

GROWTH FACTORS AND TISSUE REPAIR

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TISSUE ENGINEERING

Tissue engineering frequently involves stem cells, a kind of premature cell first isolated from the body in 1992; implanting stem cells in the appropriate location can generate everything from bone to tendon to cartilage.

Start with some building material (e.g., extracellular matrix, biodegradable polymer), shape it as needed, seed it with living cells and bathe it with growth factors. When the cells multiply, they fill up the scaffold and grow into three-dimensional tissue, and once implanted in the body, the cells recreate their intended tissue functions. Blood vessels attach themselves to the new tissue, the scaffold dissolves, and the newly-grown tissue eventually blends in with surroundings its.

TREATMENTS FOR CARTILAGE, BONE AND DERMAL WOUND HEALING

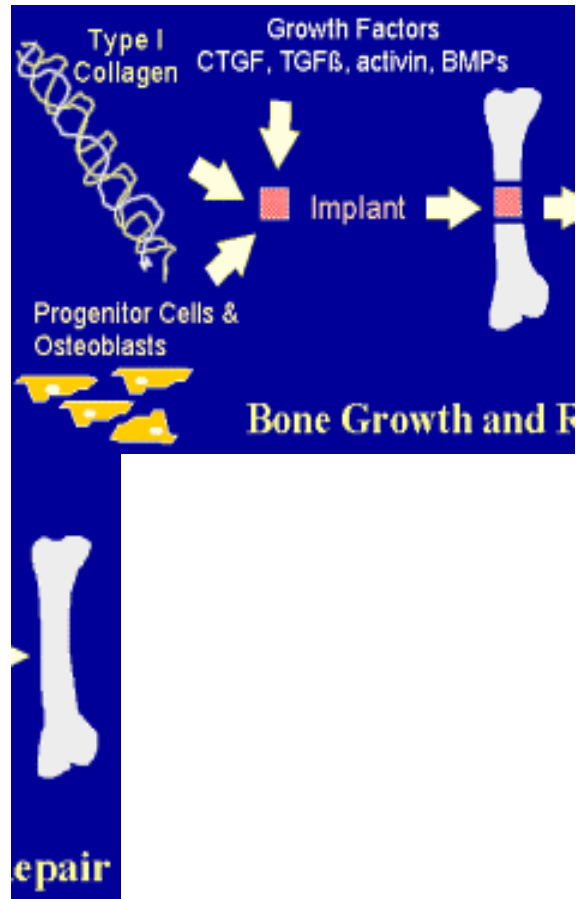
Cartilage Repair. Approximately 900,000 cases of traumatic injury to articular cartilage occur annually. Adult cartilage does not normally regenerate after injury leading to complications from sports and other physical injuries.

Bone Repair. An estimated 800,000 patients in the U.S. alone are hospitalized annually with severe bone fractures, of which half require open fracture reduction procedures.

Dermal Wound Healing. The failure of dermal wounds to heal properly affects an estimated 2.6 million patients in the U.S.

COLLAGEN TECHNOLOGY

Collagens have many inherent properties that make these proteins ideally suited as a biomaterial for tissue engineering. Biomaterials are substances used in the creation of a medical device or other implanted therapeutic product. Human material as well as the rarer types of collagen have been essentially unavailable and, to date, only collagen type I has been used in tissue engineering applications because it is the only collagen available in sufficient quantity.



APPLICATION OF CTGF TO TISSUE REPAIR

Connective Tissue Growth Factor (CTGF) is an important factor in the growth of tissues. CTGF, a cytokine secreted by connective tissue cells, sends signals that trigger certain biological responses critical to tissue development, repair and regeneration. CTGF acts to stimulate target cells through specific receptors. An important activity of CTGF is its ability under certain conditions to stimulate the formation of cartilage and bone. Scientists have found that CTGF stimulates chondrocytes and osteoblasts in cell culture models. Evidence also suggests that during normal development, CTGF acts as an osteoinductive agent. CTGF-dependent mechanisms may include the induction of other bone morphogenic proteins to form bone.