MedicalXpress

Micro molecules can identify pancreatic cancer

January 10 2007

A pattern of micro molecules can distinguish pancreatic cancer from normal and benign pancreatic tissue, new research suggests.

The study examined human pancreatic tumor tissue and compared it to nearby normal tissue and control tissue for levels of microRNA (miRNA). It identified about 100 different miRNAs that are present usually at very high levels in the tumor tissue compared with their levels in normal pancreatic tissue.

The findings suggest that miRNAs form a signature, or expression pattern, that may offer new clues about how pancreatic cancer develops, and they could lead to new molecular markers that might improve doctors' ability to diagnose and treat the disease.

Pancreatic cancer is expected to strike 33,700 Americans and to kill 32,300 others this year, making it the fourth leading cause of cancer death. The high mortality rate – the number of new cases nearly equals the number of deaths – exists because the disease is difficult to diagnosis early and treatment advances have been few.

The study, led by cancer researchers at the Ohio State University Comprehensive Cancer Center, was published online Dec. 5, 2006, in the *International Journal of Cancer*.

"Our findings show that a number of miRNAs are present at very different levels in pancreatic cancer compared with benign tissue from

the same patient or with normal pancreatic tissue," says principal investigator Thomas D. Schmittgen, associate professor of pharmacy and a researcher with the Ohio State's Comprehensive Cancer Center.

"Most are present at much higher levels, which suggests that developing drugs to inhibit them might offer a new way to treat pancreatic cancer. It also means that a test based on miRNA levels might help diagnose pancreatic cancer."

miRNAs are extremely short molecules that were discovered about a dozen years ago and found to be important for controlling how proteins are made. Scientists have now identified more than 470 different miRNAs in humans. More recent research has shown that miRNAs also play an important role in cancer.

"A big problem we face with pancreatic cancer is an inability to detect tumors early," says Russell Postier, chairman of surgery at the University of Oklahoma Health Science Center and a co-author of the study.

"The exciting findings in our work indicate that there is a microRNA gene-expression pattern that is unique to pancreatic tumors, and this might be useful in diagnosing pancreatic cancer in the future."

For this study, the researchers used a technique developed by Schmittgen and a group of colleagues in 2004 to measure miRNA in small tissue samples. The method is based on a technology called real-time PCR profiling, which is highly sensitive and requires very small amounts of tissue, Schmittgen says.

The researchers used the method to compare the levels of 225 miRNAs in samples of pancreatic tumors from patients with adjacent normal tissue, normal pancreatic tissue and nine pancreatic cancer cell lines.

Computer analysis of the data identified a pattern of miRNAs that were present at increased or decreased levels in pancreatic tumor tissue compared with normal tissue. The analysis correctly identified 28 out of 28 pancreatic tumors, 11 of 15 adjacent benign tissues and six of six normal tissues.

Levels of some miRNAs were increased by more than 30- and 50-fold, with a few showing decreased levels of eight- to 15-fold.

Schmittgen and his colleagues are now working to learn which of the miRNAs they identified are most important for pancreatic cancer development, and if some are found only in pancreatic cancer and not in other types of cancer.

Source: Ohio State University