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### A bug only a scientist could love -- UM professor unlocking secrets of STD

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**NEWS RELEASE**

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Feb. 26, 1998

**Contact:** Ralph Judd, UM biology professor, (406) 243-2347.

**A BUG ONLY A SCIENTIST COULD LOVE --  
UM PROFESSOR UNLOCKING SECRETS OF STD**

**MISSOULA--**

Ralph Judd, a microbiology professor and researcher at The University of Montana-Missoula, admits people usually take a step back when they learn what he studies.

He even gets similar reactions from his family at times. Once as a graduate student, he left his wife, Vicki, waiting in the car while he hurried into a lab to get some fresh bacteria cultures.

When he returned, Mrs. Judd said, "You know, not every wife would wait around while her husband goes to get gonorrhea."

That's been a running joke in the Judd household since he started studying gonorrhea, a sexually transmitted disease characterized by painful urination and discharge of pus, in the early 1970s.

Though the disease is seldom life threatening, having gonorrhea is an uncomfortable experience that can cause sterility and painful joints. Among females the STD also can cause severe abdominal pain, cramping, a life-threatening tubal pregnancy or -- in rare cases -- a dangerous disseminating infection when the organism invades the woman's blood stream, causing a rapid drop in blood pressure.

-more-

## Gonorr.r1--2

Judd said research at his UM laboratory has three major goals -- to study the physiology of the gonorrhea bacterium, design a simple diagnostic test to detect the organism and develop a vaccine to prevent infections.

Gonorrhea is a huge problem around the world, especially in Third World countries. Judd said the problem is less pronounced in the United States, but there are still up to 500,000 infections reported in this country every year. And the organism is sneaky, since 20 percent of infected men and most infected women don't display symptoms but can still pass on the disease.

Despite these grim facts, Judd said he has always been fascinated by gonococcus, the bacterium that causes gonorrhea. Gonococci are extremely versatile organisms seemingly designed to baffle the human immune system.

"I love the little things," Judd said. "We are their universe, since the gonococcus exists only in humans. Anything we learn about them tells us about ourselves."

He said our immune systems recognize molecules on the surfaces of invading organisms. But a gonococcus has the ability to spontaneously change its surface markers into almost infinite varieties. By the time the immune system has discovered the invader and started to fight back, Judd said, "the gonococcus has already changed its coat. The organism really knows how to fool us."

Gonococci seem to sucker immune systems with dominant molecules on their surfaces that they keep changing. However, Judd and his staff have discovered less-prominent surface molecules - like Outer Membrane Protein 85 (Omp85) -- that seem to stay fairly constant.

"If we make antibodies to these minor molecules, would it kill the bacteria?" he asked.

"This might lead us to a vaccine."

Judd's lab contributed to the discovery of the efflux pump system, a drug-resistance

mechanism used by gonorrhea bacteria, along with Dr. W.M. Shafer of Emory University in Atlanta. The lab also is studying what role the newly discovered protein Omp85 plays with the disease.

“Right now it looks like Omp85 may not be essential to the life of the organism,” he said, “but even if it isn’t, there are other proteins we are interested in pursuing.”

Under normal circumstances, gonorrhea can be cured readily with antibiotics once a patient begins displaying symptoms. A gonorrhea infection also may run its course in several uncomfortable weeks or months -- fraught with possible side effects -- if treatment is not sought.

The current test to diagnose gonorrhea involves cultivating the bacteria and can be fairly expensive. A swab is taken of the potentially infected area, and then a culture is grown over a three-day period. Judd said the current test is only 80 percent effective.

If Judd can discover a molecule on gonococcus that is always expressed, he envisions a cheaper diagnostic test -- similar to a home pregnancy test -- that would become widely used by STD clinics and perhaps be sold over the counter. If a urine sample or swab contains gonorrhea, antibodies on a test strip would bind to gonococcal proteins, causing a color change.

“Right now we are working on a test where, if gonorrhea is present, the test strip turns purple,” he said. “If it turns yellow, you have chlamydia (another STD), and if it turns green, you have both. You don’t want green.”

Judd admitted they need some research breakthroughs before a home gonorrhea test or vaccine to prevent infection is available.

He said the problem with producing a vaccine is that it’s difficult to stimulate immune responses on mucosal surfaces, which are located in areas such as the eyes, nose, genitals or

intestines. But once an immune response is triggered, immunity is conveyed to all mucosal surfaces in the body.

Judd said microbiologist Scott Manning, a UM adjunct assistant research professor, is working on vaccination strategies designed to stimulate mucosal immunity. Manning is studying the possibility of a gonorrhea vaccine taken orally that would trigger immunity in the intestines and thus in the genitalia.

“This research might also help with AIDS and infections like genital warts,” Judd said.

Most of Judd’s research funding comes from the National Institutes of Health, but he said it’s getting increasingly difficult to garner funding for gonorrhea research in this era of AIDS.

Judd emphasizes that he is only one of several researchers in his laboratory. He said undergraduates, graduate students and UM faculty all work together as a team trying to unlock the secrets of gonococcus. He said one of the most rewarding aspects of working at UM is the opportunity to teach and work with students. He teaches freshman, junior, senior and graduate-level courses.

Eight people work in Judd’s lab, and even though they work closely with the bacteria, they have never had a laboratory infection of gonorrhea.

“It’s funny. I work with the gonococcus all the time, but I’ve never actually seen an infection,” Judd said. “But that’s OK.”

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