

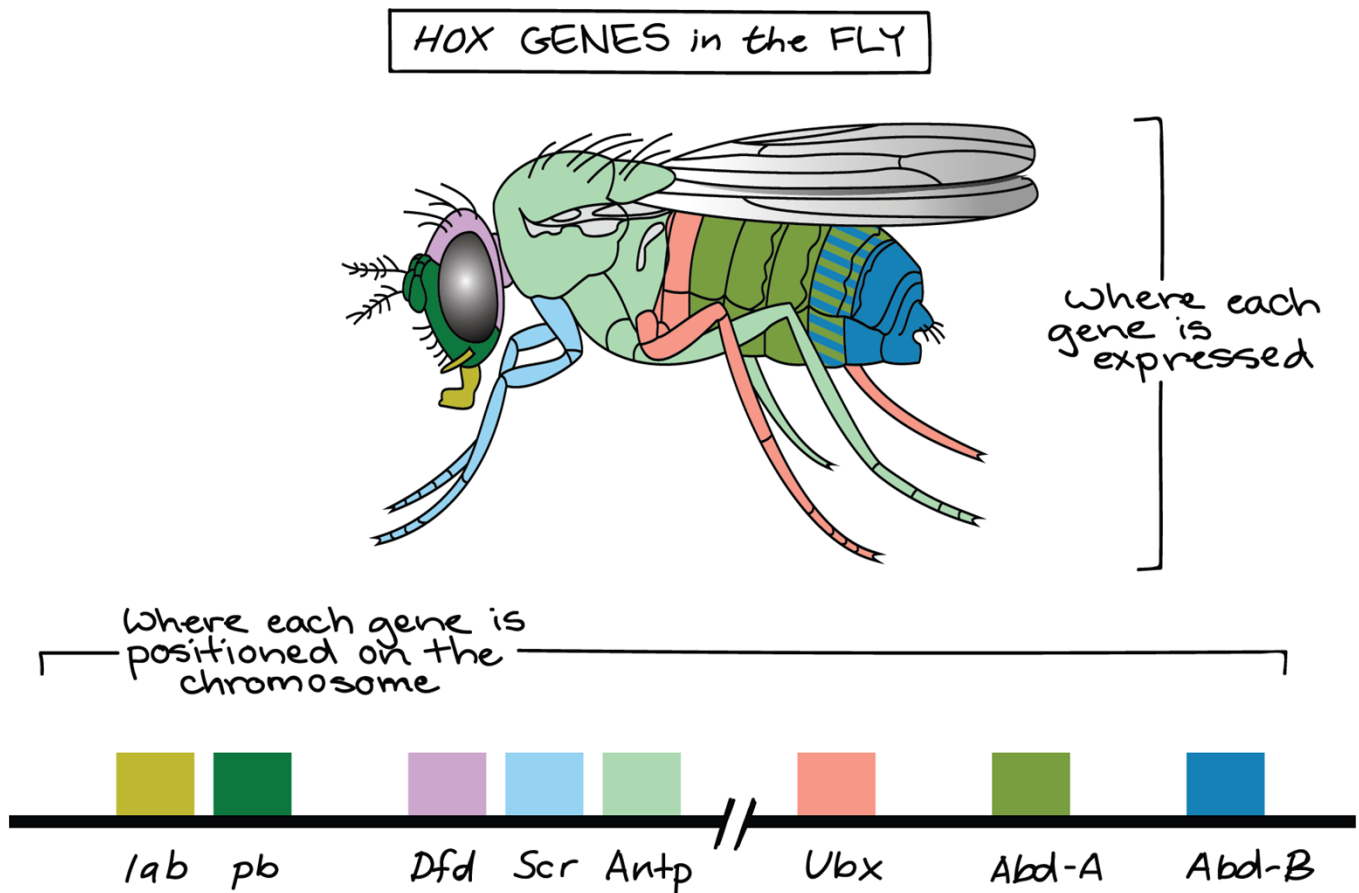
## Hox genes (GS Paper 3, Science and Tech)

### Why in news?

- Researchers at New York University recently created **artificial Hox genes** using new synthetic DNA technology and genomic engineering in stem cells.

### Details:

- They discovered that **these gene-dense clusters alone contain all of the information** needed for cells to decode a positional signal and remember it, which suggests that the compact nature of Hox clusters is what helps cells learn their location.



### What are hox genes?

- Almost all animals from humans to fish have an anterior-posterior axis, which is a line that runs from head to tail.
- In the gestational stage, Hox genes act as architects, and direct the roadmap for where cells go along the axis, as well as what body parts they make up.
- Hox genes **ensure that organs and tissues develop in the right place**, such as ensuring the limbs in mammals or the wings of birds end up at their correct anatomical positions.
- If Hox genes fail through mis-regulation or mutation, cells can get lost, playing a role in some cancers, birth defects, and miscarriages.

### Challenges:

- Despite their importance in development, Hox genes are challenging to study. They are tightly organised in clusters.
- While many parts of the genome have repetitive elements, Hox clusters have no such repeats.
- These factors make them unique but difficult to study with conventional gene editing techniques without affecting neighbouring Hox genes.

### Way Forward:

- The creation of synthetic DNA and artificial Hox genes paves the way for future research on animal development and human diseases.

## India's first commercial-scale Green Ammonia and Green Methanol project

(GS Paper 3, Environment)

### Why in news?

- Recently, NTPC RE Limited (NTPC REL) has signed a MoU with Gujarat Alkalies and Chemicals Limited (GACL).
- It seeks to realize green energy and green hydrogen objectives and the Government of India's efforts toward the **carbon-neutrality economy**.



### Collaboration:

- The MoU envisages collaborating in the field of **Renewable Energy, Green Methanol & Green Ammonia** and mutually exploring the opportunities for the supply of **100 MW RE-RTC (Round The Clock) power** and synthesizing **75 TPD Green Methanol** and **35 TPD Green Ammonia** for captive use for the production of various chemicals by GACL at its Vadodara and Dahej complex in Gujarat.

### Background:

- This development comes in the backdrop of NTPC announcing its green hydrogen initiatives and plans to build the country's first pilot projects for synthesizing green methanol, setting up green hydrogen filling stations, green hydrogen blending into PNG, and green energy storage project.

- This would be the first commercial-scale Green ammonia and Green methanol project in the country and would align with the vision laid out by the Prime Minister for Atmanirbhar Bharat.

#### **“NTPC Renewable Energy Limited” (NTPC REL):**

- NTPC REL, a **100 % subsidiary of NTPC**, for taking care of the RE business of NTPC.
- NTPC is India’s largest Power Utility and its core business is power generation with a total installed capacity of 69 GW (including JVs and subsidiaries).
- As part of increasing its renewable energy portfolio, a fully owned subsidiary has been formed on 7th October 2020 known as “NTPC Renewable Energy Limited” (NTPC REL) which shall take up Renewable Energy Parks and Projects including business in the area of Green Hydrogen, Energy Storage Technologies and Round the Clock RE Power.

### **Mangarh hillock in Rajasthan, a monument of National Importance**

**(GS Paper 1, Culture)**

#### **Why in news?**

- Recently, a team from **National Monuments Authority** submitted a report on declaring Mangarh hillock in Rajasthan as a monument of National Importance in the year of Azadi Ka Amrit Mahotsav, to Ministry of Culture.
- This report carries relevant details about the Mangarh hillock and recommendations by National Monuments Authority.



#### **Historical aspect of Mangarh hillock:**

- The hillock, situated at the Gujarat-Rajasthan border, is a **site of a tribal uprising** where a massacre of over 1500 Bhil tribal freedom fighters took place in 1913.
- The place is also known as the **Adivasi Jallianwala**, and there has been a demand to build a memorial.

- On November 17, 1913, British forces opened fire on tribals gathered at the site who were holding a meeting in protest, led by a leader from the community Govind Guru, killing over 1,500.

## **Mumbai's CSMT becomes first station to have augmented reality experience** **(GS Paper 3, Science and Tech)**

### **Why in news?**

- The Chhatrapati Shivaji Maharaj Terminus in Mumbai has become the first railway station in India to be **equipped with augmented reality screens**.

### **Salient Features:**

- The futuristic technology will allow passengers at the station to get **real-time digitised time-table** with a dedicated scrolling screen and railway information for an engaging experience.
- The passengers will also be able to **meet animals, witness magic tricks and snowfall**, and visit any place in the world virtually.
- The project at Mumbai's busiest railway station aims to generate revenue for Central Railway and offer passengers fun and infotainment during wait periods.



### **How it will work?**

- Augmented reality magic mirrors create a virtual world around the person standing in front of the screen.
- The content will change each month depending on the occasions to keep the passengers engaged. The digital train schedule will also be updated from time to time.

### **Sleeping pods:**

- Apart from the augmented reality mirror screen, Central Railway also threw open the pod hotel at Chhatrapati Shivaji Maharaj Terminus.
- Sleeping pods are a Japanese concept that allows railway passengers to get rest at the stations without having to pay a heavy price.