MedicalXpress

# Researchers find possible markers for earlier diagnosis of aggressive tongue cancer

December 19 2017

Squamous cell carcinoma of the tongue, also known as oral tongue cancer, is an aggressive form of cancer that generally affects older people. Patients with the disease often find it difficult to eat, swallow food, or speak. Reasons for its generally poor prognosis include late detection, before pain usually starts and only when physical symptoms such as lesions are present, and a propensity for spreading to other sites in the body.

But in a potential harbinger of hope for arriving at an earlier diagnosis and treatment, in a new study published in *Oncotarget*, a team of researchers from Case Western Reserve University School of Medicine, Cleveland Clinic, and University Hospitals Cleveland Medical Center has found that bacterial diversity and richness, and fungal richness, are significantly reduced in tumor tissue compared to their matched non-tumor tissues. This raises the prospect that certain bacteria and fungi, in sufficient amounts and in possibly interactive ways, may play a part in the development of oral tongue cancer. (Previous research has shown that bacteria can spur gastric and colorectal cancer and that bacterial/fungal interplay can contribute to or exacerbate Crohn's disease.)

"Our findings mean that it may be possible to perform precautionary testing in patients at high-risk for oral tongue cancer," said the study's co-senior author Mahmoud A. Ghannoum, PhD, professor in the Department of Dermatology at Case Western Reserve School of Medicine and University Hospitals Cleveland Medical Center. "If the

patterns that we found are present in people who are not yet showing signs of lesions, we could begin treatment early, offering the possibility of better patient outcomes."

Oral tongue cancer, which arises in the anterior two-thirds [front] of the tongue, has been rapidly increasing and is now the second most common malignancy in the oral cavity. While human papillomavirus causes nearly ninety percent of base-of-tongue tumors [back], HPV is rarely found (only 2.3 percent) in oral tongue cancer. The causes of oral tongue cancer are unclear, but genetic mutations probably play a role, while smoking and chewing of tobacco, alcohol use, and poor dental hygiene are correlated with the development of this type of cancer.

"Poor oral hygiene has long been associated with oral cancers, suggesting that oral bacteriome (bacterial community) and mycobiome (fungal community) could play a role," said co-senior author Charis Eng, MD, PhD, professor and vice chairman of the Department of Genetics and Genome Sciences at Case Western Reserve School of Medicine and Hardis Chair of the Genomic Medicine Institute at the Cleveland Clinic.

While the bacteriome is increasingly recognized as playing an active role in health, the role of the mycobiome has been much less studied, and never before in the case of oral tongue cancer. In the new study, the researchers extracted tissue DNA from 39 paired tumor and adjacent normal tissues from patients with the cancer. Analyses showed that *Firmicutes* was the most abundant bacterial phylum, and was significantly increased in tumor compared to non-tumor tissue, 48 percent vs. 40 percent, respectively. In total, the abundance of 22 bacterial and seven fungal genera [types] was significantly different between the tumor and adjacent normal tissue, including *Streptococcus*, which was significantly increased in the tumor group (34 percent vs. 22 percent in normal tissue .)

"Studies are starting to emerge demonstrating interactions between bacteria and fungi in the formation of disease," said Ghannoum. "Thus, additional research is needed aimed at understanding how these two communities influence or are influenced in disease settings such as oral tongue cancer."

**More information:** Pranab K. Mukherjee et al, Bacteriome and mycobiome associations in oral tongue cancer, *Oncotarget* (2017). DOI: 10.18632/oncotarget.21921

Provided by Case Western Reserve University