

**The Novel Presence and Role of Inositol
Polyphosphate 4-Phosphatase Type I in the Nucleus
and Extracellular Milieu**



to be submitted as Major Project in partial fulfilment of the
requirement for the degree of

M.Tech. (Biomedical Engineering)

Submitted by

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DECLARATION



I, **Damini Vatsa**, hereby declare that the dissertation entitled '**The Novel Presence and Role of Inositol Polyphosphate 4-phosphatase Type I in the Nucleus and Extracellular Milieu**' submitted is in the partial fulfilment of the requirements for the reward of the degree of Master of Technology in Biomedical Engineering, Delhi Technological University. It is a record of original and independent research work done by me under the supervision and guidance of **Dr. Anurag Agrawal**, Principal Scientist, CSIR-IGIB and **Prof. Bansi D. Malhotra**, Department of biotechnology, DTU. The information and data enclosed in this thesis is original and has not been submitted elsewhere for honouring of any other degree.

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CERTIFICATE



This is to certify that the dissertation entitled ‘**The Novel Presence and Role of Inositol Polyphosphate 4-phosphatase Type I in the Nucleus and Extracellular Milieu**’ submitted by **Damini Vatsa (2K14/BME/06)** is in the partial fulfilment of the requirements for the reward of the degree of Master of Technology, Delhi Technological University (Formerly Delhi College of Engineering, University of Delhi), is an authentic record of the candidate’s own work carried out by her under my guidance. The information and data enclosed in this thesis is original and has not been submitted elsewhere for honouring of any other degree.

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LIST OF ABBREVIATIONS

ABBREVIATIONS

FULL FORMS

APS	Ammonium persulfate
BAD	Bcl-2-associated death promoter
BALF	Broncho-alveolar lavage fluid
BCA WR	Bicinchoninic acid Working reagent
BIM	Bcl-2-like protein 11
DTT	Dithiothreitol
FBS	Fetal Bovine Serum
FOXO	Forkhead family of transcription factor
GFP	Green fluorescent Protein
GPCR	G-protein-coupled receptors
HRP	Horseradish peroxidase
INPP4A	Inositol polyphosphate-4 phosphatase type I
INPP4B	Inositol polyphosphate-4 phosphatase type II
mTOR	Mammalian target of rapamycin
NGF	Nerve Growth Factor
NLS	Nuclear localizing Sequence
NMDAR	N-methyl-D-aspartate receptor
PBMC	Peripheral blood mononuclear cell
PBS	Phosphate-buffered saline
PBST	Phosphate-buffered saline with 0.1% Tween-20
PDK1	Phosphoinositide-dependent kinase 1

PI	Phosphoinositide
PI	Protease Inhibitor
PI3K	Phosphoinositide 3-kinase
PM	Plasma membrane
PTEN	Phosphatase and tensin homolog
PtdIns(3)P	Phosphatidylinositol 3-phosphate
PtdIns(4)P	Phosphatidylinositol 4-phosphate
PtdIns(4,5)P ₂	Phosphatidylinositol 4,5-Bisphosphate
PtdIns(3,4,5)P ₃	Phosphatidylinositol 3,4,5-trisphosphate
PtdIns(3,4)P ₂	Phosphatidylinositol 3,4-Bisphosphate
PVDF	Polyvinylidene fluoride
RIPA	Radioimmunoprecipitation assay buffer
RPMI	Roswell Park Memorial Institute medium
RTK	Receptor Tyrosine Kinase
SDS	Sodium dodecyl sulfate
SGK3	Glucocorticoid-regulated kinase 3
TBST	Tris-Buffered Saline with 0.1% Tween 20

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OBJECTIVES OF THESIS

OBJECTIVE I: *To confirm the presence of INPP4A in Nucleus & Investigating its role*

OBJECTIVE II: *To confirm the presence of INPP4A in Extracellular milieu in vitro*