Snake bites. Most snake species are non-venomous and belong to the colubrid family although a few colubrids are technically venomous. The 3 families of venomous front-fanged snakes are the elapids, vipers, and sea snakes. Elapids include cobras, mambas, kraits, coral snakes, and the Australasian venomous land snakes. Vipers are subdivided into crotalids (pit vipers) and viperids. Viper bites are much more common than elapid bites, except in Australasia, where vipers do not occur naturally. Sea snake bites occur among fishermen of the Asian and western Pacific coastal areas. Although there are some notable exceptions, viper bites tend to cause vasculotoxicity, elapids cause neurotoxicity, and sea snakes cause myotoxicity.

Only a few snakes are known to be of medical importance. Of the vipers these include *Bothrops atrox* (Central and South America), *Bitis arietans* (Africa), *Echis carinatus* (Africa and Asia), *Vipera russelli* (Asia), and *Agkistrodon rhodostoma* (south-east Asia). In a few restricted areas of Africa and Asia, cobra bites are common; bites by mambas (Africa) and kraits (Asia) are rare. The carpet viper, *Echis pyramidum*, and saw-scaled viper, *Echis carinatus*, can justifiably be labelled the most dangerous snakes in the world and they cause more deaths and serious poisoning than any other snake.

Management of snake bite involves general supportive care and monitoring of vital functions but in a systemic snake-bite poisoning, specific snake venom antiserum is the most effective therapeutic agent available. If used correctly, it can reverse systemic poisoning when given hours or even days after the bite. It is highly desirable to wait for clear clinical evidence of systemic poisoning before giving an antiserum and therefore it should not be given routinely in all cases of snake bite. Monospecific antisera are more effective, and less likely to cause reactions, than polyvalent antisera. The dosage of antiserum to be used is dependent on the species of snake and the consequent potency of the requisite antiserum. The antiserum should be given intravenously diluted in isotonic saline, either by infusion or bolus injection (see under Adverse Effects and Precautions, above). First aid measures including incisions and suction to remove the venom and application of tourniquets are generally to be discouraged. In most cases, the bitten limb should be immobilised and the victim transferred to a medical facility, together with the snake if possible. For bites by elapids, when respiratory failure may occur before the patient reaches hospital, a tourniquet may be justified to delay the onset of neurotoxicity. Supportive treatment is necessary even in patients who have received an adequate dose of antiserum. Local pain may be treated with a suitable analgesic. Artificial respiration may be required in patients with symptoms of neurotoxicity. Anticholinesterases may be of benefit against the neurotoxic effects of some snake venoms and it has been recommended that an intravenous test dose of edrophonium preceded by atropine should be tried in patients with severe symptoms of neurotoxicity. For those patients who respond, treatment with neostigmine should be started but anticholinesterases are unlikely to affect outcome in patients who already require assisted respiration. Hypovolaemia should be corrected cautiously with parenteral fluids. Hypotension may be treated with subcutaneous adrenaline or, in patients bitten by Russell's viper, a response to dopamine has been noted. Patients with renal impairment may require dialysis if they do not respond to rehydration, diuretics, and dopamine. Broad spectrum antibacterials and a tetanus vaccine should be given as prophylactic measures. Surgical decompression and debridement of necrotic tissue may be necessary once normal haemostasis has been restored.

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Preparations

Ph. Eur.: European Viper Venom Antiserum;
USP 31: Antivenin (Crotalidae) Polyvalent; Antivenin (Micrurus Fulvius).

Proprietary Preparations (details are given in Part 3)
Arg.: Suero Antiofidico Polivalente; ***Austral.:*** Polyvalent Snake Antivenom; ***Fr.:*** Viperfav; ***Hong Kong:*** Tiger Snake; ***Mex.:*** Antivipmyn; Coralmyn; ***USA:*** CroFab.

Spider Venom Antisera

Antisuero contra el veneno de arañas; Spider Antivenins; Spider Antivenoms.

Pharmacopoeias. Many pharmacopoeias, including *US*, have monographs.
USP 31 (Antivenin (Latrodectus Mactans)). A sterile freeze-dried preparation of specific venom-neutralising globulins obtained from the serum of healthy horses immunised against venom of black widow spiders (*Latrodectus mactans*). One dose neutralises the venom in not less than 6000 mouse LD_{50} of *L. mactans*. It contains thiomersal as preservative. It should be preserved in single-dose containers and stored at a temperature not exceeding 40°.

Adverse Effects and Precautions
As for antisera in general, p.2201.

Uses and Administration
The use of a spider venom antiserum suitable for the species of spider can prevent symptoms, provided that it is done with the least possible delay; other general supportive measures and symptomatic treatment may also be needed.

An antiserum against the black widow spider (*Latrodectus mactans*) is available in the USA and Canada. The contents of a vial containing at least 6000 antivenin units is the usual dose for adults and children. In severe cases and in children under 12 years of age it is given by intravenous infusion in sodium chloride 0.9% over 15 minutes; in less severe cases, it may be given by intramuscular injection.

Antivenoms are also available against other *Latrodectus* species, including the Australian red-back spider (*L. hasselti*) and the South African button spiders. An antiserum against the funnel-web spider (*Atrax robustus*) is available in Australia.

Antivenoms have also been developed against *Loxosceles* spiders and against *Phoneutria* spiders, but there is little evidence of their effectiveness.

Spider bites. Although many species of spider are venomous, relatively few pose a danger to man. Two main clinical syndromes are recognised; necrotic araneism, produced mainly by members of the genus *Loxosceles* which includes the brown recluse spider *L. reclusa*, and neurotoxic araneism produced by members of the genera *Latrodectus* (including the black widow and red-back spiders), *Phoneutria* (South American banana spiders), and *Atrax* (funnel-web spiders).

Necrotic araneism presents as local pain and erythema at the site of the bite, commonly developing into a necrotic lesion with a black eschar that sloughs after a few weeks, sometimes leaving an ulcer that heals gradually. The area affected can be extensive. Rarely, systemic symptoms including intravascular coagulation, haemolytic anaemia, respiratory distress, and renal failure, occur and may be life-threatening. A number of therapies have been suggested, but conservative management is usually adequate with surgical repair of any persistent defects if necessary. Dapsone is reported to produce beneficial effects on healing. Treatment for systemic manifestations is supportive. Antisera are available in some countries.

Neurotoxic araneism may involve severe pain, headache, vomiting, tachycardia, hypertension, muscle spasms, and occasionally pulmonary oedema, and coma, depending upon the species. Antisera are available and reported to be more effective than those for necrotic araneism, but should be reserved for serious envenomation. Intravenous injection of calcium gluconate 10% has been suggested to relieve muscle spasm as an alternative to conventional muscle relaxants.

References.
1. Clark RF, *et al.* Clinical presentation and treatment of black widow spider envenomation: a review of 163 cases. *Ann Emerg Med* 1992; **21:** 782–7.
2. Isbister GK, *et al.* Antivenom treatment in arachnidism. *J Toxicol Clin Toxicol* 2003; **41:** 291–300.
3. Nimorakiotakis B, Winkel KD. The funnel web and common spider bites. *Aust Fam Physician* 2004; **33:** 244–51.
4. Saucier JR. Arachnid envenomation. *Emerg Med Clin North Am* 2004; **22:** 405–22, ix.
5. Swanson DL, Vetter RS. Bites of brown recluse spiders and suspected necrotic arachnidism. *N Engl J Med* 2005; **352:** 700–707.

Preparations

USP 31: Antivenin (Latrodectus Mactans).

Proprietary Preparations (details are given in Part 3)
Canad.: Antivenin (Latrodectus Mactans); ***Mex.:*** Aracmyn.

Staphylococcal Immunoglobulins

Profile
Staphylococcal immunoglobulins are under investigation for passive immunisation against infection with *Staphylococcus aureus*.

Staphylococcal Vaccines

Vacunas estafilocócicas.

Profile
Staphylococcal vaccines have been developed for the prophylaxis of staphylococcal infections.

◊ A vaccine containing *Staphylococcus aureus* type 5 and type 8 capsular polysaccharides conjugated to non-toxic recombinant *Pseudomonas aeruginosa* exotoxin A showed promise[1] in early studies in patients with end-stage renal disease who were receiving haemodialysis; however, later work failed to confirm benefit and its development was stopped.

1. Shinefield H, *et al.* Use of a Staphylococcus aureus conjugate vaccine in patients receiving hemodialysis. *N Engl J Med* 2002; **346:** 491–6.

Preparations

Proprietary Preparations (details are given in Part 3)
Braz.: Estafiloide; ***Cz.:*** Polystafana; Stafal; ***USA:*** SPL.

Stone Fish Venom Antisera

Antisuero contra el veneno del pez piedra estuarino; Stone Fish Antivenins; Stone Fish Antivenoms.

Adverse Effects and Precautions
As for antisera in general, p.2201.

Uses and Administration
An antiserum for use in the management of stings by the stone fish (*Synanceja trachynis*) is available in Australia. The antiserum is prepared from the serum of horses that have been immunised with the venom of the stone fish. Other symptomatic and supportive treatments are given in addition.

Stone fish venom antiserum may be given by intramuscular injection or, in more severe cases, by intravenous infusion. When given by intravenous infusion, it should be diluted 1 in 10 with an intravenous solution. The initial dose of stone fish antivenom given to both adults and children is dependent on the number of visible puncture sites: 1 to 2 puncture sites, 2000 units; 3 to 4 puncture sites, 4000 units; and 5 or more puncture sites, 6000 units. The initial dose may be repeated if necessary should symptoms persist.

◊ References.

1. Sutherland SK. Stone fish bite. *BMJ* 1990; **300:** 679–80.
2. Lehmann DF, Hardy JC. Stonefish envenomation. *N Engl J Med* 1993; **329:** 510–11.

Streptococcus Group B Vaccines

Vacunas contra estreptococos del grupo B.

Profile
Vaccines for active immunisation against group B streptococcal infections are being developed. Giving a vaccine to pregnant women to prevent neonatal infection has been proposed.

◊ References.

1. Baker CJ, Edwards MS. Group B streptococcal conjugate vaccines. *Arch Dis Child* 2003; **88:** 375–8.

Tetanus Antitoxins

Antitoxinas tetánicas.
ATC — J06AA02.

Pharmacopoeias. Many pharmacopoeias, including *Eur.* (see p.vii), have monographs.
Ph. Eur. 6.2 (Tetanus Antitoxin for Human Use; Immunoserum Tetanicum ad Usum Humanum). A sterile preparation containing the specific antitoxic globulins that have the power of neutralising the toxin formed by *Clostridium tetani*. It is obtained by fractionation from the serum of horses, or other mammals, that have been immunised against tetanus toxin. For prophylactic use, it has a potency of not less than 1000 international units/mL, and for therapeutic use not less than 3000 international units/mL. It should be stored at 2° to 8°, and not be allowed to freeze.
The BP 2008 states that Tet/Ser may be used on the label.

Profile
Tetanus antitoxins neutralise the toxin produced by *Clostridium tetani* and have been used to provide temporary passive immunity against tetanus, but tetanus immunoglobulins (below) are preferred. A test dose of tetanus antitoxin should always be given to identify those who might suffer hypersensitivity reactions.

Whenever a non-immune patient is seen because of injury, a course of active immunisation should be instituted (see Tetanus Vaccines, p.2240).

Preparations

Ph. Eur.: Tetanus Antitoxin for Human Use.

Tetanus Immunoglobulins

Inmunoglobulinas contra el tétanos.
ATC — J06BB02.

Pharmacopoeias. Many pharmacopoeias, including *Eur.* (see p.vii) and *US*, have monographs.
Ph. Eur. 6.2 (Human Tetanus Immunoglobulin; Immunoglobulinum Humanum Tetanicum). A liquid or freeze-dried preparation