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New screening approach identifies small proteins unique to melanoma cells, researcher says

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Jamie K. Teer, Ph.D., assistant member of the Cancer Biology and Evolution Program at Moffitt Cancer Center, and colleagues have developed a new streamlined method to rapidly identify the genetic changes in small protein fragments unique to melanoma cancer cells. These fragments can be used as targets for tumor-infiltrating lymphocytes that have been shown to reduce cancerous lesions.

The new approach is outlined in an article published online by *Nature Medicine* in May.

A previous phase 2 clinical trial showed substantial regression of metastatic lesions in up to 70 percent of melanoma patients who were treated with self-donated tumor-infiltrating lymphocytes.

"The trial, which involved the adaptive transfer of a patient's own immune cells, showed a complete tumor regression lasting at least five years in nearly 40 percent of the patients," Teer said. "To better understand how this works, researchers needed to identify tumor-infiltrating lymphocytes. We developed a new method to help do that more quickly."

Tumor-infiltrating lymphocytes are white blood cells that have left the bloodstream and migrated into a tumor. When numerous tumor-infiltrating lymphocytes are present, it suggests an immune response

against the tumor. Research into quantifying the tumor-infiltrating lymphocytes and relating those numbers to tumor characteristics and outcomes has been carried out across many types of cancer.

According to Teer, a better understanding of how tumor-infiltrating lymphocytes induce cancer cell regression should increase the effectiveness of patient-donated cell therapy and also potentially reveal novel mechanisms of tumor growth. The technique uses next-generation DNA sequencing technologies to identify the changes that lead to the unique protein fragments.

"Our new technique allowed us to more quickly and easily identify mutated gene antigens recognized by T-cells in the immune system," explained Teer. "Work such as this was previously done by generating and laboriously screening DNA libraries from tumors. The same screening technique may be applicable for identifying mutated antigens in a variety of tumor types."

Provided by H. Lee Moffitt Cancer Center & Research Institute