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Clinical application of pharmacogenomics in oncology

Pharmacogenomics (PGx) plays a significant role in the pharmacotherapy of cancer, as narrow therapeutic indices, low overall response rates, rapid and severe systemic toxicity, and unpredictable efficacy are all hallmarks of cancer therapies. The implementation of pharmacogenomics in cancer treatment offers the potential for clinicians to better predict the differences in drug response, resistance, efficacy, and toxicity among chemotherapy and targeted-therapy patients, and to optimize the treatment regimens based on these differences. Accrued evidence demonstrates that PGx biomarkers related to drug-metabolizing enzymes, drug transporters, drug targets and drug-detoxifying mechanisms, play critical roles in predicting the safety, toxicity, and efficacy of cancer therapy in individuals or groups of patients. With clinically important biomarker polymorphisms becoming increasingly delineated, the need for clinicians to understand the association of these clinically important polymorphisms with potential changes of pharmacokinetics and pharmacodynamics of certain cancer therapies has become crucial. Although the therapeutic application of PGx research in cancer treatment during the past decade has been initially slow, the accumulating evidence of bench work and bedside patient care has been growing exponentially. By identifying specific PGx biomarkers present in tumors, physicians can select and tailor a patient's treatment based on his or her genetic profile. Furthermore, it has become clear that the clinical benefit associated with these therapeutic agents targeted at the specific biomarkers is typically limited to a subset of responsive patients with or without a specific genomic mutation of the biomarkers. Thus, targeted therapy guided by PGx biomarkers has the potential to significantly improve the prognosis of selective cancer patients and avoid the costly unresponsive treatment for the nonselective patients to save valuable time for other proper treatments. There is an unprecedented urgency for more clinicians to become trained on how to interpret data from PGx testing and to prepare for the upcoming future of health care—personalized medicine.

Biography

Xiaodong Feng has integrated training experience and expertise in cancer education, pharmacy practice, community service, cancer research and cancer patient care which enabled him to incorporate essential components of knowledge, clinical skills, biomedical research, community outreach and service into high quality patient care and pharmaceutical education. He did his PhD training in Cellular and Molecular Physiology and PharmD training specialized in Pharmacy Education and Clinical Pharmacy Practice. He started biomedical research career nineteen years ago in the Wound Healing Center, School of Medicine at Stony Brook. After three years of fellowship, he continued research and teaching as an Assistant Professor in Department of Dermatology, State University of New York at Stony Brook for another 4 years. Currently he is teaching at California Northstate University College of Medicine and College of Pharmacy as Professor of Medical Education. He also has administrative role as Vice President of California Northstate University and Associate Dean of its medical school. He has over twenty years of clinical and biomedical research experience in cancer, wound healing, and cardiovascular diseases. His current research interests include drug discovery for anti-angiogenesis therapy and tumor metastasis, and application of pharmacogenomics in patient care. Two US patents on strategies of anti-angiogenesis and cancer treatments have recently been issued for him.

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