

GENOME OF INDIAN COBRA SEQUENCED

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The Indian cobra. File | Photo Credit: [NAGARA GOPAL](#)

A consortium of scientists, including some from India, have mapped the genome of the Indian Cobra, among the most poisonous snakes in the country. Knowing the sequence of genes could aid in understanding the chemical constituents of the venom and contribute to development of new anti-venom therapies, which have remained practically unchanged for over a century.

Every year, approximately five million people worldwide are bitten by venomous snakes resulting in about 400,000 amputations and more than 100,000 deaths. Each year, about 46,000 people die and 140,000 people are disabled in India from snakebites by the 'Big 4' — the Indian cobra, the common krait, Russell's viper, and the saw-scaled viper.

"High-quality genomes of venomous snakes... will enable generation of a comprehensive catalogue of venom-gland-specific toxin genes that can be used for the development of synthetic anti-venom of defined composition," the scientists said in the paper which appeared in the peer-reviewed journal *Nature Genetics* this week.

Somasekar Seshagiri, of the SciGenome Research Foundation, Bengaluru, and among the authors of the study, used the genome and gene expression data from 14 different cobra tissues. They annotated venom-gland-relevant genes and analysed the genomic organisation of gene families encoding toxin proteins involved in venom-gland function. The authors found that 19 toxin genes are expressed exclusively in the venom gland and verified the presence of protein for 16 of these genes.

Snakebites kill 45,000 people every year. So why isn't it healthcare priority?

"Targeting these 19 specific toxins using synthetic human antibodies should lead to a safe and effective anti-venom for treating Indian cobra bites," Mr. Seshagiri said in a statement.

Currently, anti-venom is produced by immunising horses with extracted snake venom and is based on a process developed more than 100 years ago. "This process is laborious and suffers from a lack of consistency leading to varying efficacy and serious side effects."

Sequencing a genome is an important step to making anti-venom but wouldn't on its own solve the problem of making and supplying enough of the product to address the huge volume — and variety — of snakebites in India, according to independent scientists.

"India is the snakebite capital of the world," says Kartik Sunagar, Assistant Professor at the Centre for Ecological Sciences, IISc.

Prof Sunagar and his colleagues reported last month that though bites from 60 of 270 species of Indian snakes are known to kill or maim, anti-venom now available is only effective against the 'Big 4.'

"These 4 species are not found in northeastern India but the region reports a significant number of snake bites. That implies we need new kinds of anti-venom against species here. The krait in Punjab produces a venom chemically different from the krait in South India," he explained to *The Hindu*.

The Sind krait from western India is over 40 times more potent than that of the Spectacled cobra, making it the most toxic Indian snake. “Unfortunately, the polyvalent anti-venom fails to effectively neutralise the venom of this species as well,” Prof. Sunagar said.

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