



Details of the Collaborative Activity

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Name of the Collaborating Department: YenePoYa Research Center and Dept of Surgical Oncology

Joint Research and Publication

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Multiple G-quadruplex binding ligand induced transcriptomic map of cancer cell lines

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Abstract

The G-quadruplexes (G4s) are a class of DNA secondary structures with guanine rich DNA sequences that can fold into four stranded non-canonical structures. At the genomic level, their pivotal role is well established in DNA replication, telomerase functions, constitution of topologically associating domains, and the regulation of gene expression. Genome instability mediated by altered G4 formation and assembly has been associated with multiple disorders including cancers and neurodegenerative disorders. Multiple tools have also been developed to predict the potential G4 regions in genomes and the whole genome G4 maps are also being derived through sequencing approaches. Enrichment of G4s in the cis-regulatory elements of genes associated with tumorigenesis has accelerated the quest for identification of G4-DNA binding ligands (G4DBLs) that can selectively bind and regulate the expression of such specific genes. In this context, the analysis of G4DBL responsive transcriptome in diverse cancer cell lines is inevitable for assessment of the specificity of novel G4DBLs. Towards this, we assembled the transcripts differentially regulated by different G4DBLs and have also identified a core set of genes regulated in diverse cancer cell lines in response to 3 or more of these ligands. With the mode of action of G4DBLs towards topology shifts, folding, or disruption of G4 structure being currently visualized, we believe that this dataset will serve as a platform for assembly of G4DBL responsive transcriptome for comparative analysis of G4DBLs in multiple cancer cells based on the expression of specific cis-regulatory G4 associated genes in the future.

Keywords PhenDC3 · TMPyP4 · 360A · APTO-253 · AQ1 · Centriole assembly

Abbreviations

G4 G-quadruplex
G4DBLs G4-DNA binding ligands

TMPyP4 5,10,15,20-Tetrakis(*N*-methyl-4-pyridyl) porphyrin
TMPyP4-PT Metallated analogues of TMPyP4 with Zn(II), Pt(II)
360A 2-*N*,6-*N*-Bis(1-methylquinolin-1-ium-3-yl)pyridine-2,6-dicarboxamide
AQ1 4-[(7-Chloroquinolin-4-yl)amino]-2-(diethylaminomethyl)phenol
CMO3 Phenanthroline-1,3,6,8 (2*H*,7*H*)-tetraone
PhenDC3 N2,N9-Bis(1-Methylquinolin-3-yl)-1,10-Phenanthroline-2,9-Dicarboxamide
APTO-253 L2-(5-fluoro-2-methyl-1*H*-indol-3-yl)-1*H*-imidazo[4,5*f*][1,10]phenanthroline;hydrochloride

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