

Fluorescent probe for oral cancer

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(PhysOrg.com) -- UC Davis researchers have developed a laser probe for the early detection of oral cancer. A trial with human subjects shows that the device could also be used during surgery to locate the edges of a tumor.

Approximately 43,000 people in the U.S. are diagnosed with tumors of the mouth, pharynx and larynx each year. The main risk factor is smoking, but a recent rise in cases has been linked to [human papillomavirus](#). Most cases are not diagnosed until the cancer has reached an advanced stage.

"There's a lot out there about breast, prostate and [brain cancer](#), but people are not so aware about [oral cancer](#) and its devastating consequences," said Laura Marcu, a professor of biomedical engineering at UC Davis. "People don't think to look for it, and there isn't any routine screening."

Marcu's laboratory collaborated with Dr. Gregory Farwell's group in the Department of Otolaryngology at the UC Davis Cancer Center to develop the fiber-optic probe.

The probe stimulates molecules in the patient's tissues with a laser. Some of these molecules naturally respond by re-emitting fluorescent light. The device rapidly detects and analyzes this light using a process called "time-resolved [fluorescence spectroscopy](#)" (TR-LIFS), which provides information about the types of molecules present.

During surgery, blood can distort the intensity of the fluorescence signal but not its duration. By using sensitive measurements of the change in fluorescence over time, surgeons can see the tumor margins even as they are cutting the tissue.

Based on encouraging results in animal tests, Marcu and Farwell's team recruited nine human volunteers from among patients who arrived at the UC Davis Medical Center for surgical therapy of the mouth, throat and larynx. They compared readings from spectroscopy with biopsy samples

from the same locations and found that the probe could accurately diagnose the cancer in the surgical environment.

The probe is similar to one that Marcu has already developed for use with brain tumors. In clinical trials, surgeons have used her technology to delineate the margins of tumors during surgery.

Details of the human oral cancer study will be published in an upcoming issue of the journal *Otolaryngology - Head and Neck Surgery*.

Provided by UC Davis

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