

Mystery behind the sting of the black scorpion decoded

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Researchers have cracked the secret behind the dangerous sting of the glossy black scorpion that quietly slithers through the under bushes of Eastern and Southern India forests.

Scorpion envenomation constitutes a critical worldwide health concern, given its considerable mortality and morbidity, particularly in tropical and subtropical areas. Despite its ubiquity and significant impact, it has garnered minimal scientific scrutiny, leading to a deficient comprehension of its venom composition, toxicity mechanisms, and overall biological significance.

To bridge this gap, a recent investigation by scientists of the Institute of Advanced Study in Science and Technology (IASST), Guwahati, an autonomous institute of the Department of Science and Technology (DST), conducted the inaugural comprehensive analysis of the venom profile of *Heterometrus bengalensis* (HB), a relatively obscure species indigenous to eastern and southern India.

The study, spearheaded by Prof. Ashis K. Mukherjee, Director of IASST, and Ms. Susmita Nath, research scholar, among others, found that the secret behind the danger of the sting lies in 25 distinct toxins spanning eight different protein families packed in the venom that the scorpion injects.

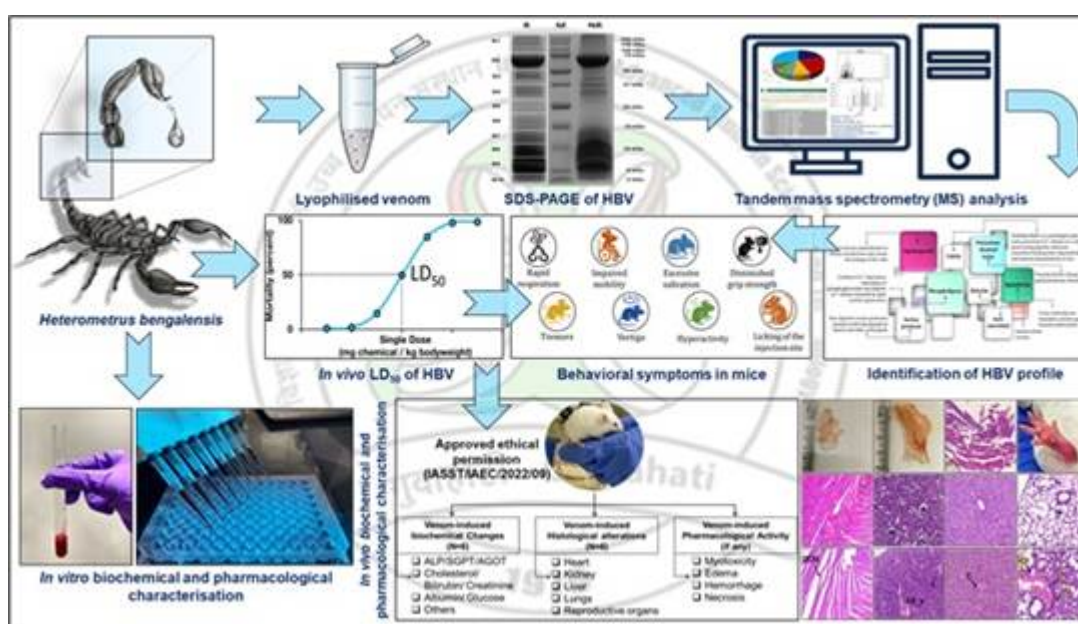


Fig: Graphical abstract: Integrated in vitro and in vivo workflow for the biochemical, proteomic, and pharmacological characterization of *Heterometrus bengalensis* venom

Spectrometry and biochemical analyses identified the 25 key toxins from 8 protein families in HBV. The researchers carried out pharmacological effects in Swiss albino mice and found that the chemicals lead to systemic toxicity, increased liver enzymes, organ damage, and a pronounced proinflammatory response.

Once the venom entered the mice's systems triggered a systemic toxic storm. Liver enzyme levels skyrocketed, signalling hepatic distress. Organs showed signs of damage, and most telling of all, the immune system went into overdrive—mounting a proinflammatory response that hinted at potential shock or severe allergic reactions in real-world stings.

This study, published in the International Journal of Biological Macromolecules, addresses a significant

deficiency in scorpion research by examining a lesser-known species and establishes a basis for future investigations into venom and its management.

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