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Metabolite Linked to Aggressive Prostate Cancer

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Researchers from the University of Michigan Comprehensive Cancer Center have identified a panel of small molecules, or metabolites, that appear to indicate aggressive prostate cancer.

The finding could lead to a simple test that would help doctors determine which prostate cancers are slow-growing and which require immediate, aggressive treatment.

Results of the study appear in the Feb. 12 issue of *Nature*.

"One of the biggest challenges we face in prostate cancer is determining if the cancer is aggressive. We end up overtreating our patients because physicians don't know which tumors will be slow-growing. With this research, we have identified a potential marker for the aggressive tumors," says senior study author Arul Chinnaiyan, M.D., Ph.D., director of the Michigan Center for Translational Pathology and S.P. Hicks Endowed Professor of Pathology at the U-M Medical School.

The researchers looked at 1,126 metabolites across 262 samples of tissue, blood or urine associated with benign prostate tissue, early stage prostate cancer and advanced, or metastatic, prostate cancer. They mapped the alterations in metabolites and identified about 10 that were present more often in prostate cancer than in the benign cells and were present most often in the advanced cancer samples.

"When we're looking at metabolites, we're looking several steps beyond

genes and proteins. It allows us to look very deeply at some of the functions of the cells and the biochemistry that occurs during cancer development," says Chinnaiyan, a Howard Hughes Medical Institute investigator.

One metabolite in particular, sarcosine, appeared to be one of the strongest indicators of advanced disease. Levels of sarcosine, an amino acid, were elevated in 79 percent of the metastatic prostate cancer samples and in 42 percent of the early stage cancer samples. Sarcosine was not found at all in the cancer-free samples.

In the study, sarcosine was a better indicator of advancing disease than the traditional prostate specific antigen, or PSA, test that is currently used to monitor or screen for prostate cancer. Sarcosine was detected in the urine, which has researchers hopeful that a simple urine test could be used.

In addition, the researchers found that sarcosine is involved in the same pathways that are linked to cancer invasiveness. This suggests sarcosine as a potential target for future drug development.

"This research gets at characterizing the chemical complexity of a sample of blood. In the future, this science will drive how doctors make treatment recommendations for their patients," says study author Christopher Beecher, Ph.D., professor of pathology at the U-M Medical School.

Results are preliminary at this point and will need years of further testing and development before this technology would be available for patients.

Reference: *Nature*, Vol. 457, No. 7231, pp. 910-915, Metabolomic profiles delineate potential role for sarcosine in prostate cancer progression.

Source: University of Michigan Health System