"The best prevention, is Early Detection"

EDRN Today

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CANCER BIOMARKERS RESEARCH GROUP

Early Detection Research Network (EDRN)
by Michelle Pitt, MHA and Felicia Evans Long, MBA

EDRN, What's the Latest?

Have you heard? The 33rd EDRN Steering Committee Meeting took place from September 5-6, 2018 in Boston, MA. This meeting marked the half waypoint for this cycle of the EDRN. These scientists have come together to help accelerate the translation of biomarker information into clinical applications and to evaluate new ways of testing cancer in its earliest stages and for cancer risk. Presentation by the EDRN PIs provided NCI Program Staff with updates on progress made by individual researchers and by the EDRN as a collaborative network.

At this meeting participants updated and discussed the collaborations led by Dr. Sudhir Srivastava and several other NCI staff. The meeting supported international collaborations to apply genomics research for cancer biomarkers research, early detection, and cancer prevention.

The early detection of cancer greatly increases the chances of successful treatment. Far too often, however, cancers are diagnosed at later stages, when curative treatment is no longer possible. We were excited to hear about all of the updates and progression presentations from each institution.

The 34th EDRN Steering Committee Meeting is from March 18-20, 2019 in Nashville, TN. Details will become available in January, 2019.

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Awards Corner
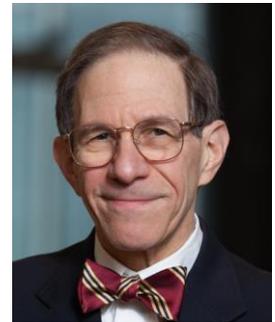
Dr. Sanford Markowitz
Featured in Dr. Sharpless's Annual Budget Report to Congress

Recipient of:
NCI Outstanding Investigator Award in December 2016

Program Director of the Month

Dr. Wang is a Program Director (PD) working at CBRG/DCP/NCI, mainly for Breast/GYN Group and G.I. Group. She has participated in significant trans-NIH initiatives relevant to genomics, gene-environment interaction (GxE) researches, including HapMap, genome wide association analysis methods, technology for analyzing genetic and epigenetic mutations, and DNA repair. In addition, she has developed initiatives to promote biomarker research for cancer early detection and prevention, including non-coding RNAs, adductomics, which is supporting novel researches being conducted by investigators, including Dr. Aziz Sancar, who received Nobel Prize in Chemistry in 2015.

Dr. Wang is a lead PD for international collaborations between US-EDRN and China-EDRN, the Cancer Institute/Hospital of the Chinese Academy of Medical Sciences (CICAMS), Shanghai Institutes for Biological Sciences (SIBS), Chinese Academy of Sciences (CAS). The collaboration projects include ethnic differences of the ERG oncogene, integrative analysis of genomics data, and microbiome as well as scientific exchanges and system review. Collaborators have reported research results, including the manuscript recently published at Scientific Reports by the Nature Publishing Group.

RESEARCH SPOTLIGHT

Tao Liu, Ph.D.
PNNL and CPDR BRLs
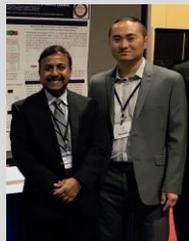
It remains challenging to identify biomarkers for early detection of aggressive prostate cancer, when it is still organ confined and considered to be clinically low risk disease. Such markers would be useful in improving selection of patients for active surveillance versus invasive treatments. In order to identify a panel of proteins with the potential to predict prostate cancer progression, the PNNL team developed sensitive targeted proteomics assays, namely the PRISM-SRM assays, for 52 protein candidates (representing prostate cancer specific, as well as common cancer driver candidates) that were selected by the CPDR team. The PRISM-SRM assays used heavy isotope-labeled synthetic peptides as internal standards for quantitative proteomics analysis of index tumors from a well-annotated CPDR cohort of 338 patients who underwent radical prostatectomy (RP) and donated prostatectomy specimens that were whole-mounted, formalin-fixed paraffin-embedded (FFPE). We oversampled on patients who exhibited cancer progression (biochemical recurrence or metastatic progression) to compare to men with at least 5 years follow-up and no evidence of cancer progression after RP. Nearly one thousand FFPE tissue sections were micro-dissected to generate tumor enriched specimens for proteomics evalutaions. The highly sensitive PRISM-SRM analyses enabled the detection and precise quantification of 42 out of 52 biomarker candidates; in comparison regular LC-SRM without the front-end chromatographic enrichment could detect only 21 of these candidates at the protein level. More importantly, we identified a three-protein panel (TGF beta, SPARC and PSA) in primary tumors that predicted metastatic progression with an AUC of 0.94, modeling the three-protein panel with key clinical features at time of biopsy, including serum PSA level, clinical T stage, and biopsy Gleason score. Preliminary analysis showed that the biomarker panel also provides the ability to predict BCR-free survival and high pathology grade groups at RP. These biomarker candidates will be tested in biopsy and proximal fluid samples to further validate their utility for clinical applications. This collaboration also represents systematic development of sensitive proteomics assays using small amount of carefully characterized pathologic specimens that is translatable in a clinical setting.

Investigator Spotlight

Fend Jiang, Ph.D.

Dr. Feng Jiang's research interest is in the area of understanding the biological and molecular genetic basis of lung tumorigenesis, and translating the new findings to the clinics for diagnosis of lung cancer by collaborating with scientists and clinical investigators across a diverse range of disciplines. Using a functional approach that integrates genomics and transcript microarrays, proteomics, and tissue arrays, he has identified potential oncogenes or tumor suppressor genes whose dysfunction may play important roles in lung tumorigenesis. The identified lung tumor-genes provide potential targets for the early detection and diagnosis of lung cancer. Dr. Jiang has demonstrated that droplet digital PCR can directly and precisely quantify non-coding RNAs and methylation of DNA in clinical specimens. He has developed potential sputum and plasma biomarkers for distinguishing malignant from benign pulmonary nodules and/or the early detection of lung cancer. He has developed peripheral blood mononuclear cell-miRNAs as new circulating immunological biomarkers for lung cancer. Dr. Jiang will further develop the biomarkers as Clinical Laboratory Improvement Amendments-validated diagnostic tests for the early detection of lung cancer or distinguishing malignant from benign growths in a LDCT lung cancer screening program. Dr. Jiang has also shown that the Illumina MiSeq can detect 50 genes for the single nucleotide variants and insertions and deletions in plasma. He is now developing genetic tests (e.g., the tumor mutational burden) that can be performed in biopsy or plasma samples for the altered genes to select lung cancer patients who will benefit from immunotherapy or personalized treatments. The success of the projects will have high clinical impact in patient care.