Turning Up the Heat on Tumors

At our lab, we are working to develop radiation-immunotherapy combinations to treat pancreatic cancer.

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At the recent Accelerating Cancer Cures Symposium in New York City, I got an inside look at the cutting-edge cancer research presented by fellow Damon Runyon scientists. The unique symposium encourages networking with fellow awardees and pharmaceutical industry leaders. Unlike solitary work in the lab, collaboration provides a synergy of ideas most likely to lead to unexpected paths of discovery.

As a physician and scientist focused on radiation oncology, I primarily treat patients with pancreatic cancer. It is absolutely critical that we find a way to increase long-term survival for patients with this deadly disease — the third-leading cause of cancer deaths in the United States. I am studying the potentially lifesaving interaction between radiation therapy and immunotherapy. In rare cases, patients with cancers such as melanoma or lung cancer treated with combinations of radiation and immunotherapy have remarkable shrinkage of tumors not only at the site of radiation but also at other sites of metastatic tumors outside of the radiation field. This phenomenon is called the “abscopal effect.” Unfortunately, predicting which patients will respond in this manner, and how to harness the anti-tumor immune cell effects of radiation on a routine basis hasn’t been possible, because we don’t understand the interaction between radiation and the immune system.

The immune system recognizes and attacks tumor cells by surveying tumor cell surface receptors that hold up “antigens,” small protein pieces derived from the tumor. Radiation appears to change the antigens presented on tumors and these new antigens may alert the cancer-fighting T cells to launch an anti-tumor immune response. Basically, T cells can recognize tumor cells that have been missed by the immune system — turning what we call a cold tumor into a hot tumor, which is highly receptive to treatment. It’s a rare phenomenon — like one in a million — but if you can understand more about that one, you may be able to duplicate the results and increase patient survival.

Our lab is identifying the tumor antigens presented in response to radiation, which may help us develop radiation-immunotherapy combinations to treat cancer. While we are currently focusing on pancreatic cancer, this has the potential to impact treatment of other cancers where radiation

therapy is routinely prescribed (e.g., melanoma, breast, lung, prostate, sarcoma, brain, and pediatric cancers).

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