CHAPTER 4

BIOCHEMISTRY

Doctoral Theses

027. AJAY SINGH
Development of Efficient Expression System For the Production of Diagnostic Reagents.
Supervisor : Prof. Vijay K. Chaudhary
Th 18811

Abstract

This work envisages to produce Protein A (SPA) genetically fused with a peroxidase (RsPrx) in 1:1 ratio and express protein in a suitable host. The gene encoding RsPrx from Indian white radish and SPA have been employed. E. coli, the most preferred host due to simplicity and cost effectiveness has been employed with T7 RNA polymerase T7 promoter based expressssion system. Since, RsPrx is derived from plant, major part of the work had been devoted for developing a novel T7 RNA polymerase T7 promoter based expression system for plant which had been validated using two model genes namely GUS (β-Glucuronidase), and GFP (Green Fluorescent Protein).

Contents

1. Introduction and review of literature. 2. Cloning, expression and purification of SPA and RsPrx chimera in e.coli. 3. Development of a new T7 RNA polymerase - T7 promoter based expression system for plants. 4. Random mutagenesis and affinity based selection of better variants of RsPrx fused to SPA or its domain using phage display technology. 5. Summary and conclusions. Bibliography and appendices.

028. JANGIR (Deepak Kumar)
Vibrational Spectroscopic Studies on Interaction Mechanism of Anticancer Drugs with Deoxyribonucleic Acid.
Supervisors : Dr. Suman Kundu and Dr. Ranjana Mehrotra
Th 18812

Abstract

The present work is to understand the DNA binding mechanism of amsacrine using infrared and Raman spectroscopic techniques. Investigate the effects of sequence context and different grooves of DNA on amsacrine interaction and understand the DNA binding mechanism of carboplatin using IR and Raman spectroscopic techniques. It also elucidate the directional preference of DNA adducts formation by carboplatin and to address the non-formation issue of GpA adducts of the drug.

Contents

1. Introduction and review of literature. 2. Instrumentation and methodology. 3. Infrared and Raman spectroscopic evaluations of amsacrine interation with DNA. 4. ATR-FTIR spectroscopic investigation of effects of sequence contexts and groove structures of DNA on amsacrine interaction. 5. Evaluation of interaction mechanism of carboplatin with DNA using FTIR, Raman and CD spectroscopic methods. 6. Structural aspects of differential interaction of carboplatin with GpG, ApG and GpA caontaining oligonucletide duplexes. 7. Conclusion and future perspectives.

029. SHRIVASTAVA (Nimisha)
Development of Phage Display Systems for Functional Genomics.
Supervisor : Prof. Vijay K. Chaudhary
Th 19084

Abstract

Deals with development of phagemid based system to construct ORFeome library of M. tuberculosis H37Rv on M13 phage using novel helper phage AGM13, characterization of ORFeome library for the identification of epitopes recognized by various MAbs raised against different mycobacterial proteins, novel and efficient genome-wide transfer of ORFs to other vectors and development of new lanbda phage based display vectors for high-density display of libraries.

Contents

1. Introduction and review of literature. 2. Construction of ORFeome library of M. tuberculosis H37Rv, its characterization and transfer to an expression vector. 3. Development of a new lambda phage display vectors for hgih density display. 4. Summay and conclusions. Bibliography and appendices.

030. VINEEL KUMAR (P)

Iron Metabolism Genes are Essential for the Growth of Mycobacterium Tuberculosis : Crucial Targets for New Drugs.

Supervisor : Prof. Anil K. Tyagi

Th 18810

Abstract

Focuses on two componenets related to iron supply and storage by disrupting the mbtE gene (Rv2380c) associated with mycobactin biosynthesis as well as those encoding the iron storage protein, BfrA and BfrB. In order to evaluate the importance of mycobactin biosynthesis as well as iron storage protein in the vivo growth of M. tuberculosis and pathogenesis.

Contents

1. Introduction. 2. Review of literature. 3. Aims and objectives. 4. Materials and methods. 5. Results and discussion 6. Summary and conclusion. 7. Bibligraphy. 8. Appendix. 9. Publications.