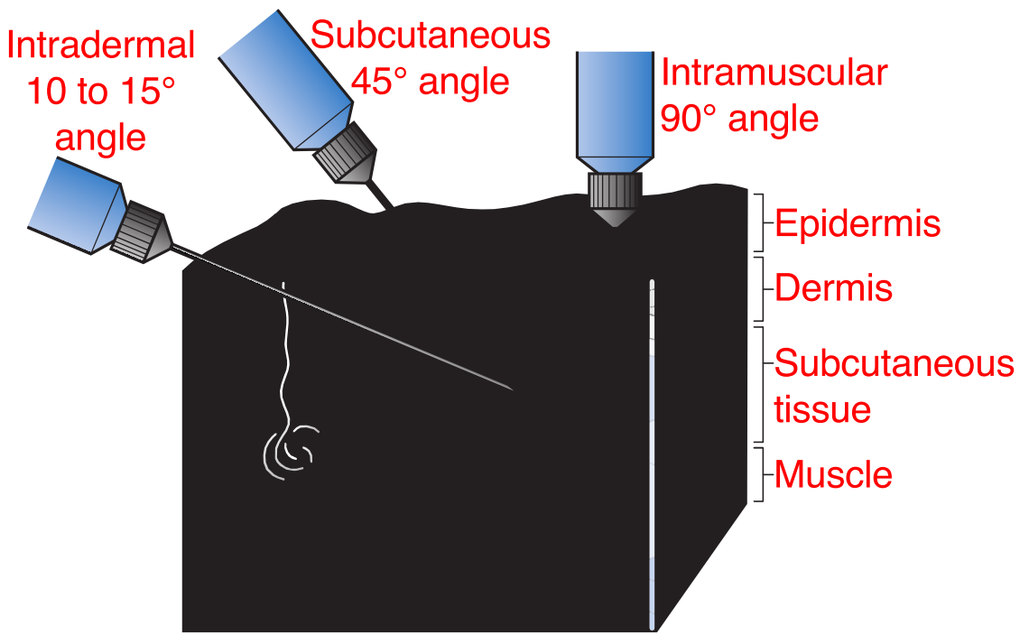

Fig. 36.2 • Intradermal, subcutaneous and intramuscular injection routes.

Intradermal injections

Intradermal (ID or i.d.) injections are given into the skin between the epidermal and dermal layers (Fig. 36.2). Volumes of up to 0.2 mL can be given by this route and absorption from the intradermal injection site is slow. This route is used for immunological diagnostic tests, such as allergy tests, or the injection of tuberculin protein to determine immunity against tuberculosis. Some vaccines such as BCG (tuberculosis) are administered by intradermal injection.

Subcutaneous injections

Subcutaneous (SC, s.c. also called hypodermic) injections are administered into the loose connective and adipose tissues immediately beneath the dermal skin layer (Fig. 36.2). Typical injection sites are the abdomen, upper arms and upper legs. Volumes of up to 1 mL can be administered comfortably, and aqueous solutions or suspensions of drugs are administered by this route. As this tissue is highly vascular, drugs administered by the subcutaneous route are fairly rapidly and predictably absorbed from this site. A common example of a drug administered by subcutaneous injection is insulin.

Intramuscular injections

Intramuscular (IM or i.m.) injections are preferably administered into the tissue of a relaxed muscle (Fig. 36.2). The muscle sites commonly used for intramuscular injection are the buttock, thigh or shoulder muscles. Aqueous or oily solutions or suspensions can be administered in volumes of up to 4 mL. In adults, the gluteal, or buttock, muscle will be used for larger volume injections, whereas in children the thigh muscle is usually larger and thus preferred. Drugs administered by the intramuscular route are more slowly absorbed from the injection site into the systemic circulation compared to those administered by the subcutaneous route.

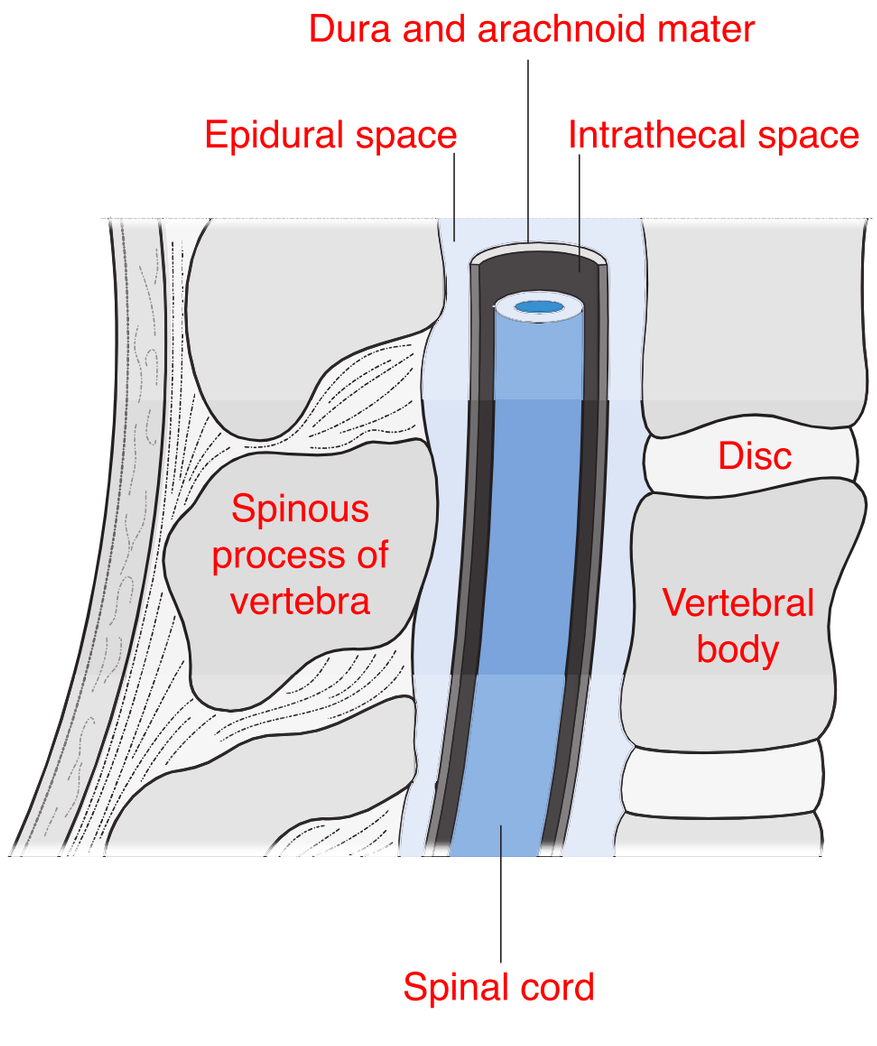

Fig. 36.3 • Spinal anatomy.

Intraspinal injections

Intraspinal injections are given between the vertebrae of the spine into the area of the spinal column (Fig. 36.3). Only drugs in aqueous solution are administered by this route. Intrathecal (IT or i.t.) injections are administered into the cerebrospinal fluid (CSF) in the subarachnoid space between the arachnoid mater and the pia mater, the two innermost protective membranes surrounding the spinal cord. This route can be used for spinal anaesthesia, and in this case the specific gravity of the injection can be manipulated to localize the site of action and thus the area of the body anaesthetized. Intrathecal injections are also given to introduce drug substances into the CSF that would otherwise not diffuse across the blood brain barrier. Typically this could be antibiotics to treat meningitis or anticancer