Biomarkers as Valuable Tools in Clinical Diagnostics

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Abstract:
Biomarkers in breast cancer have long been known and aberrations in BRCA1 or BRCA2 and CCNE1 for breast cancer and ovarian cancer modulate survival rates. Advanced ovarian cancer patients who achieve an excellent response to primary platinum-based chemotherapy with a cancer antigen 125 (CA-125) serum level less than 10 U/mL were more amenable to the benefits of paclitaxel maintenance therapy. Biomarkers can be valuable tools in clinical diagnostics as well as in therapeutic discovery and development. They are useful to predict response to therapy or risk of side effects for personalized medicine applications. Various types of biomarkers include predisposition, screening, diagnostic, prognostic and toxicity, susceptible and resistant biomarkers.

In our study working with lung cancer patients, we examined the role of MDR1 C3435T polymorphisms in lung cancer patients undergoing chemotherapy. Frequencies of MDR1 C3435C, C3435T and T3435T genotypes were 61, 16 and 23 % in lung cancer patients and 86, 9 and 5 % in the controls, respectively as determined by PCR-RFLP. We also correlated the association between MDR1 genotypes with different combinations of chemotherapy. The combinations and genotype distributions in the group receiving paclitaxel and cisplatin were as follows: CC (67 %), CT (24 %) and TT (9 %) genotypes, respectively, and the group receiving carboplatin and gemcitabine were CC (46 %), CT (19 %) and TT (35 %) genotypes, respectively. We found that MDR1 (rs1045642) C3435T polymorphism and gene expression was significantly associated with the clinical outcome in lung carcinoma patients This is the first study to determine, quantitatively, expression of the MDR1 gene in lung carcinoma. MDR1 C3435T polymorphism and its expression were significantly associated with the clinical outcome and can be used as a genetic marker.

Personalized medication is “big information” and therefore the data explosion continues. As we have a tendency to unravel the ordination to appear for personal clues, we have a tendency to square measure round-faced not solely with simply over three billion base pairs however conjointly with epigenomic changes, noncoding regions, restrictive sequences etc., that add layers of complexness. New technologies still be advanced to spot molecular markers of malady at intervals this info. Though tools have created characteristic variants a trendy pursuit, characteristic unjust variants that function biomarkers has the potential to revolutionize the means health care is delivered within the future.

This writing is somewhat divergent from the descriptive approach of outlining exciting new technologies and listing samples of numerous small RNAs that are known as potential biomarkers. The diligent work of the many has created a wealth of information that no single skilled will sustain with. We have a tendency to hope rather to debate here this state of biomarker use in numerous forms and therefore the shortcomings of our current travel models and their potential ways forward.

A biomarker refers to a quantitative biological parameter that's measured associate degreed evaluated as an indicator of traditional biological, pathogenic, or pharmacological responses to a therapeutic intervention, as outlined by the National Institutes of Health.3 consequently, capillary filtration rate, repeat vital sign readings, hemoprotein A1C, and organic phenomenon identification square measure all samples of “biomarkers.” once utilized in travel analysis discussions, the term itself usually alludes to a marker accustomed accelerate or aid in designation or observation and supply insight into “personalized” medication.

Furthermore, a “liquid diagnostic test,” because it is beginning to be known as, might add important clinical worth. This noninvasive, or minimally invasive, biomarker testing might allow speedy, economical, and repeat analysis this repeat sampling feature would therefore allow the patient with high potential for a selected malady to self-sample piss and secretion or for clinical sampling of serum/plasma or blood. To date, most of the liquid diagnostic test analysis has targeted on the rare current neoplasm cell or CTC; it's projected that nucleic acids and proteins, either free or found in extracellular vesicles like exosomes might prove helpful.