

Mon, May, 3, 2010 **Reuters News**

### **Novartis finds clues for universal *E. coli* vaccine**

- Researchers say gene approach offers broad-spectrum hope
- Initial tests of a vaccine in humans could come in 2012
- Huge potential market, but many years of work ahead

By Kate Kelland

Scientists at drugmaker **Novartis** have found bacterial components they hope can be used to develop a vaccine to protect people against a range of dangerous *Escherichia coli* (*E. coli*) infections. Certain strains of the bacteria cause diseases such as food-borne illnesses, urine infections and meningitis among newborns, in rich and poor countries alike.

"We know that we have the potential there, and this could mean that once you get vaccinated, you could even be covered against all the different diseases that *E. coli* can cause," MariaGrazia Pizza, who worked on the study in **Novartis's** Italian research labs, said in a telephone interview. She said the team, who conducted the research using computer modeling and then experiments on mice at the firm's labs in Siena, hoped the first test of the broad-spectrum vaccine could take place in humans by 2012.

*E. coli* are common bacteria that normally live in the guts of animals, including humans, but some strains, such as *E. coli* 0157, can make people very ill. Dangerous strains of *E. coli* also account for more than 80 percent of cases of urinary tract infections, which can damage the kidneys, and are also the second leading cause of neonatal meningitis and blood poisoning. *E. coli* is also behind many food-borne infections, since bacteria can be found in meat products, manure and on fresh produce that has been in contact with manure, and can be spread easily by people and equipment. The potential market for a universal *E. coli* vaccine would be huge, but despite the lure, the search for such a vaccine has been hampered because the genetic structure of different bacteria strains varies widely.

Pizza and colleagues said their approach -- which took the gene map of the bacterium rather than the bug itself as a starting point -- had helped overcome those barriers. The researchers, whose study was published in the Proceedings of the National Academy of Sciences, used the gene maps to select several hundred antigens common to pathogenic, or disease-causing, strains of the bacteria. The scientists thought these antigens -- molecules recognized by the immune system -- might protect against infection.

They gave them to mice in the lab and then exposed the mice to lethal doses of pathogenic *E. coli*. Nine of the proteins protected the mice from infection. A combination of one or more of these antigens could potentially create a broadly protective *E. coli* vaccine, they wrote in the study.

"The development of such a vaccine will be very challenging for the company, but if we were successful at the end, obviously it would be a big thing," Pizza said.

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