

Y CHROMOSOME

- The Y chromosome is a never-ending source of fascination (particularly to men) because it bears genes that determine maleness and make sperm.
- It's also small and seriously weird; it carries few genes and is full of junk DNA that makes it horrendous to sequence.
- Females have a pair of X chromosomes, whereas males have a single X and a much smaller Y chromosome.
- The Y chromosome is male-determining because it bears a gene called SRY, which directs the development of a ridge of cells into a testis in the embryo.
- The embryonic testes make male hormones, and these hormones direct the development of male features in a baby boy.
- The Y chromosome is very different from X and the 22 other chromosomes of the human genome.
- It is smaller and bears few genes (only 27 compared to about 1,000 on the X).
- These include SRY, a few genes required to make sperm, and several genes that seem to be critical for life
- many of which have partners on the X.
- Many Y genes (including the sperm genes RBMY and DAZ) are present in multiple copies.
- Some occur in weird loops in which the sequence is inverted and genetic accidents that duplicate or delete genes are common.
- The Y also has a lot of DNA sequences that don't seem to contribute to traits.
- This "junk DNA" is comprised of highly repetitive sequences that derive from bits and pieces of old viruses, dead genes, and very simple runs of a few bases repeated over and over.
- This last DNA class occupies big chunks of the Y that literally glow in the dark; you can see it down the microscope because it preferentially binds fluorescent dyes.

THE HINDU

BLOTTING PAPER

How does a blotting paper absorb ink?

- A: A blotting paper absorbs ink by capillary action, which is a natural phenomenon exhibited by liquids in their attempt to reduce surface tension.

- Any thin tube with a very fine bore say, less than 1 mm is called a capillary tube.
 - When such a tube is immersed in a liquid, the liquid rises inside the tube to a level higher than that outside it.
 - Only liquids that have an angle of contact lower than 90 degrees will rise. Other liquids, like mercury, will dip.
 - Blotting paper is made of cellulose obtained from the pulp of cotton linter, wood or straw.
 - A purified pulp paste is directly pressed to form blotting paper sheets without any treatment, so as to incorporate microscopic capillaries.
 - When such paper is placed in ink, water, or any other aqueous solution, the solution immediately enters into these capillaries and spreads all over the sheet.
 - Capillary action is also responsible for many common phenomena in our everyday life.
- based on the advice of a committee made up of the Prime Minister, the Leader of the Opposition in the Lok Sabha or the leader of the single largest Opposition party and the Chief Justice of India (CJI).
 - This judgment of the Constitution Bench was a major step towards broad-basing the ECI and enhancing its constitutional status.
 - Article 324 of the Constitution contains a provision for such a law to be enacted by Parliament.
 - The government of the day, in an unambiguous move, introduced a Bill in the Rajya Sabha on August 10 which if passed will overturn this verdict.
 - The Bill seeks to replace the Chief Justice of India from the high-powered selection committee, meaning the committee will be made up of the Prime Minister (Chairperson), Leader of the Opposition in the Lok Sabha (Member) and a Union Cabinet Minister to be nominated by the Prime Minister (Member).
 - A suggestion during the Constituent Assembly Debates was that the appointment of the CEC should be subject to confirmation by two-thirds majority in a joint session of both Houses of Parliament

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Election autonomy

- The Supreme Court of India, in a judgment on March 2, directed that the Chief Election Commissioner (CEC) and the Election Commissioners (EC) will be appointed by the President of India

(Constituent Assembly debates, June 15, 1949)

- The V.M. Tarkunde Committee appointed by Jayaprakash Narayan in 1975, the Dinesh Goswami Committee on electoral reforms set up by the then Prime Minister, V.P. Singh, in the 1990s,
- and the second Administrative Reforms Commission in its fourth report in 2009 among others made recommendations that the appointments of members of the ECI should be more broad-based (through a collegium) than leaving this solely to the government on whose advice the President made these appointments.
- In 2006, a suggestion was made by a former CEC, B.B. Tandon, to the former President of India, A.P.J. Abdul Kalam (when both were in office) that a seven-member committee headed by the Prime Minister should choose the CEC and the other ECs.
- Despite its good intent and noteworthy features, the Bill appears wanting in important aspects
- Drawing largely on the Code on Social Security, 2020, the Bill defines a gig worker as a 'person who performs work or participates in a work arrangement and earns from such activities outside of traditional employer- employee relationships and who works on a contract that results in a given rate of payment'.
- It defines an aggregator as a 'digital intermediary and includes any entity that coordinates with one or more aggregators for providing the service.
- By not defining gig workers as employees, the Bill is limited in its ability to integrate existing labor laws into its ambit.
- Hence, the aggregators will continue to be insulated from complying with the mandates of the labor laws, and remain evasive from the responsibility of providing the gig workers with workplace entitlements.

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Gig worker bill

- In a first of its kind, the Rajasthan government introduced the Rajasthan Platform- Based Gig Workers (Registration and Welfare) Bill, 2023, with the aim of ensuring social security for gig workers.
- The Bill aims to create a database of gig workers wherein the details of all the workers on-boarded or registered with a platform would be transferred to the proposed gig workers' welfare board.

- Such a database maintained by the board does not withstand ‘the duration or time of engagement with app-based platforms’.
- Fourth, the Bill at its core aims to guarantee social security to platform-based gig workers by constituting a representative welfare board and creating a welfare fund.
- It brings in eight aggregators or primary employers- services under its remit.

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Sulphur in moon

- Pragyaa, the rover of the Chandrayaan mission, has confirmed the presence of sulfur on the moon’s surface, near its south pole, and is still searching for hydrogen, the Indian Space Research Organisation (ISRO) said on Tuesday.
- The Laser -Induced Breakdown Spectroscopy (LIBS) instrument aboard the rover has made the first ever in situ measurements on the elemental composition of the lunar surface near the South Pole.
- The LIBS is a scientific technique that analyses the composition of materials by exposing them to intense laser pulses.

- A high-energy laser pulse is focused onto the surface of a material, such as a rock or soil, and generates localized plasma.

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Cyclone frequency

- A combination of global warming and a cyclical event called the Pacific Decadal Oscillation (PDO) that repeats every 20 to 30 years, could make such cyclones more frequent in the coming years, a study published on Monday in the journal Nature Communications said.
- The number of such equatorial-origin cyclones was 43% less in the period from 1981 to 2010 compared with 1951 to 1980, and this was because the PDO was in a ‘warmer’ or positive phase.
- A warming of the Central Equatorial Pacific, called an El Nino, often corresponds to reduced rainfall over India whereas cooler-than-normal temperatures, or a La Nina, is linked to excessive rainfall.
- This pattern, collectively called the El Nino Southern Oscillation (ENSO) phenomenon, repeats in the Pacific over two to seven years.
- However, the PDO is not an annual occurrence and, on average, corresponds to a warmer than average Western Pacific Ocean and

relatively cooler Eastern Pacific, though this plays out over much longer time scales.

- However, unlike an ENSO, a 'positive' or 'warmer phase' of a PDO can be known only after several years of measuring ocean temperatures and their interaction with the atmosphere
- "It's usually rare for cyclones to form near the Equator but when the waters are warm, they can gain more moisture and rise in intensity.

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REPORTER