J Cancer Sci Ther 2014, 6:10
http://dx.doi.org/10.4172/1948-5956.S1.035

OMICS Group Conferences
Accelerating Scientific Discovery

4th World Congress on
Cancer Science & Therapy
October 20-22, 2014 DoubleTree by Hilton Hotel Chicago-North Shore Conference Center, USA

IRF1 and the DNA damage response: Friend or foe

Nicole Clarke
University of Nottingham, UK

Interferon regulatory factor-1 (IRF-1) is an important anti-oncogenic transcription factor. A key component of IRF-1's tumor suppressor activity is the induction of apoptosis in cancer cells and many of its' gene targets are involved in the extrinsic or intrinsic apoptotic pathways. Early studies showed that IRF1 was also involved in DNA damage responses. IRF1 regulates DNA damage-induced apoptosis and cell cycle arrest but the target genes responsible for it's' activity were not known. Genome-wide studies, ChIP-chip and ChIP-Sequencing identified a number of gene targets of IRF1 within the DNA damage response including, BRIP1/FANCJ, FANCF, PCNA, and ATR (Ataxia telangiectasia and Rad3 related) signaling components. Fanconi anemia (FA) proteins like FANCJ and ATR signaling proteins play a role in DNA interstrand crosslink repair (ICL). Our previous work has shown that IRF1 is involved in the DNA damage response to ICLs, as cells deficient in IRF1 protein display a similar phenotype to Fanconi anemia (FA) deficient cells, increased accumulation in G2/M. The transcriptional regulation of DNA damage repair proteins such as BRIP1/FANCJ or other ATR signaling proteins most likely contributes to IRF1's role in this response. In addition, DNA motif discovery identified a set of significantly enriched IRF1 bound DNA sequences at the promoters of DNA damage genes. Furthermore, functional characterization of the IRF1 bound genes identified by ChIP-Seq demonstrated that the major gene target pathway of IRF1 is apoptosis. These data will impact on our understanding of anti-oncogenic pathways in cells and how IRF1 may contribute to the response to chemotherapeutic drugs.

Biography

Nicole Clarke completed her PhD in Molecular and Cellular Biology from Columbia University and Postdoctoral studies at the Institut de Génétique et de Biologie Moléculaire et Cellulaire. Her research work is focused on elucidating tumor suppressor networks in cells and understanding how these pathways are affected by novel protein-protein interactions and posttranslational modifications. She has published in international journals and serves as an Editorial Board Member for ISRN International Scholarly Research Notices.

Novel approaches to cancer therapeutics

Neelu Puri
University of Illinois at Chicago, USA

This lecture will discuss the innovative approach of targeting the telomere in regards to cancer therapy, focusing on the findings of a novel anticancer therapeutic, T-oligo, which has demonstrated exciting success in preclinical studies. Administration of T-oligo, an oligonucleotide homologous to 3'-telomere overhang, induces potent DNA damage responses in numerous cancer types, presumably by mimicking or inducing telomere DNA damage, resulting in cell cycle arrest, senescence, or apoptosis. Remarkably, T-oligo induces minimal side-effects in the nontransformed counterparts of these cancers, and thus, is actively being investigated as a novel anticancer therapeutic. However, as an oligonucleotide, T-oligo's intrinsic instability makes it susceptible to degradation by intracellular and serum nucleases, which severely limits its clinical use. Hence, this lecture will also discuss how T-oligo can be stabilized by complexing it with a novel cationic alpha helical peptide, PVBLG-8, to form a nanocomplex (TOP complex). The TOP complex has demonstrated increased efficacy and cellular uptake, which will help develop T-oligo as an innovative, effective therapeutic drug.

Biography

Neelu Puri has studied melanoma and non-small cell lung cancer (NSCLC) tumor biology and therapeutics for 15 years, during which time she has authored several peer-reviewed original research articles, review articles and editorials. She has served as a reviewer for the *Clinical Cancer Research*, *Cancer research*, *PLoS One*, Neoplasia, *International Journal of Oncology* and several other journals. She is also an editorial member for *Journal of Cancer Science & Therapy* and *Journal of Oncology and Biomarker Research*. She is a member of the American Association of Cancer Research, American Medical Writers Association and American Gastroenterological Association.