Stem Cell Therapy for Autism

Why in news?

Recently, the Delhi High Court has permitted two children with autism spectrum disorder (ASD) to undergo stem cell therapy for treatment of their condition.

What is stem cell therapy?

- They are body's raw materials, cells from which all other cells with *specialized functions* are generated.
- **Differentiation-** Under right conditions in the body or a laboratory, stem cells divide to form more cells called daughter cells.
- These daughter cells become either new stem cells or specialized cells (differentiation) with a more specific function, such as blood cells, brain cells, heart muscle cells or bone cells.
- **Categories**-
    - **Pluripotent stem cells-** They have the ability to differentiate into all of the cells of the adult body.
    - **Adult stem cells**- They are *tissue or organ-specific* and regenerate to form cells only of that particular organ.
- **Induced pluripotent stem cells -** Pluripotent stem cells are naturally found *only in* embryos.
- But, in 2006, researchers identified condition that would allow some mature human adult stem cells to be reprogrammed into embryonic stem cell called as induced pluripotent stem cells.

Why is stem cell therapy so significant?

- **Disease modelling-** By observing stem cells mature into cells in bones, heart muscle, nerves, and other organs and tissue, researchers may better understand how diseases develop.
- **Regenerative medicine -** It helps to generate healthy cells to replace cells affected by disease.
- **Disease diagnosis**- The regenerative properties of stem cells is used to treat diseases such as
    - Spinal cord injuries
    - Life style disease-Type 1 diabetes, heart disease, cancer etc.,
    - Neurogenerative disorder-Parkinson's disease, Alzheimer disease
    - Blood cancers
- **Drug testing**- It helps to test new drugs for safety and effectiveness.
- **Drug discovery**- Nerve cells could be generated to test a new drug for a nerve

disease.

What is Autism Spectrum Disorder?

As per World Health Organisation (WHO), about 1 in 100 children have autism.

- **ASD** - It is a *neurodevelopmental condition* where people experience social, communication and behavioural difficulties along with complicated sensory processing.
- ASD characteristics usually develop earlier during infancy.
- **Cause –** It is a developmental disability caused by differences in the brain.
- It has environmental and genetic causes.
- ***Fragile X Syndrome (FXS)*** is the leading inherited cause of autism in 4% of the global population.
- **Transmission -**It is transmitted genetically for some people.
- **Treatment-** Currently, there is *no cure* for ASD. Treatments and therapies are geared towards managing the symptoms.
- Conventional therapies include social skills training, early intensive behaviour therapy, applied behaviour analysis, speech therapy, and occupational therapy.
- Evidence-based psychosocial interventions can improve communication and social skills.
- **Support systems**- Care for people with autism needs to be accompanied by actions at *community and societal levels* for greater accessibility, inclusivity and support.

Can stem cell treatment be used to treat ASD?

- **Experimental stage**- Stem cell therapy is *not typically used for treating ASD* yet. The treatment is very much in an experimental stage and there is simply *not enough data* to make definitive claims.
- **Research evidence**- Intravenously given stem cells, can improve the overall regulation of the immune system and the neural connectivity in the brain.
- **Limited understanding**- There is also limited understanding of its long term effects and as pointed out by doctors representing the EMRB, there is no established protocol for its use to treat autism.
- **Ethics and Medical Registration Board (EMRB)-** EMRB, an autonomous body under National Medical Commission is against the use of stem cell treatment for ASD due to lack of data.
- **Predatory marketing**- EMRM's recommendation of stem cell therapy is due to false hope to parents and caregivers regarding the possibility of "curing" ASD.
- **High court ruling**- It does not give opinion on the general validity of using stem cell therapies for ASD, but in the cases filed it allows ongoing treatment to continue.
- The High Court said that NMC is permitted to take a final view on the recommendation as per provisions of the NMC Act.

National Medical Commission

• It has been constituted by an act of Parliament known as *National Medical Commission Act, 2019*
• **Aim**- To improve access to quality and affordable medical education.
• **Functions**
- To ensure availability of adequate and high quality medical professionals in all parts of the country
- To promote equitable and universal healthcare services
- To encourage medical professionals to adopt latest medical research in their work and to contribute to research
- To objectively assess medical institutions periodically in a transparent manner
- To maintain a medical register for India
- To enforce high ethical standards in all aspects of medical services
- To have an effective grievance redressal mechanism
• **Autonomous Boards**-
- UG Medical Education Board
- PG Medical Education Board
- Medical Assessment and Rating Board
- Ethics and Medical Registration Board

References

1. Indian Express- Stem cell therapy autism
2. WHO- Details about ASD

