



CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP130293

Project Title:
Minimally-invasive intratumoral drug delivery using microneedles to treat oral squamous carcinomas

Award Mechanism:
High Impact/High Risk

Principal Investigator:
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Entity:
Texas Tech University

Lay Summary:

An estimated 40,250 new cases of oral cavity tumors will be diagnosed in the US in 2012 and 7,850 people will die of the disease. Tumor of the tongue accounts for over 60% of oral tumors. The goal of this research is to develop a minimally invasive method of treating tongue tumor and other tumors of the mouth without use of surgery because surgical removal of tongue and mouth tissue often results in severe swallowing, eating, speech, cosmetic and psychological disabilities among the patients. Furthermore, over the last 30 years, aggressive surgical treatment has not resulted in any significant improvement in the five-year survival rates. Overall, there is lack of a treatment approach that can not only reduce death but can preserve patient quality of life, which suffers poorly after surgery. To address this strong clinical need, we propose to develop a simple medical device that can be used to accurately deliver tumor medications directly to the tumor. The device is comprised of tiny needles that are coated with microscopic particles containing the anti-cancer drug. The tiny needles can pierce the tumor and deposit the particles in precise locations within the tumor. The drug from the particles will slowly release directly into the tumor to provide the therapeutic effect. Direct delivery using this approach will minimize side effects, and in a single application of the device, medication can be automatically delivered for extended durations (weeks to months). The medical device is expected to be flexible because different anti-cancer drugs can be filled into the microparticles, enabling patient customization to meet different medical needs. The device also has the potential to be mounted on the tip of catheters and could be used to treat tumors of other parts of the mouth including cheeks and the 'voice box'. Overall, the use of this novel device has the potential to minimize surgery and its associated side effects in managing tongue and other tumors of the mouth.