Compendium of pancreatic cancer biomarkers established as strategic approach to early-detection

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A cancer scientist from Johns Hopkins has convinced an international group of colleagues to delay their race to find new cancer biomarkers and instead begin a 7,000-hour slog through a compendium of 50,000 scientific articles already published to assemble, decode and analyze the molecules that might herald the furtive presence of pancreatic cancer.

With limited resources available for the exhaustive and expensive testing that needs to be done before any candidate can be considered a bona fide biomarker of clinical value, it's important to take stock of the big picture and strategize, says Akhilesh Pandey, M.D., Ph.D., an associate professor in the McKusick-Nathans Institute of Genetic Medicine, Johns Hopkins University School of Medicine, and founder and director of the Institute of Bioinformatics in Bangalore, India.

Having mined the literature to amass 2,516 potential biomarkers of pancreatic cancer, Pandey and his team are publishing their compendium on April 6 in *PLoS Medicine*. They systematically cataloged the genes and proteins that are overexpressed in pancreatic cancer patients, then characterized and compared these biomarker candidates in terms of how worthy each is of further study.

More than 200 genes are shortlisted because they were reported in four or more published studies to be overexpressed —- meaning that the proteins they make are in higher abundance in people with pancreatic

cancer than in people without the disease. This qualifies them as "excellent candidates" for the further studies that are needed to validate them as sensitive and specific biomarkers, note the authors.

Pandey says he was motivated by the fact that even leading cancer investigators had no real idea about how many candidate biomarkers for pancreatic cancer had already been identified, much less how they stacked up against each other in terms of clinical value in detecting early stages of the disease. Such biomarkers are highly valued because they gallop Paul Revere-like through the bloodstream and can signal early warnings of clinically invisible cancers and other diseases.

"Curation and databases are not very sexy concepts," says Pandey. "But we can't keep doing the exciting new discovery stuff and never take the time to catalog our results and share them."

Taking pancreatic cancer biomarkers to prove the value of such a strategic "big picture" approach, Pandey says it could serve as a basis for other disease-marker research.

"For the first time with pancreatic cancer — and potentially with any cancer — we have a handle on the number of candidates already identified and a real sense of how big an army we should send on the mission of further testing them," says Pandey.

Pandey's ultimate goal is to ferret out the best protein biomarker for pancreatic cancer — a molecule that reveals itself in an accessible bodily fluid and therefore can be detected with ease and accuracy — just like the protein biomarker that's made early on by a developing fetus and is exploited by at-home pregnancy tests.

The "gold standard" pancreatic cancer biomarker would possess both high sensitivity and specificity for early diagnosis. Cancer, at its most

basic, is an abnormal population of cells that produce specific molecules — biomarkers — which healthy, cancer-free bodies do not. Cancer also tends to be incipient, Pandey says.

The ideal biomarker would allow for easy diagnosis when a cancer is still young, before it spreads to other organs. It could also help clinicians make informed decisions about treatments and better predict of outcomes, Pandey says: "Biomarkers could tell us who should undergo surgery, who should get chemotherapy, and in which people a cancer is likely to recur."

Biomarker discovery is an exploding area of research, Pandey says, yielding ever-increasing amounts of data — more than any one person can hope to keep track of, unless it's all strategically collected for widespread study.

"We want to initiate a trend by proving the importance of collection and cataloging," Pandey says, "which are exercises that many might view as tedious."

The team's next step is to create a searchable Web database that is universally available and free.

Source: Johns Hopkins Medical Institutions

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