



Growing Demand of DNA Tests

For Prelims: Deoxyribonucleic Acid (DNA), DNA Testing, DNA technology.

For Mains: Deoxyribonucleic Acid (DNA), Importance of DNA Testing and DNA technology.

Why in the News?

Recently, the [Supreme Court](#) has expressed concern about growing uses of [Deoxyribonucleic Acid \(DNA\)](#) Tests in court cases.

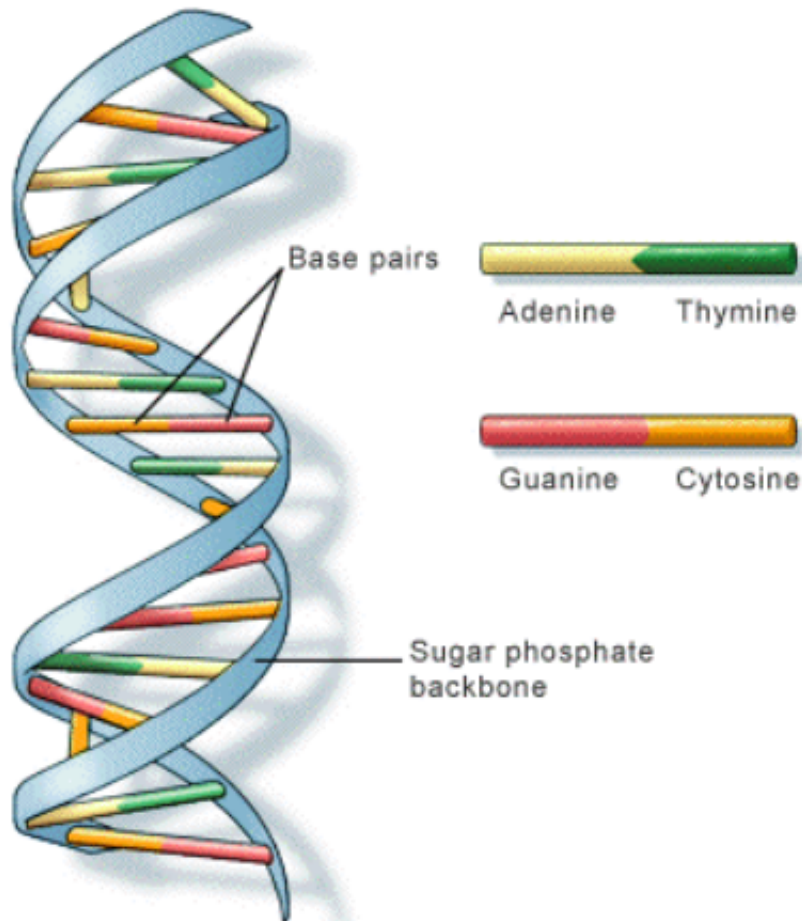
What are the Issues involved?

- A growing number of complainants are asking for **DNA tests**. Such demands, according to the government laboratory, are growing by around 20% annually.
- Although the **3,000-odd DNA tests** performed yearly by Indian laboratories are insignificant in comparison to the **70 other nations** that rely on [DNA Technology](#), the spike in demand contradicts worries about privacy and probable data abuse.
- **DNA tests** fall into a gray area in the **pursuit of justice**, bridging the gap between the 'eminent need' to **uncover the truth**, whether it be in the form of evidence in a **criminal case, a claim of marital infidelity, or proving paternity**, and the risks of slipping into **self-incrimination** and **encroachment on individual privacy**.
- This brings attention to the **expanding use of technology for improving the process of justice** but it also **violates people's privacy**
 - As part of the **right to life under Article 21**, the Supreme Court acknowledged that **bodily autonomy and privacy are part of fundamental right**.

What is Deoxyribonucleic Acid (DNA)?

- [Deoxyribonucleic acid \(DNA\)](#) is an organic molecule with a complex molecular structure.
- **DNA** molecule's strands are made up of a long chain of **monomer nucleotides**. It is arranged in a **double helix structure**.
- **James Watson** and **Francis Crick** discovered that **DNA** is a **double-helix polymer** in **1953**.
- It is essential for the transfer of the **genetic characteristic** of the living being from one generation to the other generation.
- The majority of **DNA** is found in the **cell nucleus** so it is called **nuclear DNA**.

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- **DNA** stores data in the form of a code made up of four Nitrogenous bases.
 - **Purines:**
 - Adenine (A)
 - Guanine (G)
 - **Pyrimidines**
 - Cytosine (C)
 - Thymine (T)

What is the Use of DNA Testing?

- **DNA testing** is essential for identifying and bringing justice in cases involving abandoned mothers and children.
- It is also a **highly effective technique** in **civil disputes** when the court needs to determine the **issue of maintenance** and **identify the child's parents**.

What are the Precedents Set by Supreme Court in previous cases?

- Precedents set by the **Supreme Court** through the years show that judges cannot order **genetic tests** as a **“roving enquiry”** (*Bhabani Prasad Jena, 2010*).
- In the *Banarsi Dass case, 2005*, it held that **DNA test** must balance the **interests of the parties**. **DNA tests** should also not be ordered if there was **other material evidence** at hand to prove the case.
- Before ordering a **genetic test**, courts should consider the **"proportionality of the legitimate aims,"** the court stated in its **Ashok Kumar judgment 2021**.
- The ruling of the Constitution Bench in the [K.S. The Puttaswamy case \(2017\)](#) affirming that the **right to privacy** is **part of the rights to life (Article 21)** has only strengthened the privacy argument.
- In a case involving a woman, the Supreme Court recently ruled that forcing someone to submit to

a **DNA test** against their will would **violate their right to** [personal liberty and privacy](#).

UPSC Civil Services Examination Previous Year Question

Q. Consider the following statements:

1. Genetic changes can be introduced in the cells that produce eggs or sperms of a prospective parent.
2. A person's genome can be edited before birth at the early embryonic stage.
3. Human induced pluripotent stem cells can be injected into the embryo of a pig.

Which of the statements given above is/are correct?

- (a) 1 only
(b) 2 and 3 only
(c) 2 only
(d) 1, 2 and 3

Ans: (d)

Exp:

- Germline gene therapy is the replacement of genes in egg or sperm cells with which an offspring inherits a new trait. It allows for the correction of disease-causing gene variants that are certain to be passed down from generation to generation. **Hence, statement 1 is correct.**
- **CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) technology** is employed to modify human embryos before they are transferred into women's uterus. Recently, researchers had successfully created the world's first genetically edited baby. By using CRISPR technology, the genomes of embryos were edited to disable a gene, CCR5, which allows HIV to infect cells. **Hence, statement 2 is correct.**
- Due to certain anatomical and physiological features shared with humans, the pig is considered an important animal model of human diseases with unique advantages in surgery and xenotransplantation studies. **Hence, statement 3 is correct.**

Therefore, option (d) is the correct answer.

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