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Super resolution imaging system for DNA sequencing, genotyping and proteomics

Apton Biosystems has built a versatile high-speed, affordable, imaging system with the ability to detect single fluorophores on labeled macromolecules (DNA, RNA and protein) on a surface with super resolution capability. The system was used for DNA sequencing using commercial sequencing by synthesis reagents dNTPs and Therminator X enzyme and for molecule detection using fluorescently labeled oligonucleotide and antibogy probes. Target molecules or clusters with incorporated labeled dNTPs or bound by probes or have are imaged and countedWe have sequenced PCR amplified human gene targets, Phage X174 genome, the *E. coli* genome human exomes and the human genome. We will present a cost validated execution plan to reduce the sequencing costs to $ 10 per human genome.. NSCLC cell lines were cultured and untreated or treated with tyrosine kinase inhibitor erlotinib. We detected protein phosphorylation changes for EGFR, ERK, MET and MEK, using just 0.5 to 2 cell equivalents of protein lysate containing sub pM levels of protein. We also detected indels in EGFR exon 19 and point mutations in L858R, T790M in EGFR and V600E in BRAF, at 0.5% minor component levels, by using an oligonucleotide ligation assay off-chip and then attaching the ligated product to the surface. mRNA levels and fusion mRNAs were detected using 10-20 cell equivalents of RNA. The system will enable comprehensive analysis of cancer related pathways from a few cells to help decipher changes in cellular pathways in response to mutations and consequently help with selection of efficacious drugs that are individual specific. We believe this system will revolutionize the practice of medicine by enabling affordable analysis of biological samples, cellular mutations and pathways.

Biography

Manohar R Furtado has completed his PhD in Protein Biochemistry from Pune Universsity and completed Post-Doctoral Training at Northwestern University in Virology. He served on the Faculty at Northwestern in the Department of Pathology and conducted Basic Research in Oncolgy & Infectious Diseases. He joined Applied Biosystems in 2000 and worked there as the Vice Presisident, R&D for Molecular Medicine & Applied Markets. He was a Consultant for Bio-Rad, ACD, Sample 6, DxNow and Apton Biosystems. He was on the National Biodefense Science Board at DHHS (2011-2015). He is currently the CSO and CRO at Apton. He is on the Board of LexaGene.

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