**Proceedings of the Annual Symposium & Plenary Session on Regenerative Medicine (PASRM)**

**Burn Injury: A Challenge for Tissue Engineers**

Yerneni L K*1

* Dr. Lakshmana K Yerneni, Scientist D, Institute of Pathology, Indian Council of Medical Research, Safdarjung Hospital Campus, PO Box 4909, New Delhi 110 029, India. E.mail: lkyerneni@yahoo.com

Published online on 04 Nov 2009

Ever since man invented fire he has been more frequently burning himself by this creation than by the naturally occurring bushfires. It is estimated that over 1.152 million people in India suffer from burn injuries requiring treatment every year and majority of them are women aged between 16-40 years and most of them occur in the kitchen.

The treatment for burns basically involves autologous skin grafting, which originated in India more than two thousand years ago (Sushruta Samhita), is still the gold standard for the wound resurfacing, although, autografting is difficult where graftable donor sites are limited. Although, Cadaver skin, porcine or bovine xenografts are used alternatively over the past thirty years, modern approaches like the Bioengineering of skin substitutes emerged during the past 20 years as advanced wound management technologies with no social impediment. They can be broadly categorized as Acellular and Cellular biotechnological products. The acellular products like Alloderm (LifeCell Corporation), Integra (Integra Life Sciences) act like template and depend on natural regeneration, while the cellular ones are either ‘Off-the-Shelf’ products like Apligraf (Organogenesis Inc) and Orcel (Orcel International) have allogenic elements and ‘home grown’ autologous cell products like Cultured Epithelial Autograft (CEA) and epidermal-dermal composite skin use synthetic or natural non-human matrices. The CEA is based on the ex-vivo epidermal stem cell-expansion and our laboratory has been engaged in CEA technique development with innovative cost-effective approach and yielded promising preliminary clinical success.

The basic methodological approach in CEA technique which is still clinically adopted by several developed countries involves the use of growth arrested mouse dermal fibroblasts as growth supportive matrix and is thus considered a drawback as a whole. Additionally, there is no superior enough method available to augment the growth of human keratinocyte stem cells capable of producing epithelia for large-scale grafting in burns and maintain long-term functionality as a self-renewing tissue. The normal functioning of such an in vitro constructed graft under long-term artificial growth conditions is limited by the difficulties of maintaining the epidermal stem cell compartment. An apparent answer to this problem of stem cell depletion during autograft preparation would be to start with a pure population of progenitor stem cells and derive sustainable...
autograft from them. We have been aiming to this solution and currently attempting to isolate a pool of epidermal progenitor cells using Mebiol gel, which is a Thermo-Reversible Gelation polymer and was shown by others to support the growth of multi-potent skin-derived epithelial progenitor-I cells. Additionally, the usefulness of Mebiol gel in maintaining epidermal stem cell compartment without FBS and/or animal origin feeder cells is being investigated by our group.