Development and Validation of Genomic Classifiers for Treatment Selection

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Genomic technologies today provide unprecedented opportunities to enhance the efficiency of clinical development of effective therapeutics and to target drugs to patients most likely to benefit. Targeting drugs to appropriate patients provides a rational strategy for limiting adverse effects and limiting escalating medical costs that threaten the medical and economic well being of individuals and society.

The effective utilization of genomic technologies in therapeutics development entails significant challenges and requires re-examination of familiar paradigms. In this talk I will try to present a roadmap for the development and validation of robust genomic biomarker diagnostics in conjunction with development of new drugs and for use in treatment selection for individual patients. I will try to clarify many of the misconceptions that exist about the development and validation of predictive molecular classifiers and will provide specific statistical designs and analytic strategies.

Biomarkers are used for a wide variety of objectives in disease detection, diagnosis and treatment. There are a number of serious misconceptions about the development and validation of biomarkers that derive from the ambiguous use of the term. This presentation will address key aspects of the development and validation use of biomarkers for treatment selection. It will cover biomarkers based on single genes/proteins and genomic classifiers based on the level of expression of multiple genes.
I will distinguish between validation of a genomic classifier for identifying which patients benefit from a widely available treatment from the use of a genomic classifier for focusing the development of a new therapeutic. Efficient clinical trial designs for both objectives will be discussed. For the Powerpoint presentation and related publications see the Technical Reports section of http://linus.nci.nih.gov/brb

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