Editorial

Failing immune surveillance in humans: Repercussion of modern day lifestyles

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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, TGFβ) 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,
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.

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References
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