Tianhong Dai, Ph.D. received an **Airlift Research Foundation Research Grant**

Award Period: January 15, 2011 – January 14, 2013

Project Title: "Hyperspectral Microendoscopy to Monitor VEGF during Pancreatic Cancer Therapy"

Project Overview:

The hypothesis of this proposal is that: UVC light can be used as an alternative/adjunctive modality for preventing and treating multi-drug resistant infections associated with combat wounds. To test this hypothesis, we propose the following specific aims:
1) Determine the prophylactic and therapeutic efficacies of UVC light for open fractures, burns, and surgical wounds in rodent models infected with *Pseudomonas aeruginosa, Klebsiella pneumoniae, Acinetobacter baumannii, or Staphylococcus aureus*, which are the pathogens most frequently identified in combat wounds. We have been fortunate to gain unique access to an *in-vivo* bioluminescence imaging technique and use it to monitor in real time the extent of infection in rodent models. UVC irradiation will be initiated at varying time points after infection to investigate the efficacies of UVC for both early and established infections. The efficacies found with UVC will be compared with those of topical sulfamylon, a commonly used topical drug for combat-related wound infections.
2) Identify the possible side effects of UVC on mammalian cells that may be exposed during UVC irradiation of infected wounds. This will be implemented by respectively exposing human keratinocyte cultures, human skin equivalents, and *in-vivo* rodent skin to UVC light at the effective antimicrobial doses. UVC induced tissue alternations and DNA damage of mammalian cells will be assessed. The cancer/mutagenesis experiment will be carried out to investigate whether UVC induces skin cancer in the UVC-treated rodents. Accomplishing the specific aims outlined in this proposal will provide the foundation required to assess the efficacy as well as possible side effects of UVC prophylaxis and treatment for open fracture, burn, and surgical wound infections. If UVC irradiation of wounds proves to be both safe and effective, this treatment could be rapidly implemented because portable UVC devices could be distributed to military personnel and used without medical training. This technology could be implemented in the field and could delay the onset or progression of infection until medical intervention is available.