

- Wounds is a discontinuity of tissue.
- wound healing is a rely on complex processes for healing , it is of 2 type:
 1. regeneration is limited to epithelium and the liver.
 2. repair resulting in scarring. (most tissues)

The four phases of wound healing—hemostasis, inflammation, proliferation, and remodeling—do not follow a simple and linear chronological order but overlap in time.

Classic Stages of Wound Healing :

1. Hemostasis Tissue injury and the consequent damage to capillary blood vessels initiates the coagulation cascade through the activation of fibrinogen. This activation results in the formation of platelet aggregation and fibrin scaffold that stems blood loss and allows for the migration of cells. Platelets play a critical role in the stages of wound healing and in particular are the chief effector cells during hemostasis.
2. Inflammatory phase of wound healing. The inflammatory phase typically lasts 48 hours. Neutrophils invade the wound and phagocytose foreign debris, followed by monocytes that eventually differentiate into macrophages, which further consume debris in their paths. It is important to note that macrophage invasion is critical to the inflammatory phase because macrophage-defective or macrophage depleted animals undergo abnormal wound healing.
3. Proliferation: From approximately 48 hours to 21 days after tissue injury, healing enters the proliferation phase:
 - Keratinocytes migrate and proliferate enough to create an epithelial layer that covers the wound. This is directly stimulated by epidermal growth factors.
 - Fibroblasts produce collagen that acts as a scaffold for a vascular network.
 - The hypoxic environment increases expression of hypoxia-inducible factor 1 (HIF-1 α) protein to serve as the primary stimulus of angiogenesis.
 - Fibroblasts and macrophages replace the fibrin mesh to form granulation tissue.
 - fibroblasts that have differentiated into myofibroblasts have contractile ability to assist in bringing the wound edges together in a process known as wound contraction
4. Remodeling The fourth and final stage of wound healing is the remodeling phase, which starts at approximately 21 days and can last for 2 years. Throughout this stage, many of the cells contained in the wound undergo apoptosis or exit the wound, to eventually leave collagen and ECM proteins. This entire matrix is remodeled and strengthened from type III collagen into mainly type I collagen by matrix metalloproteinases (MMPs). The wound eventually forms scar tissue and never fully regains complete strength comparable to undamaged skin, at approximately 80% normal strength.