

LAWRENCE AIDS SEARCH FOR CAUSES OF LUNG AILMENTS

Department of Biological Sciences and Virginia Bioinformatics Associate Professor Chris Lawrence, Ph.D. has established a consortium with researchers at the Mayo Clinic, Rochester MN to investigate the role of fungi in chronic airway disease. Data generated over the last few years by Dr. Hirohito Kita, M.D. and colleagues at the Mayo Clinic and University of Buffalo Medical School strongly suggest that airborne fungi play a major role in the development of chronic airway diseases in particular asthma and chronic rhinosinusitis (CRS). Moreover, the main fungus that appears to be most strongly associated with this phenomenon is *Alternaria*. Last year Dr. Lawrence received a grant from the NSF-USDA Interagency Microbial Genome Sequencing Program to sequence and annotate the genome of one species of *Alternaria*. Another grant awarded in 2002 by the National Science Foundation Plant Genome Program centered on functional genomics has allowed Dr. Lawrence to develop technology for manipulating *Alternaria* at the molecular level. He has been using the set of predicted proteins obtained from the *Alternaria* genome sequence and other *Alternaria*-related technologies to aid researchers at Mayo in identifying fungal proteins that have a profound effect on the human immune system using a technique called proteomics that is also coupled with immunological experiments.

"We have recently combined our teams' efforts to continue to establish a new paradigm in immunology related to chronic airway disease" said Lawrence. The team at VT led by Lawrence provides genomic, bioinformatics, and fungal resources to the team at Mayo led by Dr. Kita that then uses these to perform the immunology experiments using mice and cells derived from human patients. "Our collaboration has already led to the identification of several *Alternaria* proteins that appear to trigger and subsequently enhance the novel immune response associated with CRS; this is quite different from fungal or mold allergy since it is not an IgE-associated phenomenon. CRS affects over 30 million people in the U.S. annually with a direct cost of the illness exceeding \$5.6 billion per year according to the Center for Disease Control and Prevention; the more we understand the pathology underlying CRS, the more likely we will be able to design new therapeutic strategies for prevention and control. Now we are planning on exploring the relationship of these fungal proteins in the development and severity of asthma with additional researchers from the University of Minnesota. Dr. Kita and colleagues' research is currently supported by the Mayo Foundation and several grants from the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health. Since we have formed this consortium we have been able to submit several grants that are currently being reviewed by NIAID that highlight the teams combined strength in genomics, bioinformatics and immunology," said Lawrence.

Dr. Christopher Lawrence joined Virginia Tech in fall 2003. He earned a PhD in Plant Pathology from Auburn University in 1998 and was an Assistant Professor of Molecular Biology/Genomics at Colorado State University before accepting an Associate Professor position held jointly between the Virginia Bioinformatics Institute and the VT Department of Biological Sciences.