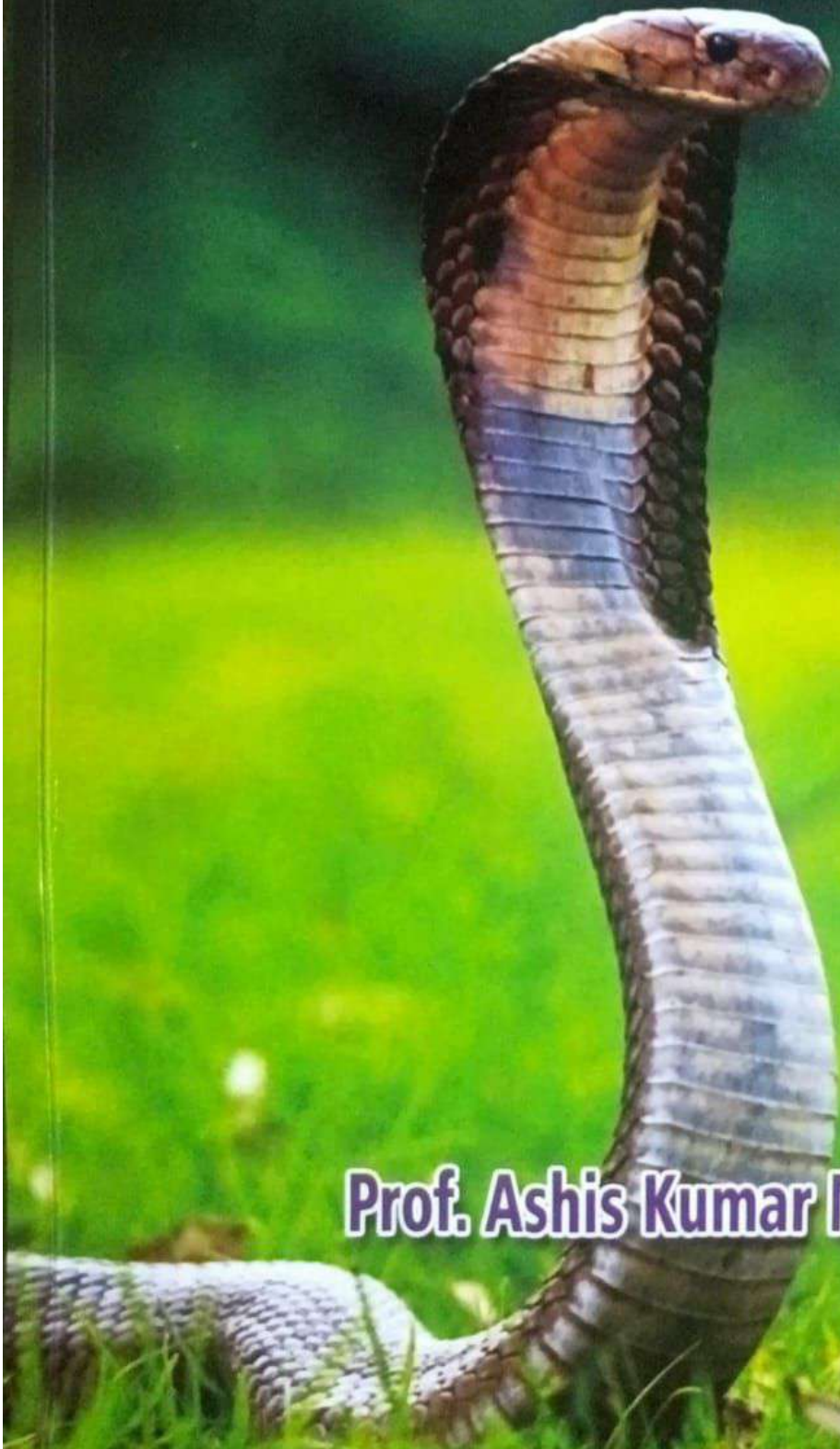


Venomous *Snakes of India:* **MYTHS AND FACTS**



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Venomous Snakes of India: Myths and Facts

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Venomous Snakes of India: Myths and Facts

[A unique compendium of knowledge on the importance of snakes in world cultures, debunking common superstitions about snakes, descriptions of the major venomous snakes prevalent in India, composition and efficacy of snake venom, and treatment against snakebite]

- Published by** : Publication Cell, IASST,
Guwahati-781035, Assam.
- Author** : Prof. Ashis Kumar Mukherjee
- Publisher** : Publication Cell, Institute of Advanced Study in
Science and Technology, Vigyan Path,
Paschim Boragaon, Garchuk ,
Guwahati-781035, Assam
- First version** : August 2025
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appropriate legal action.
- ISBN [ISBN]** : 978-81-962249-3-6
- Cover Image** : Dr. Jayaditya Purakayastha
- Dedication Image** : Author
- Cover Design** : Author
- Printer** : Saraighat Offset Press, Bamunimaidam, Ghy-21
- Price** : Rupees 200

Dedication

This book is dedicated to the cherished memories of

A famous inorganic chemist, a noted academician,
former vice-chancellor of Tezpur University &
former education advisor to the
Governor of Assam



Prof. Mihir Kanti Chaudhuri,
PhD., Dr rer nat, FNA, FASc
(21 July 1947-13 December 2024)

Venomous Snakes of India : Myths and Facts

PREFACE

Snakes are an essential part of the biota (including animals, birds, and plants) that live in a particular place and have been the focus of human fascination for centuries. Just hearing the name "snake" creates suspicion, and we are afraid. This fear is a natural human response, meaning snakes evoke more emotion and fear in us than perhaps any other living creature. In Indian culture, a snake is seen respectfully; conversely, it is also considered a crooked, harmful animal. *Vasuki Naga* (serpent's name) is mentioned in Indian mythological books as Lord Shiva's neck ornament. The *Sesh Naga* made a bed (*Anantyasajjya*) of a thousand folds for Lord Vishnu (in Indian culture believed to be the guardian of this world), in which Lord Vishnu lay half-immersed with Mother Lakshmi. Hence, snakes are revered in Indian culture. Snake worship is a centuries-old tradition in India.

In addition, many ancient cultures worldwide have depicted snakes as a form of power. But, unfortunately, snake bite itself is a terrible disaster. The fluid produced by the special salivary glands of venomous snakes is known as venom. A venomous snake injects venom into the victim's body with its fangs (poison teeth) to paralyze the victim. A person can become paralyzed or even die from the effects of these intense toxins. Victims of snake bites experience severe pain at the bite site, which is an envenomation symptom. We commonly say that "the pain of a snake bite can be understood by those who have been bitten." This fear of snakes is passed down from generation to generation. As a result, we are naturally afraid of snakes. But it is not true that snakes are always harmful; there are

good sides to them. But even in today's scientific age, snakes and snake venom are surrounded by superstition and mystery, and we don't see or know the respectable side of snakes.

It is pertinent to mention in this context that snakebite deaths are a severe problem in rural tropical areas, particularly in Southeast Asian countries. More than 100,000 snake bites occur in India every year. Unfortunately, very little attention has been paid to affordable and effective treatment against snakebite in Southeast Asian countries. Geographical and species-specific variations in the composition and mode of action of snake venom and our lack of accurate knowledge of the pathological characteristics of the toxin, and the commercial antivenom produced by Indian manufacturers for treating snakebites in the Indian subcontinent, is highly unsatisfactory due to non-availability or inadequate stockpiling of antivenoms in rural health centres. As a result, the World Health Organization has declared snakebite a neglected tropical disease. Therefore, in the Indian subcontinent, snakebite treatment improvement, early snakebite diagnosis, and prevention should be top priorities.

But over the last few decades, people have slowly realized that the available scientific information about snakes is much more exciting and accurate than many popular beliefs, exaggerated stories, and misconceptions. Apart from the social contribution of our snakes, it is equally important to know the medicinal properties of snake venom components and their clinical applications. In addition to understanding the molecular mechanism of action of snake venom components in the human body, there is a particular need to improve the treatment of snakebite patients and drug discovery from snake venoms. Perhaps this is why scientists worldwide have become more interested in researching snake venom. It is good to mention that 16 July is celebrated worldwide as "World Snake Day," although the reason for choosing this day is not precisely known.

Since childhood, I have been very interested in snakes. I was wondering how snake venom works. Why do people die from snake bites? As a child, I was fascinated by the snake charmers roaming the streets or alleys at noon and tried to learn more about snakes from them. Unfortunately, they never answered my questions satisfactorily, and I realized that they, too, do not have proper scientific knowledge about snake venom.

My curiosity about snakes since childhood has motivated me to research snakes. So after receiving an M.Sc. in Biochemistry from Banaras Hindu University, Varanasi, India, I started research from Burdwan Medical College under Burdwan University, Burdwan, West Bengal, on Indian snake venoms, mainly components of Indian Cobra and Indian Russell's viper venoms, and snake bite remedies. Snakebite patients from nearby villages and distant places used to come for treatment at Burdwan Medical College Hospital. Most were poor people or farmers who were often the family's sole breadwinners. I felt the plight of snakebite patients admitted to this hospital for treatment, so I decided to continue my research in this field. Keeping this vow in mind, for the past 30 years, I have been working tirelessly on the composition, mode of action of snake venoms, and treatment against venomous bites. To learn more about this, I have done joint research projects with many scientists worldwide, and our collaborative research on snake venom continues today. Apart from this, I am constantly working on quality control of commercial antivenoms and medical applications of snake venom proteins.

However, there is a lack of scientific books on snake venom for the general public. Seeing the overwhelming curiosity and interest in people about snakes, I decided to write a book in simple language on the venomous snakes found in India. I realized that writing a book in simple language would spread scientific knowledge about snakes among people and remove many misconceptions about snakes that are prevalent in our society. In this book, I have

discussed various aspects of snakes from mythology to the scientific level, such as describing major venomous snakes found in India and how to avoid snake bites. I also tried to present some scientific facts about snake bite treatment. Misconceptions and superstitions about snakes are a social problem, so I have refuted the common superstitions about snakes with scientific arguments. I fully believe that you will like this book and that it will prove helpful in enhancing your knowledge about snakes from a scientific point of view.

I am grateful to God for giving me the strength and courage to write this book. I greatly appreciate and express my gratitude to the pioneers and scientists in the field of snake venom research for their valuable suggestions, constructive criticism, and kind help in editing the book chapters. I am grateful to various funding agencies of the Government of India for providing research grants and financial assistance for research on snake venom. I also got a lot of encouragement from my colleagues and family to write this book. I thank my father, Professor Dr. Subhash Chandra Mukherjee, my mother, Dr. Sandhya Mukherjee, my wife Abira Mukherjee, my son Anandan Mukherjee, my brother Dr. Soumen Mukherjee and my sister Dr. Sudipta Mukherjee (Chakraborty) for their constant inspiration, motivation, and indomitable courage to write this book. I also thank my previous and present students who helped me in different ways in writing this book. I also thank the readers for showing an interest in reading the book.

I would appreciate your constructive comments on improving the next edition of this book.

Prof. (Dr) Ashis Kumar Mukherjee
Author

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