



INSIDE THIS ISSUE

President's Message66
Co-editors' Messages.....67
Notes from the Editor Emeritus:
Michael L. Beehner.....69
Early results in the use of
injectable ACell suspended in
arterial blood serum/PRP in
retarding hair loss/re-growth of
miniaturizing scalp hairs73
How I Do It: The Intruder: our
performing instrument for blunt
donor area dissection78
Unique universal transplanter.....80
Cyberspace Chat:
Part II: Bleaching necrosis from
hair highlighting: prevention,
treatment of the chemical burns
and resulting scarring alopecia ...84
Holding solutions86
Hair's the Question.....89
Controversies91
Review of the Literature.....92
Message from the Program Chair
of the 2011 Annual Meeting93
Meetings and Studies: Review of
the 17th Annual OLSW94
Letters to the Editors98
Message from the Surgical
Assistants Chair of the 2011
Annual Meeting.....100
Review of the OLSW Surgical
Assistant's Program.....100
Surgical Assistants Corner101
The pace of wound healing101
Classified Ads102

Use of porcine urinary bladder matrix in hair restoration surgery applications

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For the past two years, I have been working with a new wound healing product called ACell MatriStem™, an extracellular matrix (ECM) derived from porcine urinary bladder. I was introduced to the product by Dr. Gary Hitzig, who was just starting to explore its use as well. ACell is U.S. FDA–approved for management of topical wounds and is being used for wide-ranging medical applications, such as treating surgical wounds, war injuries, and even degenerative conditions. Following is a summary of the results of my preliminary studies with ACell that were presented at the October 2010 18th Annual Scientific Meeting of the ISHRS in Boston.

The ECM occupies the space between cells and is part of every organ and tissue of every animal species. ECM has “xenogenic transferability,” meaning we can take ECM from various animals and use them in humans without fear of reactions because the makeup of animal ECM (e.g., cow, pig, horse) is so similar to that of humans. Use of ECM in surgery has been found to enhance wound healing, promote tissue regeneration, and inhibit scarring. There are numerous ECM products on the market today, but ACell is unique with its bilaminar structure and may therefore have distinct advantages compared to other products.

ACell MatriStem™ is composed of animal tissue that is processed to remove all cells, and irradiated with electron beams to completely sterilize the product. It is non-crosslinked, which allows it to naturally degrade with minimal inflammatory reaction. The unique bimodal surface has a basement membrane on one side, which is conducive to epithelial and endothelial cell attachment and differentiation. The other side, the mesenchymal tunica propria layer, facilitates integration into the wound bed and promotes vascular ingrowth. Studies have shown that ACell treatment of wounds inhibits fibrotic scarring and promotes angiogenesis. There is even evidence that progenitor cells are recruited to the wound to participate in tissue regeneration.¹

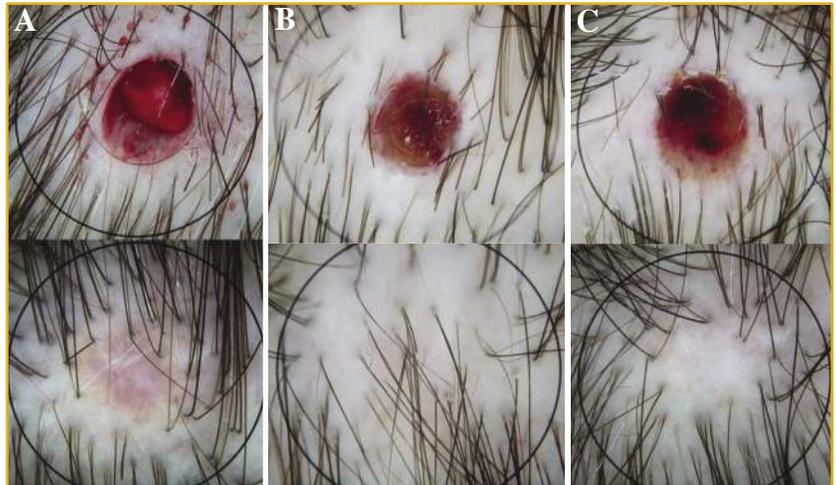


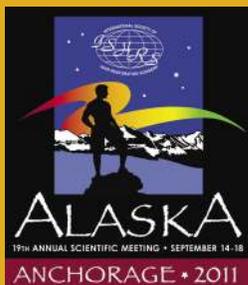
Figure 1. A: Control without ACell treatment shows fibrotic contracted scar. B: Punch (ACell treated) with surrounding transected follicles shows almost undetectable healing with hair regrowth. C: Punch (ACell treated) without transection shows smooth, hairless spot.

Looking closer at the components within the ACell product (porcine urinary bladder matrix), it has been found to contain:

- Structural Proteins
 - Collagen types: I, II, III, IV, V, VI, VII
 - Proteoglycans
- Growth Factors (VEGF, BMP4, PDGF-BB, KGF, TGFbeta1, IGF, bFGF, EGF, TGFalpha)
- Glycoproteins (laminin, elastin, fibronectin)
- Anti-Infective Peptides (18 AMPs have been identified in porcine tissue)
 - Porcine defensin pBD-1

I began using ACell in the following areas of my hair restoration surgery practice: punch harvest sites (small FUE and larger); strip harvest donor healing; FU grafting; and autocloning with plucked hair.

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