



HERPETOLOGIA

A column for short herpetological contributions

THE REALIZATION OF THE VENOMOUS SNAKE KEEPERS DREAM

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So it is possible: immunity against snake venom. The animal that manages to realise the dream of every keeper of venomous snakes is the mongoose.

This civet that belongs to the subfamily of *Herpestinae* arms itself against snake venom by a small modification in the acetylcholine receptor. This albumen on the outside of the nerve cells binds acetylcholine. And this acetylcholine is one of the substances involved at the transmission of stimuli between nerve cells.

Normally spoken the acetylcholine will be destroyed after the transmission of stimulus has taken place. This demolition is caused by the enzyme cholinesterase. However, the neurotoxin in the venom of cobra's and other snakes slows down the effect of this last called enzyme. What then happens is quite obvious: the transmission of stimuli will continue and this leads toward a continuous overstimulus. The respiratory organs for instance can not stand this continuous overactivity, get paralysed and the victim dies.

Unless the victim is a mongoose. For this animal does never get affected by an overconcentration of acetylcholine, because the receptor can not bind acetylcholine, due to a very little change of only four albumen parts. The mongoose's heart muscles therefore can never get overstimulated after a bite of a cobra.

However, there is still a question left: is the immunity of the mongoose one hundred percent? At the end of the last century scientists performed experiments which results seem to be opposite to a study that recently was published in the American scientific magazine *The Proceedings of the National Academy of Sciences* (7th nov. 1995). At the end of the 19th century both Fayre and Calmette showed that a mongoose could stand six times more venom than a rabbit. But the mongoose died when it received eight times the dose that is deadly to rabbits. Still, it seems to be an outraging achievement for a small mammal with a body length of fifty centimetres.

This remarkable achievement gives the mongoose an excellent reputation as a venomous snake killer. Already the Mahabharata, a large Indian epic from round and about 1000 years before Christ, contains stories on the mongoose. And in his Jungle Book the British au-

hor Rudyard Kipling describes a fight between a snake and a mongoose. In a way such a fight resembles a paso doble. As soon the mongoose sees a cobra, it will continuously change position in a very rapid way. If the snake approaches, the mongoose stretches to its full length and pushes itself to the ground. Next it will withdraw and make itself small by shrivelling up a little. The cobra behaves in an opposite way. The snake glides forward and hardly changes its direction. Then it will draw itself up and show its hood. In this way it will follow every movement of the mongoose in a shocking way. All these movements are varied during the fight. Both animals move almost at the same time forward and backwards. They follow their opponent in a scrupulous way and anticipate on its movements.

The fight can last for several rounds. At the end of it the mongoose withdraws for a small instance and then attacks with wide open mouth. The 'kiss of death' takes place at the moment the snake turns its head a little sideways or sinks it in order to attack.

Though the article in *The Proceedings of the National Academy of Sciences* concludes that the mongoose is immune for snake venom, the experiments of Fayre and Calmette show the risk the mongoose takes while attacking a venomous snake. The snake's venom can kill the mongoose. That the mongoose usually wins the deadly fights, is due to its speed and its thick, strongly expanded fur. The snake might be able to eject venom into the fur, to injure the skin and inject venom is another chapter. And this chapter is mostly too difficult

■ LITERATURE

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