replace neurons damaged by spinal cord injury, stroke or other neurological problems.

Produce insulin that could treat people with diabetes or cartilage to repair damage caused by arthritis.

Replace virtually any tissue or organ that is injured or diseased.

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The cells could be used to study disease, identify new drugs, or screen drugs for toxic side effects.

Regulations in India:

In March 2019, the Union Health Ministry had notified the ‘**New Drugs and Clinical Trial Rules, 2019**’ which state that stem-cell-derived products are to be used as “new drugs”.

This means that any doctor who uses stem-cell therapy **needs to take permission from the government**.

In India as well as globally, **only blood stem cells from bone marrow to treat blood cancers and different blood disorders are permitted**.

The clinical use in any other disease or use of any stem cells other than these is still in the research stage.

Advantages:

It offers a **lot of medical benefits** in the therapeutic cloning and regenerative medicine.

It shows great **potential in the treatment of a number of conditions** like Parkinson’s disease, spinal cord injuries, Alzheimer’s disease, schizophrenia, cancer, diabetes and many others.

It helps the researchers **know more about the growth of human cells** and their development.

The stem cell research can allow the scientists to test a number of potential medicines and drugs without carrying out any test on animals and humans. The drug can be tested on a population of cells directly.

The stem cell therapy also allows researchers to **study the developmental stages** that cannot be known directly through the human embryo and **can be used in the treatment of a number of birth defects**, infertility problems and also pregnancy loss. A higher understanding will allow the treatment of the abnormal development in the human body.

The stem cell therapy puts into use the cells of the patient’s own body and hence the **risk of rejection can be reduced** because the cells belong to the same human body.

Challenges:

Destruction of blastocysts: The use of the stem cells for research involves the destruction of the blastocysts that are formed from the laboratory fertilization of the human egg.

Unknown side-effects: Like any other new technology, it is completely unknown what the long-term effects of such an interference with nature could be

Limitations of adult cells: The disadvantage of adult stem cells is that the cells of a particular origin would generate cells only of that type, like brain cells would generate only brain cells and so on.

Potential Rejection: If the cells used in the therapy are embryonic, then the cells will not be from the same human body and there are chances of rejection.

Potential use in negative activities: It can be used to create bio-weapons or weapons of mass destruction

Way forward:

Internationally agreed, and enforced, regulations are essential to protect patients from the dangers of stem cell tourism, whereby treatments that have not been approved in one country are freely available in another.