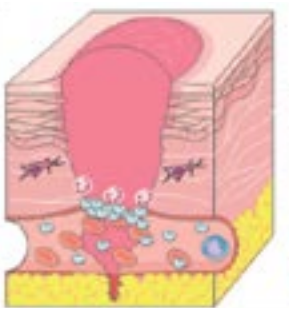
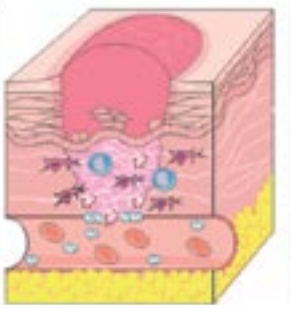
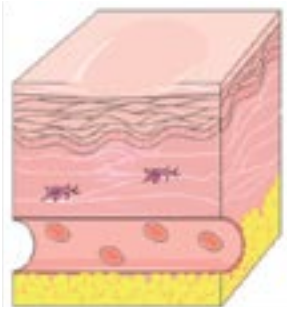
proteintech®

Cytokine toolkit for wound healing research

Wound healing is a highly complex biological process of replacing damaged tissue with newly produced tissue. The wound healing process is regulated by many different cell types, growth factors, cytokines, and chemokines.

Phases of wound healing

	Inflammatory	Proliferative	Remodeling
Epidermis / Dermis			

 Fibroblast
 Neutrophil
 Macrophage
 Platelet
 Erythrocyte
 Keratinocyte

Inflammatory	Proliferative	Remodeling
• Coagulation	• Epidermal resurfacing	• Extracellular matrix formation
• Cytokine and chemokine release	• Fibroplasia	• Scar tissue formation
• Cell recruitment and chemotaxis	• Angiogenesis	• Wound closure
	• Extracellular matrix synthesis	• Contraction

humankine® key features

- High bioactivity & stability
- Excellent lot-to-lot consistency
- Endotoxin-, xeno-, and animal component-free
- Seamless transition from research to cGMP
- Reliable supply

Learn More

Role of Cytokines and Growth Factors in the Wound Healing Process

Cytokine/Growth factor	Symbol	Source	Function
Platelet-derived growth factor (including isoforms AA, AB, and BB)	PDGF	Platelets, macrophages, endothelial cells, keratinocytes, smooth muscle cells	Chemotactic for PMNs (polymorphonuclear), macrophages, fibroblasts, and smooth muscle cells. Activates PMNs, macrophages, and fibroblasts. Mitogenic for fibroblasts, endothelial cells, and smooth muscle cells. Stimulates production of MMPs, fibronectin, and HA. Stimulates angiogenesis and wound contraction. Remodeling. Inhibits platelet aggregation. Regulates integrin expression.
Transforming growth factor beta (including ß1, ß2, and ß3)	GFß	Platelets, T-lymphocytes, macrophages, endothelial cells, keratinocytes, smooth muscle cells, fibroblasts	Chemotactic for PMNs, macrophages, lymphocytes, fibroblasts, and smooth muscle cells. Stimulates TIMP synthesis, keratinocyte migration, angiogenesis, and fibroplasia. Inhibits MMPs production and keratinocyte proliferation. Regulates integrin expression and other cytokines. Induces TGFß production.
Epidermal growth factor	EGF	Macrophages, T-lymphocytes, keratinocytes, and many tissues	Mitogenic for keratinocytes and fibroblasts. Stimulates keratinocyte migration and granulation tissue formation.
Transforming growth factor alpha	TGFα	Macrophages, T-lymphocytes, keratinocytes, and many tissues	Mitogenic for keratinocytes and fibroblasts. Stimulates keratinocyte migration and granulation tissue formation.
Fibroblast growth factor family	FGF	Macrophages, mast cells, T-lymphocytes, endothelial cells, fibroblasts, and many tissues	Chemotactic for fibroblasts. Mitogenic for fibroblasts and keratinocytes. Stimulates keratinocyte migration, angiogenesis, wound contraction, and matrix deposition.
Keratinocyte growth factor (also called FGF-7)	KGF	Fibroblasts	Stimulates keratinocyte migration, proliferation, and differentiation.
Insulin-like growth factor-1	IGF-1	Liver, macrophages, fibroblasts, and other tissues	Stimulates synthesis of sulfated proteoglycans, collagen, keratinocyte migration, and fibroblast proliferation. Endocrine effects similar to growth hormone.
Vascular endothelial cell growth factor	VEGF	Keratinocytes	Increases vaso-permeability. Mitogenic for endothelial cells.
Tumor necrosis factor	TNF	Macrophages, mast cells, T-lymphocytes	Activates macrophages. Mitogenic for fibroblasts. Stimulates angiogenesis. Regulates other cytokines.
Interleukin-1	IL-1	Macrophages, keratinocytes	Stimulates MMP-1 synthesis, fibroblast, and keratinocytes chemotaxis.
Interleukin-6	IL-6	Macrophages, keratinocytes, PMNs	Fibroblast proliferation, TIMP synthesis.
Interleukin-8	IL-8	Macrophages, fibroblasts	PMN chemotaxis, collagen synthesis.
Interferons	IFN-γ etc.	Lymphocytes and fibroblasts	Activates macrophages. Inhibits fibroblast proliferation and MMP synthesis. Regulates other cytokines.

HumanKine Cytokines and Growth Factors for Wound Healing Research

Catalog No.	Product name	Species	Activity
HZ-1215	HumanKine® recombinant human PDGFaa	Human	≤ 10 ng/mL EC50
HZ-1308	HumanKine® recombinant human PDGFbb	Human	0.3-3 ng/mL EC50
HZ-1011	HumanKine® recombinant human TGF beta 1	Human	≤ 0.5 ng/mL EC50
HZ-1092	HumanKine® recombinant human TGF beta 2	Human	0.018-0.18 ng/mL EC50
HZ-1090	HumanKine® recombinant human TGF beta 3	Human	0.14-0.75 ng/mL EC50
HZ-1327	HumanKine® recombinant human FGF-1	Human	0.5-2.5 ng/mL EC50
HZ-1285	HumanKine® recombinant human FGFbasic-TS	Human	0.05-0.4 ng/mL EC50
HZ-1218	HumanKine® recombinant human FGF-4	Human	≤ 1.25 ng/mL EC50
HZ-1100	HumanKine® recombinant human FGF-7 (KGF)	Human	4-20 ng/mL EC50
HZ-1322	HumanKine® recombinant human IGF-1	Human	2-14 ng/mL EC50
HZ-1038	HumanKine® recombinant human VEGF165	Human	0.3-3.75 ng/mL EC50
HZ-1204	HumanKine® recombinant human VEGF121	Human	≤ 15 ng/mL EC50
HZ-1014	HumanKine® recombinant human TNF alpha	Human	0.002-0.026 ng/mL EC50
HZ-1320	HumanKine® recombinant human IL-1 alpha	Human	0.075-0.375 ng/mL EC50
HZ-1164	HumanKine® recombinant human IL-1 beta	Human	≤ 0.05 ng/mL EC50
HZ-1019	HumanKine® recombinant human IL-6	Human	<0.5 ng/mL EC50
HZ-1318	HumanKine® recombinant human IL-8	Human	
HZ-1301	HumanKine® recombinant human IFN gamma	Human	0.02-0.14 ng/mL EC50