Pittet-Wagener Lab Projects
As of Spring 2014

The Identification of Specific Strains of Pseudomonas aeruginosa in Lung Infection and their Relation to Patient Outcomes

Principal Investigators: Jean-Francois Pittet, M.D.; Brant Wagener, M.D., Ph.D.
In this study, we are collecting sputum samples from all patients diagnosed with Pseudomonas aeruginosa at a UAB ICU. The samples are then tested for their expression of various components of the Type III secretion system which is responsible for pathogen virulence. We then compare this bacterial data with clinical data and outcomes in patients to determine the relationship between bacterial virulence and pneumonia definitions/patient outcome/ARDS/etc.
Key Collaborator: Troy Stevens, Ph.D. (University of South Alabama)

The Role of Blunt Head Trauma in Nosocomial Lung Infections

Principal Investigators: Jean-Francois Pittet, M.D.; Brant Wagener, M.D., Ph.D.
This project looks to understand to role of coagulopathy in lung infection after blunt head trauma. We are currently using a mouse model of head injury and have revealed that there is coagulopathy after head injury. We are currently studying the mechanisms of this coagulopathy, including the alpha-7 nicotinic receptor, and how this coagulopathy may lead to increased opportunity for nosocomial lung infection.
Key Collaborator: Patrick L. Bosarge, M.D.

The Role of Coagulopathy in Pediatric Trauma

Principal Investigators: Jean-Francois Pittet, M.D.; Brant Wagener, M.D., Ph.D.
Coagulopathy after trauma in adults is a common phenomenon, although not well understood. There is less known in children and we seek to determine first the relationship between coagulopathy and mortality after trauma in children. We are currently looking into the roles of aPC and syndecan-1 in this process.
Key Collaborators: Robert Russell, M.D. (Children's Hospital); Steven J. Lisco, M.D., FCCM, FCCP (University of Nebraska at Omaha); Amy L. Duhachek-Stapelman, M.D., (University of Nebraska at Omaha)

The Role of the Glycocalyx after Trauma in Nosocomial Lung

Infections

Principal Investigators: Jean-Francois Pittet, M.D.; Brant Wagener, M.D., Ph.D.
This is a new collaboration in which we will look first at glycocalyx shedding after trauma/hemorrhage. From there, we will look into the mechanisms of how this shedding may lead to ARDS or increased risk of nosocomial infection.
Key Collaborator: Randall Dull, M.D., Ph.D. (University of Illinois College of Medicine at Chicago)

The Role of IL-8 and phosphodiesterases in ARDS and Nosocomial Lung Infection

Principal Investigators: Jean-Francois Pittet, M.D.; Brant Wagener, M.D., Ph.D.
After trauma, chemokines, including IL-8, are increased within the lung air spaces of patients. This leads to inhibition of beta-agonist-mediated alveolar fluid clearance. We are studying the role of PI3K and phosphodiesterases in this process and whether specific inhibitors of these proteins could restore the normal human response to beta-agonists in patients with ARDS.
Key Collaborators: Sadis Matalon, Ph.D.; Thomas C. Rich, Ph.D. (University of South Alabama)

The Role of N-WASP in Nosocomial Lung Infection

Principal Investigators: Jean-Francois Pittet, M.D.; Brant Wagener, M.D., Ph.D.
IL-1beta and TGF-beta (mediators released during trauma and infection) lead to decreased lung epithelial barrier function and therefore increase a patient's risk of nosocomial lung infection and ARDS. We have found that N-WASP is critically involved in this process and that its inhibition may be able to prevent these inhibitory processes and restore epithelial barrier function.
Key Collaborator: Qiang Ding, Ph.D.

The Role of the Parasympathetic and Sympathetic Nervous System in Noscomial Lung Infection after Trauma

Principal Investigators: Jean-Francois Pittet, M.D.; Brant Wagener, M.D., Ph.D.
After trauma, there is intense vagal stimulation that may be a contributor to ARDS and nosocomial lung infection. We are performing a study in which we will look at sympathetic and parasympathetic nervous system patterns in patients who have undergone trauma (using special monitoring equipment) and will relate this to their outcomes in the ICU.

Key Collaborators: Vinod Singh, M.D.; Nicole P. Juffermans, M.D., Ph.D. University of Amsterdam, Netherlands.

The Role of Vitamins C and E in Prevention of Nosocomial Lung Infection

Principal Investigators: Jean-Francois Pittet, M.D.; Brant Wagener, M.D., Ph.D.
In this project, we are giving patients who have undergone trauma prophylactic doses of Vitamin E to determine whether this will decrease the incidence of nosocomial pneumonia. This project is occurring in conjunction with our in vitro study.
Key Collaborators: Albert Pierce, M.D.

The Role of Vitamin E in Nosocomial Lung Infections

Principal Investigators: Jean-Francois Pittet, M.D.; Brant Wagener, M.D., Ph.D.
We are studying the ability of Vitamin E to prevent bacterial injury to lung epithelial and endothelial cells *in vitro.* Additionally, we are determining the ability of Vitamin E to decrease mortality in a mouse model of nosocomial pneumonia.
Key Collaborator: Maret G. Traber, Ph.D. (Linus Pauling Institute at Oregon State University)

The Role of Whole Blood Resuscitation on Nosocomial Lung Infections

Principal Investigators: Jean-Francois Pittet, M.D.; Brant Wagener, M.D., Ph.D.
Resuscitation with banked blood induces immunomodulation and may increase a patient's risk for ARDS and nosocomial pneumonia. We are studying these effects in a mouse model of trauma/hemorrhage and looking at mediators in banked blood that may be the cause of this phenomenon.
Key Collaborator: Rakesh Patel, Ph.D.