# The protein survivin could be a useful biomarker for pancreatic cancer

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Pancreatic cancer kills more than 40,000 people every year, and among cancers it's particularly insidious. For 80 percent of patients, the disease is already so advanced at the time of diagnosis that treatment is unlikely to provide significantly life-extending benefits. For patients diagnosed with localized pancreatic cancer, the five-year survival rate remains barely above 20 percent, according to the National Cancer Institute. New research from scientists at Fox Chase Cancer Center in Philadelphia, which will be presented at the AACR Annual Meeting 2012 on Sunday, April 1, shows that a protein called survivin could be a useful tool in understanding pancreatic cancer—particularly for identifying which subsets of patients will most likely respond to treatment.

In a recent study of pancreatic cancer patients who had undergone tumor resection, the scientists found that patients who underwent different treatment regimens, following surgery, had different levels of survivin and experienced different lengths of disease-free survival.

"Biomarkers for pancreatic cancer are especially useful because the survival is so poor and it's such a bad disease for people to get," says Saad Khan, M.D., a medical oncology fellow at Fox Chase. "We're looking for biomarkers that tell us how the cancer will behave, whether or not it's a more aggressive type that will spread to different parts of the body. Most importantly for our research, we want to see if there are drugs that work better in patients with survivin than in those who don't have it."

They first studied cancerous tissues from 88 patients who had had pancreatic tumors, as well as nearby lymph nodes, surgically removed at Fox Chase. The researchers found higher levels of survivin in the cells from the lymph nodes than in the cells from the primary tumor. They went on to measure survivin in cells from 60 patients, of the original 88, who had undergone chemotherapy or radiation after surgery. The patients with higher levels of survivin lived longer periods of time before the cancer returned. The connection was strongest and statistically significant in patients who received the chemotherapy drug gemcitabine, though the researchers found similarly suggestive trends among patients who received radiation therapy or 5-FU.

"We found that when there was a higher amount of survivin expressed in the nucleus, there was significantly longer disease-free survival for all patients," says Khan. "In terms of overall survival, patients treated with chemotherapy or radiation did better when they had higher amounts of survivin which goes against what we'd expected, but this did not achieve statistical significance. Our results suggest that people with higher levels of survivin responded better to specific chemotherapies."

Survivin—which is readily detectable in cancerous and embryonic tissues but not in most healthy tissue—is a protein that blocks apoptosis, or cell death. Because of its strong association with cancer, researchers have long sought ways to use survivin to better understand and treat the disease.

"Survivin has been looked at quite carefully in many cancers," Khan says, "but there's been no clear information about how it is expressed in a large number of pancreatic cells."

Khan, finishing up his third year of medical oncology training, came up with the idea to study survivin with his mentor, Barbara A. Burtness, M.D., associate director for clinical research and professor of medical

oncology at Fox Chase. The researchers used a surgical specimens linked to a patient database prepared by coauthor and surgical oncologist John P. Hoffmann, M.D.

It's too early to know how useful survivin will be as a prognostic indicator. Khan says the next step is to study more pancreatic cancer samples and try to understand all the different variables that can impact a person's survival. The researchers have also started studying survivin in other tumor samples, including those from patients treated for head and neck cancers.

"There's a lot of work being done in biomarkers for more aggressive cancers, like pancreatic," Khan says. "We are hoping to find ways to improve on existing chemotherapies, which are ineffective for controlling disease for a significant period of time,"

Provided by Fox Chase Cancer Center