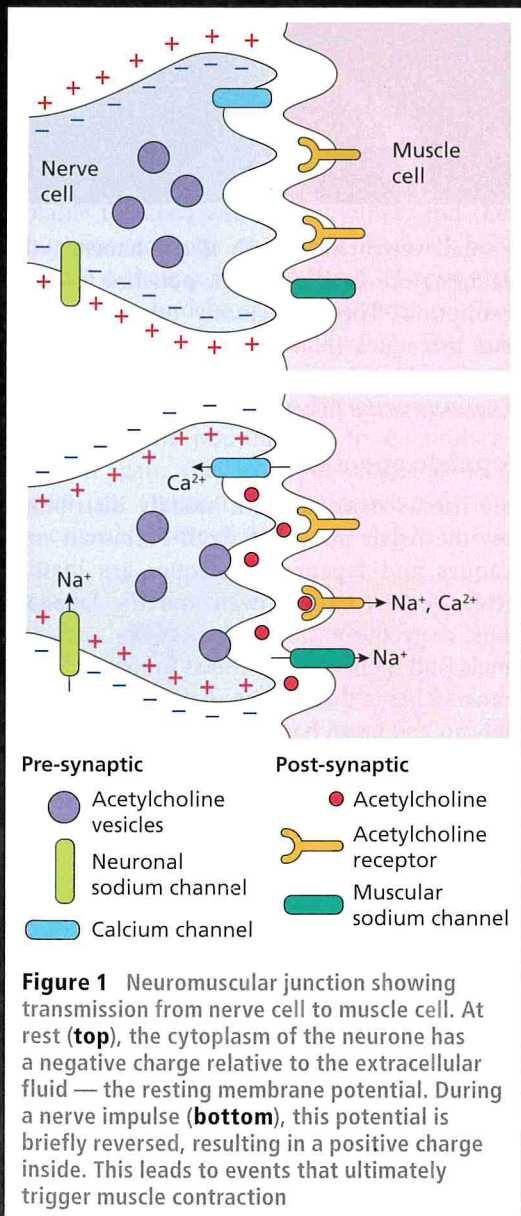




# Snake venom



Of the 2340 known species of snake, approximately 420 are venomous. Around 5 million snake bites are recorded globally each year, and at least 125 000 victims die. Snake venom can contain many different toxins. Those that target the nervous system are called neurotoxins. Many venoms contain several neurotoxins that work together to prevent the nervous system from functioning, thus immobilising prey.

Many neurotoxins disrupt the transmission of impulses that make muscles work, by affecting events within the neuromuscular junction (see Figure 1). Electrical impulses travel along the length of a motor neurone until they reach a junction with a muscle cell. Impulses reaching the terminal of the neurone cause an influx of positive ions, including sodium and calcium (see *BIOLOGICAL SCIENCES REVIEW*, Vol. 31, No. 3, pp. 2–6). This stimulates the vesicles containing the neurotransmitter acetylcholine to fuse with the surface membrane of the neurone. As a result, the vesicles release their acetylcholine, which diffuses across the gap and binds to specific receptors on the muscle cell, leading to influx of calcium ions from the sarcoplasmic reticulum. These ions fuse with troponin, exposing the binding sites of actin molecules, which triggers contraction.

Pre-synaptic neurotoxins block neurotransmission by affecting release of acetylcholine from the neurone. Post-synaptic neurotoxins block binding of acetylcholine to the receptors in the muscle cell membrane. Together these neurotoxins effectively block transmission of nerve impulses to muscles, thus paralysing the muscle. Muscle contraction is required to keep animals alive, so suffocation, caused by paralysis of muscles involved in breathing, is a common cause of death after snake bite.

If you are travelling in areas known to be frequented by snakes, without appropriate protective gear (why?), take a smart phone. That way, if you are bitten, you can call the emergency services and take a picture of the snake to show them so that they can bring the appropriate anti-venom (see this for more: <https://tinyurl.com/8p7socc>).

Max Drakeley and Liz Sheffield, University of Liverpool; Catherine McCrohan, The University of Manchester