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St. Cloud State University student Mathew Routh, a fifth-year senior biomedical science major, pours an agar solution into petri dishes Thursday to prepare them for use in the toxoplasma gondii research project. The solution is a growth medium that provides food for the single-celled parasite.

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## **Students get real-world lab experience in project**

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A local research project could one day help keep pregnant women, organ transplant recipients and people with poor immune systems healthy.

The St. Cloud State University project studies toxoplasma gondii, a single-celled parasite that lives in human beings and animals.

The project is led by assistant professor Christopher Kvaal and is supported by a three-year, \$162,500 Academic Research Enhancement Award from the National Institutes of Health.

Toxoplasma infects one in five people in the United States -- and about one in three people worldwide -- and remains inside the body permanently. It rarely affects healthy people, but it poses a significant threat to unborn babies and people with suppressed immune systems.

The research gives undergraduate students valuable research experience and advances years of toxoplasma research, bringing scientists a little bit closer to finding a cure.

"It can hit home because one in five people you talk to is infected but doesn't know it," Kvaal said.

### **Serious infection**

The most common ways to be infected by the organism are by eating undercooked meat and touching cat feces, even the trace amounts contained in dust from a litter box.

Most people don't realize they've been infected because healthy people experience few, if any, symptoms, Kvaal said.

"Cysts form in your brain, eyes and muscle tissue, but you won't even know that's happening," he said.

Toxoplasma presents serious health issues for pregnant women, people with AIDS and patients receiving chemotherapy or organ transplants.

Infections during a pregnancy can cause birth defects. Toxoplasma can cause complications such as encephalitis in people with suppressed immune systems.

Kvaal and his students hope to identify weaknesses or vulnerabilities in toxoplasma. They'll use yeast as a surrogate host for toxoplasma DNA because it's safer than culturing the parasite in human cell lines.

Senior Mathew Routh signed up for the project to get more research experience.

"Just being in a lab, experiencing a lab, helps you," the biomedical science major said. "You just learn why you do stuff. In class you just do what you're told."

Routh spends about 12 hours a week on the project.

### Painstaking work

The research team will run the experiment millions of times. Kvaal expects a discovery about one in every 1,000 times. He believes what the researchers will learn will lead to the development of a drug that kills toxoplasma infection. The development of that drug could be as far off as 10 years.

"We all walk on the shoulders of giants," Kvaal said. "We are not starting from scratch. We're advancing the work that's been done for the last 20 years, and as this technology advances, we can make bigger and bigger strides."

Kvaal spends about 40 hours a week on the project and expects to study toxoplasma the rest of his career. Right now he works with 11 students, two of them freshmen. He hopes to get 40 students involved during the three-year project.

"What the undergraduates get is sort of real-world skills, and it's the hardest thing to have them admit that failing is OK," Kvaal said. "You learn more from your mistakes than when you do things perfectly."

The project helps Morgan Binnie, a senior majoring in biomedical science, combine skills she's learned in various classes.

"It's added on to what we've learned already," she said.