



# Axolotls and Organ Renegration

## Why in News?

The **Axolotl**, a species of **salamander** (lizard-like **amphibians**) possesses an extraordinary ability to regenerate lost body parts, inspiring researchers to delve into the secrets of this **unique regenerative power**.

- The focus of their investigations lies in understanding the **elusive o** (for “ova deficient” **gene**, which plays a **pivotal role in the axolotl's regenerative process**.

## What is Axolotl?



- **About:**
  - **Axolotl are amphibians that spend their whole lives underwater.** They exist in the wild in only one place—**Lake Xochimilco** near **Mexico City**, a network of **artificial channels, small lakes, and temporary wetlands** that help supply water to nearby **Mexico City's 18 million residents**.
    - **Lake Xochimilco is also a UNESCO World Heritage site**
  - Axolotls, like humans, contain two copies of every gene - **one inherited from the father and the other from the mother**.
- **Prey:**
  - They feast on a **menu of mollusks, worms, insect larvae, crustaceans, and some fish**.
- **Special Feature:**
  - They have fascinated scientists for their **ability to regenerate lost body parts and for their rare trait of neoteny**, which means **they retain larval features throughout life**.
    - These features are also studied by cancer researchers for their unique **resistance to developing cancerous tissues**.

- Even though they are **amphibians, axolotls remain aquatic throughout their lives but they are now almost extinct in the wild.**
- **Threat:**
  - Axolotl populations have declined considerably due to a **combination of habitat loss** (largely driven by Mexico City's continued urbanisation), **water pollution, and invasive fish species** (such as **carp** and **tilapia**, which **compete with axolotls for food and prey upon them**).
- **Protection Status:**
  - [International Union for the Conservation of Nature and Natural Resources \(IUCN\)](#) has classified the axolotl as a [critically endangered](#) species since 2006.

## What is Organ Regeneration?

- **About:**
  - Organ regeneration is the process of **restoring or replacing damaged or missing organs or tissues in living organisms**. It is a fascinating phenomenon that varies widely among different species, from plants to animals.
    - Organ regeneration has enormous potential for **medical applications, such as treating injuries and diseases that affect human organs**.
- **Major Processes:**
  - **Remodelling:** This involves reshaping and reorganising the existing tissues to form new structures.
    - For example, **plants and some sea creatures**, such as jellyfish, can replace missing parts by extensively **remodelling their remaining tissues**.
  - **Blastema formation:** This involves growing a mass of undifferentiated cells at the site of injury that can differentiate into various cell types and form new tissues and organs.
    - For example, some animals such as **salamanders** can regenerate missing parts by first growing a blastema.
  - **Compensatory hypertrophy:** This involves increasing the size and function of the remaining part of an organ to compensate for the loss of another part.
    - For example, in **humans if one kidney is removed from a human, the other enlarges**.
- **Other Example of Organisms that can Regenerate Organs:**
  - **Planarians, Zebrafish** and [Sea cucumber](#).

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