

# Predictive Biomarkers

Sathvik Raj A\*

Department of Biochemistry, Acharya Nagarjuna University, Guntur, Andhra Pradesh, India

## Short Communication

A predictive biomarker is used to identify individuals who are more likely to respond to exposure to a particular medical product or environmental agent. The response could be a symptomatic benefit, improved survival, or an adverse effect. Cancer biomarkers are substances or processes measured in the body or in bodily fluids and that can predict the risk of developing a cancer (predictive biomarkers) indicate the early onsets of cancer (diagnostic biomarkers) or measure risk of cancer progression or potential response to therapy (prognostic biomarkers).

Prognostic biomarkers are often identified from observational data and are regularly used to identify patients more likely to have a particular outcome. To identify a predictive biomarker, there generally should be a comparison of a treatment to a control in patients with and without the biomarker. A prognostic biomarker provides information about the patients overall cancer outcome, regardless of therapy, whilst a predictive biomarker gives information about the effect of a therapeutic intervention. A predictive biomarker can be a target for therapy.

We defined a prognostic factor as a patient characteristic that identifies subgroups of untreated patients having different outcomes, and a factor predictive of treatment effect as a patient characteristic that identifies subgroups of treated patients having different (as a consequence of treatment) outcomes. A prognostic biomarker is a clinical or biological characteristic that

provides information on the likely course of the disease; it gives information about the outcome of the patient. A therapeutic biomarker is generally a protein that could be used as target for a therapy. A biomarker measured before or after an exposure to a medical product or an environmental agent to indicate the likelihood, presence, or extent of toxicity as an adverse effect.

Diagnostic biomarkers are used for the critical determination of whether a patient has a particular medical condition for which treatment may be indicated or whether an individual should be enrolled in a clinical trial studying a particular disease. A biological molecule found in blood, other body fluids, or tissues that is a sign of a normal or abnormal process, or of a condition or disease. A biomarker may be used to see how well the body responds to a treatment for a disease or condition. It is also called molecular marker and signature molecule. People often confuse the terms prognosis and diagnosis. The difference between the two is that while a prognosis is a guess as to the outcome of treatment, a diagnosis is actually identifying the problem and giving it a name, such as depression or obsessive-compulsive disorder.

A bad prognosis means there is little chance for recovery. Someone with a good or excellent prognosis is probably going to get better. Poor prognostic factors include the stage of disease at presentation, which is influenced by presence of nodal and/or distant disease. In particular, the presence of nodal disease influences survival and the likelihood of metastatic disease. Independent prognostic factors can be particularly useful in clinical medicine since, by their independence, they can be applied to various clinical scenarios and they can be relied upon even in the absence of other clinical information.

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\*Address for Correspondence: Sathvik Raj A, Department of Biochemistry, Acharya Nagarjuna University, Guntur, Andhra Pradesh, India, E-mail: rajsathvik349@gmail.com

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