Russell's viper (Daboia russelii)

Prelims : Current events of National and International Importance

Why in News?

Studies carried out in mice have demonstrated that two approved drugs, varespladib and marimastat, effectively counter the systemic and lethal effects of Russell's viper venom, individually or in combination.

- Russell's vipers are responsible for ***over half of India's snakebite cases.***
- **Components** - Phospholipase A_2 (PLA_2), and Snake Venom Metalloproteinase (SVMPs) are two ***main components of Russell's viper snake venom.***
- **Effects -** These toxins interfere with components of the blood clotting cascade to induce anticoagulant and haemorrhagic effects in humans.
- **Drugs** - While the varespladib drug inhibits PLA_2, the marimastat drug inhibits SVMP.
- In the latest study, Russell's viper venom from Punjab and Tamil Nadu exhibited the highest PLA_2 activity, followed by other regions Kerala, Maharashtra, Goa, and Madhya Pradesh.
- Russell's viper snake venom from all other regions exhibited minimal PLA_2 activity.
- Proteinase activity was highest in Karnataka, followed by the Rajasthan, Madhya Pradesh, Goa, and Andhra Pradesh regions.
- In contrast, venom from Tamil Nadu exhibited little to no activity, while venom samples from other regions exhibited modest proteolytic activity.
- The PLA2 inhibitor varespladib was found to neutralise even the high PLA2 activity of the venom found in Tamil Nadu and Punjab.
- The varespladib drug effectively inhibited the modest PLA2 activity of the venom from other Indian regions.
- In the case of the matrix metalloprotease-inhibiting drug, marimastat, the drug effectively inhibited the venom in a concentration-dependent manner.
- The drug was effective even when the proteolytic activity was high, as seen in Karnataka.
- As expected, the drug exhibited highly potent inhibitory effects against the venom with moderate activity, as seen in Madhya Pradesh, Rajasthan, and Goa.
- Overall, the drugs varespladib and marimastat when used individually or in a therapeutic drug combination were found to be very effective in reducing venom-induced cytotoxicity, venom-induced coagulopathy, and fibrinogenolysis.
- When used individually, the drugs were effective in reducing the venom-induced cytotoxicity by snake populations from some regions while being less effective in the case of venom from some other regions.
- However, the therapeutic combination of varespladib and marimastat nearly completely inhibited these activities.

Reference

[The Hindu | Hope to cure Russell's viper bites]