Editorial for focused issue "Cancer Health and Medicine: A new era"

Like every decade, this decade brings a new era of hope in treating various diseases including the devastating cancer. Tremendous and overwhelming efforts from around the world have made this outcome possible. Immunotherapy has shown magnificent promise in treating malignant tumors of various anatomic origins. Multiple novel targets have been identified to treat aggressive cancers and new methods including noninvasive liquid biopsy are on the way for the early detection of cancer. Next generation sequencing has revolutionized and opened up new avenues to characterize various cancers and develop rapid personalized treatment strategies. Exciting new role of mitochondria in cancer progression, metabolic reprogramming has been identified, which can be exploited for cancer biomarker development and treatment. Extracellular vesicles are also gaining tremendous attention due to their emerging role in tumorigenesis and potential in cancer therapeutics and biomarker development.

In this special issue of *Annals of Translational Medicine*, we have discussed the emerging and promising role of immunotherapy in cancer. Dr. James P. Allison, the noble prize winner in medicine in 2018 has shown the path of CTLA-4 blockade for effective generation of anti-tumor T cell response in cancer. This paradigm shifting work resulted in the development of ipilimumab (FDA approved), which remarkably improved overall survival of melanoma patients. Following that path, Nivolumab, Pembrolizumab, PD-1/PD-L1 directed molecules were also developed to empower the efficiency of the immune system to restrict and eventually eradicate cancer progression. Notably, these immunotherapeutic treatment regimens are not restricted to treat melanoma and various other solid tumors can also be treated. In addition, CAR-T cell based immunotherapy utilizing axicabtagene ciloleucel and tisagenlecleucel has also been developed. These are remarkable achievements in this "era of cancer medicine".

Worldwide, breast cancer (BC) is a leading cause of death in women. Due to enormous complexity in terms of histologic subtypes and molecular heterogeneity, BC management is a significant clinical challenge. Due to lack of appropriate molecular markers, early detection of BC still remains difficult. Moreover, a significant racial disparity exists in BC incidence, aggressiveness and mortality among various populations. The molecular drives causing this racially disparate outcome are yet to be characterized. Like many other solid tumors, an immunosuppressive environment provoked by chronic inflammation makes it difficult to effectively eradicate this disease. Notably, sustained immunosuppressive condition may allow the cancer cells to adapt strategies to achieve loco-regional, distant metastasis and treatment resistance. Thus, understanding the molecular pathways leading to chronic inflammation and immunosuppression are of paramount importance. With the advent of novel immunotherapeutic strategies described above, we are hopeful to develop better BC management strategies by reversing the immunosuppressive environment.

Apart from providing energy, mitochondria have the remarkable ability to govern diverse array of important and critical functions in regulating immune function, cellular signaling, apoptosis, autophagy and mitophagy. Genomic alterations leading the mitochondrial dysfunction not only reprogram energy metabolism but also aid to develop an immunosuppressive environment favoring cancer progression. Mutations in mitochondrial DNA may lead to various incurable genetic diseases. Reprograming in mitochondrial function could also be linked to racial disparity in various malignancies. In this special issue, mitochondrial dependency of immune and inflammatory cells' functions has also been discussed. Thus, "don't ignore me" mitochondrial signal thoughtfully deserves our attention and deeper understanding of their role particularly in regulating immune system function. This could be invaluable to link mitochondria to the current road map of new immunotherapeutic approaches being developed for various malignancies.

As the Guest Editor, I would like to express my sincere gratitude to scientists who have contributed to this focused issue and all the cancer patients for whom, better treatment and prevention strategies are on the way.

I would like to take this opportunity to express my deepest gratitude and heartfelt thanks to the Science Editor of ATM, Hailing Lian for the fruition of this focused issue.

Acknowledgments

This work was supported by The University of Texas Health Science Center at Tyler.

Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

Ethical Statement: The author is accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Santanu Dasgupta

Santanu Dasgupta
Department of Medicine, The University of Texas Health Science Center at Tyler, Tyler, TX 75708, USA.
(*Email: santanu.dasgupta@uthct.edu*)
doi: 10.21037/atm.2019.09.103
View this article at: http://dx.doi.org/10.21037/atm.2019.09.103

Cite this article as: Dasgupta S. Editorial for focused issue "Cancer Health and Medicine: A new era". Ann Transl Med 2019;7(20):592. doi: 10.21037/atm.2019.09.103