Animals-based medicines have been utilised since antiquity. Studies on this subject are sporadic despite the fact that traditionally many animal-based drugs have been administered all over the world. The healing of human ailments by using medicines obtained from animals is known as Zootherapy.

Although plant-derived materials make up the majority of ingredients used in most traditional medical systems globally, whole animals, animal parts and animal-derived products also constitute important elements in the medical system. The use of animals for medicinal purposes is part of a body of traditional knowledge which is becoming more relevant to discussion on conservation biology, public health policies, sustainable management of natural sources, biological prospection and patents.

For instance, the sponge *Luffariella variabilis* produces a chemical known as monoalide, which is anti-inflammatory in action. This chemical inhibits the action of the enzyme phospholipase-A2. Another sponge *Discoderma sp.* has a chemical known as Discodermolide, which is a powerful immunosuppressive agent. It has anti-proliferative and anti-mitotic properties. It is also a potent accelerated cell senescence and neuroprotective agent.

A sterol sulphate halestenol sulfate isolated from a sponge *Halichondria* is anti-microbial. Lasonolide derived from another species of sponge fights tumours by binding with DNA. Cytosine arabinoside (Cytarabine) derived from a Caribbean sponge is used in the treatment of cancer of WBC such as acute myeloid leukaemia. This chemical is capable of inhibiting DNA and RNA polymerases and nucleotide reductase enzymes needed for DNA synthesis. Halavan, a drug derived from a sea sponge, has also improved survival of women who have metastatic breast cancer.

Venoms from jellyfishes, corals and sea anemone nematocysts contain hemo, cardio, dermo and neurotoxic substances like paly toxin, sarcophine and anthopleurine. Secosteroid an enzyme used by corals to protect
of plasmin-like activity occurring in human sperm plasma (plasmin degrades plasma protein). It has also been found that the salivary secretion Hirudin is more effective than heparin in inhibiting fibrin formation because being smaller they penetrate the clot more effectively.

Chitin present in shells of crabs, shrimps and lobsters has anti-inflammatory effect. Glucosamine sulphate obtained from the shells of shrimps acts as an inhibitor of Herpes virus.

Centipede venom is used to treat conditions such as lock-jaw, seizures and convulsions. It is also employed to relieve carbuncles on the skin and to alleviate pain.

It was found that horse-shoe crab’s blood would clot when it came into contact with gram-negative bacteria, whether the bacteria were dead or alive. This blood clotting ability makes it very valuable in testing the injectable medicines, vaccines and sterile medical equipments.

The scorpion also yields useful compounds. A toxin named Margatoxin has been isolated from the venom of the scorpion. This compound blocks lymphocyte activation and production of interleukin-2 by human T-cells. This toxin is used as an immunosuppressant and may be potentially useful in the treatment of auto-immune disorders or in the prevention of rejection of organ transplants. A chemical named TM 601 from the yellow scorpion in Israel has been found useful in attacking malignant brain tumours called Glioma. Researchers at the University of Washington have also shown that a compound known as Chlorotoxin found in the venom of scorpion could help in the treatment of brain cancer.

The anti-coagulant found in the saliva of blood sucking ticks is being used to prevent undesired blood clotting during open-heart surgery. Scientists from the University of Buffalo have come across a peptide called GSMtx-4 from the venom of Chilean rose tarantula, a spider. This peptide is found to improve the muscular activity in muscular dystrophy.

Propolis, a resinous substance that bees gather from certain trees, is anti-microbial, anti-bacterial, anti-fungal and anti-malarial. It can be used to heal sore throat. Bee venom stimulates alcohol dehydrogenase and acetaldheydrogenase and keeps the enzymes at elevated levels during alcohol withdrawal. It is an effective treatment against acne causing bacteria, and for wound healing. The venom of wasp was found to inhibit the growth of gram-positive and negative bacteria and is considered a potential source for developing new anti-bacterial drugs.

Anti-cancer drugs have also been isolated from the wings of Asian sulphur butterflies (Catapsilla crocale) and from the legs of Japanese stag beetle.

The Gastropod mollusk, Conus, secretes a toxin that has yielded a powerful painkiller called Ziconotide. This acts as a calcium channel blocker that inhibits the relay of neurotransmitters and is used to treat chronic pain.

Dolastatin-10 isolated from the sea hare has the potential to be used for the treatment of leukaemia, tumours, and liver and breast cancer. In the US, the slug’s slime is used as a carrier of drugs in the treatment of burns and skin conditions.

Sea urchins and humans share more than 700 genes. Some of the genes in sea urchin are related to Parkinson’s disease,
diabetes insipidus, cancer and muscular dystrophy. Understanding how these genes develop and change in sea urchin may lead to better understanding of the treatment and cause of the diseases that affect humans.

Trabectedin is an anti-tumour drug used for the treatment of advanced soft tissue sarcoma. This chemical is nothing but the extract of ascidia (sea squirt). From another species of ascidia, *Ecteinascidia turbinata*, an experimental cancer drug called Yondelis has been isolated by chemists of the University of Illinois. This drug can kill cancer cells and clinical studies have shown that it is safe for use in humans.

Granular glands of amphibian secretions include biogenic amines, bufogenics, bufotoxins, alkaloids and peptides. Many of these compounds have a defensive role. Their pharmaceutical effects include cardiotoxic, myotoxic and neurotoxic activities. Some are vasoconstrictive and hypotensive agents while others have hallucinogenic effects. The skin of American leaf frog also has thousand-fold greater effect than morphine at the same dosage level. Magainin-2 is derived from the frog’s skin and looks promising in the search for antibiotics to which bacteria cannot develop resistance.

Exenatide found in the saliva of Gila monster has led to healthy substantial glucose levels and progressive weight loss. The drug is given to patients who are not able to control sugar with medicines like metformin, sulfonylurea, etc. The lizard’s hormone is 50% identical to human glucagon-like peptide analogue, which increases the production of insulin when blood sugar levels are high.

Teprotide, a peptide isolated from the venom of Brazilian viper, was the lead compound for a drug called Captopril. This is used for hypertension, congestive heart failure, and prevention of kidney function in diabetic neuropathy.

From another Pygmy rattlesnake venom, a cyclic heptapeptide was derived called Eptifibatide. It is an antiplatelet that selectively blocks the platelet glycoprotein 11b/11a receptor. It belongs to the class arginine-glycine-aspartate mimetics that reversibly bind to platelets. It is used to reduce the risk of acute cardiac ischemic events.

Hyaluronic acid derived from the combs of rooster is a skin care ingredient as it holds in moisture well. It can be injected into the knees to treat osteoarthritis. It is also used in eye surgeries to protect delicate eye tissues.

However, research in Zootherapy should be compatible with the welfare of the animals and also done with biological conservation in mind. Such animals should be exploited for their by-products in a sustainable way. 

Dr. K. Venkataraman is retired Reader and Head, Dept. of Zoology, Madura College, Madurai-11. Address: A-T-2 Porkudam Apartments, Bypass Road, Madurai–16; Email: durai1941@hotmail.com