joint IBI & ISREC SEMINAR

“Nanosystems for Targeted Therapy and Molecular Immunosensing of Ovarian Cancer”

Monday – July 1, 2013 – 2:00 p.m.
EPFL – room SV1717a

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host: Prof. M. Swartz

Abstract

Most of ovarian cancer (OC) patients are diagnosed in the late stage of the disease when it has already disseminated beyond the ovaries, while the currently used treatment modalities often fail to effectively cure the disease. Thus, OC patients need to be diagnosed at the early stage and efficiently treated with targeted therapies using synthetic lethality. Here, we present engineered nanosystems (NSs) for targeted therapy and molecular immunosensing of OC. For targeted therapy, we engineered biodegradable nanoparticles (NPs) of poly(lactic-co-glycolic acid) containing cytotoxic agents or drugs inhibiting OC cells transporters involved in pH dysregulation to simultaneously target key molecular elements of OC within tumor microenvironment. The NPs were decorated with polyethylene glycol and anti-tumor endothelial marker 1 (TEM1) antibody (Ab)/scFv. These NSs (~220 nm) showed sustained-release profile and actively inhibited TEM-1 expressing MS-1 endothelial cells and OVCAR-5 cells. For molecular sensing, we capitalized on preparation of improved immunosensor to sense CA125 expressed by OC cells and found in OC patients serum. To amplify the sensing signals, surface of the electrodes were decorated with NPs (20 nm) that were armed with anti-CA125 Ab using silica coated gold NPs or CdSe quantum dots. The engineered immunosensors were successfully tested using EIS and CV methods showing high precision. These NSs may be used for successful detection and effective therapy of OC as well as other solid tumors.

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