Colonial Spider's Venom Gland

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Why in News?

Indian researchers have produced the first comprehensive molecular and functional profile of the venom gland of the colonial spider Stegodyphus sarasinorum, indicating anti-cancer drug potential.

Key Highlights of the Study

- Researchers combined transcriptomics, proteomics, metabolomics and Confocal Raman spectroscopy to map the molecular composition and spatial distribution of biomolecules in the venom gland.
- **31 Protein Components -** Transcriptomic analysis identified 31 annotated protein components, including venom-associated and non-venom proteins.
- **32 Proteins Identified -** Proteomic analysis independently identified 32 proteins in the venom gland.
- **81 Metabolites -** UHPLC–Mass Spectrometry identified 81 metabolites, including amino acids, biogenic amines, nucleotides, nucleosides, quaternary amines and organic acids.
- **Anti-Cancer Potential -** Venom-gland extracts showed **dose-dependent cytotoxicity** against **Dalton's lymphoma ascites (DLA) cells** in laboratory experiments.
- **Antimicrobial Potential -** Certain venom peptides, including **U12 and U20 lycotoxins**, are of interest because of their ability to disrupt cellular membranes, making them potential templates for antimicrobial and anticancer research.
- **Hemocyanin Proteins -** The study also identified hemocyanin proteins, which have attracted interest because of their immune-modulating and potential cancer-immunotherapy relevance.
- **Antioxidant Activity -** The venom gland showed radical-scavenging activity in assays involving DPPH, ABTS, hydrogen peroxide and hydroxyl radicals, indicating potential antioxidant applications.

About Stegodyphus sarasinorum

- **Social Spider -** Unlike most spiders, which are solitary, *S. sarasinorum* lives in **large, permanent colonies** and cooperatively captures and feeds on prey.
- **Indian Cooperative Spider -** It is also known as the **Indian cooperative spider**.
- **Family – Eresidae,** commonly associated with velvet/social spiders.
- The World Spider Catalog recognises *S. sarasinorum* as an accepted species.
- **Distribution -** Its recorded distribution includes Pakistan, India, Sri Lanka, Nepal and Myanmar.
- **Habitat -** It occurs particularly in ***dry, shrubby and seasonal habitats***, with communal silk nests often constructed on shrubs and trees.
- **Cooperative Behaviour -** Members of the colony cooperate in prey capture, feeding and brood care.

Reference

[The Hindu | Stegodyphus sarasinorum]

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