

Ultra-sensitive sensor discovery: A historical perspective!

Though man held nature in awe, he had always wished to unravel its mysteries with the advancements in science and technology; man intended to control nature and its working. And in this attempt he has ventured into newer and newer discoveries. The test tube babies for childless couples, plastic surgery, and face lifting methods to remain young and beautiful are the attempts to race against nature. The work of selective breeding of humans, to produce super humans may be a future possibility!

One of the latest discoveries may be a boon to millions of sufferers, specially the people of developing nations, the scientists have developed a new 10-times cheaper ultra-sensitive sensor to detect the early stages of several cancers and viruses, including HIV with the naked eye. Researchers from the Imperial College, London claim that their visual sensor technology is ten times more sensitive than the current gold standard methods for measuring biomarkers. These indicate the onset of diseases such as prostate cancer and infection by viruses including HIV. The color of the liquid changes to give either a positive or negative result. Researchers claim their sensor would benefit countries where sophisticated detection equipment is sparse, enabling cheaper and simpler detection, and treatment for patients. The team tested the effectiveness of the sensor by detecting a biomarker called p24 in blood samples, which indicates HIV infection. Researchers also tested samples for the biomarker called prostate specific antigen (PSA) which is an early indicator for prostate cancer. The scientists also claim the sensor can also be reconfigured for other viruses and diseases where the specific biomarker is known. The



sensor works by analyzing serum derived from blood, if the result is positive for p24 or PSA there is a reaction that generates irregular clumps of nanoparticles, which give off a distinctive blue hue in a solution inside the container. If the results are negative the nanoparticles separate into ball like shapes creating a reddish hue and both reactions can be easily seen by naked eye. The team also claims that the sensor is so sensitive that it is able to detect minute levels of p24 in samples where patients had low viral loads, which could not be diagnosed using existing tests such as the enzyme-linked immunosorbent assay test as well as the Gold Standard nucleic acid based test.

While research has reached advanced stages in industrialized countries, India is yet to wake up to the challenge. It is the utmost need that Indian Scientists especially from Medical and Dental areas should make utility of this research with a good conscience and prudence for the welfare and betterment of mankind.

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