Prelim Bits 24-09-2018

Interceptor Missile Test

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- India‘s Ballistic Missile Defence (BMD) system is concentrated on tracking and destroying incoming hostile missiles both inside (endo) and outside (exo) the earth's atmosphere.
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- The BMD program includes a two-tiered system consisting of two interceptor missiles, namely Prithvi Air Defence (PAD)/ Pradyumna and Advanced Air Defence (AAD)/Ashwin Ballistic Missile Interceptor.
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- India successfully conducted an interceptor missile (Prithvi Defence Vehicle) test off the Abdul Kalam Island in Odisha Coast.
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- The Prithvi Defence Vehicle (PDV) is being developed by DRDO which is set to replace the existing PAD.
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- PDV mission is for engaging the targets in the exo-atmosphere region at an altitude above 50 km of the earth’s atmosphere.
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- PDV is guided by high-accuracy Inertial Navigation System (INS).
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- AAD mission is for engaging the targets in the endo-atmosphere at an lower altitude of 15-30 km.
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MINERVA-II1

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- It is the world’s first man-made object to explore movement on an asteroid surface.
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- It is developed by Japanese Space Agency.
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- MIcro Nano Experimental Robot Vehicle for Asteroid (MINERVA) is the

second generation rover deployed by Hayabusa2 spacecraft.
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- It recently landed on Asteroid Ryugu and the world's first rover to land on the surface of an Asteroid.
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- This is also the first time for autonomous movement and picture capture on an asteroid surface.
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- It will collect a sample of the primitive world during its stay at Ryugu, to bring to Earth for laboratory analysis.
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oesophageal organoids

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- Scientists have successfully grown world's first oesophageal organoids using stem cells.
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- Oesophageal organoids are miniature, functional versions of the human food pipe.
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- The oesophagus is a muscular tube that actively passes food from the mouth to the stomach.
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- The organ can be affected by congenital diseases called oesophageal atresia - a narrowing or malformation of the oesophagus caused by genetic mutations.
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- The production of organoids using stem cells paves new ways to study and test drugs against gut disorders.
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- It was grown entirely from pluripotent stem cells (PSCs), which can form any tissue type in the body.
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Stem cells

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- Stem cells differ from other kinds of cells in the body.
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- They have the remarkable potential to develop into cell types in the body

during early life and growth.
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- They have three unique properties.
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1. They are capable of dividing and renewing themselves for long periods;

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2. They are unspecialized; and

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3. They can give rise to specialized cell types.

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- Commonly, stem cells come from two main sources:
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- Embryonic Stem Cell - Embryos formed during the blastocyst phase of embryological development.
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- Adult stem cells – Exist throughout the body after embryonic development and are found inside of different types of tissue such as the brain, bone marrow, blood, blood vessels, skeletal muscles etc.
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- The capacity to differentiate into specialized cell types and be able to give rise to any mature cell type is referred to as potency.
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- **Totipotent stem cells** can differentiate into embryonic and extra embryonic cell types. These cells are produced from the fusion of an egg and sperm cell and can construct a complete, viable organism.
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- The only totipotent cells are the fertilized egg and the cells produced by the first few divisions of the fertilized egg are also totipotent.
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- **Pluripotent stem cells** are the descendants of totipotent cells and can differentiate into nearly all cells, i.e. cells derived from any of the three germ layers.
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- These are true stem cells, with the potential to make any differentiated cell in the body. Embryonic Stem Cells come under this category.
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- **Multipotent stem cells** can differentiate into a number of cells, but only

those of a closely related family of cells (i.e) it can only differentiate into a limited number of types.
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- Eg. The bone marrow contains multipotent stem cells that give rise to all the cells of the blood but not to other types of cells.
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- **Oligopotent stem cells** can differentiate into only a few cells, such as lymphoid or myeloid stem cells.
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- **Unipotent cells** can produce only one cell type, their own, but have the property of self-renewal, which distinguishes them from non-stem cells.
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- Such Unipotent cells include muscle stem cells.
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Hornbill Watch initiative

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- It is an interactive web interface that allows a person to report on hornbills anywhere in India.
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- It was launched by Scientists from Nature Conservation Foundation and Conservation India.
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- Hornbills play essential roles in forest ecosystems as dispersers of seeds of forest plants.
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- There are nine hornbill species in India out of which four are found in the Western Ghats. They are,
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1. Indian Grey Hornbill (endemic to India),
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2. the Malabar Grey Hornbill (endemic to the Western Ghats),
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3. Malabar Pied Hornbill (endemic to India and Sri Lanka) and
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4. Widely distributed but endangered Great Hornbill.
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- India also has one species that has one of the smallest ranges of any hornbill, **the Narcondam Hornbill**, found only on the island of Narcondam.
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- The hornbills were reported from 70 protected areas in the country.
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Total Expense Ratio

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- The ratio is associated with Mutual Funds investment.
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- Mutual funds are investments where an investor entrusts his/her money with an investment manager (of an asset management company) to manage it efficiently.
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- This money management comes at a cost, which is usually charged as a percentage of the investment.
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- The charge levied is called Total Expense Ratio and money received from the investment is reduced by this ratio.
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- For example, if a fund charges 2% as the TER, and the fund produces a gross profit (return) of 15% in a given year, the investor would get 13%.
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- SEBI, the regulator of Mutual Funds, has laid down rules on how much an asset management company can charge an investor to manage their funds.
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Source: The Hindu, PIB

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