Stromal cell-derived factor-1 (SDF-1) is a secreted 89-amino acid protein that binds chemokine receptor type 4 (CXCR4), a seven-pass G-protein-coupled membrane receptor. Several cell types, including osteoblasts, fibroblasts, and endothelial cells, express SDF-1.

Some studies have shown that separate administration of vascular endothelial growth factor (VEGF) or Stromal cell-derived factor-1α (SDF-1α) exhibited a therapeutic effect in promoting angiogenesis in the wound healing process. In a study of Long et al., a collagen membrane is prepared as a drug delivery scaffold to investigate whether the combined administration of SDF-1α and VEGF has a synergistic therapeutic effect on diabetic wound healing. They specifically fused a collagen-binding domain (CBD) with SDF-1α and VEGF separately, and sustained release of the two recombinant proteins from the collagen scaffold is successfully observed. Meanwhile, when a CBD-VEGF and CBD-SDF-1α co-modified scaffold is implanted in a diabetic rat skin wound model, it not only shows a synergistic effect in facilitating angiogenesis but also reduces inflammation in the short-term. Moreover, long-term results reveal that the co-modified scaffold is also able to enhance rapid wound healing, promote blood vessel regeneration, and assist cell proliferation, re-epithelialization, and extracellular matrix accumulation. Taken together, the study indicates that the CBD-VEGF and CBD-SDF-1α co-modified scaffold helps in quick recovery from diabetic wounds by coordinating angiogenesis and inflammation [1].

1)
Long G, Liu D, He X, Shen Y, Zhao Y, Hou X, Chen B, OuYang W, Dai J, Li X. A dual functional collagen scaffold coordinates angiogenesis and inflammation for diabetic wound healing. Biomater Sci. 2020 Oct 7. doi: 10.1039/d0bm00999g. Epub ahead of print. PMID: 33025970.