

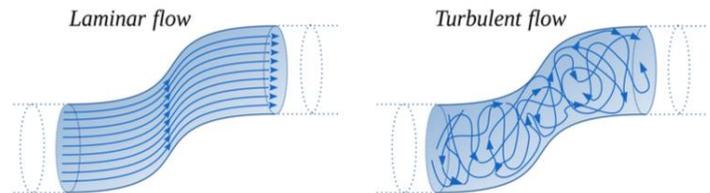
Navier Stokes equations

The two key physical effects that determine the state of a fluid's motion are inertia the tendency of a fluid to keep moving and viscous friction, which tends to bring all motion to a halt.

The strength of inertia increases with the speed of motion, the mass of the fluid, and the distances over which the flow occurs.

The strength of friction is determined by the fluid's viscosity, which is higher for honey, moderate for water, and lower for air.

- When viscous effects dominate, a flow is well ordered and predictable, and disturbances quickly dampen out.
- There is little mixing and the fluid tends to move as if it were composed of distinct layers, which is why it's called laminar flow.
- But when inertia dominates, the flow is highly unstable.
- Without much friction, small disturbances don't die out but instead grow and spread.



- This is what happens to a rising plume of incense smoke: tiny fluctuations in the air are amplified within the plume, causing it to become turbulent.
- The balance between fluid inertia and viscosity (and other forces due to pressure differences and gravity) are precisely described by the Navier Stokes equations, which extend Newton's law for a rigid body (like a billiard ball) to a fluid

Current Affairs 13th December 2023 by Saurabh Pandey

- In fluid mechanics, the Navier-Stokes equations are partial differential equations that express the flow of viscous fluids.
- These equations are generalizations of the equations developed by Leonhard Euler (18th century) to explain the flow of frictionless and incompressible fluids.

The Hindu

Ashley

- Ashley, an artificial intelligence campaign volunteer (US)
- Ashley is one of the first examples of how generative AI is ushering in a new era of political campaigning in which candidates use technology to engage with voters in ways increasingly difficult to track.
- To some, it is an exciting new tool for conducting high quality conversations on a large scale. Over the weekend, Ashley called thousands of Pennsylvania voters.
- Like a seasoned campaign volunteer, Ashley analyzes voters' profiles to tailor conversations around their key issues.

Extreme rainfall corridor

- The Indian monsoon has well known features, such as the onset of the

monsoon, the withdrawal, the active and break periods, and the low pressure systems (or monsoon depressions).

- Every aspect of the monsoon has been affected by global warming.
- The total seasonal rainfall has also trended downwards for more than seven decades, due to the differential heating of the land versus the ocean due to global warming.
- However, this trend has been distributed unevenly through the monsoon season as manifest in the longer duration but lower intensity of dry spells and the greater intensity of wet spell.

Where does extreme rain occur?

- India's monsoon forecasts rely heavily on its relation to the El Niño and the La Niña phenomena, although this relation holds only about 60% of the time.
- The so called large scale extreme rainfall events are actually simultaneous or near simultaneous heavy rain episodes that are strewn across a 'highway' that extends from parts of West Bengal and Odisha to parts of Gujarat and Rajasthan.
- The most remarkable new finding is that this corridor has remained unchanged from 1901 to 2019.

- In the seemingly chaotic change in all aspects of the monsoon, such a trapping of the extreme events to a relatively narrow corridor is good news for potential improvements in process understanding, which is bound to lead to better predictions of these synchronized extreme rainfall events.
- Section 43D(5) makes grant of bail virtually impossible under UAPA.
- It leaves little room of judicial reasoning.
- The test for denying bail under the UAPA is that the court must be satisfied that a “prima facie” case exists against the accused.
- Section 43D(5) in The Unlawful Activities (Prevention) Act, 1967
- (5) Notwithstanding anything contained in the Code, no person accused of an offence punishable under Chapters IV and VI of this Act shall, if in custody, be released on bail or on his own bond unless the Public Prosecutor has been given an opportunity of being heard on the application for such release:
- Provided that such accused person shall not be released on bail or on his own bond if the Court, on a perusal of the case diary or the report made under section 173 of the Code is of the opinion that there are reasonable

grounds for believing that the accusation against such person is prima facie true.

UAPA #UPSC #CSE

What is UAPA?
The Unlawful Activities Prevention Act, 1967 is a Parliamentary law that gives powers to the central government to deal with activities directed against the integrity and sovereignty of India.

New Amendments (2019)

- NIA officers of the rank of Inspector or above can investigate a case in addition to DSP or ACP ranked officer in a state.
- The law empowers the government to designate individuals as terrorists.
- The approval of Director General of Police is required to attach properties connected with terrorism.

Provisions

- UAPA is applicable to both Indians and well as foreigners. It can be applied to offences committed either in India or outside.
- The law provides for death penalty and life imprisonment as the highest form of sentences.
- A maximum time of 180 days is given to the Investigating agency to file report, which can also be extended.

Concerns

- It gives absolute and sweeping powers to the central government to arrest individuals indulging in an activity it considers as unlawful.
- The courts are bound to give stringent punishment under the UAPA even if offence is not serious.

IN THE LOK SABHA
NATIONAL INVESTIGATION AGENCY AMENDMENT BILL, 2019

Empowers NIA to probe terror attacks targeting Indians, Indian interests on foreign soil

Allows NIA to probe cyber-crimes and cases of human trafficking

Allow the Centre and states to designate sessions courts as special court for trial

UNLAWFUL ACTIVITIES (PREVENTION) ACT AMENDMENT BILL

UAPA Bill empowers NIA DG to approve seizure/attachment of property in case

Inspector of NIA can investigate offences under chapter IV and VI

PROTECTION OF HUMAN RIGHTS (AMENDMENT) BILL

Increase NHRC members from two to three, one of which will be a woman

A retired Supreme Court judge could also be considered as chairperson

The Hindu

Imp section of Indian patent act

What is a Patent?

- Patent
 - is an exclusive and monopoly right
 - to use the patented invention
 - for a limited area and time (20 Years)
 - by stopping others
 - from making, using, importing or selling.
- Patents are territorial rights,
 - so an Indian patent will only give the owner rights
 - within India and
 - rights to stop others from importing products into India
- No concept of International Patents
- When a patent is granted,
 - the applicant becomes the owner of the patent.
 - Like any other form of property, a patent can be bought, sold, licensed or mortgaged.



THE PATENT ACT, 1970

PATENT- The word patent derives from the Latin word patere means 'to lay open i.e to make available for public inspection. A patent gives its owner the right to exclude others from making, using, selling & importing an invention for a limited period of time.

PATENT ACT 1970 along with PATENT RULES 1972 came into force on 20th April 1972 replacing the Indian Patents and design act 1911.

This act was based on the recommendation of the Ayyangar committee.

The main reason behind this act was to become a member of TRIPS.

The head patent office is located in Kolkata. Other branches are Delhi, Mumbai & Chennai.

The patent system in India is administered by the controller general of patents, designs & trademarks. (sec 73).

TERMS

1. **CONVENTION COUNTRY**- means a country that is a member of a group of countries or union of countries or intergovernmental organizations (sec 133)

2. **CONVENTION APPLICATION** - this means an application for a patent made by virtue of sec 135.

3. **DISTRICT COURT** - by code of civil procedure 1908

Section 43D (5) of UAPA

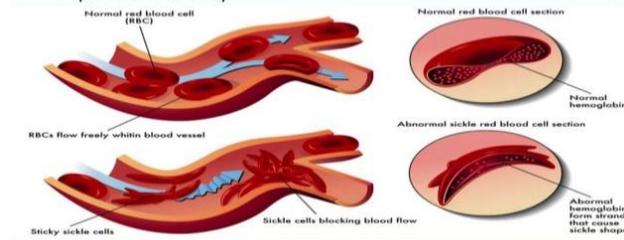
- This, therefore, means that if any ingredient independently satisfies the requirements for the grant of a patent, irrespective of its inclusion in a composition under Section 3(e), it would be patent eligible.
 - The court's close scrutiny of the precise legislative text stands out. It further held that the rejection of the composition in the instant case was justified due to the patentee's failure to produce evidence to substantiate that the invention was more than a sum of its part
 - The second case is Hong Kong and Shanghai University versus Assistant Controller of Patents which relates to Section 3(i).
 - This provision, in a nutshell, excludes from the scope of protection, inventions which consist of any process for the medicinal, surgical, curative, prophylactic, diagnostic, therapeutic or other treatment of human beings or animals to render them disease free or to enhance their economic productivity.
 - The judgment sheds considerable light on the kinds of diagnosis that are excluded by this filter.
- Section 3 of the Patents Act -This provision contains a set of filters that every invention must pass through for it to be patentable.
 - Apart from the famous Novartis judgment from the Supreme Court of India on one such exclusion relating to Section 3(d) on the need for an invention to showcase enhanced therapeutic efficacy.
 - Novozymes vs Assistant Controller of Patents and Designs, relates to Section 3(e), which excludes from protection those compositions that amount to a mere aggregation of their components.
 - The court holds that Section 3(e) does not exclude from the scope of protection aggregates that are already known.

The Hindu

Casgevy and Lyfgenia - Gene therapy

Sickle Cell Anemia

- In sickle cell anemia, the red blood cells become **rigid and sticky** and are shaped like sickles or crescent moons.
- These irregularly shaped cells **can get stuck in small blood vessels**, which can slow or **block blood flow** and oxygen to parts of the body.



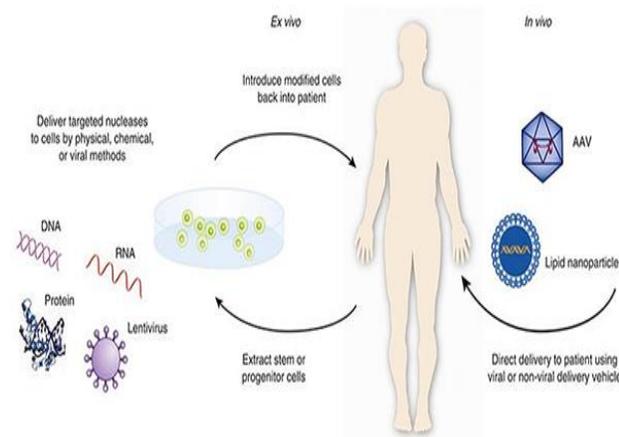
Unlike traditional medicines or therapies, **gene therapy** is a potential one-time treatment aimed at targeting the underlying cause of a disease at the cellular level and may deliver transformational improvement in quality of life.



This approach may be significant for patients with genetic diseases, and has the potential to deliver breakthroughs that change patients' lives — today and in the future.



Pfizer.com/RareDisease



- UK drug regulator approved **Casgevy**, the gene therapy to treat people above 12 with sickle cell disease and beta thalassemia, the U.S. FDA has approved two gene therapies **Casgevy and Lyfgenia to treat sickle cell disease in patients over 12.**

- These landmark decisions mark the beginning of gene therapy using the **CRISPRCas9 tool to treat diseases that could otherwise be cured only through bone marrow transplantation.**

- While **Lyfgenia uses a disabled lentivirus as a vector to introduce into the blood stem cells a new gene for Haemoglobin that mimics the healthy version**, **Casgevy uses the gene editing tool of CRISPRCas9 to disable a particular gene (BCL11A) that turns off foetal Haemoglobin production in blood stem cells.**

- While about **10% of adults continue to produce foetal Haemoglobin**, in others, the **BCL11A gene prevents the production of foetal Haemoglobin.**

- By disabling the **BCL11A gene**, **foetal Haemoglobin that is produced, which does not have the abnormalities of adult Haemoglobin, helps treat patients with sickle cell disease or beta thalassaemia.**

- Both gene therapies use patients' own blood cells for gene editing, the number of patients who can potentially be treated will be huge as these treatments do not rely on matching bone marrow donors.
- But in reality, these treatments would be exorbitantly expensive.
- Also, much like bone marrow transplantation, only certain hospitals will be equipped to extract a patient's blood stem cells and use the genetic editing tool to the stem cells before reinjecting them, thus limiting the number of beneficiaries

The Hindu
