Preface

Prostate cancer is a typical disease of the aging; the incidence of this disease increases dramatically in men over 50-55 years old and is the most common non-cutaneous cancer in US men as well as many other developed countries. It is estimated for prostate cancer to cost $1.5 billion per year in direct medical expenses and an additional $2.5 billion in indirect costs such as loss of wages and productivity. Currently, the mortality rate of prostate cancer is second to that of lung cancer; the majority of cancer death is caused by metastatic disease. Currently, the most effective therapeutic modality for metastatic disease, first developed by Huggins and Hodges in 1941, is to interrupt the positive effect of growth stimulation by androgen. Despite of the initial excellent responsiveness from patients toward hormonal therapy, prostate cancer invariably relapses to a castration resistant state as a terminal disease. Currently there are only few options for treating patients with castration resistant prostate cancer such as chemotherapy or radiation; these regimens only prolong patients' survival. Until now, there is still no curative regimen.

Despite of low circulating hormone in patients underwent hormonal therapy; androgen receptors and/or hormone synthesis become highly active in castration resistant prostate cancer. Overwhelming data have shown multiple mechanisms leading to hyperactive androgen receptor, including gene mutation or amplification, altered expression of androgen receptor co-activators and co-repressors, or the presence of AR splice variants in the absence of the ligand-binding domain is constitutively active. In addition, the crosstalk of androgen receptor with other signaling pathways and/or altered androgen receptor-regulated gene expression are also shown to contribute to the onset of castration resistant prostate cancer. Thus, targeting androgen receptor remains a focal point for developing more effective therapeutic strategy.

One of the most exciting developments in modern medicine has been the step-by-step construction of disease in combination with molecular analysis of genetics, cell biology, and animal models. Knowledge from these studies has produced many potential new molecular targets at DNA, RNA and protein levels, which spark the discovery of new class of compounds as the next generation of medicine developed from many new technologies of chemistry and physics. In addition, molecular imaging is an emerging field of technique that deals with imaging of disease on the cellular or genetic level rather than on an anatomic level. The ability to image molecular target in cancer cell is a result of new insight into the genetic mechanisms of disease and the development of new analytic techniques to probe these genetic factors. Thus, the concept of personalized medicine becomes more apparent because molecular imaging technology can be combined with nanomedicine targeting key molecular defects associated with different diseases.

In this special issue of *Translational Androgen and Urology*, Dr. Raj and I have invited an international expert panel of clinicians and basic scientists to outline current challenges of prostate cancer treatment and discuss every aspect of hormonal metabolism, receptor alteration and mechanism in prostate cancer to pave a way for developing better therapeutic strategy and prognostic tools. Also, a wide range of topics such as cancer metastasis, animal model, molecular imaging and targeted therapy of prostate cancer were included as well.

We would like to acknowledge our deep appreciation to every author faculty for their expertise and knowledge, which has enabled us to put together what we feel to be a comprehensive overview of "molecular" disease of prostate cancer. We also thank the Editor-in-Chief, Dr. Lue, for affording us the privilege of being the Guest Editors of this issue and for editorial assistance. We hope you enjoy reading it as much as we enjoyed putting it together.

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