

Aptasensors: A solution to cancer diagnosis

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Cancer refers to the uncontrolled proliferation of certain abnormal cells in the body which adversely affects the health of a person and has been a major cause of concern for a long time. Therefore, it is extremely important to detect cancer at an early stage to devise a proper therapeutic strategy and arrest the disease. Although many diagnosis methods have evolved over the past few years, some questions remain unanswered. Currently, a number of detection methods are available for cancer diagnosis. The application of aptasensors in the identification of tumour cells and the biomarkers that characterise them have revolutionised the field of cancer diagnosis. To identify these biomarkers, specialised probes are used which can bind to their particular target and help us analyse the risk factors. Even in the circulatory system, markers generally exist in the form of plasma proteins or free DNA. Basically, aptasensors are a type of biosensor in which the element that recognises the target under study is a DNA or RNA oligonucleotide. A number of aptasensors have been exploited in the clinical diagnostic field, such as nucleic acid aptasensors, electrochemical aptasensors, optical aptasensors, etc. Recently, six DNA aptasensors were isolated by researchers which were targeted against the common lung cancer biomarkers using the SELEX technique (systematic evolution of ligands by exponential enrichment), which requires the use of magnetic carboxyl agar beads. The magnetic beads with carboxyl groups ensure the coupling of the DNA or RNA aptamer to the target. An experiment was conducted to determine the specificity of such aptasensors in the identification of lung cancer biomarkers, which revealed that the DNA aptamer could detect the specific lung cancer biomarkers in the serum of lung cancer patients but not in the case of healthy patient's serum. This technique has also made the diagnosis of gynaecological cancer possible to a certain extent which otherwise is very difficult to detect. Additionally, when highly specific aptamers are used, the detection of cancer cells is more pronounced. Hence, these aptasensors can be a stepping stone to the fight against cancer.

Keywords: Aptamers, DNA aptasensor, RNA aptamers, Cancer, Biomarkers, Biosensors

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