Clinical Regenerative Wound Healing With Stem Cells

Grant Award Details

Grant Type: Disease Team Planning
Grant Number: DT1-00653
Investigator:

<table>
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<tr>
<th>Name</th>
<th>David Woodley</th>
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<tr>
<td>Institution</td>
<td>University of Southern California</td>
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<td>Type</td>
<td>PI</td>
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Award Value: $33,626
Status: Closed

Grant Application Details

Application Title: Clinical Regenerative Wound Healing With Stem Cells
Public Abstract: Chronic skin wounds affect a large number of patients every year who suffer from diabetes, burns, venous disease leg ulcers, arterial disease leg ulcers, pressure ulcers, and ulcers from spinal diseases. The annual health care costs for wound care in the United States is $15 billion. The purpose of our CIRM Disease Team Planning Award Proposal is to create an investigative team across the academic departments of Pathology, Dermatology, Surgery, Dermatology and Cell and Neurobiology who will work together using stem cell technology to study regenerative wound healing of the skin in which there is restoration of the skin's normal architecture, lack of fibrosis and regeneration of skin appendages – hair follicles, sebaceous glands and eccrine glands. This type of healing takes place in Nature such as the regeneration of the limb of a newt, but does not occur normally in post-natal human beings. Our team consists of (i) a NIH-funded Plastic Surgeon who runs the [REDACTED] Burn Unit and has performed many wound healing clinical trials; (ii) a NIH-funded Pathologist with expertise in epidermal-mesenchymal interactions and skin appendage formation; (iii) an accomplished stem cell biologist; (iv) a NIH-funded clinical investigator dermatologist with expertise in wound healing and (iv) two NIH-funded molecular biologists with expertise in gene therapy, lentiviral delivery of genes into human skin cells, skin cell motility and wound healing. In this proposal, the team will organize a research agenda that is disease oriented with the goal to translate our findings to the clinic and manipulate the microenvironment of human skin wounds such that they heal in with a regenerative, non-scarring process in which there is an organized expression of skin appendages in the healed skin using stem cells. If successful, this would completely alter the wound healing landscape and have a major impact on the care of burn wounds, chronic leg ulcers from patients with venous and arterial disease, pressure ulcers and spinal cord injury-induced wounds. It would also benefit children who are born with a genetic scarring blistering disease of the skin called dystrophic epidermolysis bullosa for which there is currently no cure or treatment and which is usually fatal during young adulthood. In this Planning Grant, we will have Team Meetings every 2 weeks, 2 week-end planning Retreats and 2 consultants [REDACTED].

Statement of Benefit to California: Wound healing of skin wounds is a major public health problem. It is estimated that approximately $15 billion dollars per annum are expended for the diagnosis and treatment of skin wounds from pressure ulcers, spinal cord injuries, diabetes, venous disease, arterial disease, and surgery. To date, skin wounds heal, but they do not regenerate normal human skin. Rather, they heal as a facsimile of normal skin with a fibrosed (scarred dermis), effaced epidermis and an organ lacking sweat glands, oil glands and hair. This facsimile of normal skin has considerable morbidity, lacks critical skin functions and is highly vulnerable to further injury and morbidity. The fibrosis of large burn wound across limbs and body parts induces contractures that can limit the mobility and functionality of the victim. Similar problems occur in genetic skin diseases such as dystrophic epidermolysis bullosa (DEB) which is a widespread blistering and scarring disease of children who develop such fibrotic “mitten” deformities of their hands to render their hands functionally useless. The translational research of this project would have a major impact of the health of citizens of California and the World.

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