

Research targets basic metabolism of disease-causing fungi, bacteria

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Pablo Sobrado, assistant professor of biochemistry with the Fralin Life Science Institute at Virginia Tech, has received a \$1.1 million grant from the National Science Foundation (NSF) to advance his research on the mechanism of iron acquisition in fungi and mycobacteria.

Iron is essential for all life. The level of free [iron](#) in humans is less than *Aspergillus fumigatus* and *Mycobacterium tuberculosis* need. To satisfy their metabolic needs and enable infection, these microbes secrete molecules called siderophores to obtain iron from the host. The synthesis of siderophores requires special enzymes. Sobrado is studying these enzymes. "Our aim is to understand how the enzymes activate [molecular oxygen](#) and attach it to the substrate molecules, lysine or ornithine, in the biosynthesis of siderophores," he said.

He reported in the July 2010 issue of the journal *Biochemistry* that the [enzyme](#) from *A. fumigatus* contains the cofactor flavin adenine dinucleotide (FAD) that reacts with molecular oxygen and forms a stable intermediate. The NSF grant will fund the research to elucidate the mechanism of action and the structure of the enzymes from *A. fumigatus* and *M. tuberculosis*, specifically, how they stabilize the intermediate and what regulates the specificity of the enzyme.

For the educational component of the NSF grant, Sobrado is collaborating with a group at the University of Pavia who are experts on [protein crystallography](#). "Our students will travel to Italy to be trained in how to solve the structure of enzymes," he said. "The goal is to train

global scientists."

The students will include members of Virginia Tech's Multicultural Academic Opportunities Program and Post-baccalaureate Research and Education Program, as well as high school students who will present their work at the local science fair.

More information: The paper, "*Aspergillus fumigatus* SidA is a highly specific ornithine hydroxylase with bound flavin cofactor," by Wyatt Chocklett and Sobrado, is available at www.ncbi.nlm.nih.gov/pubmed/20614882.

Provided by Virginia Tech

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