

## BASIC SCIENCE AND RESEARCH

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Regenerative medicine can be defined as the amalgam of (1) precursor cells, (2) scaffold or matrix technology and (3) growth or differentiation factors to restore tissue deficiencies. Soft tissue replacement requires the (re)generation of a stable vascularized organoid which survives at the long-term in an equilibrium with adjacent host tissue.

Tissue engineering holds the promise of generating tissues de novo and adipose tissue is the ideal soft tissue surrogate to redefine body contour defects due to its intrinsic plastic characteristics.

Regenerative medicine research recapitulates the embryonal events in histogenesis and current animal models are available to define the specific requirements to induce or guide adipose tissue development. Adipose tissue or preadipocyte-seeded biohybrids require a rapid revascularization to successfully engineer an adipose construct into a three-dimensional form. A preshaped “preadipocyte”-seeded biocompatible scaffold holds promise to support adipose tissue development. The major withdrawal to use porous scaffolds in adipose tissue engineering is the necessity for the construct to be revascularized by an extrinsic source as adipocytes are highly metabolic active cells and thus highly vascularized.

From our experience the histio-inductive in vivo approach seems to be more attractive to induce adipogenic induction using the basic principles of an included intrinsic vascular source and the concept of a “preserver of space” which is provided by a tissue engineering chamber allowing tissue expansion. Identification of key points of cellular control such as regulating glycoproteins or vaso-active molecules within the stromal-vascular fraction of white adipose tissue could ultimately result in the generation of a nutritional and supportive matrices which not only could enhance survival of fat grafts but also could be used to induce adipogenic induction at desired *loci*.

Our interest is redirected towards the extracellular matrix which not only provides structural support but also coordinates cellular and cell-matrix interactions. If we want preadipocytes, the progenitors of adipocytes, to migrate, proliferate and differentiate we'll have to speak the language of the matrix.