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ASIA EDITION

Australia, UK develop new antidote for snake bites using CRISPR technology

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Heparin repurposed as an inexpensive antidote for cobra venom



Scientists at the University of Sydney, Australia and Liverpool School of Tropical Medicine, UK have made a remarkable discovery, i.e. a commonly used blood thinner, heparin, that can be repurposed as an inexpensive antidote for cobra venom.

Cobras kill thousands of people a year worldwide and perhaps a hundred thousand more are seriously maimed by necrosis, the death of body tissue and cells, caused by the venom, which can lead to amputation. Current antivenom treatment is expensive and does not effectively treat the necrosis of the flesh where the bite occurs.

Using CRISPR gene-editing technology to identify ways to block cobra venom, the team, which consisted of scientists based in Australia, Canada, Costa Rica and the UK, successfully repurposed heparin (a common blood thinner) and related drugs and showed they can stop the necrosis caused by cobra bites.

The team used CRISPR to find the human genes that cobra venom needs to cause necrosis that kills the flesh around the bite. One of the required venom targets are enzymes needed to produce the related molecules heparan and heparin, which many human and animal cells produce. Heparan is on the cell surface and heparin is released during an immune response. Their similar structure means the venom can bind to both. The team used this knowledge to make an antidote that can stop necrosis in human cells and mice.

The World Health Organization has identified snakebite as a priority in its programme for tackling neglected tropical diseases. It has announced an ambitious goal of reducing the global burden of snakebite in half by 2030.