

Researchers develop first genetic test to predict tumor sensitivity to radiation therapy

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Recent advances in the understanding of cancer have led to more personalized therapies, such as drugs that target particular proteins and tests that analyze gene expression patterns in tumors to predict a patient's response to therapy. Moffitt Cancer Center researchers have contributed to these advances by developing the first test that analyzes the sensitivity of tumors to radiation therapy. They discovered that colon cancer metastases have varying sensitivity to radiation therapy based on their anatomic location.

Researchers from Moffitt previously developed a radiation sensitivity index (RSI) that predicts how sensitive tumors are to radiation based on expression patterns of different genes. In a paper published July 15 in *The International Journal of Radiation Oncology, Biology and Physics*, they used the RSI to determine the radiation sensitivity of 704 metastatic and 1362 primary colon tumors.

They discovered that metastatic colon tumors are more resistant to radiation than primary colon tumors. The researchers also report that radiation sensitivity may be dependent on the anatomic location of the tumor metastasis. This is one of the first research studies to highlight the importance of the location of the metastasis as well as the location of the original primary tumor, in predicting response to [radiation therapy](#). The researchers confirmed some of these findings by analyzing how effective radiation therapy was in 29 [colon cancer](#) tumors that metastasized to either the liver or lung. Their findings validated that those patients who had metastatic disease in their lungs had a better response to radiation

then patients who had [metastatic disease](#) in their liver, as predicted by RSI.

This study suggests that it may be possible to personalize radiation therapy for patients. "Radiation sensitivity index provides the first opportunity to use [tumor](#) genetics to guide and optimize the [radiation dose](#) that patients receive. The consequences for this can be quite dramatic. We have estimated that up to 15 percent of patients will be candidates for dose optimization," explained senior study author Javier F. Torres-Roca, MD, director of Clinical Research and associate member of the Department of Radiation Oncology at Moffitt.

The medical community has noted Moffitt's contributions to improving cancer care. According to editors of the *International Journal of Radiation Oncology, Biology and Physics* who highlighted the study in a commentary, "Radiation sensitivity index is important progress towards personalizing radiation therapy. The results generate important hypotheses that could dramatically influence patient care."

Provided by H. Lee Moffitt Cancer Center & Research Institute

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