Study identifies a method for optical detection and laser-based photo destruction of ovarian cancer cells

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Research conducted by Baharak Bahmani, PhD, Yadir Guerrero, BS, Danielle Bacon, Vikas Kundra, MD, PhD, Valentine I. Vullev, PhD, and Bahman Anvari, PhD was selected as Editor's Choice for the September 2014 issue of *Lasers in Surgery and Medicine* (LSM).

The manuscript titled, "Functionalized Polymeric Nanoparticles Loaded with Indocyanine Green as Theranostic Materials for Targeted Molecular Near Infrared Fluorescence Imaging and Photothermal Destruction of Ovarian Cancer Cells" was published in *LSM*, the official journal of the American Society for Laser Medicine and Surgery, Inc. (ASLMS).

The study demonstrates the effectiveness of a nano-structured system for combined near infrared (NIR) fluorescence imaging of human epidermal growth factor receptor-2 (HER2) over-expression, as a biomarker of ovarian cancer cells, and photothermal destruction of these cells in vitro.

"The use of multi-functional nanoconstructs in detection and treatment of tissue malformations is a very promising and rapidly advancing area of research," stated Dr. Bahmani. "Herein, we have reported in-vitro targeting of ovarian cancer cells using Indocyanine Green loaded polymeric nanoparticles functionalized with anti-epidermal growth factor receptor-2 (anti-HER2) antibodies. These multi-functional nanoconstructs were utilized to optically detect ovarian cancer cells followed by laser-based photodestruction of cancer cells. The

functionalization procedure described in this manuscript may be implemented as a platform for functionalization of various types of nanoconstructs for detection and therapy of malignant tissue."

Dr. Bahmani is assistant project scientist in department of Bioengineering, University of California, Riverside. She received her PhD from University of California, Riverside in 2013. Her research interests include developing multi-functional nanoconstructs for optical diagnostic and laser-based phototherapy of ovarian cancer.

"The biophotonics research group at UC Riverside has engineered an optical nano-scale multi-functional platform composed of a polymeric material doped with indocyanine green, and functionalized with monoclonal antibodies. In collaboration with colleagues at The University of Texas MD Anderson Cancer Center, the investigators demonstrate that this single platform is capable of specific targeting, near infrared molecular imaging, and photothermal destruction of ovarian cancer cells in vitro," stated Dr. Anvari.

More information: "Functionalized polymeric nanoparticles loaded with indocyanine green as theranostic materials for targeted molecular near infrared fluorescence imaging and photothermal destruction of ovarian cancer cells." *Lasers Surg Med*. 2014 Sep;46(7):582-92. DOI: 10.1002/lsm.22269. Epub 2014 Jun 24.

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