Biomarkers predict effectiveness of radiation treatments for cancer

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An international team of researchers, led by Beaumont Health System's Jan Akervall, M.D., Ph.D., looked at biomarkers to determine the effectiveness of radiation treatments for patients with squamous cell cancer of the head and neck. They identified two markers that were good at predicting a patient's resistance to radiation therapy. Their findings were published in the February issue of the *European Journal of Cancer*.

Explains Dr. Akervall, co-director, Head and Neck Cancer Multidisciplinary Clinic, Beaumont Hospital, Royal Oak, and clinical director of Beaumont's BioBank, "Radiation therapy is a common treatment for people with squamous cell cancer of the head and neck. However, it's not always well-tolerated. It can take two months, resulting in lots of side effects. Some of these complications are permanent. Before my patient goes down that path, I really want to know if their tumors are going to respond to radiation. That's where the patient's biomarkers can shed some light. If not, we can look at other treatment options - saving time, possible risk for complications and expense."

A biomarker is a gene or a set of genes or its products, RNA and proteins, that researchers use to predict a key clinical issue such as diagnosis, prognosis, and response to treatment, choice of treatment or recurrence. Biomarker studies can provide a bridge between emerging molecular information and clinical treatment. Biomarkers may also lead to personalized treatment, in contrast to protocol-based medicine of today.

"Personalized treatment decisions based on biomarkers go beyond traditional cancer staging classifications. Individualized treatment plans could reduce morbidity and potentially improve survival by avoiding treatment failures," says Dr. Akervall. "There is reason to believe that a better understanding of the biological properties of these tumors, as measured in the patient's pre-treatment biopsies, may lead us to predict the response to radiation therapy and concurrent chemoradiation, thus allowing for tailored patient-specific treatment strategies."

The study followed two groups of patients. In the first group, researchers screened 18,000 genes and identified five distinct markers. The second group was larger and confirmed these findings and two of them in particular. Two markers were good at predicting whether or not radiation-based therapy would be effective.

Adds Dr. Akervall, "While our findings are encouraging, and a step toward personalized medicine, we hope to do more of this research with a larger, randomized trial."

According to the National Cancer Institute, most cancers of the head and neck usually begin in the squamous cells that line the moist surfaces of the mouth, nose and throat. Three risk factors identified with squamous cell carcinomas of the head and neck include - tobacco and alcohol use, as well as infection with cancer-causing types of human papillomavirus or HPV.

Provided by Beaumont Health System