Getting the body to attack cancer can be a challenge, as many tumors are able to suppress immune activity. One possible solution, published earlier this year in *Nature Biomedical Engineering*, involves injecting a weakened bacterial strain to help alert the immune system to a tumor's presence.

Lead study author Jinhui Wu, a biotechnology researcher from Nanjing University in China, tells *The Scientist* via email that the idea for the experiment came from the 1966 science fiction film *Fantastic Voyage*, which "focuses on the process of micron-sized robots entering the body to remove blood clots," he explains. He and his team wondered if they could do something similar, but for cancer, and chose to use *Salmonella typhimurium* as the therapeutic vehicle because it’s already been demonstrated to be safe for use in humans as part of cancer therapy. Instead of using the bacterium as a weapon to attack tumor cells directly, however, Wu and his colleagues saw its potential to empower immune cells to do so.

The team coated *Salmonella* with positively charged nanoparticles before injecting them into mice that had been treated with radiotherapy. The radiation triggered the tumors to shed negatively charged antigens that clung to the bacteria. Measuring dendritic cell activation as a proxy for the anti-tumor immune response, they observed an 83 percent survival rate compared with just 25 percent in mice treated with radiotherapy and injected with saline.

The results suggest that the engineered *Salmonella* helped ensure that antigen-detecting dendritic cells, which immunosuppressive tumors can disable or keep at bay, came into contact with the tumor antigens and activated an immune response. Polina Weitzenfeld, a tumor immunologist at the Rockefeller University who did not work on the study, tells *The Scientist* that Wu and his colleagues conducted a "well-designed study" with an "interesting approach" that she says “includes all necessary controls.” Weitzenfeld and Fred Hutchinson Cancer Research Center’s Kristin Anderson, who also didn’t participate in the work, say they expect the treatment to work better in tumors with a high mutation rate. As Anderson explains, “tumors that make a lot of proteins that look different from healthy proteins will likely result in more antigens for the bacteria to transport.”

One weakness of the study, Anderson tells *The Scientist*, is that the researchers used transplanted tumors derived from a cell line in their mouse model. Such tumors tend to be more homogeneous than human cancers, she notes, and do “not always completely simulate the tumor microenvironment of human cancers.”

Growing tumor models like those used in the study “can be great for asking proof-of-concept questions,” Anderson says, but they sometimes make a poor proxy for human cancers, in which immune cells may lose functionality over time. For these reasons, Anderson says she suspects that this therapy may have subtler effects when applied to humans. Still, Wu says he plans to test the treatment in humans, but that further safety testing is necessary before that happens.

“Unfortunately,” Weitzenfeld cautions, “it is much easier to cure mice than humans.” —Dan Robitzski