

## STAFF PROFILE

Featured in the newsletter of ClinicalRM, a full-service Clinical Research Organization

### **Dan Zurawski: Research Molecular Biologist**

By Kimbra Cutlip

Dan Zurawski is not a uniformed member of the U.S. military, but he is on the front lines of a war against a pernicious, shape-shifting enemy. A senior scientist and principal investigator at the Department of Wound Infections at Walter Reed Army Institute of Research, Dan is searching for novel weapons to fight back devastating bacterial infections in wounded warriors.

Multi-drug resistant bacteria (MDR), or extremely drug resistant bacteria (XDR), have become a major problem for Wounded Warriors, and pose a serious public health threat. Despite antibiotic therapy, five to fifteen percent of traumatic wounds in warriors become infected with these pathogens. While they don't usually affect healthy individuals, they can be devastating to diabetics and those who are immunocompromised such as Wounded Warriors.

"We need new drugs to overcome these pathogens," Dan says, "Bacteria really have an uncanny ability to become resistant very quickly. It's time to think outside the box."

His lab is doing just that. One idea they are investigating in collaboration with Rutgers University is the potential for predatory bacteria to control infections. In another area, Dan has been working on novel small molecules such as iron chelators as a possible antimicrobial agents. Equally important to the work, is the animal modeling that he and his team have been developing to test their ideas. "When I started this, I recognized a translational gap where some really good scientists are doing some really good things *in vitro* at the bench but don't have a means to translate that into a product," he says. "The biggest part of that is animal modeling."

It's a gap that Dan and his lab are now helping to fill. Since 2011, his lab has developed three animal models to test all six of the major MDR and XDR pathogens. Known as the ESKAPE pathogens, these include *Enterococcus faecium*, (methicillin-resistant) *Staphylococcus aureus*, often referred to as MRSA, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, *Pseudomonas aeruginosa*, and *Enterobacter* species. They now have a mouse pulmonary model, a mouse wound model, and a porcine wound model to test antimicrobial drugs.

Last year, when he was invited to present his work at the prestigious Gordon Research Conference, it opened the flood gates of interest in his animal models. "These are research platforms we use for looking at novel antibiotics within the lab," Dan says, "but it also becomes a really nice collaboration tool." As a result of the conference, the lab is now working with academic institutions and pharmaceutical companies to conduct pre-clinical animal testing for efficacy, safety and toxicity of their novel antimicrobial tools.

It has been a labor of love Dan says to work on research with a direct application to helping Wounded Warriors. He was exposed to the devastation of traumatic war injuries while conducting his post doctoral work at Uniform Services University of the Health Sciences (USUHS). The school shared a campus with the hospital that received wounded veterans of the Iraq war. Dan was studying novel secreted proteins in *Shigella* and becoming increasingly disillusioned with basic research that, while interesting, “would be read by only a handful of people.” He wanted to work on something that had a more direct application. After completing his post doctoral work, he took a job at WRAIR where he hoped his *Shigella* research would prove useful in the development of a vaccine.

But in 2008, when an opportunity came up for Dan to apply for a grant to work on ESKAPE pathogens at the Department of Wound Infections, he took a risk and wrote a few proposals. It was an area in which he had not yet worked, but he received two grants. He quickly moved over to the department and began working at CRM. The challenge of running his own lab at 35 was daunting at first, but he says he relied on experience gleaned from growing up with a father who was the vice president of a large biotech firm. Today, he manages 12 people in his lab and has been partnering with some of the world’s leading researchers in the field of novel anti-microbial research.

He laughs at the notion that he is achieving rock-star status in his field, but admits there might be a correlation between giving a science talk to hundreds of people and performing music on stage. It’s a correlation he’s qualified to make. In college, Dan was the lead singer and songwriter for a band that played throughout Philadelphia. He says there was even a record deal with Capital Records. “It fell through, but for some time I actually thought it might go somewhere,” he says.

Music remains an important part of his life, and it’s something he’s passing along to his two daughters, Sasha, 6 and Rachel, 4. Only time will tell if he’s also passing along his passion for microbial science, but he brings the influences of his work home. “We’re very into the farm to table movement and supporting local, organic farming,” he says, “because I’m conscious of the importance of not exposing animals to antibiotics.” It’s just one of the ways Dan is trying to make a difference.