ECRONICON OPEN ACCESS

EC NEUROLOGY
Guest Editorial

The Disclosure of Hidden Facts of the Scorpion, for Better Medical Research

M V Raghavendra Rao*

M.D (Medicine) (Hon) (USA), D.Sc, Ph.D (ANU), Ph.D (London), FRCP (Edin), FWAMS (Netherlands), FRSTMH (UK), FIBMS (UK), FIMSA, Current Professor, Chairman of the National Council of India, and Senior Executive Vice President, World Academy of Medical Sciences, Netherlands (Europe), Former Scientist and Director, Apollo Institute of Medical Sciences and Research, Hyderabad, Former Professor and Dean, Avalon University School of Medicine, Curacao, Central America

***Corresponding Author:** M V Raghavendra Rao, M.D (Medicine) (Hon) (USA), D.Sc, Ph.D (ANU), Ph.D (London), FRCP (Edin), FWAMS (Netherlands), FRSTMH (UK), FIBMS (UK), FIMSA, Current Professor, Chairman of the National Council of India, and Senior Executive Vice President, World Academy of Medical Sciences, Netherlands (Europe), Former Scientist and Director, Apollo Institute of Medical Sciences and Research, Hyderabad, Former Professor and Dean, Avalon University School of Medicine, Curacao, Central America.

Received: June 26, 2026; **Published:** July 02, 2026

Abstract

Taking into account the results and actions performed during the previous COVID-19 pandemic waves, it seems that in the last wave in our Region, the decision-making process that concerned patients, both surgical and those who required intensive or critical cares, have been adapted and changed, based on modifications suffered in care indicators, both in terms of available resources and in the volume of activity demanded by both COVID-19 infected or non infected patients operated on.

This article aims to offer some new perspectives on this issue.

Keywords: *COVID-19 Pandemic; SARS-CoV-2 Infection; Safety Management; Surgery*

Nearly 60 years ago, thalidomide was prescribed to treat morning sickness in pregnant women. This was the biggest man-made medical disaster ever, where over 10,000 children were born with severe malformations. The thalidomide disaster completely changed the way drugs are tested. This drug was not tested on long-term gestation animals.

Viviparity is common amongst mammals, but not many provide a long gestation period, to study the long-term effects of the toxicants on foetal development. Rats have 21 days, rabbits have 30 days, dog has 60 days gestation period. Where the gestation period is as long as in the case of sheep, horses, monkeys, and elephants, they are not available because of the cost of procurement and maintenance. So in this situation, scorpion comes in handy. It is cheap, available, viable, and reliable, with Viviparity and a long gestation period of little over 10 months. Most of the researchers/doctors are unaware of this. Hence, the scorpion can be used as a medical research model.

Scorpion venom is a major focus in modern medical research, especially for isolating potent neurotoxins and biologically active peptides. Scientists are engineering these molecules into life-saving pharmaceuticals, including targeted cancer therapies, powerful antibi-

Figure

otics, and treatments for autoimmune diseases. Scorpion venom is the most expensive liquid on Earth, costing roughly $39 million per gallon. Scorpion venom has more than ten thousand bioactive molecules/compounds/peptides. Researchers extracted chlorotoxin from the scorpion venom. Chlorotoxin specifically binds to tumour cells. Researchers attach dyes to these peptides to "light up" cancer cells during surgery, and are also testing them as targeted delivery vehicles to destroy cancer cells without harming healthy tissue. Some of the compounds in the venom have been proven effective at killing drug-resistant bacteria, including *Staphylococcus* and tuberculosis. Components in scorpion venom, like iberiotoxin, are highly specific to certain potassium ion channels. Certain scorpion venom peptides act as powerful analgesics by modifying sodium channels, paving the way for non-addictive painkillers that could serve as alternatives to opioids. *T. serrulatus* venom has a CPP (Cell Penetrating Peptide). It has an anti-cancer effect. The potential of utilizing scorpion venoms as a source for discovering new cancer therapeutics.

Chlorotoxin is a 36-amino acid peptide found in the venom of the scorpion *Leiurus quinquestriatus*. Chlorotoxin is widely researched for its ability to bind selectively to cancer cells, particularly gliomas, making it a powerful agent for targeted cancer detection and treatment. By attaching a fluorescent dye to chlorotoxin, scientists developed "Tumour Paint". When injected, it lights up malignant brain cancer cells, helping surgeons distinguish between healthy tissue and cancerous growths during surgery. Researchers are actively studying chlorotoxin to bypass the blood-brain barrier. It is used as a vehicle to deliver nanomedicines and drugs directly to lethal brain tumours like glioblastomas without harming healthy cells.

Blue (or red) scorpion (*Rhopalurus junceus*) is famous due to its antineoplastic activity in the Dominican Republic and Cuba. Its venom maintains energy in cancer patients and also acts as a pain reliever. The protein present in it can inhibit the proliferation and growth of cancer cells. It also reduces the intensity of pain and restores energy in cancer patients. The venom extract can behave as an anti-inflammatory, analgesic, and anti-cancer agent.

The venom of *Tityus discrepans,* N intermediates, *Odontobuthus doriae* scorpions contains two peptides, namely neopladine and neopladine, which cause apoptosis in human breast cancer cells and show marked defects.

Scorpion venom contains bioactive peptides that have shown significant potency against a variety of viruses, including those that cause Hepatitis C, HIV-1, SARS-CoV, and Influenza. These peptides, often cationic and amphipathic in nature, act by directly damaging the viral envelope or blocking early stages of infection, such as attachment and entry into host cells. Several peptides isolated from scorpion venom have recently been proven to possess an antiviral activity against several viral families.

Several toxins, including integrins, are present in scorpion venom, which have the ability to disrupt blood coagulation.

A peptide toxin present in the venom of *Androctonus australis garzonii* can induce the atrial natriuretic peptide secretion, while the venom of *Buthus martensii* scorpion contains BmK I toxin, which moderates the contraction of the heart. The venom of *Centruroides margaritatus* contains a peptide, margatoxin, which inhibits the voltage-dependent potassium channels. It also affects the nicotinic ACh-receptor in order to release norepinephrine, which shows impacts on sympathetic control of cardiovascular function.

Studies have revealed the anti-diabetic effects of scorpion toxins, which also activate and generate ß-islets. Scorpion venom, along with Chinese drugs, is used to cure diabetes.

Ion channels also contribute to the different phases of the action potential and are involved in metabolic diseases, such as disorders of glucose homeostasis (hyperinsulinemia, hypoglycaemia, and different forms of diabetes mellitus), becoming a challenge for studies and for the development of new drugs.

The specific peptides present in the venom of the Chinese scorpion, *Buthus martensii Karsch,* find applications as effective AEDs. The scorpion›s entire body, particularly its tail, has been used in Chinese medicine to treat nervous disorders such as epilepsy, paralysis, and apoplexy.

The neurotoxins present in venom have a 3D backbone that helps them to bind efficiently for a long time. The venom of *Leiurus quinquestriatus* with alkaloid neurotoxins causes synergistic effects to regulate the action potential. When scorpion toxins are attached to receptors on dopaminergic neurons, then release of dopamine is observed, which may be effective for the treatment of Parkinson's disease.

Emperor scorpion (*Pandinus imperator*) peptide is highly effective at killing the *Plasmodium* parasite›s sexual and asexual stages. It works by disrupting the parasite›s cell membrane and preventing it from developing into a form that can infect humans.

Meucin-24 and Meucin-25 --peptides can eliminate malaria parasites within red blood cells without harming the human cells.

Embryotoxon peptide prevents the parasite from growing inside red blood cells by reacting with lipids in the cell membrane, effectively "suffocating" the infection.

Synthetic peptides derived from scorpion venom (such as *dKn2–7* and *K1K8*) have been shown to kill clinically resistant strains of *Candida* and inhibit biofilm formation without harming healthy mammalian cells.

Tityus scorpions contain natural compounds that inhibit filamentous fungi.

Researchers have discovered that specific antimicrobial peptides (AMPs) found in venoms target fungal cell walls and alter membrane permeability, offering a promising alternative to limited, highly toxic conventional antifungals.

The use of Scorpions in biomedical research are adjuncts, aid, shortcut, or supplements which help an investigator to decide whether an experiment on an animal is likely to produce a useful result.

No new drug can be used in patients until it has been extensively tested in animals. Alternative methods help reduce the number of animals required for drug research, but they cannot eliminate the need for animals in preclinical studies. Even though no animal model is a complete set of models for a process in a human being, the intact animal does provide a better model of the complex interactions of the physiological process than an alternative technique.

Volume 18 Issue 6 June 2026