Human Skin Equivalent for Transplants and Pharmacologicals Tests

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In tissues bioengineering, synthetic or biological materials have been used as cutaneous substitutes for the treatment of large skin lesions. In this research, I developed techniques that transform swine tissues into compatible human body material. Due to its similarity to humans, several parts of swine organisms may be used in human medicine, but pigskin is not for definitive human skin transplantation because of its clinical rejection. With the objective to serve as temporary skin xenotransplantations to longterm maintenance, I developed a technique for the purification of pigskin, so that once transplanted it would eliminate rejection problems with no risk to the immune system of the transplanted patient. In the process of pigskin purification, I eliminate all genetic material associated to the swine tissues (interfibrillaries materials, cells and donor pig fat) in order to obtain a clean matrix (purified pigskin). This clean matrix is then refilled with sustainable gelled collagen to reproduce human biological tissues and to keep the biomechanical and structural characteristics of human skin. The matrix of the real human skin obtained will serve as a support structure for the organism of the transplanted patient, effectively reconstructing the area of injured skin. In addition to the use of skin transplants, real human skin matrix may also be used on burns, severe wounds, in skin recovery of tumor affected people, hernias or wounds of difficult healing. It may also be used to test cosmetic and pharmaceutical products at a low cost and without the use of animals. I demonstrate this type of technology efficacy, as well as its economic viability. This is particularly important in Brazil since human skin banks can be found in only four major cities in the country.

Awards Won: