

Vitamin D protects cells from stress that can lead to cancer

By inducing a specific gene to increase expression of a key enzyme, vitamin D protects healthy prostate cells from the damage and injuries that can lead to cancer, University of Rochester Medical Center researchers report.

“Many epidemiological studies have suggested the beneficial properties of vitamin D,” said Yi-Fen Lee, associate professor of urology at the Medical Center who led the research. “Our findings reflect what we see in those studies and demonstrate that vitamin D not only can be used as a therapy for prostate cancer, it can prevent prostate cancer from happening.”

The International Journal of Cancer published the findings in its June 15 issue.

Lee and her research team discovered one mechanism involving vitamin D that protects cells from oxidative stress. The vitamin D used in the study is 1,25-hydroxylvitamin D3, the most potent and active form of vitamin D in the human body. Nonmalignant human prostate epithelial cells also were used.

Normal metabolism in cells generates reactive oxygen species (ROS), molecules of peroxide, for example, or so-called free radicals. These substances can play a role in cell signaling and even kill bacteria. Exposure to some chemicals or forms of radiation can produce high levels of ROS that can damage DNA and play a significant role in speeding aging or causing cancer.

Lee found that vitamin D links with a gene known as G6PD, increasing its activity and the production of an enzyme called glucose-6-phosphate dehydrogenase. Increased activity of the enzyme clears cells of ROS, the molecules that can damage and injure cells.

“If you reduce DNA damage, you reduce the risk of cancer or aging,” Lee said. “Our study adds one more beneficial effect of taking a vitamin D supplement. Taking a supplement is especially important for senior citizens and others who might have less circulation of vitamin D, and for people who live and work areas where there is less sunshine.”

Large amounts of vitamin D should not be taken without medical supervision, she said.

The G6PD pathway is one of the mechanisms vitamin D uses, Lee said. The researchers did not find any similar activity in prostate cancer cells.

“Vitamin D does not protect cancer cells from injury or damage, which is good,” Lee said.

Source: University of Rochester

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