

Venomous Komodo Monitor

New research suggests the Komodo monitor uses venom, not bacteria, to subdue prey.

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Komodo MonitorA new study suggests that the effectiveness of the Komodo monitor's bite is a combination of highly specialized serrated teeth and venom. The new research also dismisses the widely accepted theory that prey die from septicemia caused by toxic bacteria living in the monitor's mouth.

Using medical imaging techniques, an international team led by Dr. Bryan Fry from the University of Melbourne, suggests that the Komodo monitor (*Varanus komodoensis*) has the most complex venom glands yet described for any reptile, and that its close extinct relative *Megalania* was the largest venomous animal to have lived.

"These large carnivorous reptiles are known to bite prey and release them, leaving the prey to bleed to death from the horrific wounds inflicted," Fry said. "We have now shown that it is the combined arsenal of the Komodo dragon's tooth and venom that account for their hunting prowess."

Komodo monitors have some 60 highly serrated teeth which are frequently replaced during their lifetime. The researchers conducted a study of the Komodo monitor bite, employing computer techniques to analyze stress in a monitor's jaws and compare them to those of a crocodile. The monitors were found to have much weaker bites than crocodiles, but magnetic resonance imaging (MRI) of a preserved monitor head revealed complex venom glands and specialized serrated teeth which create deep lacerations for entry of the venom.

"We believe that the dragon is able to weaken and immobilize their prey with a venomous bite that increases the damage done by their long serrated teeth," Fry said.

The researchers located and surgically excised the glands from a terminally ill monitor at the Singapore Zoo, and used mass spectrometry to obtain a profile of the venom molecules. The team also analyzed which toxin genes were expressed in the monitor's venom gland.

The effects of the venom were also tested by the team and found to be similar to that of the gila monster and many snakes which cause a severe loss in blood pressure by widening blood vessels, thereby inducing shock in their prey. These findings may explain the observations by Fry and others that Komodo monitor prey become still and unusually quiet soon after being bitten. Bitten prey also bleed profusely, consistent with the team's discovery that the venom was also rich in toxins that prolong bleeding.

The researchers also examined fossils of the monitor's giant extinct relative *Megalania* (*Varanus priscus*). From similarities in skull anatomy they determined that this 23 foot lizard would have used a similar venom and bite system, making it the largest venomous animal to have ever lived.

The research will be published in the journal 'Proceedings of the National Academy of Sciences.'