

Abstract for Dr François A. Auger presentation at
Workshop On Stem Cell Research for Regenerative Medicine and Tissue Engineering
Feb 1-2, 2007, Arlington, VA

Skin tissue engineering: was it really so simple a challenge...?

François A. Auger, M.D., FRCP(C)

Director / LOEX

Full Professor of Surgery, Laval University, Quebec, Canada

The development of skin tissue engineering (TE) is a paradigm for the evolution of this fascinating biotechnological domain. The successful creation *in vitro* of skin substitutes has given a vigorous impetus towards its translation into the clinical arena. Furthermore, as we now look back on the evolution between the *in vitro* prowess and the therapeutic application, these events clearly parallel the maturation that has unfolded in many applications of TE for other organs. The basic elements for TE are deceptively simple, but creating clinically applicable constructs is an exacting goal. Until now, different *in vitro* skin-reconstruction approaches have allowed many scientists to probe many fascinating research questions in cutaneous function and pathology and clinical applications have had a significant impact on patient healthcare. The development of TE in the field of cutaneous substitutes has evolved from the culture of simple epidermal sheets to more complex structures leading to bilayered skin constructs. However, it must be pointed out that only a few one-step application culture techniques for epidermal-dermal constructs have reached the bedside of gravely wounded patients. More frequently, a dermal component is created with or without a temporary synthetic epidermis. This therapeutic sequence entails a second surgical step to "recreate" the epidermal layer. Thus we shall review these various constructs that have been developed for skin TE and we shall also explore the crucial integrative aspects in TE that are now construed as being of major importance for even more significant therapeutic results.

References

1. Auger, F.A. *Biomed Mater Eng.* **16**(4 Suppl): p. S19-25. (2006).
2. Auger, F.A., et al. *e-Biomed: Journal of Regenerative Medicine.* **1**(5): p. 75-86. (2000).
3. Berthod, F., et al. *J Invest Dermatol.* **108**(5): p. 737-742. (1997).
4. Berthod, F., et al. *J Cell Physiol.* **207**(2): p. 491-498. (2006).
5. Black, A.F., et al. *Faseb J.* **12**(13): p. 1331-1340. (1998).
6. Claudinot, S., et al. *Proc Natl Acad Sci U S A.* **102**(41): p. 14677-14682. (2005).
7. Dai, J., et al. *In Vitro Cell Dev Biol Anim.* **38**(4): p. 198-204. (2002).
8. Grenier, G., et al. *Tissue Eng.* **11**(1-2): p. 90-100. (2005).
9. Hardin-Young, J., et al. *Curr Neurovasc Res.* **1**(3): p. 241-249. (2004).
10. Hudon, V., et al. *Br J Dermatol.* **148**(6): p. 1094-1104. (2003).
11. Lafrance, H., et al. *Med Eng Phys.* **17**(7): p. 537-543. (1995).
12. Laplante, A.F., et al. *Faseb J.* **15**(13): p. 2377-2389. (2001).
13. Mansbridge, J. *J Anat.* **209**(4): p. 527-532. (2006).
14. Michel, M., et al. *In Vitro Cell Dev Biol Anim.* **35**(6): p. 318-326. (1999).
15. Pouliot, R., et al. *Transplantation.* **73**(11): p. 1751-1757. (2002).
16. Powell, H.M., et al. *Biomaterials.* **28**(6): p. 1084-1092. (2007).