

## CHAPTER 17

### GENETICS

#### Doctoral Theses

146. CHAUDHARY (Shashi)  
**Molecular Genetics of Parkinson's Disease : Contribution of Alpha Synuclein, UCH LI, Parkin, NAT 2 and SCA 2 Genes.**  
Supervisor : Prof. B.K. Thelma  
Th 14748

#### *Abstract*

Contribution of a synuclein, UCH LI, Parkin and NAT 2 genes to idiopathic Parkinson's disease among Indians has been evaluated in this study. Our collaborating clinicians recruited both young onset and late onset PD cases and appropriate age and sex-matched controls. Genetic analysis methods including PCR amplifications, sequencing, mutation screening (utilizing RFLP, CSGE), gene dosage analysis, SNP genotyping and SNP haplotype construction have been utilized in this study.

#### *Contents*

1. Review of Literature & Introduction. 2. Genetic variations in UCH LI gene. 3. Mutation analysis and association of SNPs/SNP. 4. Association of SNPs/SNP haplotypes in NAT 2 gene and genotype-phenotype correlations. 5. Analysis of complex phenotypes including Parkinson's disease, Spinocerebellar ataxia and retinitis pigmentosa in a large family. 6. Summary. Bibliography and Appendices.

147. JOSHI (Nalini)  
**Molecular Genetic Analysis of Copper Resistance in Pseudomonas Putida Strain S4.**  
Supervisor : Prof. Sheela Srivastava  
Th 14750

#### *Abstract*

Deals with the copper resistance mechanism in Pseudomonas putida strain S4, a copper mine isolate, through detailed genetic and molecular genetic characterisation. Copper is

involved in a variety of cellular processes and the maintenance of cellular copper status is essential for all life. Therefore, an improved understanding of copper acquisition, assimilation and metabolism is of great significance. *P. putida* strain S4, a multi-metal resistant strain which has learnt to survive in a metal-rich habitat, proved to be a good model system to arrive at metal management strategies. Studies on copper, nickel and zinc resistance in this strain have been carried out earlier. Being a copper-mine isolate, resistance to copper was further analysed to answer some of the perplexing questions of homeostasis versus resistance to this essential yet toxic metal. The present investigation is an effort towards elucidating the molecular mechanism of copper resistance in this strain.

#### *Contents*

1. Introduction. 2. Materials and Methods. 3. Results. 4. Discussion. 5. Summary and Conclusions Bibliography and annexures.

148. PRASAD (Pushplata)  
**Molecular Genetic Correlates of Diabetic Chronic Renal Insufficiency.**  
 Supervisor : Prof. B. K. Thelma  
 Th 14706

#### *Abstract*

Cytokines play an important role in the development of diabetic chronic renal insufficiency (CRI). While transforming growth factor B1 (TGF B1), under hyperglycemic conditions, induces renal hypertrophy and fibrosis, cytokines like chemoattractant protein- 1 (MCP- 1), and “regulated upon activation and normal into kidney. Over expression of these chemokines thus leads to glomerulosclerosis and interstitial fibrosis. The effect of MCP- 1 and RANTES on kidney is conferred by their receptors i.e, CCR2 and CCR5 respectively. Therefore, to understand the contribution of some of these contemporary candidates to the genetic basis of diabetic kidney disease, association of eight SNPs from TGDB1, CCR2 and CCR5 genes with CRI among individuals with type2 diabetes was tested. Neither of the two promoter SNPs (G>A-800 and C>T - 509)of TGFB1 gene showed association with CRI in this study. These SNPs have not been tested for association with DN or CRI or ESRD in any other population and thus no comparison is possible. However, in our population since this SNP was found

to be a minor variant (With frequency of variant allele=0.01), it was non-informative. Lack of association of CCR2 Val64Ile SNP in our study is similar to other reports from Japanese population. In a comparative analysis between north Indian (NI) and South Indian (SI) sample sets a trend of genotypic association and significant allelic association of SNP G>A 59029 in CCR5 gene was seen in South Indians but was absent in North Indian population. A significant allelic association of allele 'C' (OR: 2.28; CI: 1.005-5.19) of Val64Ile SNP in CCR2 gene was observed among South Indians only. Our result is contrary to the only available report of lack of association of this SNP with diabetic nephropathy in Japanese population. The observed differences between North Indian and South Indian sample sets could be attributed to the difference in allele and genotype frequencies in the representative base line populations.

#### *Contents*

1. Review of literature and introduction. 2. Materials and methods. 3. Renin-angiotensin-aldosterone system and diabetic CRI. 4. Cytokine mediated inflammatory pathway and diabetic CRI. 5. Dopaminergic pathway and diabetic CRI. 6. Combined analysis of multiple candidate gene polymorphisms in CRI- an insight. References.

149. UMA (G.)  
**Transgenic Indica Rice with Antiviral Constructs of Tungro Viruses and Characterization of RTBV Transgenics for Resistance.**  
 Supervisors : Dr. M. V. Rajam and Dr. I. Dasgupta  
 Th 14749

#### *Abstract*

Considering the economic importance of rice and the devastating affects of rice tungro disease, the present work develops tungro virus resistant transgenic indica rice (cv. PB-1) plants by the introduction of viral genes from both RTBV and RTSV.

#### *Contents*

1. Introduction. 2 Review of literature. 3. Materials and Methods. 4. Result and discussion. 5. Summary, Conclusions, Bibliography and annexure.