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Project Title: Impairment of Epidermal Wound Healing Responses by the Cholinergic Anti-Inflammatory Pathway
Year Awarded: 2012

What did you hope to learn through this research?

Our goal was to begin to tease apart the epidermal $\alpha 7$ acetylcholine nicotinic receptor (nAChR) cholinergic microenvironment and elucidate how keratinocyte $\alpha 7$ nAChR activation influences Toll-like receptor 2-mediated inflammatory responses during wound infection. Moreover, we sought to explore these defects in genetic mouse models of impaired wound healing and human chronic wounds.

What can you tell us about the progress made in this area since you completed your Fellowship?

Because of the generous funding from 3M and the WHSF, I was able to generate a significant amount of data that resulted in an NIH R01 grant submission for the 2013 October funding cycle. We are currently in the process of completing and/or writing two manuscripts related to the 3M/WHSF Fellowship. Furthermore, we have initiated collaborations with Notre Dame and the University of Pennsylvania to further dissect out the relevance of epidermal nicotinic receptors related to wound healing and infection.

How can this research help patients, clinicians and scientists?

A better fundamental understanding of how keratinocyte nAChRs regulate inflammatory responses during wound infection will expedite the development of new targeted treatment modalities to improve clinical care for uncontrolled inflammation and infection in chronic wound patients. This strategy may have several advantages over many current systemic or non-specific treatment regimens.

How did this Fellowship help your career?

The 3M/WHSF Fellowship enabled the development of an NIH R01 grant submission, which provides a substantial potential for continued funding of this initial research. Furthermore, the fellowship has invigorated new collaborations and networking with other members of the WHS and external researchers. I have since accepted a new position as Chair of the WHS Website committee, with the hope of maintaining and improving the focal interface of the WHS.

How did you get interested in wound healing and this area in particular?

I originally became interested in wound healing when I was a novice graduate student in Luisa DiPietro's lab. At the time, I did not fully comprehend the urgent clinical needs for patients with acute or chronic wounds, nor the associated morbidities. Since attending my first WHS meeting in 2005, I have certainly come to appreciate the continuum of research and patient care that leads to improved wound assessment, advanced clinical methodologies, and patient education.

Approximately how many publications have you published since becoming a Fellow? Of these, how many relate to your Fellow research?

Since receiving the fellowship in May of 2012, I have been able to publish 5 manuscripts as a senior or co-author. Furthermore, I have 2 related manuscripts under revision, and 2 manuscripts that are in preparation.

What are your future plans for your work in wound healing?

We have begun to explore the epidermal cholinergic pathway in a burn wound healing model, and have identified several cholinergic defects in human burn wounds. My ultimate goal would be to conduct a wound healing study in space to further assess the role of weight bearing on tissue repair. I have had a fervent interest in astronomy and space travel since the age of 5. Furthermore, I had the unique opportunity as a graduate student to conduct a study at NASA's Ames Research Center involving the impact of mechanical unloading on cutaneous wound healing in the lab of Charles Wade PhD.

Who do you consider your mentors and your close associates in this project?

I have received a tremendous amount of support and guidance from Luisa DiPietro DDS, PhD, who served as my PhD advisor, as well as Richard Gallo MD, PhD, who served as my post-doctoral advisor. After discovering a role for nAChRs in regulating epidermal antimicrobial peptides during my post-doctoral fellowship, I was fortunate enough to be introduced to and mentored by other experts in wound healing or infection, specifically Peter Elias MD, Sergei Grando MD and Victor Nizet MD. These individuals have provided me with both the scientific foundation and professional development to further expand my wound healing research interests. Furthermore, I am lucky to have the unwavering encouragement from my husband, Sascha Kristian PhD, whom I met while conducting skin infection studies during our post-doctoral research.

Can you tell us about your life away from the lab?

Of course, I enjoy socializing with my friends and colleagues as often as I can. I also spend my free time taking dance classes and yoga. I especially love to travel abroad and explore archaeological and geological attractions. However, I am especially passionate about contributing my time as a volunteer at PAWS animal shelter in Chicago. PAWS (Pets Are Worth Saving) is a no-kill animal shelter that strives to establish no-kill communities, to educate communities, and to set higher standards for the treatment of animals.