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Biomarkers in Cancer: Recent Advances

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Biomarkers are invaluable tools for cancer detection, diagnosis, patient prognosis and selection of treatment. In cancer research and treatment, assay of biomarker can be used to identify the presence of tumour, determine its stage, subtype and ability to respond to treatment. Further, biomarkers in cancer can be used to better understand tumour formation and to develop new therapeutic approaches. Despite years of intensive analysis only a small number of plasma proteins have been validated as cancer biomarkers such as prostate specific antigen and cancer antigen 125. Now with technological advances in gene expression, genomic and proteomic analysis discovery of biomarkers is a fast growing area of cancer research. Development of genomics and proteomics has made it possible to monitor a large number of cellular pathways simultaneously. This has enabled the identification of biomarkers and signalling molecules associated with cell growth, cell death and cellular metabolism. Further, they are facilitating in monitoring the functional disturbances, molecular and cellular damage and damage response. This talk aims to describe some of the development of biomarkers in cancer research and detection with emphasis on different genomic and proteomic tools for the identification and discovery of new biomarkers including gene expression signatures associated with cancer cells which can tell us about cancer pathogenesis, progression and help in identifying patients who are most likely to respond to treatment and 'single cell proteomics' to further understand tumorigenesis and work towards personalized treatment strategies.