Wound healing

Cutaneous wound healing is the process by which the skin repairs itself after damage. It is important in restoring normal function to the tissue.
There are two main types of healing, primary intention and secondary intention. In both types, there are four stages which occur; haemostasis, inflammation, proliferation, and remodelling.

Primary Intention

Healing by primary intention occurs in wounds with dermal edges that are close together (e.g a scalpel incision). It is usually faster than by secondary intention, and occurs in four stages:
Haemostasis – the action of platelets and cytokines forms a haematoma and causes vasoconstriction, limiting blood loss at the affected area
The close proximity of the wound edges allows for ease of clot formation and prevents infection by forming a scab
Inflammation – a cellular inflammatory response acts to remove any cell debris and pathogens present
Proliferation – cytokines released by inflammatory cells drive the proliferation of the fibroblasts and the formation of granulation tissue
Angiogenesis is promoted by the presence of growth mediators (e.g VEGF), allowing for further maturation of the granulation tissue; the production of collagen by fibroblasts allows for closure of the wound after around a week
Remodelling – de vascularisation of the region occurs, and the fibroblasts undergo apoptosis.

Secondary Intention

Healing by secondary intention occurs when the sides of the wound are not opposed, therefore healing must occur from the bottom of the wound upwards.
It occurs in the same four stages as primary intention:
Haemostasis – a large fibrin mesh forms, which fills the wound
Inflammation – an inflammatory response acts to remove any cell debris and pathogens present
There is a larger amount of cell debris present, and the inflammatory reaction tends to be more intense than in primary intention
Proliferation – granulation tissue forms at the bottom of the wound
This is an important step, as the epithelia can only proliferate and regenerate once granulation tissue fills the wound to the level of the original epithelium; once the granulation tissue reaches this level, the epithelia can completely cover the wound
Remodelling – the inflammatory response begins to resolve, and wound contraction can occur

Myofibroblasts are vital cells in secondary intention. They are modified smooth muscle cells that contain actin and myosin, and act to contract the wound; decreasing the space between the dermal edges. They also can deposit collagen for scar healing.

An uncommon complication from wound healing (particularly in people with darker skin), are keloid scars, whereby there is excessive collagen production, leading to extensive scarring. This can occur in both primary and secondary intention healing.