In Silico Identification of novel ligand enhances Myelopoiesis to prevent infection caused after Chemotherapy.

A Major Project dissertation submitted
In partial fulfilment of the requirement for the degree of

Master of Technology
In
Bioinformatics

Submitted by
Jyoti Parmar
(2K12/BIO/010)

Under the supervision of
Dr. G.U. Gurudutta Scientist 'F'

Institute of Nuclear Medicine and Allied Sciences (INMAS),
Defence Research & Development Organisation (DRDO),
Brig. S.K. Majumdar Road, Timarpur, Delhi-110054

University Guide
Dr. Jai Gopal Sharma
Associate Professor
Department of Biotechnology
Delhi Technological University
(Formerly Delhi College of Engineering)
Shahbad Daulatpur, New Bawana Road, Delhi-110042

CERTIFICATE

This is to certify that the M. Tech. dissertation entitled **"*In Silico* Identification of novel ligand enhances myelopoiesis to prevent infection caused after Chemotherapy."**, submitted by **Jyoti Parmar (2K12/BIO/010)** in partial fulfilment of the requirement for the award 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.

The information and data enclosed in this dissertation is original and has not been submitted elsewhere for honouring of any other degree.

Date:

Dr Jai Gopal Sharma
Associate Professor, Faculty of Biotechnology
(Project Mentor)
Department of Bio-Technology
Delhi Technological University
(Formerly Delhi College of Engineering, University of Delhi)

ACKNOWLEDGEMENT

This project report is the result of whereby I have been accompanied and supported by many people. Their contributions in assorted ways from start to end of this project work deserve special mention. It is a pleasure to convey my gratitude to all of them in my humble acknowledgment.

In the first place I sincerely thank **Dr. Jai Gopal Sharma, Associate Professor Faculty of Biotechnology Department of Biotechnology Delhi Technological University,** for allowing me to do this research work.

I sincerely thank **Dr. R.P. Tripathi, Director of INMAS,** for allowing me to do this research work.

I am very thankful to **Dr. Rajeev Vij** and **Dr. Naveen Soni** for allowing me and guiding me to do work as trainee in INMAS.

I would like to express gratitude to my supervisor **Dr. Gurudutta Ganganahalli ‚Scientist'F', H.O.D Stem Cell and Gene Therapy Department, INMAS DRDO, New Delhi** for his much needed advice and supervision. He provided me unflinching encouragement and support in various ways. I am very thankful to him for giving me an opportunity to carry out project work as a research trainee.

I would like to specially thank **Mr. Pawan Kumar Raghav** for troubleshooting and proofreading of this thesis. This project would not have been possible without his guidance and patience and I learned a lot while working with him as an associate.

I would like to thank **Dr. Neeraj Satija, Dr. Yogesh Kumar Verma Scientist "C"** for giving me opportunity to carry out my project work and helped me by providing theoretical knowledge. I also want to say thank to my fellow mates **Saumya Bharti , Richa Bajpai , Sonia Tiwari , Harpreet Kaur Matharu , Shabhnam Shah** for providing such a wonderful and supporting environment in lab.

I dedicate this thesis to my parents who deserve a special mention for always being there for me. It is because of their inseparable support and prayers.

JYOTI PARMAR

DECLARATION

I hereby declare that the project work entitled **"*In Silico Identification of novel ligand enhances myelopoiesis to prevent infection caused after Chemotherapy*."** is an authentic record of my own work carried out at Department of **Stem Cell and Gene Therapy Research Laboratory, Division of Radiation Biosciences, Institute of Nuclear Medicine and Allied Sciences (INMAS), DRDO**, Brig. S.K. Majumdar Road, Timarpur, Delhi-110054 under the guidance of **Dr. G.U. Gurudutta**,

JYOTI PARMAR

2K12/BIO/010
M.Tech Bioinformatics
Department of Bio-Technology
Delhi Technological University
(Formerly Delhi College of Engineering, University of Delhi)

CERTIFICATE

This is to certify that this project report entitled **"*In Silico Identification of novel ligand enhances myelopoiesis to prevent infection caused after Chemotherapy.*"** by Jyoti Parmar (2K12/BIO/010) M.Tech Bioinformatics Delhi Technological University (Formerly Delhi College of Engineering) Shahbad Daulatpur, New Bawana Road, Delhi-110042 is a bonafide record of work carried out under my guidance and supervision in my laboratory.

Dr. G.U. Gurudutta

Scientist 'F' Head,
Stem Cell and Gene Therapy Research Laboratory
Division of Radiation Biosciences INMAS, DRDO
Brig. S.K. Majumdar Road, Timarpur,
Delhi-110054

ABBREVIATIONS

PU.1:	Purine rich box1
HSC:	Hematopoietic stem cells
LT-HSC:	Long-Term reconstituting Hematopoietic Stem Cells
ST-HSC:	Short-Term repopulating Hematopoietic Stem Cells
CLP:	Common Lymphoid progenitor
CMP:	Common Myeloid progenitor
URE:	Upstream Regulatory Element
BM:	Bone marrow
MEP:	Megakaryocytic Erythroid progenitors
GMP:	Granulcocyte Monocyte progenitor
CF:	C-terminal zinc finger of GATA1
3D:	Three-Dimensional
PDB:	Protein Databank
HBonds:	Hydrogen Bonds
IDs:	Identity Numbers
CBP:	CREB binding Protein
CEBP:	Ccaat-Enhancer Binding Proteins
FOG1:	Friend of GATA1
Egrs:	Early Growth Response Protein-1
WBC:	White Blood Cell
RBC:	Red Blood Cell
TCF1:	T cell factor
SpdbViewer:	Swiss PDB Viewer
AML1:	Acute Myeloid Leukemia 1(Runx1)

DSvisualizer:	Discovery Studio Visualizer
PDBSUM:	Protein DataBank Sum
NK cells:	Natural killer cells
AGM:	Aorta gonad mesonephros
MLL:	Mixed lineage leukemia
SCL/TEL:	T cell acute leukemia
bHLH:	Basic helix loop helix
LMO2:	LIM domain only 2
PPI:	Protein-Protein Interactions

CONTENT