



PERSONALIZED MEDICINE

VA's Office of Research and Development is at the forefront of developing safer, more effective treatments based on new knowledge about the role of genes in health and disease. The goal is to provide medical care that is personalized to the genetic makeup of individual Veterans. Genomic analysis has already provided valuable insights into the origins of diseases that affect large numbers of Veterans, such as diabetes and cancer. Genomic analysis may also help predict Veterans' response to certain drug treatments. In early 2011, VA launched the Million Veteran Program (www.research.va.gov/mvp), a major initiative that aims to build one of the world's largest databases of genetic, military exposure, lifestyle, and health information.

EXAMPLES OF VA RESEARCH ADVANCES

"SHORT" FORM OF 5-HTT GENE LINKED WITH PTSD, DEPRESSION—People with a certain form of the serotonin transporter gene 5-HTT may be at greater risk for developing posttraumatic stress disorder, confirms a study by South Carolina VA researchers. They and others looked at rates of PTSD in 388 Veterans. All the Veterans' DNA was examined for different forms of the 5-HTT gene. Those who had two copies of the "short" form of the gene had greater PTSD severity. And a Providence VA team found that people with two "short" forms tend to dwell repetitively on their distress and its causes, which can make them vulnerable to depression. Other studies have implicated the short form of 5-HTT in depression. It makes less serotonin transporter protein than other forms of the gene do. SSRI drugs, used to treat both depression and PTSD, are thought to target 5-HTT.

GENE FOR HIGH BLOOD PRESSURE—People with certain forms of the angiotensin II receptor type-1 (AGTR1) gene may be at increased risk for high blood pressure, suggested a study by a team at the VA San Diego Health Care System. The trial included 455 people who had either normal blood pressure or prehypertension. A form of the AGTR1 gene was more common in the prehypertensive group. AGTR1 has also been implicated in heart disease, breast cancer, and diabetes.

DNA MAY HELP STEER HEART DISEASE TREATMENT—Testing for two variations in DNA on an area of chromosome 4 may help determine therapy after coronary artery bypass grafts (CABG). A Houston VA research team identified which of 1,166 patients had the variations, called rs2200733 and rs10033464. Those patients were at risk for atrial fibrillation after surgery, but only if they had been taking a beta-blocker before the surgery. People with the rs2200733 variant also seemed to have an increased risk of mortality after surgery, by about 57 percent.

★ FACTS ABOUT PERSONALIZED MEDICINE—With the completion of the Human Genome Project and other gene-mapping efforts, researchers have a detailed map of humans' genetic structure. Research is now focused on learning more about the role of specific genes, how they interact, and what activates or deactivates them. A common method of investigation is the "genome wide association study," or GWAS, in which scientists scan and analyze DNA from huge numbers of research volunteers to tease out which genes or genetic variations are linked to particular diseases or health traits. Investigators are also studying how to apply this knowledge to medical care, with the goal of customizing patients' care based on their individual genetic make-up.