SRY Gene (sex-determining region Y)

Why in the news?

Exceptional instances of females possessing the SRY gene have been reported three times in the medical literature, two in 2024 itself.

- **The SRY gene** – Provides instructions for making a protein called the sex-determining region Y protein.
- **SRY Gene's Role** – The SRY gene, *located on the Y chromosome*, is the primary determinant of maleness.
- Its presence typically leads to the development of male characteristics, while its absence leads to female development.
- **Typical Sex Determination** – Eggs carry an X chromosome, while sperm carry either an X or a Y.
- XX combinations result in females, and XY combinations result in males.
- **SRY Translocations** – Rarely, the SRY gene can move from the Y chromosome to an X chromosome (a translocation).
- **Sterile male** – If this X chromosome fertilizes an egg, the resulting XX individual usually develops as a sterile male, a man who is unable to reproduce due to a lack of sperm or other reproductive issues.
- **Exceptional Females with SRY** – Cases of fertile females with the SRY gene on an X chromosome are exceptional cases.
- **Key to Female Development in These Cases** – The key difference in these exceptional females lies in a specific *deletion on the X chromosome carrying the SRY gene*.
- This deletion results in the inactivation of the translocated X chromosome during female development.
- This "biased" inactivation silences the SRY gene, allowing female development to proceed.
- If the other X chromosome were inactivated, the individual wouldn't survive because the deleted genes are essential for life.
- **Significance** – These cases reinforce the SRY gene's importance in male development.
- Only when it is silenced (through biased X-inactivation due to the deletion) can female development occur even with the SRY gene present.
- **Further Research** – The article suggests the need for more research to

understand the long-term effects of SRY translocations, even when they result in female development.
- It also highlights the potential value of screening for such translocations in the future.

Reference

The Hindu - SRY Gene

