

Antibiotic resistance has become a fundamental threat to public health and safety (High-level meeting on antimicrobial resistance, United Nations, 2016, <https://www.un.org/pga/71/event-latest/high-level-meeting-on-antimicrobial-resistance/>). This affects the entire spectrum of medical and social issues from respiratory infections to surgical procedures to food safety. [The Center for Antibiotic Discovery and Resistance \(oucreate.com\)](http://oucreate.com) led by Zgurskaya conducts research and prepares the next generation of scientists to address this critical area. The Center spans several Universities across the US and abroad and involves collaborations with leading pharmaceutical companies. The following projects are offered in Zgurskaya lab to introduce this line of research.

Project 1: Analyses of mechanisms of action of new antibiotics effective against Mycobacterium tuberculosis.

Mycobacterium tuberculosis is a significant human pathogen. Students working on the project will participate in development of biochemical assays to analyze mechanisms of action of recently discovered anti-tuberculosis compounds. The hypothesis to be tested is that these inhibitors target a transporter protein involved in assembly of mycobacterial cell walls.

Project 2: Analyses of in vitro and in vivo activities of discovered inhibitors of multidrug efflux pumps.

In collaboration with computational and medicinal chemists we discovered new inhibitors of multidrug efflux pumps effective against different bacteria. Students will participate in establishing specific binding sites on the target proteins and characterization of the mechanism of action.

Project 3: Tools to facilitate antibiotic discovery and development.

We developed a new technology to analyze the effect of active efflux and transmembrane diffusion in antibacterial activities that facilitate antibiotic discovery and development. Students will participate in genetic manipulation of bacterial pathogens to make them amendable for different analyses.