

**LIST OF AWARD RECIPIENTS**  
**UB 2020 RESEARCH AND DEVELOPMENT ACTIVITIES FUND (IRDF)**

**Principal Investigators  
and Co-Investigators  
March 2006**

**"Chemical Microarrays to Identify Cell Specific Ligands for Diagnostic and Therapeutic Applications"**

Principal Investigator

Matthew Disney  
Chemistry  
College of Arts & Sciences

Co-Investigator

Terry D. Connell  
Microbiology  
School of Medicine and Biomedical Sciences

Project Description

The goal of this proposed work is to develop general methods to identify ligands that recognize the surface of pathogenic cells using chemical microarrays. Microarrays provide an ideal platform for probing interactions at cell surfaces because they display ligands in a manner that mimics interactions at cell-cell interfaces. These efforts will involve several long range interdisciplinary collaborations at UB that include the collection of biological data on the ligands that cell surfaces recognize. This information has the potential to enable development of facile medical diagnostics and therapeutics. Professor Matthew Disney's group at UB has extensive experience in the development of small molecule microarray platforms to probe the interactions of organic ligands to whole cells. He has developed a microarray surface that resists non-specific cell binding and is suitable for studying the binding of pathogens to ligands displayed on microarrays. Dr. Terry D. Connell's (Dept. of Microbiology & Immunology) group has experience in the culture and evaluation of a variety of bacterial pathogens including *Vibrio cholera*, *Porphyromonas gingivalis*, *Salmonella enteritidis*, *Bordetella pertussis*, *Bacillus cereus* (anthrax surrogate), and enterotoxigenic *Escherichia coli*. Their combined experience will allow a suite of pathogenic organisms to be studied to identify the ligands which are recognized by these bacteria and whether those ligands are internalized by the pathogens. Both questions are of critical importance in understanding the pathogenesis of those bacteria which have serious impacts on human health.

## **“Four Seasons: The Experience of Midlife and Older Adults in the Buffalo Niagara Region”**

### Principal Investigator

Kathryn Foster  
Institute for Local Governance & Regional Growth  
School of Law

### Co-Investigators

Daniel Hess  
Urban & Regional Planning  
School of Architecture

Edward Steinfeld  
Architecture  
School of Architecture

Debra Street  
Sociology  
College of Arts & Sciences

Anthony Szczygiel  
Law  
School of Law

Machiko R. Tomita  
Rehabilitation Sciences  
School of Public Health & Health Professions

Deborah Waldrop  
Social Work  
School of Social Work

### Project Description

The Buffalo Niagara region is a natural laboratory for cutting-edge, cross-national research on the processes and outcomes of population aging, both for communities and individuals. Western New York and Southern Ontario each have populations older than their respective national averages, and are similarly diverse economically and socially. In a community with declining population, access to better data and models is critical to understanding and strategically responding to the choices and behaviors of aging populations.

An interdisciplinary group of University at Buffalo experts will develop and implement a benchmark longitudinal survey of perceptions and experiences of the region’s midlife and older adults. Reflecting its theoretical framework encompassing social capital theory, ecological theories of aging, and life course theories of cumulative advantage and disadvantage, the survey

will address a range of age-related experiences, including social/health characteristics; economic choices and resources; political behavior; and the nature of and reliance upon social and cultural networks. Key project components include: 1) research design, survey development and initial data collection; 2) summary report of findings and data provided to UB research community; and 3) preparation of a major proposal using the baseline data to effectively compete for external support. Survey findings will 1) address unresolved theoretical questions cross cutting traditional disciplinary interests; 2) exploit linkages to the university's existing core of aging research; and 3) be the foundation for cross-disciplinary, cross-national research to follow. The project also will exploit the unique position of UB as a "border university" with particular strength in cross-national interdisciplinary research

### **"Optimizing Antibiotic Dosing in Staphylococcus aureus Bloodstream Infection"**

#### Principal Investigator

Brian T. Tsuji

Pharmacy Practice

School of Pharmacy & Pharmaceutical Sciences

#### Co-Investigators

Alan Forrest

Pharmacy Practice

School of Pharmacy & Pharmaceutical Sciences

Alan J. Lesea

Medicine

School of Medicine & Biomedical Sciences

Joseph Mylotte

Medicine

School of Medicine & Biomedical Sciences

Patrick Smith

Pharmacy Practice

School of Pharmacy & Pharmacy Practice

#### Project Description

*Staphylococcus aureus* is the most important bacteria causing bloodstream infection in both the hospital and community setting. Certain resistant strains of *S. aureus* referred to as methicillin-resistant *S. aureus* or MRSA are resistant to multiple classes of antibiotics. Vancomycin is an antibiotic that has been the mainstay of therapy against these deadly, resistant strains. However, increasing reports of treatment failures associated with resistance to this last line of defense antibiotic, the precipitous rise of MRSA infections, and the high attributable mortality of this organism in bloodstream infections demand the optimization of dosing strategies for vancomycin. Therefore, the major objective of this proposal is to utilize novel in vitro models to predict optimal dosing regimens of vancomycin that will be efficacious in the clinical setting.

This interdisciplinary approach integrates pharmacokinetic, bacteriologic, and molecular data into a pharmacodynamic system that examines the emergence of resistance when MRSA is exposed to vancomycin. Our central hypothesis is that novel in vitro pharmacodynamic models can be used to design dose-optimized antibiotic regimens for the treatment of MRSA bloodstream infection in humans. Taken together with clinical data and the intense study of bacterial characteristics of MRSA isolates obtained from infected patients, this strategy will not only provide insight into optimizing vancomycin therapy, but may also be applied to designing optimal dosing regimens for other antibiotics to combat the emergence of bacterial resistance.