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# Wound Congress 2017: Tissue Engineering And Regenerative Medicine (Term) In Skin Regeneration, Wound Healing And Their Clinical Applications_Susanti R Dewi_Bandung Institute Of Technology (Itb), Indonesia

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The skin is the largest organ of the body and has an array of functions. Skin compartments, epidermis, and hair follicles house stem cells that are indispensable for skin homeostasis and regeneration. These stem cells also contribute to wound repair, resulting in restoration of tissue integrity and function of damaged tissue. Unsuccessful wound healing processes often lead to non-healing wounds. Current chronic wound therapies are limited, so the search to develop better therapeutic strategies is ongoing. Tissue engineering and regenerative medicine (TERM) has caused a revolution in present and future trends of medicine and surgery. In different tissues, advanced TERM approaches bring new therapeutic possibilities in general population as well as in chronical wound healing, improving restoration of biological functions and rehabilitation. The mainstream components required to obtain a functional regeneration of tissues may include biodegradable scaffolds, drugs or growth factors and different cell types (either autologous or heterologous) that can be cultured in bioreactor systems (in vitro) prior to implantation into the patient. Particularly in the chronic wound bed is an environment of unabated inflammation, low mitogenic activity, excessive matrix metalloproteinases, extracellular matrix degradation, reduced angiogenesis, and premature fibroblast senescence, resulting in an overall delayed time to healing. The use of mesenchymal stem cells derived secretomes and biological scaffolding, is geared toward restoring the wound's ability to heal, either by supplanting ineffective healing mechanisms or by augmenting physiological processes. This paper will focus on the relevance of epidermal stem cells and other adult stem cells in the context of wound healing and skin disorders, and discuss their potential application in cell/ scaffold-based wound therapies as well as their limitations.

Skin is the largest organ of the body and is necessary for our lives, since it performs many functions such as providing a physical interruption to the external environment, sensation, retention of normal hydration and thermal regulation. Significant skin loss is associated with high death rate and morbidity in the acute phase, and with physically and cosmetically drastic scarring in the long term. There are huge of tissue-engineered products in the clinic that are used-up as skin substitutes to promote healing of traumatic burn and diabetic wounds, producing results that satisfy the barrier function of the skin. The current tissue engineered skin although constitutes one of the most famous tissue constructs, yet it lacks several important functions including those provided by the appendages such as the hair follicles, sebaceous and sweat glands. Dermal skin replacement have been developed to promote regeneration of the dermis and although the incorporation of growth factors to accelerate healing has also been explored, none of them have addressed the issuance of regenerating the hair follicles, sebaceous or sweat glands and their important function.

The next generation tissue engineered products should take into deliberation the regeneration of its appendages taking cues from developmental biology and stem cell engineering. Although the complicacy of skin may be difficult to recapitulate entirely, new or improved functions can be provided by genetic modification of the cells that make up the tissues. Gene-enhanced skin substitutes will have great potential as cell-based devices to deliver therapeutics systemically or locally and can even be employed as biological models to know tissue development or disease progression in a realistic three-dimensional context.

In this context, we would like discuss skin epidermal stem cell biology, developmental biology and homeostasis of skin appendages, transcriptional and epigenetic regulation of skin stem cells, vascularization and immunity in skin homeostasis, and tissue engineering approaches for skin substitute development. Our goal is to bring together scientists from basic research fields, such as stem cell biology, transcriptional control and developmental biology, with translational and bioengineering researchers who are developing new therapeutic approaches towards skin regeneration.

Biography:

SusantiRosmalaDewi graduated as a general practitioner in 2010. Since 2015, she is studying as a dermatoveneraology resident in SebelasMaret University of Surakarta. She has written two papers, which have been published in International and National Congress of Dermatology.