

GRID: GENETICS RESEARCH INSTITUTE OF THE DESERT

Eisenhower Gene Research Helps Predict Disease



Radhika Andavolu, PhD, MBA demonstrates DNA mutation detection using a polymerase chain reaction method, which amplifies small quantities of a specific DNA sequence for research in a few hours.

The research being done in the Eisenhower Lucy Curci Cancer Center has the potential to significantly affect the health of patients currently living in the Coachella Valley and the health and well-being of generations to come.

The Genetic Research Institute of The Desert (GRID) conducts research on the potential an individual has to develop cancer, or other diseases, and assists in the development of preventive and therapeutic strategies tailored to a person's unique genetic makeup. GRID is the first and only molecular biology research lab in the Coachella Valley conducting research studies.

The not-for-profit organization began eight years ago, the brainchild of Lawrence Cone, MD, an infectious disease physician on staff at Eisenhower Medical Center. "My interest in medicine has always been in the basic aspects of medicine. I've been trained in infectious disease and medical oncology; and consequently, my interests in those areas were very specific and acute," shares Cone. "As time went by, I became involved in genetics, which I've always enjoyed, and wanted to take the interests I had in science, particularly in microbiology and cancer, and put those to work in a genetics program."

While working at Eisenhower Medical Center, Dr. Cone befriended oncologist Murthy Andavolu, MD. The physicians both shared a common interest in cancer and genetics, and began talking more about the possibilities of a genetics research program. Cone had already obtained private funding to launch the venture. When Dr. Andavolu mentioned that his wife Radhika was a molecular biologist with an MBA, a director for the organization became clear.

GRID's goal is to prevent and promote cures for cancer, AIDS, hepatitis, multiple sclerosis and other neurological disorders. "Genetic information is crucial in helping us pinpoint underlying disease mechanisms. By studying genetic variants in the patient population, we can determine the genotype [genetic makeup of a cell] associated with a disease as well as how a drug will respond, which can greatly affect a patient's treatment regimen," explains Radhika Andavolu, PhD, director of GRID. "We now have the tools to help us predict how certain individuals will respond to certain treatments. Thus, we can create more effective therapies for specific diseases."

Dr. Andavolu first became aware of the role genetics played in health when her grandmother was diagnosed with ovarian cancer. "This was in the early 1980s, and I was still in India at the time. I remember the doctors telling us that her cancer was genetically linked," recalls Andavolu. "All we had in India at the time for treatment was radiation. Chemotherapy was not available yet. It was very difficult for my grandmother to endure the treatments at her age, and she eventually passed away.

That really affected me and was a major driving force for my interest in genetics." Andavolu earned her PhD in India and did her post-doctoral work at City of Hope National Medical Center in Duarte, California. An MBA helps in her role as director of GRID.

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The primary focus for researchers at GRID is two-fold: risk prevention and personalized treatment. "We work with physicians and patients in hopes of providing the insight and information needed to help prevent disease. However, if the disease has already been determined, our work can help physicians and patients make better, more appropriate treatment decisions," says Andavolu. "Time is precious for many of these patients. Many go through several phases of chemo and do not respond, and can end up wasting valuable time. We want to help patients avoid this scenario. From the information we gather in our studies, we are trying our best to help physicians and patients create more pinpointed, personalized and efficient treatments," explains Andavolu.

GRID specializes in genotyping and DNA (deoxyribonucleic acid, a nucleic acid containing genetic information) analysis as well as gene expression (the process by which genetic information manifests in cells) analysis and RNA (ribonucleic acid) analysis using microarrays, a multiplex technology used in molecular biology, to identify differentially expressed genes between normal and tumor tissue.

[PHOTO dir="assets/news/story/Spring2009Pg52.JPG" align="Left" caption="Radhika Andavolu, PhD, MBA and Lawrence Cone, MD confer on research strategy." width="350"]

"What we do is screen the gene and take only the associated genes, and make a panel. Then, we find the genetic variance in the patient population compared to the normal population and compare them. We put them together, and say, for instance, we have a panel of 10 genes. If I screen 10 genes, probably only four are associated with a disease," explains Andavolu. "So, I explore the other six, and keep those four, and then go and screen more genes. When a patient comes in, we screen all the genes I've found associated with the disease. Then, out of those, if I see, say 10 of the genes, then I'm sure that that person will have the disease, maybe not this year—but eventually. That's how we predict." Andavolu cautions, however, that genetics are only one predictor of disease. "There are many factors involved— environment, diet, other lifestyle choices. We can only tell one aspect by the genotypes we look at."

GRID and Andavolu's work is getting noticed on a local and national scale. Andavolu is a sought after speaker and recently presented her findings on gene expression profiling in prostate cancer at the American Association of Cancer Research in San Diego. She has also presented at the Infectious Disease Society of American Annual Meeting, the Cancer Therapeutics International Conference in San Francisco, the San Antonio Texas Breast Cancer Symposium, and the European Congress of Clinical Microbiology and Infectious Disease in Prague. Dr. Andavolu and Dr. Cone are also frequent contributors to *American Journal of Medical Genetics and Clinical Genetics*.

While cancer has been a main focus of study at GRID, Dr. Cone is eager to explore the role genetics play in disease in general. "We have accomplished a lot in our first eight years, learning more about the certain roles genes play when predicting what type of cancer an individual may develop depending upon their genetic inheritance," shares Cone. "We are also interested in the role of genetics in terms of other diseases as well as infectious diseases and developing treatment."

Dr. Cone is also extremely appreciative of the community. "We are grateful to our donors and supporters who have allowed us to continue this innovative work in molecular biology and understanding the processes of diseases," says Cone. "Above all, our highest mission is a commitment to the better health of our community as a whole."

