



18 December, 2023

Bone Marrow Transplant

Context: In a groundbreaking first, Army Hospital (R&R) successfully performed a life-saving Bone Marrow Transplant for a 7-year-old with a rare immunodeficiency disorder.

➤ Definition of Bone Marrow Transplant:

- A medical procedure that replaces bone marrow with healthy cells, either from the patient's own body or a donor.
- Also known as a stem cell or hematopoietic stem cell transplant.
- Primarily used to treat cancers such as leukemia, myeloma, and lymphoma, along with other blood and immune system disorders.

➤ Stem Cells and Bone Marrow:

- Stem cells are specialized cells with the ability to replicate and transform into various types of cells required by the body.
- Different types of stem cells are found in various parts of the body at different times.
- Hematopoietic stem cells, crucial for blood cell production, are located in bone marrow and circulating in the bloodstream.

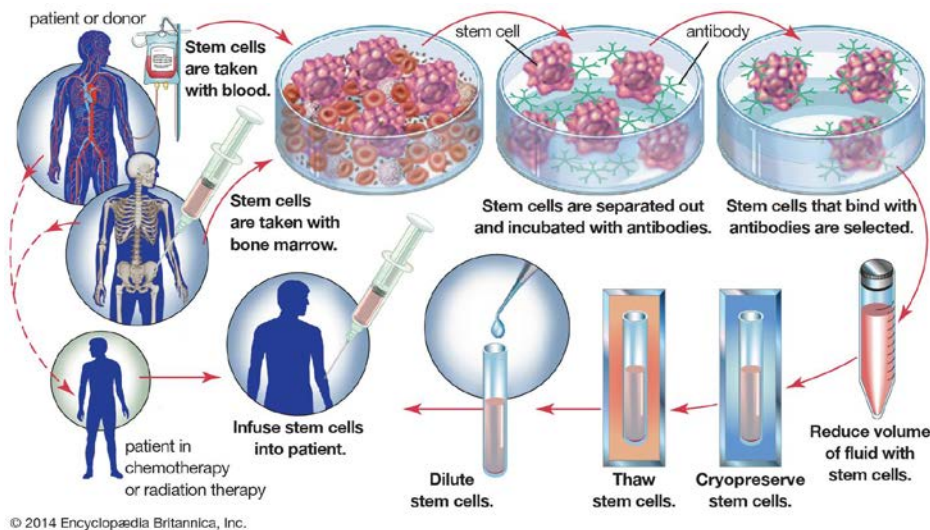


➤ Significance of Hematopoietic Stem Cells:

- Cancer and its treatments can damage hematopoietic stem cells, impacting the production of red and white blood cells and platelets.
- Red blood cells carry oxygen, white blood cells are part of the immune system, and platelets aid in clotting.

➤ Bone Marrow/Stem Cell Transplant Procedure:

- The procedure aims to restore the body's ability to produce essential blood cells and combat infections.
- Two main types of transplants: Autologous (using the patient's own cells) and Allogenic (using donor cells).



➤ Types of Transplants:

- **Autologous Transplant:**
 - Involves using the patient's own stem cells, collected before intensive cancer treatment.
 - After treatment, the stem cells are returned to restore the immune system and blood cell production.
- **Allogenic Transplant:**
 - Utilizes stem cells from a donor after the patient undergoes chemotherapy or radiation.
 - The success of the transplant often relies on finding a suitable donor match, including siblings, family, or unrelated volunteers.
- **Other Options:**
 - **Umbilical cord blood transplant:** Uses stem cells from umbilical cord blood.
 - **Parent-child transplant and haplotype mismatched transplant:** Involve a 50% match from family members.

Face to Face Centres





18 December, 2023

- **Graft-Versus-Cancer Effect:** Common in Allogenic Transplants, where the new stem cells recognize and eliminate remaining cancer cells.
- **Finding a Donor Match:**
 - Donor matching is based on human leukocyte antigens (HLA), crucial for reducing the risk of graft-versus-host disease (GVHD).
 - Siblings are often preferred donors, but unrelated donors or cord blood can also be suitable.
- **Procedure Steps:**
 - The initial placement of a catheter for administering treatments.
 - **For Autologous Transplants:**
 - Collection of stem cells.
 - Pre-transplant treatment with chemotherapy or radiation.
 - Infusion of stem cells.
 - Recovery with close monitoring.
 - **For Allogenic Transplants:**
 - Identification of a compatible donor and HLA typing.
 - Collection of stem cells from the donor.
 - Pre-transplant treatment with chemotherapy.
 - Infusion of donor cells.
 - Recovery with antibiotic treatment and GVHD prevention.
- **Recovery and Monitoring:**
 - Rigorous monitoring of cell recovery, growth, and potential side effects.
 - Administration of antibiotics to reduce the risk of infection.
 - Ongoing care to address and manage side effects and complications.
- **Complexity and Personalization:**
 - Transplants are complex medical procedures, and specific steps may be adjusted based on individual cases.
 - Patients may require hospital stays for various steps, and the duration can vary.
 - Regular communication with healthcare teams is essential for understanding and managing expectations.

Logistics Ease Across Different State (LEADS) 2023

Context: Sh. Piyush Goyal, the Union Minister of Commerce & Industry, Consumer Affairs, Food & Public Distribution, and Textiles, unveiled the "Logistics Ease Across Different State (LEADS) 2023" report.

- A comprehensive report guiding States and UTs for revolutionary reforms in the logistics sector.
- **Purpose and Importance:**
 - Aims to provide strategic insights for stakeholders in the logistics sector.
 - Encourages healthy competition among States/UTs to enhance logistics performance.
 - Aligns with the vision of Viksit Bharat.
- **Notable Initiatives and Vision:**
 - Stresses the significance of key initiatives like PM GatiShakti, granting 'industry' status to logistics, and promoting digital initiatives.
 - Emphasizes the role of logistics in India's growth vision, aiming for a tenfold increase from USD 3.5 trillion to USD 35 trillion by 2047.
- **Performance Highlights:**
 - Based on a pan-India primary survey conducted between May and July 2023.
 - Covers over 7,300 responses across 36 States/UTs.
 - Highlights achievements, fast movers, and aspirers in different groups (Coastal, Landlocked, North-East, Union Territories).
- **Evolution and Objectivity:**
 - Conceived in 2018, LEADS evolved to incorporate both perception and objectivity in its evaluation.
 - Differs from the Logistics Performance Index by considering a wider spectrum of state initiatives.
- **Positive Shift in States' Performance:**
 - LEADS 2023 signals a positive shift in States' performance across key pillars: Logistics Infrastructure, Logistics Services, and Operating and Regulatory Environment.
 - Provides region-specific insights for informed decision-making and comprehensive growth.
- **Performance Highlights from LEADS 2023:**
 - **Coastal Group:**
 - **Achievers:** Andhra Pradesh, Gujarat, Karnataka, Tamil Nadu.

Face to Face Centres



18 December, 2023

- **Fast Movers:** Kerala, Maharashtra.
- **Aspirers:** Goa, Odisha, West Bengal.
- **Landlocked Group:**
 - **Achievers:** Haryana, Punjab, Telangana, Uttar Pradesh.
 - **Fast Movers:** Madhya Pradesh, Rajasthan, Uttarakhand.
 - **Aspirers:** Bihar, Chhattisgarh, Himachal Pradesh, Jharkhand.
- **North-East Group:**
 - **Achievers:** Assam, Sikkim, Tripura.
 - **Fast Movers:** Arunachal Pradesh, Nagaland.
 - **Aspirers:** Manipur, Meghalaya, Mizoram.
- **Union Territories:**
 - **Achievers:** Chandigarh, Delhi.
 - **Fast Movers:** Andaman & Nicobar, Lakshadweep, Puducherry.
 - **Aspirers:** Daman & Diu/Dadra & Nagar Haveli, Jammu & Kashmir, Ladakh.
- **Collaborative Development:**
 - Developed collaboratively, LEADS 2023 brings objectivity to the assessment of infrastructure development and process-related reforms.
 - 23 States/UTs aligned their State Logistics Policies with the National Logistics Policy.

Casgevy, Thalassemia and Genetic Editing

Context: CRISPR-based therapies for sickle-cell disease and β -thalassaemia have received regulatory approval in both the U.K. and the U.S., marking a significant milestone for these highly anticipated treatments.

- This development signifies a groundbreaking era with the potential to transform the lives of millions facing inherited blood disorders.
- **Prevalence of Thalassemia and Sickle-Cell Anaemia:**
 - Thalassemia affects over a million people globally, and approximately 100,000 individuals depend on regular blood transfusions.
 - An estimated 20 million people worldwide are suffering from sickle-cell anaemia.
- **CRISPR Discovery Timeline:**
 - The CRISPR system, discovered over almost three decades of academic pursuit, identified clustered regularly interspaced short palindromic repeats (CRISPR) in 1993.
 - CRISPR + Cas proteins were recognized as an antiviral defense system in 2005, leading to groundbreaking work by Emmanuelle Charpentier and Jennifer Doudna, who were awarded the 2020 Nobel Prize in chemistry.
- **Applications and Innovations:**
 - The CRISPR-Cas9 system serves as a programmable 'molecular scissor' for precise DNA editing.
 - Teams led by Feng Zhang and George Church demonstrated CRISPR-Cas9's use in editing eukaryotic organisms, spurring applications in genetic therapies and agricultural advancements.
- **CRISPR in Medicine - Casgevy Approval:**
 - The U.K.'s Medicines and Healthcare products Regulatory Agency (MHRA) approved the CRISPR-based method "exagamglogene autotemcel" (Casgevy).
 - The U.S. Food and Drug Administration (FDA) also approved Casgevy for treating sickle-cell disease, marking it as one of the first CRISPR-based therapeutics approved by major drug regulators.
 - Casgevy involves modifying a patient's blood stem cells to produce normal red blood cells.
- **Evolution of CRISPR Technologies:**
 - Ongoing advancements include base-editing, prime editing, and the modification of epigenetic effects.
 - First-generation CRISPR-based therapies pave the way for more efficacious and efficient technologies.
- **Thalassemia:**
 - Thalassemia is an inherited blood disorder characterized by insufficient hemoglobin production, a vital component of red blood cells.
 - Inadequate hemoglobin leads to impaired red blood cell function and a shortened lifespan, resulting in reduced oxygen delivery to body cells.

Face to Face Centres

DELHI MUKHERJEE NAGAR: 9205274741, 42 | **LAXMI NAGAR:** 9205212500, 9205962002 | **RAJENDRA NAGAR:** 9205274743 | **UTTAR PRADESH PRAYAGRAJ:** 0532-2260189, 8853467068 | **LUCKNOW (ALIGANJ):** 0522-4025825, 9506256789 | **LUCKNOW (GOMTI NAGAR):** 7234000501, 7234000502 | **GREATER NOIDA:** 9205336037, 38 | **KANPUR:** 7887003962, 7897003962 | **GORAKHPUR:** 7080847474, 9161947474 | **ODISHA BHUBANESWAR:** 9818244644/7656949029



dhyeyaias.com

18 December, 2023

- **Impact on Health:**
 - The lack of healthy red blood cells in thalassemia can manifest as fatigue, weakness, and shortness of breath, collectively termed anemia.
 - Severe anemia poses the risk of organ damage and potential fatality.
- **Classification of Thalassemia:**
 - Thalassemia is classified into trait, minor, intermedia, and major categories based on its severity.
 - Thalassemia trait may exhibit mild or no symptoms, requiring no specific treatment.
 - Thalassemia major represents the most severe form, necessitating regular and comprehensive treatment.
- **Types of Thalassemia:**
 - **Alpha Thalassemia:**
 - Defects in alpha globin protein chains determine the type.
 - One defective gene results in asymptomatic alpha thalassemia minima.
 - Two defective genes may cause mild symptoms, known as alpha thalassemia minor.
 - Three defective genes lead to moderate to severe symptoms, termed Hemoglobin H disease.
 - Four defective genes often result in fatality or require lifelong blood transfusions, referred to as hydrops fetalis with Hemoglobin Barts.
 - **Beta Thalassemia:**
 - Defects in beta-globin genes dictate the type.
 - One defective gene results in mild symptoms, known as beta thalassemia minor.
 - Two defective genes cause moderate to severe symptoms, presenting as thalassemia intermedia or beta thalassemia major/Cooley's anemia.

NEWS IN BETWEEN THE LINES

Yogmaya Temple



Recently, the Yogmaya Temple in Mehrauli, once believed to date back to the Mahabharata era, has undergone a transformation from a Mughal-sponsored structure to a modern concrete building.

About Yogmata Temple:

- The Yogmaya Temple, also known as the Jogmaya temple is believed to have ancient roots tracing back to the **Mahabharata era**, monument in **Mehrauli**.
- It was built between **1806** and **1837** by **Lala Sidhu Mal**, a noble in the court of **Mughal Emperor Akbar II**.
- This temple held cultural significance, fostering **Hindu-Muslim unity** through traditions like **Phool Walon ki Sair**.
- Literary sources like the **Bhagawat** and historical texts allude to the temple's connection to the Mahabharata era, with tales of **Yudhishtir** and **Lord Krishna** associated with its creation.
- Accounts by historians like Thomas **Metcalfe** in the **19th century** mention the construction of the Yogmaya shrine during Akbar II's reign, adding to its historical documentation.

Bodhicitta



Recently, the Tibetan spiritual leader the 14th Dalai Lama delivered a two-hour-long teaching to his devotees on Bodhicitta at Siliguri's Sed-Gyued Monastery.

About Bodhicitta:

- Bodhicitta is translated as "**awakening mind**" or "**thought of enlightenment**".
- It serves as a pivotal principle deeply interwoven into the **teachings of Mahayana Buddhism**, guiding practitioners on the compassionate path of altruism and selflessness.
- It is the commitment to embark on a path of awakening and be a bodhisattva, one dedicated to the liberation of all beings.
- There are two types of bodhicitta: **Conventional** and **Ultimate**.
- Conventional bodhicitta is a mind that wishes to **free beings from suffering** and bring them to the state of enlightenment.
- Ultimate bodhicitta is a mind that has **realized emptiness**.

Face to Face Centres





18 December, 2023

Surat Diamond Bourse



Recently, the Prime Minister of India inaugurated Surat Diamond Bourse in Gujarat.

About Surat Diamond Bourse:

- The Surat Diamond Bourse (SDB) is a **large-scale project** in Surat, **Gujarat**, India.
- It is the **world's largest corporate office hub**, with over 67 lakh square feet of floor area.
- It is also a global center for trading rough and polished **diamonds** and **jewelry**.
- It is spread across **35.54 acres** and has **4,500 offices** for national and international traders.
- It also includes a customs clearance house for import and export, a jewelry mall and facilities for international banking and safe vaults.
- It was built to expand and consolidate the **diamond trading business from Mumbai to Surat**.
- The overall structure of the complex was completed in May 2022, and the overall construction was finished on **July 26, 2023**.
- On **August 22, 2023**, **Guinness World Records** officially declared it the world's largest office building, surpassing The Pentagon.
- It received the prestigious **platinum rating** from the **Indian Green Building Council (IGBC)** for its environmentally sustainable practices and design.

Place in News Bhutan

Recently, Bhutan plans to build a massive "international city" in an area of over 1,000sq. km on its border with Assam.

Bhutan (Capital: Thimphu)

Location: Bhutan, a landlocked country of south-central Asia, located on the eastern ridges of the Himalayas.

Political Boundaries: Bhutan shares its border with **China** to the north and **India** to the south, east and west.

Physical Features:

- **Mount Jomolhari** and **Gangkhar Puensum** are prominent peaks in Bhutan.
- **Lush valleys** carved by rivers like the **Paro** and **Punakha** Valleys.
- Rivers like the **Drangme Chhu**, **Sankosh**, and **Manas** River flow through Bhutan.



Personality in News Guru Teg Bahadur

Recently, Prime Minister of India paid homage to Sikh Guru Teg Bahadur, commemorating his martyrdom.

Guru Teg Bahadur (1621-1675)

- Guru Tegh Bahadur was the **ninth of ten Sikh Gurus**.
- He was a great **teacher**, and a **renowned fighter**, thinker and poet.
- His birth name was **Tyag Mal**, which means "**master of renunciation**".
- He stood against the forced conversions of **Kashmiri Pandits** and **non-Muslims to Islam**, displaying resistance against religious oppression.
- His writings, consisting of about **116 poetic hymns**, are preserved in the sacred text '**Guru Granth Sahib**.'
- He founded the town of **Chak-Nanki in Punjab** during one of his missions, later becoming part of **Anandpur Sahib**.
- He publicly beheaded in **1675 by emperor Aurangzeb** in Delhi for refusing to convert to Islam.
- He earned the name "**Teg Bahadur**" (**Mighty of The Sword**) from **Guru Hargobind** due to his valor in battling the Mughals.
- Gurudwara **Sis Ganj Sahib** marks the site of his execution.
- Gurudwara **Rakab Ganj Sahib** commemorates the places where his body was cremated.



POINTS TO PONDER

- What is the name given to the apex predator mosasaur fossil discovered in Japan's Wakayama Prefecture? - **Wakayama Soryu**
- Where did Prime Minister Narendra Modi inaugurated the largest office space in the world? - **Surat Diamond Bourse, Gujarat**
- Who was the most recent recipient of the esteemed Nyholm Prize for Education from the Royal Society of Chemistry? - **Savita Ladage**
- In which country is the Duqm Port located? - **Oman**
- What is the IUCN status of Indian Tent Turtle? - **Least Concern**

Face to Face Centres

