CANCER GENOMICS & PROTEOMICS *4*: 107-318 (2007)

"How Soon will we Attain Truly Individualized Therapy?"
Special Issue Edited by A. Burger, B. Leyland-Jones

Editorial

"*How soon will we attain truly individualized therapy?*"

The release of the sequence of the human genome with the beginning of the 21st century introduced the "omics" into science and led to unprecedented progress in molecular medicine. In particular, the complexity of the various signaling pathways regulating malignant diseases is becoming better understood, and agents targeting differences between tumor and normal cells have entered clinical practice. Furthermore, traditional chemotherapeutics that have been developed based upon empirical science are being revisited with the intention to convert them into targeted therapies based upon *e.g.* mismatch repair status, or topoisomerase 2 expression. Therapy tailored toward an individual's DNA, RNA or protein profile holds the promise to obtain huge improvements in survival, whilst greatly reducing unnecessary side-effects.

The advent of powerful genomic, proteomic and bioinformatic tools has provided us with the means to change current treatment paradigms and to approach truly individualized cancer therapy. Tissue microarrays are now being made routinely from tumor blocks of patients entering multicenter clinical trials.

DNA arrays that contain the complete human genome (both as array CGH and expression arrays) have been developed and are being used to better classify human cancers, to obtain gene signatures of drug response, and to identify new cancer-specific genes that could be employed as therapeutic targets.

The rapid functional characterization of gene products – the proteins –, their post-translational modification, and the delineation of their complex networks in the cell is now made possible through proteomic technologies, such as mass spectrometry, protein and methylation microarrays.

The articles in this issue provide an overview of preclinical and already implemented clinical approaches to individualized therapy, utilizing both, genomic and proteomic approaches. They highlight important molecular pathways (cancer metastasis, drug resistance, cancer stem cells, cancer cachexia and translational regulation of cancer cells) against which new drugs must be targeted to complement our available armamentarium of molecular anticancer agents for the treatment of multigenic cancers.

Angelika M. Burger and Brian Leyland-Jones

Genomic and Proteomic Approach to Individualized Therapy

New Molecular Targets