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Cancer - Finding A Better Cure

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Cancer detection tests have gained a lot of popularity and investor's attention. If successful such tests will be rewarding financially as well as socially.



Cancer being the most deadly disease worldwide, many scientists and researchers are taking on the biggest challenge of not only detecting the cancer early, but also finding ways to test cancer in a way which is easier, faster and yet cost-effective.

Given that people face a lifetime risk of around 40 percent of suffering from cancer, what can be done? The researchers note: "Early detection and intervention can prevent many cancer deaths. Detecting cancers earlier, while they are still curable, can save lives regardless of what caused the mutation." The World Health Organization too opines that Early detection of cancer greatly increases the chances for successful treatment.

Generally speaking, by the time conventional medicine has given a cancer diagnosis to a patient, it's too late. Standard cancer screening procedures can only detect cancer when the cancer tumor has developed into a billion cells or more. Fortunately, we now have the power to catch and identify nearly all forms of cancer - in their earliest stages of development.

The American Society for Radiation Oncology in March 2017 released the results of the largest prospective clinical trials conducted to date which showed that by using CTC counts as a biomarker, detection of recurrence of lung cancer was possible on an average of six months before the conventional imaging methods such as PET/CT scan detected them.

Later, scientists working at the Sean Parker's Institute for Cancer Immunotherapy uncovered a blood test method for predicting whether melanoma patients will respond to targeted treatments for the programmed cell death protein pathway in tumors. The findings were published in Nature.

Back home, Strand Life Sciences, a bengaluru-based company launched a similar blood test to detect a wide range of cancers. Strand, founded by two professors at the Indian Institute of Science, collaborated with the Mazumdar Shaw Center for Translational Research, which is run by Biocon Ltd founder Kiran Mazumdar-Shaw, to develop the blood tests. The tests will be sold at an affordable cost of $310 compared to a $3,000 test sold in U.S.

The development of blood-based tests attracted the attention of investors too. GRAIL, a biotech company raised $900 million of a planned $1 million to enable cancer screening from a single blood test. Alphabet's Verily also tried to create projects in the same vein which included a diagnostic tool for cancer detection, establishment of healthy baseline for human beings etc. It received an $800 million investment from Temasek, an investment company based in Singapore. Freenome, a two year old liquid biopsy company that also focuses on early detection of cancer raised $65 million led by Andreessen Horowitz. Other investors included Google Ventures, Polaris Partners, Charles River Ventures, Eric Schmidt's Innovation Endeavors, Spectrum 28, Asset Management Ventures.

The researchers of New York University in conjunction with Bio-Rad Laboratories, California developed gene-based blood tests to monitor blood levels of DNA fragments known as circulating tumour DNA. ctDNA are released in the blood when tumour cells break down. The researchers claimed that it could reliably detect previously unidentifiable forms of metastatic melanoma. They also opined that this method had more advantages over current methods because the tests avoid the radiation exposure that comes with CT scans, and the tests can be performed more easily and more often.

Purdue researchers worked on developing lateral flow strips, similar to home pregnancy tests for the detection of cervical cancer in its early stages. Cervical cancer is the fourth most common type of cancer in women. Doctors say that if found early, cervical cancer is highly treatable and is associated with long survival. However, current detection is based on HPV test which doctors say isn't always able to correctly classify whether somebody has a disease or not.

MIT engineers too devised a test that makes use of a synthetic biomarker, a nanoparticle that interacts with tumour proteins to release fragments that can be detected in a patient's urine sample. The method has been said to be far more sensitive for the detection of ovarian tumours and was able to detect nodules smaller than 2 millimeters in diameter in mice. Researchers are now further investigating the possibility of using this approach on other cancers, including prostate cancer.

A team of researchers, led by Professor Yoon-Kyoung Cho of Life Science at UNIST developed a new technique that effectively identifies cancer-causing substances in the urine or blood. Professor Yoon-Kyoung Cho presented an integrated centrifugal microfluidic platform (Exodisc), a device that isolates extracellular vesicles (EVs) from urine. Despite the increasing importance of EVs as potential biomarkers in the diagnosis and prognosis of various diseases, current methods of EV isolation and analysis suffer from complicated procedures with long processing times. "Using Exodisc, it is possible to isolate EVs from raw samples within 30 minutes," says Professor Cho. Simultaneously, US academics at Indiana University developed a machine that mimics the ability of dog to sniff out and detect whether a person has a prostate cancer through a urine test.

To address and better manage the disease, MedGenome - India's genomics based research and diagnostics companylaunched 'Oncotrack'. The liquid biopsy based Oncotrack is a non-invasive screening test that is set to transform the

way physicians in India can identify genetic alterations, interpret, assess and treat various forms of cancer.

The test developed entirely by MedGenome, is the only one to be validated in India and verified from samples of cancer patients from across the country. The test screens the samples by analyzing cell-free DNA that is isolated from the patients' blood. Using high end sequencing technology, the screening process identifies specific gene mutations that are linked with Melanoma, Lung and Colon cancers. The test facilitates detection of mutation where there is difficulty of obtaining biopsy or in the event of a damaged biopsy material and non-availability of tissue biopsy. This offers Oncologists the power to look for actionable alterations in a patient's treatment, management, without having to do an invasive biopsy or where biopsy is not an option.

Volatile Analytics, a biotech company has developed a chewing gum that can detect cancer. The gum absorbs chemical compounds present in the patient's saliva as he chews it. After chewing for fifteen minutes, the product is then analyzed to determine whether or not it contains specific chemicals. So far, various gums for the detection of cancer of pancreas, lungs and breasts have been developed.

Colon cancer is the most preventable but least prevented disease. Majority of people diagnosed with colon cancer are more than 50 years of age. A pilot study was launched by the University College London Hospital (UCLH) Cancer Collaborative to see if a simple, non-invasive stool test that patients could do at home could rule out the presence of colorectal cancer. The Quantitative Faecal Immunochemical Test, known as qFIT, detects hidden quantities of blood in a stool. There is growing evidence that the qFIT test can accurately 'rule-out' colorectal cancer for patients with suspicious lower abdominal symptoms with over 95% accuracy.

Owlstone Medical, a diagnostic company has developed a breathlyser that identifies cancer at an early stage. Owlstone looks to develop tests for two types of cancer, namely, lung cancer and colorectal cancer. Aviva Ventures invests £4m for this breath test. This investment means Owlstone Medical has now raised £19.3 million in funding.

Although such tests are revolutionary and can save millions of life, critics argue that producing these kind of tests is a difficult scientific challenge. Plus, clinical trials to produce credible data might take several years if not longer. In addition, biomarkers can vary from one person to another or can vary from one month to the next in the same person. The skepticism has also increased after Theranos, a start-up launched in 2003 with plans to revolutionize the diagnostic market had to face several lawsuits and allegations of consumer fraud after raising $400 million fund.

Given this scenario, there is no question that if successful such tests will be rewarding financially as well as socially. It might change how we deal with cancer. But, whether these tests will find a place in the market is again a million dollar question.