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Doctors, materials scientists hope a blood test will encourage more colon cancer screenings

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Colorectal cancer is the second leading cause of cancer deaths in the U.S. and a growing problem around the world, but not because it's a particularly difficult cancer to detect and halt. The problem, doctors and researchers believe, is that not enough people are being screened for early signs of the disease, either because they do not know the recommendations or because they are avoiding getting a colonoscopy, which many perceive as an unpleasant procedure.

The current alternatives, said Shan Wang, a professor of materials science and engineering and of electrical engineering, aren't exactly more pleasant – most of those involve gathering and testing stool samples.

But Wang, his graduate student Jared Nesvet and Uri Ladabaum, a professor of medicine, may have at least a possible solution: a blood test to detect colorectal cancer, which in principle would be less expensive, less invasive and more convenient than colonoscopies and other current tests, the researchers said. Wang and Nesvet have already developed a test that works in the controlled environment of a materials science lab, and now, with help from a Stanford ChEM-H seed grant, the trio are working to validate their approach in the real world of clinical medicine.

"There's a barrier for compliance" to colonoscopy recommendations, Wang said. "The driving force for a blood test is really to improve compliance and detect cancer early."

Falling short on screening

Current recommendations suggest that everyone between the ages of 50 and 75 get a colonoscopy, but only around 60 to 65 percent of people do so, according to recent studies.

"We've put a lot of effort into getting people screened and, so far, have fallen short of the goal to match screening rates for breast and cervical cancers," Ladabaum said.

Part of it is the ick factor. Whether a colonoscopy actually is that unpleasant – Ladabaum said that many patients wake up from the procedure saying, "Are we done? Really?" – the perception is there and prevents some people from getting screened. Whatever the reason people avoid the procedure or whether it's just a lack of knowledge, Ladabaum said there's a gap to be filled in detecting early – and more treatable – signs of cancer.

The team thought a blood test would be more convenient and appealing, and might increase screening rates. Such a test was certainly possible, Wang, Nesvet and Ladabaum realized, because even early in the development of colorectal cancers, genes from dead tumor cells appear in the bloodstream. The challenge was finding those cancer-relevant genes, which account for only around a tenth of a percent of the free-floating genetic material found in blood, Nesvet said.

"You need very sensitive techniques," Nesvet said, but fortunately there was a solution: magnets. Specifically, Nesvet and colleagues use magnetic tags that attach only to genes associated with colon cancer, some of them identified by collaborator Megan Hitchins, a former associate professor of medicine. Once the tags are attached to cancer-relevant genes, the team can suck those genes out of a blood sample with a small magnetic field and test whether they've been activated or

deactivated, which could indicate whether colorectal cancer is starting to take shape.

From the lab to the clinic

Wang and Nesvet have tested their idea in the lab, and it works well so far, Nesvet said. Now, with help from Ladabaum and the ChEM-H grant, they'll start testing it on blood samples from real patients. Among the questions they'll address are practical ones about how to identify the right people to study, when to draw blood or how to handle the samples.

"That's where we as clinical researchers can help," Ladabaum said.

Wang cautions that a new screen for colon cancer is still a ways off, and that it could involve hundreds, if not thousands, of blood samples before they can be confident their blood test really works. "I expect this will be a five- to 10-year study to bring this technology to fruition," Wang said.

But if it does work, it could be a significant advance. The test is in principle less expensive and less invasive, "so hopefully more people will get it," Nesvet said.

Provided by Stanford University

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