



## Impact of social behavioral and genomic sciences on translational cancer research

Studies have shown that there are many possible risk factors for cancer prognosis. Identifying or targeting a single risk factor is not sufficient in understanding cancer etiology or developing a comprehensive treatment strategy. Cancer may be influenced by a combination of genetic, lifestyle, social behavior, and environmental determinants of health. These risk factors may often coexist and interact with each other. Therefore, a better understanding of the genetic and social behavioral risk factors—such as tobacco use, unhealthy eating, physical inactivity and inherited genetic variants—could improve strategies for primary, secondary, and tertiary cancer prevention and control.

However, many researchers and public health practitioners often consider genomics and social behavioral sciences to be unrelated disciplines. In the field of cancer research, genomic sciences focus on single-nucleotide polymorphism (SNP), DNA sequencing, mRNA expression, DNA methylation, metabolomics, and proteomics data to explore oncogenic mechanisms, cancer evolution, and treatment improvement. Social behavioral sciences examine and evaluate the role of cultural, social, and behavioral determinants of health and health disparities to promote wellness, prevent cancer, and improve the quality of life of cancer survivors. Yet together, both social behavioral and human genomic related studies have not only improved cancer prevention, cancer detection, and patients' quality of life but also have made cancer treatment more effective.

Recently, a growing number of researchers, institutes, and governments recognize the importance of integrating both social behavioral and genomic sciences in order to effectively and efficiently prevent, detect, and treat cancers. The Centers for Disease Control and Prevention (CDC) and the Institute of Medicine (IOM) have emphasized the importance of genomics for health professionals. The CDC developed a number of genomic competencies for the public health workforce to deliver and to evaluate various appropriate intervention approaches with these genetics components. For example, one genomic competency is to “identify the role of cultural, social, behavioral, environmental and genetic factors in the development of disease, disease prevention, and health promoting behaviors and their impact on medical service organization and delivery of services to maximize wellness and prevent disease”. The IOM Roundtable on Translating Genomic-Based Research for Health also suggested the integration of genomic medicine into the patient-centered medical home.

In this special issue, we solicit articles that review and/or identify several major social behavioral and genetic risk factors for cancer to give readers an overview on updated information regarding potential cancer prevention and prognosis research. For example, Dr. Moody-Thomas reviews and describes the role of behavioral sciences in translational cancer research from several different prospects, including definition, models, and application of translational research. She suggests that using an integrated and collaborative approach with the basic, clinical, and behavioral sciences together will accelerate the translation of scientific discoveries into improvements for the general population. Dr. Williams provides a brief overview of cancer prevention and control, including both social, behavioral and genomic strategies, and their applications within cancer research, such as cancer related health disparities and precision medicine. Another review paper by Su *et al.* summarized the risk impact of using indoor tanning beds, its related biological markers and mechanism, and the protective effect of sulforaphane on melanoma. Using genetic biomarkers as a tool to customize treatment for each patient is the goal of precision medicine. The current risk classification for prostate cancer prognosis based on several clinical factors is not sufficient. Lin *et al.* explored potential biological mechanisms of the angiogenesis gene-gene interaction network associated with prostate cancer aggressiveness. Their findings not only provide more information for the mechanism behind prostate cancer etiology but also may serve as integrated biomarkers for building a risk prediction model for prostate cancer aggressiveness.

Social behavioral and health behavioral sciences cooperate in other ways to improve cancer prevention and prognosis. Social behavioral sciences contribute to translational cancer research through a methodological, to dissemination and implementation perspectives. Health behavioral sciences, especially in tobacco control and cervical cancer screening, play an important role for cancer prevention. For example, in their article Chen *et al.* examined the association between subjective risk perceptions of lung cancer (both absolute and relative) and cigarette-smoking behaviors among a large and nationally representative sample of U.S. adults, followed by a study using guideline-based, comprehensive tobacco control program in a public hospital system. Celestin *et al.* examined the impact of group behavioral counseling and the group's long-term smoke-free status post-treatment in primary care clinics. Another study, by Mahas *et al.* regarding the prevention of cervical cancer, examined barriers to and some interesting factors associated with Pap test. The study showed that the HPV DNA test has better efficacy in finding early and advanced cervical cancer compared to Pap tests. Williams *et al.* examined the rates of HPV DNA detection with tampons collected at home as compared to clinician obtained cervical swabs. Fisher and colleagues also report HPV vaccine uptake

among high risk populations for HIV infection and identify demographic and behavioral factors associated with vaccination. Besides tobacco control and cervical cancer screening, nutrition intake is another modifiable behavioral factor associated with cancer. Coffee consumption and sugar intake from sugar sweetened beverages among cancer survivors will be an important issue as survival rates increase due to improvements in treatment and health care. Yuan *et al.* investigated the association of caffeine intake and endometrial cancer risk using the National Health and Examination Survey (NHANES). Tseng *et al.* evaluated whether cancer status and other risk factors associated with sugar intake from sugar sweetened beverages.

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