



## LABORATORY RESEARCH PROFILE

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What is the current focus of your research?

A major objective of our work is to determine the relationship between variations in the genes of our patients and our patients' ability to metabolize psychiatric medications. We are now able to measure precise changes in the sequence of nucleotides that make up a gene. Based on these changes, we are able to predict how some individuals will metabolize some of the most widely used psychotropic drugs. This new field is referred to as psychiatric pharmacogenomics.

We are also interested in how changes in the structure of genes expressed in the brain can predict which patients will be more likely to become depressed or develop serious drinking problems. There is already compelling evidence that suggests changes in some genes are linked to an increased risk for suicide. We also believe that changes in other genes may place individuals at high risk for some of the most serious consequences of alcoholism.

How might this research contribute to our understanding of disease and the potential treatment or prevention of disease?

As we understand how genes work, we can develop new treatments. For example, if specific genes are linked to the development of the intense craving for alcohol, individuals with these gene variations will be at an increased risk for developing an addictive illness. Five years ago, we did not have the technology to measure changes in the key genes that are associated with the development of these illnesses. Today we do.



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Another new development is that we have sophisticated neuroimaging methodologies that allow us to identify early brain dysfunction in patients with psychiatric illnesses. As we continue to develop these new genetic and neuroradiological technologies, we will be able to define the precise genes that are linked to specific psychiatric diagnoses. In addition, as the interactions of these genes are better understood, we will be able to develop new medications to influence the expression of genes.

What do you find rewarding about your work?

I feel that I am very fortunate to be a part of the genomic scientific revolution in psychiatry at Mayo Clinic. It is truly exciting to be using new scientific discoveries in ways that can improve the lives of our patients. It is a privilege to share the experience of recovery with patients who I have cared for over the years.

Another source of great satisfaction is having the opportunity to mentor bright and motivated young investigators at Mayo. These young scientists provide us with hope that the important work that we have begun will continue and ultimately lead to the still distant goal of eliminating mental illness.

How has being at Mayo Clinic contributed to the success of your research?

I don't believe there is another place that is as well organized to facilitate the practice of genomic medicine. We have excellent physicians and scientists, a fantastic electronic medical record and a shared vision of an integrated practice. Those powerful characteristics make us uniquely different from any other institution in the world. ■