A NOVEL TECHNIQUE FOR DETECTING PANCREATIC CANCER

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ABSTRACT
Cancers are a large family of diseases that involve abnormal cell growth with the potential to invade or spread to other parts of the body. Pancreatic cancer is one of the most lethal cancers, with a five-year survival rate of six percent. Cancer screening is currently not possible for many types of cancers, and even when tests are available, they may not be recommended for everyone. Universal screening or mass screening involves screening everyone. Selective screening identifies people who are known to be at higher risk of developing cancer, such as people with a family history of cancer. Several factors are considered to determine whether the benefits of screening outweigh the risks and the costs of screening. To overcome the above issue Jack Andraka has invented a technique which is similar to diabetic strips, for early-stage pancreatic cancer screening. This paper sensor measures the level of mesothelin in a sample to test the presence of cancer in a patient. He used coated strips of filter paper with a mixture of single-walled carbon nanotubes, which made the paper conductive, and antibodies against human mesothelin. Samples containing mesothelin were applied to these paper test strips, and the binding of the mesothelin to the antibody was quantified by measuring changes in the electrical properties of the strip.

KEYWORDS: cancer, carbon nanotubes, diabetic strips, mesothelin.
INTRODUCTION
Pancreatic cancer is one of the most lethal cancers, with a five-year survival rate of six percent. Some 40,000 people die of it each year. The diagnosis can be devastating because it is often delivered late, after the cancer has spread. Unlike the breast or colon, the pancreas is nestled deep in the body cavity a difficult to image, and there is no early symptom or lump (about experiment).

OBJECTIVES
Pancreatic cancer is a lethal cancer; if it is not diagnosed early it becomes lethal leading to death of patient. Existing methods are expensive and identify cancer at final stages, but this new method identifies cancer at early stages and is a cheap method, thus immediate treatment can be given to a patient and can save life of a person.

EXPERIMENTAL METHODS
A new type of sensor similar to diabetic strips, for early-stage pancreatic cancer screening. This paper sensor measures the level of mesothelin in a sample to tests the presence of cancer in a patient. We used coated strips of filter paper with a mixture of single-walled carbon nanotubes, which made the paper conductive, and antibodies against human mesothelin. Samples containing mesothelin were applied to these paper test strips, and the binding of the mesothelin to the antibody was quantified by measuring changes in the electrical properties of the strip. We have taken samples containing mesothelin were applied to these paper test strips, and the binding of mesothelin to the antibody was quantified by measuring changes in the electrical properties of the strip. Human blood serum obtained from both healthy people and patients with chronic pancreatitis, pancreatic intraepithelial neoplasia (a precursor to pancreatic carcinoma), or pancreatic cancer showed a dose-dependent response.

Fig: (a) (b) shows that single walled carbon nanotubes.
RESULTS AND DISCUSSION

The sensors were inexpensive, rapid, non-invasive, simple, sensitive and selective. Once the blood sample is placed on the strip, the protein mesothelin penetrates the nanotubes network and forms an immune complex with an antibody. This forms a large immune complex, rips apart the network and spreads to neighbouring nanotubes, thus changing the electrical properties. The result is picked up with a meter. The test is more than 90% accurate at detecting mesothelin levels, costs less than Rs. 100 and takes 5 minutes to run.

CONCLUSION

We have concluded that his method is 168 times faster, 1/26,667th as expensive and 400 times more sensitive than ELISA, 25% to 50% more accurate than the CA19-9 test and over 90 percent accurate in detecting the presence of mesothelin.
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