

The Cell cycle and cancer

Essay

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بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ

﴿قَالُوا سُبْحَانَكَ لَا عِلْمَ لَنَا إِلَّا مَا عَلَّمْتَنَا إِنَّكَ

أَنْتَ الْعَلِيمُ الْحَكِيمُ﴾

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***I would like to dedicate this work
to my
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whose love and encouragement
have made me what I am today.***

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List of Abbreviations

2D-PAGE	2 Dimension Polyacrylamide Gel Electrophoresis
AIDS	Acquired immune deficiency syndrome
Akt	Protein Kinase B
ALL	Acute lymphoblastic lymphoma
AML	Acute myelogenous lymphoma
AP	Activating Protein 2
APC	Anaphase Promoting Complex
APC/C	Anaphase Promoting Complex/ Cyclosome
ARF	Alternative Reading Frame
ASPP	Apoptosis Stimulating Protein Of P53
A-T	Ataxia Telangectasia
ATF2	Activating Transcription Factor 2
ATLL	Adult T cell leukemia/lymphoma
ATM	Ataxia Telangectasia Mutated
ATP	Adenosine Triphosphate
ATR	ATM-Rad3-Related
BASC	BRCA1 Associated Genome Surveillance Complex
BAX	Bcl2 Associated X Protein
BCL2	Breakpoint Cluster 2
B-CLL	B cell – chronic lymphocytic lymphoma
BL	Burkitt's lymphoma
BMI1	B Lymphoma Insertion Region
BRCA 1&2	Breast Cancer Genes 1&2
BRCT	BRCA C Terminal
BrdU	5-Bromo-2'-deoxyuridine
BUB	Budding uninhibited by Benzamidazole
BUBR	Budding uninhibited by Benzamidazole receptor
BWS	Beckwith – Wiedemann Syndrome
C/EBP	CAAT/enhancer binding protein

CAK	Cyclin Activating Kinase
CbPa	Osteoblast specific Runt family transcription factor
CDKN2A	CDK inhibitor 2A
CDKs	Cyclin Dependent Kinases
cDNA	Cloned DNA
Cdt1	Replication licensing factor
CEP	Chromosome enumeration probes
CGH	Comparitive genomic hybridization
CHD4	Chromodomain helicase-DNA binding protein
Chk 1&2	Checkpoint proteins
CIP/KIP	Cyclin Inhibiting Protein/Kinase Inhibiting Protein
CKIs	Cyclin Dependent Kinases Inhibitors
CML	Chronic myeloid leukemia
CMML	Chronic myelo-monocytic leukemia
c-oncogenes	Cellular- oncogenes
CRC	Colo-rectal carcinoma
CSF-1	Colony stimulating factor 1
Ct	Cycle threshold
CTD	C-terminal domain
DC	Dendritic cells
DCIS	Ductal carcinoma in situ
DDS	Denys-Drash Syndrome
DHPLC	Denaturing high pressure liquid chromatography
DLBCL	Diffuse Large B Cell Lymphoma
DNA	Deoxyribonucleic Acid
E2	Ubiquitin conjugating enzyme
E3	Protein ubiquitin ligase
EGF	Epidermal growth factor
EGFR	Epidermal growth factor receptor
ERK	Extracellular signal regulated protein kinase
FANC	Fanconi anemia protein

FCM	Flowcytometry
FISH	Florescence in situ hybridization
FITC	Flourescine isothiocyanate
G0 phase	Gap 0
G1 phase	Gap 1
G2 phase	Gap2
GADD45	Growth arrest DNA damage inducible gene
GPCR	G protein –coupled receptor
GR	Glucocorticoid Receptors
H2O2	Hydrogen Peroxide
HATs	Histone acetylase transferase
HBP1	HMG box containing suppressor
HCC	Hepatocellular carcinoma
HDAC	Histone deacetylase
HDM2	Human double minute 2
HIV-1	Human immune deficiency virus-1
HLA	Human leucocyte antigen
HPV	Human papilloma virus
HSC	Hematopoietic Stem Cells
ID1	Inhibitor of DNA binding 1
IGF	Insulin-like growth factor
IGF-R	Insulin-like growth factor receptor
IHC	Immunohistochemistry
IL	Interleukin
INF-γ	Interferon-- γ
INK4	Inhibitors Of CDK4
IR	Ionizing radiation
kDa	Kilo Dalton
KO	Knock out
LAA	Leukemia associated antigens
LOH	Loss of hereterozygosity

LSI	Locus specific indicator
M phase	Mitosis Phase
MAD	Mitotic arrest deficient
MCL	Mantle Cell Lymphoma
MCM	minichromosome maintainence
MDM2	Minute Double Murine 2
MDS	Myelodysplastic syndrome
MED2	Mediator subunit
MEK 1&2	Mitogen activated protein kinase
MGUS	Monoclonal gammopathy of undetermined significance
MM	Multiple myeloma
MPF	Mitosis / M Phase Promoting Factor
MRD	Minimal residual disease
mRNA	messenger Ribonucleic Acid
MS	Mass spectrometry
MTS 1	Major Tumor Suppressor 1
Myo-D	Muscle specific transcription factor
NBS	Nijmegen breakage syndrome
NBS1	Nibrin
NES	Nuclear Export Signal
NFIL-6	Nuclear factor activated by interleukin 6
NHL	Non Hodgkin lymphoma
NK/T	Natural killer T cell lymphoma
NLS	Nuclear localization signal
NPC	Nasopharyngeal carcinoma
NRD	Nucleosome remodeling and acetylating complex
NSCLC	Non small cell lung cancer
ORC	Origin recognition complex
P53R2	P53 inducible ribonucleotide
PAPA-repeat	Alternating proline-alanine residues
PC	Prostatic cancer

PCNA	Proliferating Cell Nuclear Antigen
PCR	Polymerase chain reaction
PDGF-A	Platelet derived growth factor -A
PEST	Proline-glutamate-serine-threonine
PFTa	Pifithrin a
PFTm	Pifithrin m
Ph1	Philadelphia chromosome
PI3K	Phosphatidyl inositol 3-kinase
PkCd	Protein kinase Cd
PLL	Prolymphocytic leukemia
PML	Promyelocytic leukemia
PML-NB	PML- nuclear bodies
pRB	Retinoblastoma Protein
Q-PCR	Quantitative –PCR
Q-PCR	Quantitative PCR
R point	Restriction Point
RAEB	Refractory anemia with excess blasts
RAEB-T	Refractory anemia with excess blasts in transformation
RC	Replicative complex
RDS	Radio-resistant DNA synthesis
RFLP	Restriction fragment length polymorphism
RNA	Ribonucleic Acid
RNA PoII	RNA polymerase II
RT-PCR	Reverse transcriptase -PCR
S phase	Synthesis Phase
SCC	Squamous cell carcinoma
SCF	Skp- cullin F box protein
Sdi1	Senescence cell derived inhibitor 1
Ser	Serine
SLVL	Splenic lymphoma with villous lymphocytes
SMZL	Splenic marginal zone lymphoma

SPF	Synthesis / S Phase Promoting Factor
SSCP	Single stranded confirmation polymorphism
STAT	Signal transducer and activator of infection
T-LBL/ALL	T cell lymphoblastic lymphoma/acute lymphoblastic leukemia
TC	Translocation and cyclin D
TF	Transcription factor
TFIIH	Transcription factor H
TGF-β	Transforming Growth Factor-B
Thr	Therionine
TNF-α	Tumor Necrosis Factor- A
TRAIL-R2	Tumor necrosis factor-related apoptosis inducing ligand receptor
Tsp-1	Protein Thrombospondin-1
Tyr	Tyrosine
Ub	Ubiquitin
UV	Ultraviolet
VEGF	Vascular Endothelial Growth Factor
v-oncogenes	Viral oncogenes
Waf1	Wild-type p53-activated fragment
WAGR	Syndrome consisting of: Wilm's tumor, aniridia, Genitourinary abnormalities and Mental retardation
WB	Western blot
WT1	Wilm's tumor gene
Wt-p53	Wild type p53

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