CANCER PREVENTION & RESEARCH
INSTITUTE OF TEXAS

Award ID:
RP170314

Project Title:
Biodegradable nanoclusters for molecular cancer imaging

Award Mechanism:
Individual Investigator

Principal Investigator:
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Entity:
The University of Texas M.D. Anderson Cancer Center

Lay Summary:

Ovarian cancer is the deadliest gynecologic malignancy that results in an estimated 150,000 death per year including ca. 14,000 women in the USA alone. Significant efforts in improving patient outcomes including cancer free survival and cure from the disease are focused on early detection, prevention and identifying the best course of therapy. However, the lack of reliable biomarkers has been associated with a slow progress and difficulties in optimizing various strategies; currently, most validation approaches are based on clinical trials requiring a large number of patients and a long time to achieve results.

There is an urgent critical need for a technology that would allow sensitive and non-invasive detection of ovarian cancer to provide new impetus to advancements in management of ovarian cancer patients that has been long overdue. In this project we propose to develop such technology based on molecular specific photoacoustic imaging. Indeed, our compelling preliminary data show that a combination of ultrasound-guided spectroscopic photoacoustic (sPA) imaging and molecular specific plasmonic nanoparticles enables detection of metastatic foci as small as 50 µm, which consist of as few as 30 cells, in vivo with high spatial resolution. This unprecedented performance provides an exciting opportunity for development of highly sensitive molecular specific detection methods of ovarian cancer in the clinic. Indeed, the possibility of PA imaging at clinically relevant depth – beyond 6 cm in tissue – has been well documented and clinical photoacoustic systems are already been evaluated in clinical trials. Here we hypothesize that ovarian cancer cells can be detected in vivo with high sensitivity and specificity using molecular specific photoacoustic-ultrasonic imaging with biodegradable plasmonic nanoparticles. Furthermore, this technology can be translated into clinical practice.