



Wound Healing
Foundation

WHF Award Recipient Profile



Name: Ivan Jozic Ph.D.

Title: Research Assistant Professor

Institution: Dr. Phillip Frost Department of Dermatology and Cutaneous Surgery, University of Miami Miller School of Medicine

Project Title: Targeting Caveolin-1 by Methyl- β -Cyclodextrin for Treatment of Non-Healing Chronic Wounds

Year awarded: 2019

What do you hope to/did you learn through this research?

The goal of this project is to better understand how upregulation of caveolin-1 (Cav1) in diabetic foot ulcers regulates two hallmarks of non-healing chronic wounds: wound infection and wound closure. Our lab and others have previously shown Cav1 to be involved in cell migration as well as pathogen internalization. Thus, we hope that disruption of Cav1 can target healing outcomes on two levels: 1) by restoring cellular migration that is necessary for successful wound closure and 2) by inhibiting wound colonization of opportunistic bacterial pathogens.

How can this research help patients, clinicians and/or scientists?

We are hoping that this study will help advance the field not only at the basic science level, but will have a significant translational impact. **At the basic science level**, we are hoping it will provide a novel understanding regarding the mechanisms that guide wound healing and its inhibition in patients, *i.e.* how Cav1 orchestrates cytoskeletal rearrangement downstream of EGF signaling to affect cellular migration, as well as how Cav1 contributes to internalization and persistence of *S. aureus* infection. **At the translational level**, this will provide 1) a better understanding of the mechanism by which Cav1 contributes to pathogenesis of chronic wounds, 2) possibility to use Cav1 as a biomarker of non-healing outcomes. **At the clinical level** it will provide a new therapeutic avenue as it focuses on 1) how caveolae can serve as potential therapeutic targets in shifting non-healing into healing wounds; 2) insights regarding mechanisms that limit clinical efficacy of previously tested therapies and 3) provide new approach to limit wound infection. If our hypothesis is correct, accumulation of Cav1 in chronic wounds may serve to sequester/inhibit growth factor receptors, rendering growth factor therapies ineffective.

How did this award help your career?

I look forward to receiving the WHF Medline Research Grant Innovation Award that will fund my research for the next year and provide me the opportunity to obtain the answers to fundamental questions that I outlined in the proposal. As a junior faculty, this award will provide support at the very important point in my career development towards becoming an independent scientist as I plan to pursue an academic career.

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

I am a molecular and cell biologist by training. Because my PhD dissertation dealt primarily with *in vitro* models, focusing on endomembrane trafficking, more specifically transport from the plasma membrane to the early endosome, I was looking forward to integrate my skills with a clinically relevant research questions during my post-doctoral training. Given that caveolins have been shown to regulate numerous signaling events, which play important roles in regulation and coordination of the wound healing process, cutaneous wound healing seemed to me as an ideal research field to expand my research to study mechanisms that regulate it.

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

Wound healing is an exciting field of research with many open questions that provide great opportunities. For one, understanding how structure and composition of the cell membrane orchestrates compartmentalization of signaling events will provide invaluable insights into why some growth factor therapies continue to fail to reach FDA approval for efficacy in treatment of chronic wounds. It will also be interesting to delineate which other signal transduction cascades may be affected and how therapeutically targeting membrane composition may indirectly affect them as well.

Who do you consider your mentors and your close associates in this project? How did you start working with them?

I consider Dr. Marjana Tomic-Canic to be my closest mentor who provides superb guidance and support and helped me mature as a scientist and a teacher. Our research group is a dynamic, robust and, most importantly, fun research "playground" that facilitates discussions and exchange of ideas in a very supportive environment and I am very fortunate to interact closely with Dr. Irena Pastar. In addition, I am surrounded by scientists and clinicians that are advancing the field of wound healing, including Dr. Robert Kirsner and his entire Clinical Research Team, Dr. Evangelos Badiavas, Prof. Stephen Davis and many others who continue to inspire me and provide guidance and support. I started to work with them when I joined Tomic-Canic Lab as a postdoc and I am very fortunate to be working in such extraordinary wound healing research environment. I am also deeply grateful for having a career mentor in Dr. Ralf Paus who has provided me with invaluable advice in how to navigate and circumvent some of the pitfalls associated with starting your own lab.

Tell us about your life away from the lab and/or clinic?

Along with my wife, I also volunteer at the local animal shelter and we foster dogs until they are ready for adoption. I am also an avid fan of soccer and hence in my spare time I like to play in local Sunday leagues.

The Wound Healing Foundation is a 501(c)3 organization.