



Kala- azar Disease

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Why in News

Recently, a team of researchers from the National Centre for Cell Science (NCCS), Pune have found **new biomolecules to fight drug resistance in Kala- azar (visceral leishmaniasis)**.

- NCCS is an autonomous organisation under the Department of Biotechnology, Government of India.
- It was established to facilitate cell biology research in the country.

Leishmaniasis

- It is a **neglected tropical disease** affecting almost 100 countries including India. Neglected tropical diseases are a diverse group of communicable diseases that prevail in tropical and subtropical conditions in 149 countries.
- It is **caused by a parasite called Leishmania**, which is transmitted through the bite of sand flies.
- There are **three types of leishmaniasis**:
 - **Visceral leishmaniasis**, which affects multiple organs and is the most serious form of the disease.
 - **Cutaneous leishmaniasis**, which causes skin sores and is the most common form.
 - **Mucocutaneous leishmaniasis**, which causes skin and mucosal lesions.
- Visceral leishmaniasis, which is commonly known as Kala-azar in India, is fatal in over 95% of the cases, if left untreated.

Key Points

- **Resistance to Drug:** The only drug available against leishmaniasis, **miltefosine**, is rapidly losing its effectiveness because of **emerging resistance to this drug** due to a decrease in its accumulation inside the parasite.

- **Responsible Proteins:** A protein called 'P4ATPase-CDC50', is responsible for intake of the drug by the parasite, and another protein, called 'P-glycoprotein', is responsible for throwing this drug out from within the parasite's body.
- A decrease in the activity of the former protein, and an increase in the activity of the latter **results in less accumulation of miltefosine inside the parasite's body**, thus causing it to become resistant to the drug.
- While exploring ways to tackle miltefosine resistance, the researchers worked with one of the species of Leishmania that causes infection, called Leishmania major.
- They **tried to manipulate these transporter proteins** in the species in a manner that would result in **increased uptake of the drug and decrease in its being thrown out** of the parasite's body.
- They used computational methods to design small molecules, called **peptides**, that could very specifically interact with the transporter proteins of Leishmania major alone, and not interfere with human proteins in any way.
 - A **peptide** is a short chain of **amino acids**.
 - Amino acids are organic compounds that combine to form proteins.

Source: PIB