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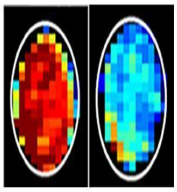
MRI Detects Cancerous Cells



Results of a John Hopkins study suggest MRI could one day make biopsies more effective and even replace them altogether by noninvasively detecting tell-tale sugar molecules shed by the outer membranes of cancerous cells. The study has been published in the journal *Nature Communications.*

According to Jeff Bulte, Ph.D., a professor of radiology and radiological science in the Institute for Cell Engineering at the John Hopkins University School of Medicine, “We think this is the first time scientists have found a use in imaging cellular slime. As cells become cancerous, some proteins on their outer membranes shed sugar molecules and become less slimy, perhaps because they’re crowded closer together. If we tune the MRI to detect sugars attached to a particular protein, we can see the difference between normal and cancerous cells.”

The research is based on recent findings that indicate glucose can be detected by a fine-tuned MRI technique because it has the ability to interact in a unique way with surrounding water molecules without administering dyes. During this study, the research team compared MRI readings from proteins known as mucins with and without sugars attached to see how the signal changed. They then looked for that signal in four types of lab-grown cancer cells and detected markedly lower levels of mucin-attached sugars than in normal cells.

Xiaolei Song, Ph.D., the lead author on the study and a research associate in Bulte’s laboratory points out that the advantage of detecting a molecule that is already inside the body is that there is the possibility of generating an image of the entire tumour. This is generally not possible with injected dyes as they only reach part of the tumour. Dyes are also quite expensive.

However, the research team cautions that more testing is required to gauge the value of this technique in human cancer diagnosis. The team’s next step is to distinguish more types of cancerous tumours from benign masses in live mice. If future studies also show success, this technique could potentially be used to detect cancer at an early stage as well as monitor response to chemotherapy. It can also guide biopsies and reduce unnecessary biopsies.

The project was supported by the National Institute of Biomedical Imaging and Bioengineering, the National Cancer Institute, the Maryland Stem Cell Research Foundation, and the Pearl and Yueh-Heng Yang Foundation.

Source: John Hopkins Medicine

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