CHAPTER 65

ZOOLOGY

Doctoral Theses

647. BORGOHAIN (Prakash)
Developmental and Physiological Pecurliarties in Oxytrichid Ciliates (Phylum : Ciliophora; Family Oxytrichidae) and its Significance in the Systematics of the Family.
Supervisors : Prof. V. K. Bhasin and Prof. G. R. Sapra
Th 16913

Abstract

Studies the selected species from the two subfamilies (in *sensu stricto*) and *sensu lato* to find resorption pattern has any taxonomic bearing. Also a peculiar and novel method of cytoplasmic rotation employed by the encysting oxytrichid cells in late stages of encystment has been studied. This forceful method was seen only in the cells with cortical granuled belonging to subfamily oxytrichinac and the *sensu lato* group. Stylonychined lacking such granules do not show vigorous form of cytoplasmic rotation. This criterion is applied to remove the ambiguous status of the *sensue lato* cells which may of may not possess the granuled but are otherwise closer to the stylonychines.

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648. CHANDRA (Mahesh)
Studies on Expression of Androgen and Estrogen Receptor α in Specific Organs During Hypo-Spermatogenesis in the Rat Following Hormonal Intervention.
Supervisors : Dr. M M Misro and Dr. Neeta Sehgal
Th 16777

Abstract

The prestnt investigation is conducted, to study the steroid receptor modulation in rats following the hormonal intervention. The androgen and estrogen intervention in adults upregulates ERα expression. AR expression, as revealed by RT-PCR shows a decline after androgen intervention, whereas it reveals an enhanced expression after estrogen intervention. However the AR protein levels show a marked decline after both the interventions, resulting in low immunopositivity. Estrogen administration also induces AR protein degradation through translational/post-translational pathways in the pituitary producing two peptides which are recognized by the antibodies specific for androgen receptor.

Contents

649. GUPTA (Sanjay Kumar)
Characterization of Novel Bacterial Isolates From Oil-Contaminated Soil and Study of Community Dynamics During Bioremediation of Hexachlorohexane (HCH) Contaminated Soil.
Supervisor : Prof. Rup Lal
Th 16914

Abstract

Studies the microbial diversity of oil-contaminated sites of Panipat oil fefinery, Panipat, Haryana and Mathura oil refinery, Mathura, U.P and community dynamics/structure during biostimulation of indigenous community present in HCH-contaminated soil from HCH dump site, a number of strains are isolated from oil-contaminated sites. Finally, four strains namely Esp-1^T, SM16^T, SM115^T and SM117^T are selected and classified by polyphasic approach. Strains Esp-1^T and SM 16^T are isolated from Panipat oil refinery whereas strains SM117^T and SM115^T are isolated from Mathura oil refinery. Strains Esp-1^T and SM117^T contained a single polar flagellum whereas strains SM115^T and SM117^T are non-flagellated.

Contents

4. Results and discussion of Part-I. 5. Results and discussion of Part-II 6. Results and discussion of Part-III. 7. Results and discussion of Part-IV. 8. Summary. Bibliography and Appendix.

650. KIRTI KUMARI

Kinetics and Diversity of Enzyme Haloalkane Dehalogenase (LinB) and its role in Enzymatic Bioremediation of Hexachlorocyclohexane (HCH).

Supervisor : Prof. Rup Lal

Th 16780

Abstract

The present study demonstrates the α-and γ-HCH are not the substrates for action of LinB. LinB B90A showed negligibe activity on α-HCH in contrast to a recent report, thus clearly indicating that α- HCH is not a substrate for enzyme LinB. The study shows that all nine LinB enzyme variants exhibited a higher affinity for β-hch followed by δ-HCH. It identified LinB SSO4-5 and LinB SSO4-3 as the potential enzyme variants to be used for enzymatic bioremediation of β-and δ-HCH.

Contents

1. Introduction. 2. Review of literature. 3. Materials and methods. 4. Results. 5. Discussion and Perspectives. 6. Conclusions. Bibliography and Appendix.

651. KORDE (Reshma)

Functional Analysis of Cysteine and Aspartic Proteases Using Prodomain Peptides and RNA Interference.

Supervisors : Dr. Rita Singh and Dr. Pawan Malhotra

Th 16783

Abstract

It studies the effect of prodomain peptides on FP2 and PMIV. The enzyme activity of active recombinant proteins, falcipain 2 (FP2) and plasmepsin IV (PMIV) using prodomain peptides from the pro-regions of respective proteases. Measured and indentified key determinant peptide sequences within the prodomain with inhibitory potency against their conate enzymes. Similar peptide inhibitors are tested in the murine malarial model. Also confirmed the effects of the prodomain mediated approach using siRNA on cysteine proteases falcipain 1 (FP1), falcipain 2(FP2), and falcipain 3 (FP3) *in vitro* and found a new role for FP2 in

merozoite egression besides hemoglobin degradation.

Contents

1. Introduction. 2. Review of literature. 3. Materials and methods. 4. Results I. 5. Results II. 6. Discussion. 7. Summary and Colclusions. Bibliography.

652. MISHRA (Lokesh Chandra)
Novel Artemisinin Based Combinations Against Blood Stages of Plasmodium Falciparum and Their effect on Some vital Metabolic Events.
Supervisor : Prof. V K Bhasin
Th 16778

Abstract

The TRI, HT-AMB, LIC-A or IND were found appropriate as a partner of artemisinin against blood stages of P.falciparum. Stage specific study has also revealed that in a particular combination both the compounds have different targets which is one of the requisite of an ideal combination. other metabolic assays suggested that these compounds show synergistic interactions with ART through different modes of action. ART inhibited the cytoadherence almost completely while potent partner compounds IND and LIC-A showed superior cytoadherence inhibitory property than others.

Contents

1. Introduction to malaria parasite. 2. Review of literature. 3. Aims and objectives. 4. Materials and methods. 5. Experimental Details 6. Results. 7. Discussion. 8. References. Bibliography.

653. RAI (Sandhya)
Evaluation of nifH as Biomarker for Nitrogen Fixing Potential in Soil Using Metagenomics.
Supervisors : Dr. Dileep Kumar Singh
Th 16912

Abstract

Evaluates *nifH* (one of the structural genes encoding Component II of nitrogenase enzyme complex involved in biological Nitrogen fixation) as biomarker for nitrogen fixing potential in soil using metagenomic approaches bypassing the need of culturing.

It evaluate *nifH* as a suitable biomarker for nitrogen fixing potential in soil. *nifH* could be periodically checked and monitored in the agricultural deilds to predict future nitrogen fixation status in order to avoid any major and sudden change which could be harmful to the nutrient (Nitrogen) budget of the field.

Contents

1. Introduction. 2. Review of literature. 3. Comparative spatialanalysis of diazotrophic community structure and function in the rhizosphere of various crop plants. 4. Temporal dynamics of bacterial community structure in the rhizosphere of cotton by 16S rDNA analysis. 5. Temporal dynamics of soil diazotrophic community structure and function in the agricultural feild of cotton crop. 6. Cloning, sequencing and phylogenetic analysis of *nifH* gene for temporal diazotrophic community diversity in the rhizosphere of cotton. 7. Conclusions. 8. Summary. Bibliography and Appendix.

654. RAWAT (Varunendra Singh)
Vitellogenins (A and B) and Estrogen Receptors (α and β) as Indicators of Exposure to Estrogenic Compounds : Gene Expression Analysis in the Indian Freshwater Murrel, Channa Punctatus (Bloch).
Supervisor : Dr. Neeta Sehgal
Th 16911

Abstract

This work reports on isolation and purification of Vitellogenin (Vg) and Choriogenin (Chg), and molecular identification of an isomer of Vg. Further it establishes presence of two forms of Vgs, VgA asd VgB and two estrogen receptors (ERs), ERα and ERβ in *Channa punctatus*, the partial sequences for which have been obtained. It also deals with the use of the expression of these genes as an indicator to exposure to estrogenic compounds.

Contents

1. Review of literature. 2. Introduction. 3. Materials and methods. 4. Results. 5. Discussion. Summary. Bibliography.

655. SHARMA (Pooja)
Kinetic Analysis of Genetic Variants of the Enzyme Hexachlorocyclohexane (HCH) Dehydrochlorinase (LinA) and Development of a High Througput Screening (HTS) System : Prospects for Enzymatic Bioremediation of HCH.
Supervisor : Prof. Rup Lal
Th 16909

Abstract

Investigates the scope of using various natural LinA enzyme variants to exlore the possibility of finding the most suitable LinA variant capable of yielding turnover rates high enough to be taken for field trials. Additionally it demonstrates the usability of a screening system to tap the enormous diversity of *linA* variants existing in nature. It also attempts to seek a solution to the problem of poor solubility of LinA protein encountered in this study by virtue of three truncations at presumably slicing off the presumptive dignal sequence to obtain significant amount of the protein in the soluble fraction.

Contents

656. SHIVANI
Studies on Soil Health of Himachal Soil Using 16S rRNA Gene *nif*H Gene and Soil Enzymes.
Supervisor : Dr. D. K. Singh
Th 16910

Abstract

This study searches for the effects, organic management conditions has on soil health determined by physical, chemical, and especially biological parameters of the soil. Soil enzymes dehydrogenase, urease and nitrate reductase and culturable bacterial, *Azotobacter* population are studies. Species of *Azotobacter* has been recommended as biofertilizer for maize grown under tropical regions. The effect of organic, chemical fertilizers and *Azotobacter chorococcum* strain w6 population on maize crop and soil health a small microcosm experiment is carried out. Twelve bacteria are isolated from experimental soil and partial 16S rDNA gene is sequenced. Three of these 12 bacterial isolates pt1-1^{T,}

pt1-2^T and pt1-3^T are taxonomically characterized using polyphasic approach. Bacterial Community dynamics and structure of different microcosm treatments is analyzed using metagenomic approach.

Contents

1. Introduction. 2. Literature review. 3. Material and methods. 4. Results and discussion. 5. Summary. Bibliography and Appendix.

657. SINGH (Rajeev)
Immunoregulatory Role of Neuropeptides in Spotted Murrel Channa Punctatus (BLOCH).
Supervisor : Prof. Umesh Rai
Th 16781

Abstract

It describes the immnoregulatory role of neuropeptides in spotted Murrel Channa Punctatus (Bloch). Fishes are stressed by various cognitive and non-cognitive factors. These stressors induced the secretion of numerous neuropeptides, including endogenous opioid peptides and urotensins. The effect is reported to be dependent on type of stressor, sexual maturity of fishes and species specificity. The endogenous opioid peptides include beta-endorphin, enkephalins and dynorphins. Urotensins secreted from Dahlgren cells of caudal neurosecretory system of fishes are of two types, urotensin I and urotensin II. The role of endogenous opiods is explored in regulation of non-specific immune responses in fershwater teleost C. punctatus. In vitro effect of β-endorphin on phagocytosis nitric oxide and superoxide production by splenic phagocytes is investigated. Cells are treated with different concentrations of β-endorphin ranging from 10^{-13} to 10^{-5} M. β-endorphin has diversed effects on phagocyte functions.

Contents

1. Introduction. 2. Beta-endorphin regulates diverse functions of splenic phagocytes through different opioid receptors in freshwater fish Channa punctatus (Bloch) : an in vitro study. 3. Delta opioid receptor-mediated immunoregulatory role of methionineenkephalin in freshwater teleost Channa punctatus (Bloch). 4. Opioid and non-opioid receptor-mediated immunoregulatory role of Leucine-enkephalin in teleost Channa punctatus. 5. Kappa-opioid receptor-mediated modulation of

innate immune response by dynorphin in teleost Channa punctatus. 6. Immunomodulatory Role of Urotensins in Teleost Channa Punctatus 7. Summary. Bibliography.

658. SUMAN (Shubhankar)
Radiation-Induced Oxidative and nitrosative Stress Signaling in the Radioresistant Lepidopteran Insect System.
Supervisor : Prof. Rakesh Kumar Seth
Th 16779

Abstract

Demonstrates that the Lepidopteran insects/insect cells carry a relatively stronger antioxidant system that has some distincet features from mammalian system and is also associated with significantly reduced macromolecular damage. This system also undergoes negligible nitrosative stress induction in response to ionizing radiation as a result of an altered NOS signaling, apparently contributed by altered NOS activity and suppressed cytosolic calcium release activity. Since the NOS-mediated generation of NO and its metabolites is known to play definite role in radiosensitivity/radioresistance, absence of radiation-induced NOS activity may contribute to high resistance of Sf9 cells against radiation-induced apoptosis at higher doses. The study shows that Spodoptera system carries an apparently shorter p53 homologue that translocates to nucleus upon γ-irradiation, binds with human p53 promoter, regulaters MnSOD expression and responds to irradiation in similar manner as human p53 but with an altered dose-dependence.

Contents

659. TANEJA (Jyoti)
Molecular Determinants of Fsh Action in Granulosa Cells.
Supervisor : Dr. Rita Singh
Th 16782

Abstract

FSH receptor signaling induces complex pattern of gene expression that regulate cell proliferation, differentiation and cytoskeletal reorganization in granulosa cells. The present sudy is initiated with an overall objective of understanding the gonadotropin mediated molecular interactions involved in granulosa cell differentiation. It is found that PMSG upregulates Insulin receptor gene and protein expression in rat ovary. This is the novel observation and further studies are performed on the effect of FSH on cultured granulosa cells in vitro. FSH upregulated insulin receptor gene expression in granulosa cells in vitro. Moreover, FSH mediated upregulation of insulin receptor is observed in a concentration and time dependent manner. FSH upregulated the expression of insulin receptor substrate IRS-1 and IRS-2 in a time dependent manner. Further, FSH mediates IRS-1 and IRS-2 upregulation in cAMP independent and cAMP dependent manner respectively. FSH is a known regulator of granulosa cell proliferation and with the results that FSH upregulated IRS-1expression, effect of IRS-1 knockdown by siRNA is checked on FSH mediated granulosa cell proliferation. It is found that IRS-1 knock down inhibited FSH mediated granulosa cell proliferation.

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