

Table S1. Representative examples of multilayer wound dressings/materials reported previously

Layer1	Layer2	Layer3	Drug	Purpose
Hydrophilic nanofiber inner layer	Hydrophobic nanofiber middle layer	Hydrophobic outer layer	LID in inner layer; CIP in middle layer; outer layer drug-free	Directional exudate transport + sequential release (fast analgesia + long-term antibacterial) + waterproof/anti-contamination outer layer ¹
Superlyophobic PDMS layer	Superlyophilic gauze layer	Lyophobic PDMS layer	Optionally combined with lyophilized stem-cell supernatant powder	Unidirectional drainage/exudate management + stable anti-adhesion (reduced tissue tearing during dressing changes) ²
Gelatin cryogel regenerative layer	PVP-I cryogel antiseptic layer (top)	/	Antiseptic iodine in top layer; bottom layer for regeneration support	“Protection + regeneration” bilayer: antibacterial barrier above, pro-healing scaffold below ³
PCL/Gel electrospun scaffold (sublayer)	Dense PU membrane containing ethanolic propolis extract (top)	/	Propolis bioactives mainly in PU/EEP top layer	Dense protective/antibacterial top layer + cell-adhesive proliferative nanofibrous sublayer ⁴
Chitosan sponge (hydrophilic)	PLGA/wool keratin electrospun membrane (hydrophobic)	/	Upper membrane: nanosilver + bFGF; lower sponge: bFGF	Dual-function bilayer: antibacterial barrier + sustained pro-angiogenic/pro-regenerative factor support ⁵
Hydrophilic nanofiber layer	Semi-hydrophobic hydrogel layer	/	Bioactives loaded in composite system	“Moisture/exudate handling + adherence balance” via hydrogel–nanofiber bilayer integration ⁶
Wound contact layer with imprinted micropatterns	Absorbing layer (superabsorbent particles embedded in TPU matrix)	Semipermeable TPU backing layer	Primarily structure-driven (drug-free example)	Classic “backing–absorbent–contact” tri-layer architecture for exudate control + barrier protection + reduced adhesion ⁷
Xan-based film	CC/AHA hydrogel	Xan-based film	Xan-based film layers are loaded with Rg3 and AgNP; the middle CC/AHA hydrogel layer is loaded with VEGF	It promotes wound healing by releasing multiple therapeutic agents ⁸

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