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Healthful Lifestyle Teaches Prostate Genes to Behave

Living right—with a good diet, exercise, and low stress—brings out the best in your genes

By Bernadine Healy M.D.
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Adopting a healthful lifestyle can switch on good genes and suppress cancer-provoking ones all in a matter of months, according to a report by Dean Ornish and colleagues from the University of California-San Francisco. In a pilot study of 30 men with early prostate cancer, an association between personal behavior and individual gene expression suggests a biological explanation for evidence from other studies that eating right and improving lifestyle can tame tumor growth.

The men in the GEMINAL study—short for Gene Expression Modulation by Intervention with Nutrition and Lifestyle—who chose "watchful waiting" rather than surgical or radiation treatment of their small, low-grade prostate cancers, agreed to provide tissue from their first prostate biopsy and then undergo a second one after participating in a three-month intensive and structured program of nutrition, moderate exercise, and stress reduction.

During the study, participants were provided with all of their food, which was low in fat and red meat, high in plant-based foods such as whole grains, fruits, and vegetables, and supplemented with soy, fish oil, vitamins C and E, and selenium. The men were expected to exercise at least 30 minutes six times a week; walking was fine. Every day for one hour they were to practice relaxation using yoga, meditation, or guided imagery, and each week to join a one-hour psychosocial support group.

Associated changes in gene behavior after three months of the intervention program were based on analyzing normal prostate tissue from the before-treatment and after-treatment biopsies for levels of RNA, the molecules that translate the DNA blueprints into action.

The researchers used each patient's before and after RNA patterns as markers for changes among hundreds of proteins made by the prostate that are known to influence how the gland grows and responds to male hormones.

The results were impressive. Expression was beneficially changed in over 500 different genes: Certain genes believed to be cancer preventing were turned up, and an array of disease-promoting genes, including oncogenes in the so-called RAS family that are present in both prostate and breast cancer, were turned down. These were surprising findings to Christopher Haqq, the scientist who performed the gene analyses in the study, which appears in the June 17 issue of the *Proceedings of the National Academy of Sciences.* He said the results gave him pause about his own health habits.

Ornish, who is also president of the nonprofit Preventive Medicine Research Institute in Sausalito, Calif., is the first to say that the study is merely a pilot that begs for follow-up work. This includes monitoring gene function and PSA levels, which fell only minimally, for longer than three months, and studying gene alterations in tumor cells, not just healthy ones. Most important is what happens in the long term to these men with slow-growing, indolent prostate cancers. To know if their disease arrests or even regresses because of what they eat and how they live will require a controlled clinical trial of similar men with similar tumors that will extend many years into the future.

In the meantime, there just may be enough here to make everyone recognize the common sense of such healthful habits. Even among these 30 men, lifestyle changes made weight and waist size drop, lowered bad cholesterol and blood pressure, and improved mood and psychological functioning, all in three months. This alone should be a huge motivator to eat better, exercise more, and find more joy in everyday life.

The added observation that such grand behavior might make for better-behaving genes is an important message to everyone at any age. While no one is born with a perfect set of genes, the study strongly suggests that genes do not have to be your fate.

SCS Matters, LLC
Subtle Communications Systems
4230 Lincoln Avenue • St. Joseph, MI 49085 • (269) 921-2217 • www.scs-matters.com
Debra Basham debra@scs-matters.com • Joel P. Bowman joel@scs-matters.com