



Molecular Cancer Detection/Cancer Stem Cells

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Location: HSC-18, room 050

The major focus of our group is the development of sensitive and specific assays for early noninvasive or minimally invasive molecular detection of cancer, and the development of cancer stem cells-targeted therapies (in collaboration with the IBC&DD). Since virtually all tumors represent highly heterogeneous populations of cells, molecular analyses of surgically obtained gross or biopsy specimens are not optimal. In contrast, the most representative cancer cells, including cancer stem cells, are more likely than their normal counterparts to exfoliate into biological fluids, so we are studying multiple molecular markers, including telomerase, metalloproteinases, adhesion molecules and others, on particular populations of *exfoliated and sorted cancer cells* isolated from corresponding fluids.

I. Molecular Cancer Detection Projects

Gastrointestinal Cancers

Involved: Martin Karpeh, MD; David Rivadeneira, MD (*Dept of Surgery/Surgical Oncology*)

Molecular markers: telomerase activity; metalloproteinases; TIMP-1; E-cadherin; methylated/unmethylated promoters of E-cadherin; CEA etc.

Prostate Cancer

Involved: Howard Adler, MD (*Dept of Urology*)

Molecular markers: telomerase activity, PSA, PCA-3, metalloproteinases.

II. Cancer Stem Cells Project

Involved: Martin Karpeh, MD; David Rivadeneira, MD (*Dept of Surgery/Surgical Oncology*)

Howard Crawford, PhD (*Dept of Pharmacological Sciences*)

Grigori Enikolopov, Ph.D. (*Cold Spring Harbor Laboratory*)

Petar Djuric, PhD (*Dept of Electric & Computer Engineering*)

III. Cancer Stem Cells-Targeted Drug Development Project

Involved: Iwao Ojima, PhD (*Institute of Chemical Biology & Drug Development*)

Howard Crawford, PhD (*Dept of Pharmacological Sciences*)

Wei-Xing Zong (*Department of Molecular Genetics & Microbiology*)

IV. Development of Instruments for Early Cancer Detection

Involved: S. Luryi, PhD; V. Gorfinkel, PhD; E. Kabotyanski, PhD (*Dept. of Electrical & Computer Engineering*);

B. Gorbovitski, PhD (*BioPhotonics Inc.*)

Recent publications:

Botchkina GI, Kim RH, Botchkina IL, Kirshenbaum A, Frischer ZI and Adler HL. Noninvasive detection of prostate cancer by quantitative analysis of telomerase activity. *Clinical Cancer Research*, 11 (9), 3243-3249, 2005.

Kabotyanski EA, Botchkina IL, Kosobokova O, Botchkina GI, Gorfinkel V, and Gorbovitski B. Highly sensitive revealing of PCR products with capillary electrophoresis based on single photon detection. *Biosens Bioelectron.*, 21, 1924-1931, 2006.