

Researchers using salmonella to fight cancer

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University of Minnesota researchers are using salmonella – the bacteria commonly transmitted through food that sickens thousands of U.S. residents each year – to do what was once unthinkable: help people.

U of M Masonic [Cancer](#) Center researchers believe [salmonella](#) may be a valuable tool in the fight against cancer in organs surrounding the gut – such as the liver, spleen, and colon – since that's where salmonella naturally infects the body.

Researchers want to "weaponize" salmonella, allowing the bacteria to then attack cancer cells in its natural environment.

Trials in animals have already shown salmonella can successfully controlled tumors in the gut. Human clinical trials are already underway at the U of M and are showing promise.

"Many bacteria and viruses - even harmful ones - can be used to fight disease," said Edward Greeno, M.D., lead researcher on the clinical study and Medical Director of the Masonic Cancer Clinic. "We believe it may even be possible to use bacteria to fight cancer."

Scientists have known for centuries that cancer patients sometimes get better after they've been exposed to an infection. For example, Greeno said, there is a published Austrian report from the 1860's on a patient with a large tumor. The patient was placed in the same room as another sick patient with a bad infection. Soon, the tumor became infected and began to shrink in the original patient and nearly disappeared.

Unfortunately, the infection also killed the patient with the tumor.

So the key for this research initiative, Greeno said, was to find a way to get the tumor fighting abilities of salmonella delivered to the patient - without making the patient sick.

What they came up with:

- Greeno's Medical School colleague, Dan Saltzman, M.D., Ph.D., genetically modified a batch of salmonella to weaken it and added Interleukin 2, or IL-2. "You could think of IL-2 as a guard dog that sniffs around looking for threats inside the body," he said. When it finds one, it calls in an attack by the immune system.
- Researchers knew if they could make IL-2 near tumors, it would identify the cancerous cells as a threat and trigger an immune response near the tumor.
- Salmonella naturally finds its way to a person's gut and associated tissues. Salmonella also naturally likes to grow inside of tumor cells. Hence, if you're looking for ways to treat cancer in the bowels, the nearby lymph nodes or the liver - salmonella is a perfect method to deliver a package of IL-2.

In a nutshell, by using genetically modified salmonella packaged with IL-2, Medical School researchers have created a kind of two-prong attack on cancer – the immune response called in by IL-2, and the salmonella itself. The therapy is administered simply – mixed with a few ounces of water and imbibed orally.

"This probably won't replace other ways of treating cancer such as

chemotherapy and radiation," Greeno said. "But it's a promising area of study and we hope it can be a potent tool in our battle against cancer. It also has potential to be a much cheaper and less toxic alternative to chemotherapy and radiation."

Provided by University of Minnesota

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