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## Adaptation of inorganic nanocrystals for more stable and sensitive molecular beacons for gene detection

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Breast cancer is one of the leading causes of death in women, globally [1]. In South Africa breast cancer was the second leading cancer in South African women in the years between 1986 and 1992 [2]. Several methods including mammograms and other complimentary methods, such as magnetic resonance imaging, positron emission tomography, computerized tomography scan and immunohistochemistry are used in the diagnosis of breast cancer. Molecular beacons (MBs) are systems that are designed to detect target as a function of fluorescence intensity. The method involves use of fluorescence resonance energy transfer (FRET) which is dependent on the distance between the donor fluorophore and an acceptor chlorophore (Quencher). There are several biomarkers used in the diagnosis of breast cancer and together with molecular beacons more efficient method of diagnosis can be achieved. Traditionally organic fluorophore are used in designing MBs. However, inorganic semiconductors famously known as quantum dots have been seen to be more advantageous and could easily substitute organic fluorophores in design of MBs. Inorganic nanocrystals are considered to be photostable compared to organic fluorophores which are easily photo-degraded. In this study three types of quantum dots were separately attached to one end of DNA probe containing black luowo (Quencher) at the other end. Commercial QDs (Qdot 525 nm) was attached to one end of the DNA probe. Secondly, two different types of quantum dots namely InP/ZnSe and CdTe/ZnS were synthesized and attached to one end of the DNA probe in place of the commercial Qdot 525 nm. The surface of all quantum dots was modified to allow attachment of the DNA probe. Known concentrations of the target were used in evaluating the performance of the DNA probe and their fluorescence intensity detected using micro-plate reader (model). It was established that with the increase in the amount of target in the sample the fluorescence intensity increased significantly. Some of the results will be discussed in the conference.

### Keywords

Cancer, molecular beacons, DNA probe, fluorophore, quencher

### References

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