

Life & Times

Venom:

saving lives in general practice

Research into snakebite is not something that immediately stands out as being relevant to clinical practice in the UK. Snakebite is one of the Neglected Tropical Diseases (NTDs); indeed, it is commonly regarded as the most neglected of them all. The budget for the 2006 film *Snakes on a Plane* (33 million dollars) was actually greater than all of the money dedicated to snakebite research in the last 10 years.^{1,2}

But what relevance does this have to general practice in the UK? The British Isles have only one venomous snake, the adder (*Vipera berus*). Although bites and stings are commonplace in primary care, snakebite is something unlikely to present in general practice in the UK. Conversely, our colleagues in primary care across the globe see and manage this devastating problem on an all too frequent basis. Snakebite is responsible for up to 138 000 deaths every year and many more are left with a permanent disability.³ Around the world someone dies from snakebite on average every 4 minutes. However, the last human fatality following an adder bite in the UK was in 1975, and only 14 deaths have been documented since the records started in 1876.^{4,5}

VENOM

Venom is a toxic substance produced and delivered actively to a victim through a delivery mechanism, such as fangs or spines.⁶ This differs from a poison, which is delivered passively, for example, through skin contact. These highly noxious cocktails can be used as a means for both predation and defence. Venoms have adapted continuously over time to meet various ecological pressures and humans have discovered how to harness some of nature's best-kept secrets for their own advantage.

The first ever angiotensin-converting enzyme inhibitor (ACEI), Captopril, was developed in 1975 from the venom of the Brazilian pit viper (*Bothrops jararaca*). Millions



Vogel's pit viper (*Timeresurus vogelii*). Picture taken in the Khao Yai National Park in Thailand, in 2019. Credit: Bethany Moos.

have gone on to benefit from ACEIs, yet few are aware of the history behind the discovery of this drug. This is just one example of how venom has been harnessed for therapeutic benefit, but there are many more; Exenatide is a synthetic form of the peptide found in the venom of the Gila monster (*Heloderma suspectum*). One of only a few venomous lizards, the Gila monster has a neurotoxic venom containing exendin-4, which acts to lower the blood sugar by stimulating the secretion of insulin.⁶ The Magician's cone snail (*Conus magus*) is a predatory snail that hunts with a proboscis to harpoon its prey, injecting venom to rapidly induce paralysis. Ziconotide (Prialt) is a neuronal calcium channel blocker derived from the toxin found in the venom of this voracious mollusc, and is administered intrathecally to treat chronic severe intractable pain.⁷ Venom holds great potential for the development of new drugs and remains largely an untapped reserve. Nature has evolved and adapted over many more years than humans have been on the planet; it is right that we should place a greater focus on studying the creatures we share the earth and oceans with to identify

and harness the potential power within different venoms.

The 19th of September 2019 marked the second International Snakebite Awareness Day, established by the Royal Society of Tropical Medicine and Hygiene. This event shone a very timely spotlight onto this NTD. It provided opportunities to share the latest research, focusing not only on the work of researchers and clinicians, but also on the victims. It may seem a far cry from the consulting room in general practice, but next time you prescribe an ACEI, think back to where this medication originated from. Let us not forget the history behind the medicines we have come to rely on, and more importantly, the people who continue to suffer from snakebite.

The Wellcome Trust recently announced an investment of £80 million into snakebite research and this, coupled with the World Health Organization roadmap outlining a plan to halve death and disability from snakebite, are significant steps towards improving outcomes for snakebite.

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