



Editorial

Failing immune surveillance in humans: Repercussion of modern day lifestyles

Mohammed Abdul Hannan Hazari 

Department of Physiology, Deccan College of Medical Sciences, Kanchanbagh, Hyderabad-500058, Telangana, India.

Article history Received 21 March 2019 Accepted 21 March 2019 Online 27 March 2019 Print 31 March 2019

Immunological surveillance is the policing act of the immune system of the body which identifies and destroys invading pathogens and also maintains a check whether the host cells are going vary and turning into cancer. Natural killer (NK) cells, B-lymphocytes and T-lymphocytes provide cellular machinery through which surveillance mechanism works. For the surveillance mechanism to function precisely, the invading pathogens, dysplastic or neoplastic cells should express antigens that are not normally present on the host cells. This helps the elements of immune system to differentiate from 'self' and 'non-self' so as to mount an immunological response against it or not. In differentiating 'self' with 'non-self', the immune system uses 'checkpoints' — molecules on certain immune cells that need to be activated (or inactivated) to start an immune response [1]. Human body has a very effective immune check and housekeeping mechanism [2].

In the current times, the rising incidence of different neoplasms is in part attributed to failure of immune surveillance mechanism. Cancer immunosurveillance is now more accurately described as "cancer immunoediting" and is composed of three distinct steps—elimination, equilibrium and escape. The tumor cells if they reach escape stage they evade the immune system and grow progressively [3]. Neoplastic cells sometimes find ways to evade immune checkpoints and survive. Different processes have evolved in tumor cells to escape elimination

by immune surveillance like antigenic modulation (e.g. HLA down regulation), antigen masking, production of soluble tumor antigens or other tumor products (e.g. transforming growth factor β , TGF β) and induction of tolerance [4]. Reig et al envisaged that hepatitis C virus (HCV) eradication with antiviral agents is associated in time with the emergence of recurrent cancer sites in patients previously treated for liver cancer and is an example of immune surveillance failure [5].

Lifestyle factors which have been implicated in altering the immune system include physical factors, psycho-social factors, etc. Some of the common physical factors comprise of smoking, exposure to occupational and automobile exhaust, increasing consumption of preserved, processed and packaged foods, regular drinking of cold and hot beverages, unnecessary use of nutritional or vitamin supplements, working in infectious and bio-hazardous environments and excessive (sometimes irrational) use of antimicrobial agents. Exposure to environmental factors in early life [6], stringent hygiene and too much indulgence in hand washing (healthy practice though) has compromised the development of strong immune system [7]. Mobile phone usage for long durations physically effect human body [8,9] and interfere with the social life too [9].

More than the physical factors, psycho-social factors cause insult to the body defense mechanism. Limited or poor-quality sleep,

Corresponding author

Dr. Mohammed Abdul Hannan Hazari
Professor and Head

Department of Physiology, Deccan College of Medical Sciences,
DMRL 'X' Road, Kanchanbagh, Hyderabad-500058,
Telangana, India.

Phone: +91-9160164070

Email: hannanhazari@deccancollegeofmedicalsciences.com



DOI: <https://doi.org/10.23921/amp.2019v3i1.38529>

Print ISSN: XXXX-XXXX

Online ISSN: 2456-8422

Copyright © 2019. Quench Academy of Medical Education and Research (QAMER).



This is an open access article licensed under a Creative Commons Attribution 4.0 International License.

sedentary life, minimal socializing, pessimistic attitude, grumpy behavior, suppressed desires and feelings are the psychological and social variables which afflict the immune system in many ways wherein the immune watch (check) system starts losing battle and is pushed to the brink of collapse or shutdown [10].

Psychoimmunology or psychoneuroimmunology has emerged as an important interdisciplinary field which studies interplay between mind, nervous system, endocrine glands and immune mechanisms. Psychological makeup of a person, physical and emotional stressors, concurrent medical/health conditions determine the outcome of the immune response. The exact mechanism may not be known for failing immune process under the influence of psychological disturbances but its risk cannot be overlooked.

One of the newer cancer treatment modalities is immunotherapy which is based on the principle of strengthening person's own immune system to tackle with the tumor cells. Promising target sites for cancer immunotherapy are various immune check points like programmed cell death protein-1 (PD-1), programmed death-ligand 1 (PD-L1) and cytotoxic T-lymphocyte-associated antigen-4 (CTLA-4).

Having said about immunotherapy using different molecules, lifestyle corrections are furthermore essential for a balanced psychoneuroimmunological axis and minimizing the reparative work on cellular and molecular machinery so as to prevent failure of immune surveillance.

Acknowledgments: None

Conflict of interest: None

References

1. The American Cancer Society medical and editorial content team. Immune checkpoint inhibitors to treat cancer [Internet]. Atlanta (GA): American Cancer Society; [Updated 2018 Oct 1]. Available from: <https://www.cancer.org/treatment/treatments-and-side-effects/treatment-types/immunotherapy/immune-checkpoint-inhibitors.html> (Last accessed March 20, 2019)
2. Burnet FM. The concept of immunological surveillance. *Prog Exp Tumor Res.* 1970; 13:1-27. PMID: 4921480
3. Paul S, Lal G. Development and function of natural killer cells and its importance in cancer immunotherapy. In: Hayat MA, editor. *Immunology*. London: Academic Press, an imprint of Elsevier; 2018. pp.117-40. DOI: 10.1016/B978-0-12-809819-6.00009-5
4. Fleuren GJ, Gorter A, Kuppen PJ. Immune surveillance. In: Delves PJ, editor. *Encyclopedia of immunology*. 2nd ed. Cambridge: Academic Press; 1998, pp.1243-47.
5. Reig M, Boix L, Mariño Z, Torres F, Forns X, Bruix J. Liver cancer emergence associated with antiviral treatment: An immune surveillance failure? *Semin Liver Dis.* 2017 May; 37(2):109-118. PMID: 28388736 DOI: 10.1055/s-0037-1601349
6. MacGillivray DM, Kollmann TR. The role of environmental factors in modulating immune responses in early life. *Front Immunol.* 2014 Sep 12; 5:434. PMID: 25309535 DOI: 10.3389/fimmu.2014.00434
7. Strachan DP. Hay fever, hygiene, and household size. *BMJ.* 1989 Nov 18; 299(6710):1259-60. PMID: 2513902 DOI: 10.1136/bmj.299.6710.1259
8. Yasmeen J, Arifuddin MS, Khatoun N, Mahveen U, Hazari MA. Immediate effects of mobile phone radiations on heart rate variability in college going students. *Natl J Physiol Pharm Pharmacol.* 2018; 8(1):56-61. DOI: 10.5455/njppp.2018.8.0727708082017
9. Basu T. What's new among cancer etiology horizon? In: Atroshi F, editor. *Cancer causing substances*. London: IntechOpen; 2018. Available from: <https://www.intechopen.com/books/cancer-causing-substances/what-s-new-among-cancer-etiology-horizon> DOI: 10.5772/intechopen.71305
10. Lifestyle choices may affect immune system [Internet]. New York: Ameritas Wellness. 2014 Mar 5. Available from: <https://www.ameritasinsight.com/wellness/health-and-wellness/lifestyle-choices-may-affect-immune-system> (Last accessed March 20, 2019)