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Cancer-causing gene found in plasma may help predict outcomes for patients

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Researchers at the University of Cincinnati have discovered that a human cancer-causing gene, called DEK, can be detected in the plasma of head and neck cancer patients. DEK may help doctors understand how a person's immune system could be used to treat cancer or predict outcomes for patients.

These results are being presented via poster at the Multidisciplinary Head and Neck Cancer Symposium in Scottsdale, Arizona, Feb. 18-20.

"Head and neck cancer remains the sixth most common cancer worldwide," says Trisha Wise-Draper, MD, PhD, assistant professor in the Division of Hematology Oncology at the UC College of Medicine, a member of both the Cincinnati Cancer Center and UC Cancer Institute and principal investigator on this study. "Although, infection with the human papilloma virus, or HPV, has emerged as a factor for determining outcomes for head and neck squamous cell carcinoma (head and neck cancer), leading to less intense treatment strategies for patients, no plasma biomarkers exist to predict tumor response to treatment or possible relapse.

"One potential plasma biomarker is programmed by the human DEK gene, which has been found to promote cancer. DEK RNA and protein are highly increased in tissue specimens from several tumor types including head and neck cancer, breast cancer and melanoma, and antibodies to DEK are also detected in patients with autoimmune diseases like juvenile rheumatoid arthritis and lupus. Our previous work

has shown that DEK is highly and universally present in head and neck cancer tissue specimens regardless of stage or HPV infection and has suggested tumor-association. In addition, white blood cells (macrophages), secrete DEK protein leading to the hypothesis that DEK may be present in the plasma of cancer patients and could be correlated with aggressiveness of disease and patient outcomes."

In this study, researchers collected whole blood from either patients with newly diagnosed and untreated head and neck cancer or normal healthy participants who were the same age. Plasma was separated from the samples, and an enzyme-linked immunosorbent assay (ELISA), a test that uses antibodies and color change to identify a substance, was administered.

Plasma DEK levels were compared to normal control levels, tumor stage, age and smoking status; these levels were also compared to inflammatory markers, which can signify cancer, in the plasma and tissue.

"We found that DEK was present in the plasma of both healthy control subjects and those with head and neck cancer," Wise-Draper says. "Overall, DEK was decreased in head and neck cancer patients compared to healthy patients, but it was inversely correlated with IL-6, which is secreted by T cells (white blood cells that play a role in immunity) and triggers an immune response, in the plasma. The immune system's reaction to the tumor also appeared to be linked with high DEK plasma levels. So, although DEK presence is increased in head and neck cancer tissue, plasma DEK levels are decreased in patients when compared with healthy individuals and are further decreased in patients with advanced cancers."

She says these findings, along with DEK's link with IL-6 levels, suggest that high DEK levels may mean better outcomes for patients.

"Furthermore, high DEK levels in the plasma may predict better immunotherapy in terms of cancer treatment," she says. "Further analyses are ongoing to determine whether DEK levels predict response to various treatments, correlate with the body's immune response and whether DEK presence in the serum (in blood, serum includes all proteins not used in blood clotting and all the electrolytes, antibodies, antigens, hormones or any external substances, like drugs) will predict remaining disease or early relapse.

"This information will be important to verify DEK plasma measurements as a clinically useful test and may give insight to future personalized and targeted treatment strategies for head and neck cancer."

Provided by University of Cincinnati