doi.org/10.54393/pjhs.v1i2.19

PAKISTAN JOURNAL OF HEALTH SCIENCES
https://thejas.com.pk/index.php/pjhs
Volume 1, Issue 2 (Jul-Dec 2020)

Review Article

Differentiation and TNM staging of Oral Squamous Cell Carcinoma

Shahida Perveen[1*], Imrana Tanvir[2], Kashifa Ehsan[3] and Hina Asif[3]
[1]Department of Pathology, Continental Medical College, Lahore, Pakistan
[2]Department of Pathology, King Abdulaziz University, Rabigh, Saudi Arabia
[3]Shaukat Khanum Memorial Cancer Hospital, Lahore, Pakistan
*shahidarasool2779@gmail.com

How to Cite
Perveen, S., Tanvir, I., Ehsan, K., & Asif, H. (2020). Differentiation and TNM staging of Oral Squamous Cell Carcinoma. *Pakistan Journal of Health Sciences*, *1*(2). https://doi.org/10.54393/pjhs.v1i2.19

ABSTRACT:

Head and neck carcinoma has great regional distribution in sub sites with distinct anatomical and physiological variation. Alcohol consumption, excessive smoking and hematopoietic stem cell transplantation are common risk factors for head and neck carcinoma. Alcohol consumption & tobacco chewing has a strong relationship with the development of oral, larynx, pharynx cancers. A typical HNSCC has a superficial change such as scaling, crusting, presence of cutaneous horn and ulceration. The stage of disease is apparent in the form of symptoms of head and neck carcinoma. Genetic alterations accumulation is source of initiation and development of carcinogenic cells. The development of HNSCC is based on many factors. Its underlying mechanism is based on the genetic and molecular changes along with repetitive injury to the epithelial layer by external stimuli. Different types of smoking such as Cigar, Pipe, Huqqa etc. exist in sub-continent and smoke from these sources contain toxic agents like tar and carbon monoxide. Mouth cavity and lungs are the places where tar being sticky substance deposits and cause many respiratory and oral diseases.

KEYWORDS:

Head and neck cancer, Carcinoma, Smoking, Risk factors, Lungs

INTRODUCTION

Immunity

An organism's capacity to fight a specific virus or poison through the use of specialized antibodies or sensitized white blood cells [1]. Immunity is an evolutionarily conserved defense strategy, inherent in both plants and animals, for disease tolerance. It confers the host protection against viral, bacterial, protozoan, and fungal infections [2]. During human evolution, the immune response has been strongly targeted by natural selection [3]. Immune system cells emanate from the bone marrow and subsequently move to the peripheral tissues to defend them. They travel through the bloodstream and the lymphatic system, which is a specialized system of channels. They do so after maturation in the bone marrow These pluripotent hematopoietic stem cell**s** give birth to all types of blood cells, earning them the name pluripotent hematopoietic stem cells. The natural killer cells are the third lineage of lymphoid-like cells that descend from the very same precursor cells but lack the antigen-specificity that distinguishes adaptive immune responses. ***Bone marrow;*** Stem cells in the soft inside of your bones give rise to plasma cells, white blood cells, red blood cells, and other immune cells. Every day, your bone marrow produces

Copyright © 2020, PJHS, Published by CrossLinks International Publishers
This work is licensed under a Creative Common Attribute 4.0 International License

doi.org/10.54393/pjhs.v1i2.19

a significant number of new blood cells and is released into the bloodstream [4]. Red blood cells, platelets, and immune system white blood cells are all biological components of blood. which carry oxygen and cause blood clotting in wounded tissues, come from the same source originator or progenitor cells are hematopoietic stem cells found in the bone marrow. Two more specialized types of stem cells, the **T and B lymphocyte**s, having a common lymphoid progenitor, are also produced by the division of these pluripotent cells. These stem cells are responsible for adaptive immunity. These lymphocytes are eminent T-cells in the thymus and B cells in the bone marrow differ in their differentiation sites and antigen receptors. During maturation, these cells move between both the bloodstream and peripheral lymphoid organs. B cells become antibody-secreting plasma cells after coming into contact with antigen, whereas T cells become effector T cells with a variety of functions. Macrophages are the innate immune system's main tissue-resident phagocytic cells. They are abundantly dispersed throughout the body's tissues. They are the mature version of monocytes, which circulate in the bloodstream and constantly develop into macrophages as they migrate into tissues. *Granulocytes* are a collective term for *basophils, eosinophils, and neutrophils.* They circulate in the bloodstream and only enter tissues once neutrophils are stimulated to phagocytose bacteria at infection or inflammatory sites. ***First-line defenses include the skin, mucous membranes, and other organs;*** Your skin is the first line of defense in preventing and killing bacteria before they reach your body. Skin produces oils and other immune-system-protecting cells. Mucous membranes line the pulmonary, gastrointestinal, urinary, and reproductive systems. Mucus is produced by these membranes, which softens surfaces. Bacteria adhere mucus produced by the respiratory system and are subsequently expelled from the airways by cilia, which are hair-like structures. Bacteria are caught in tiny hairs in the nose. Microorganisms are protected and destroyed by substances found in sweat, tears, saliva, mucus membranes, and vaginal secretions [5]. The immune system's precursor to polymorphonuclear leukocytes, dendritic cells, macrophage, and mast cells in the myeloid progenitor. A common myeloid progenitor that gives rise to a variety of leukocytes (white blood cells), erythrocytes (oxygen-carrying red blood cells), and mega-karyocytes (platelet-producing cells) is important in blood clotting. The leukocytes inferred from the myeloid stem cell are monocyte, dendritic cells, eosinophils, basophils, and neutrophils. Antigens presented by specialized dendritic cells are recognized by lymphocytes. Phagocytic cells and micropinocytosis seem to be immature dendritic cells that migrate from the circulation to the tissues and consume massive amounts of extracellular fluid. They grow swiftly and migrate to lymph nodes where they come into touch with a virus. Mast cells after being derived from bone marrow precursors, continue their development in tissues. Their main residence is near small blood vessels and, after activation, they affect vascular permeability by releasing certain substances. In protecting mucosal surfaces against pathogens, they are believed to play a part for their best-known role in orchestrating allergic responses [6]. As the count of *eosinophils and basophils* increases during a parasitic infection, they seem to be participating in protecting against parasites. Therefore, they are inducted to sites of allergic inflammation. The most crucial and great many cellular components of the innate immune responses are *neutrophils*, which are the immune system's third phagocytic cell; Overwhelming gemmal infection is caused by inherited abnormalities in neutrophil function, which is lethal if left untreated [7].

The Tissues and Organs of the Immune System

***Lymph nodes*;** An outer cortex and an interior medulla make up a lymph node. The cortex is made up of two layers: an exterior layer of B cells arranged into lymphoid follicles and T-cells and dendritic cells in a deeper layer. When an immunological response is triggered, germinal centers, which are key areas for extensive B-cell growth, are found in some of the follicles. These follicles are referred to as secondary lymphoid follicles [8]. These small nodules encircle and destroy germs, preventing them from spreading to other regions of your body

Copyright © 2020, PJHS, Published by CrossLinks International Publishers
This work is licensed under a Creative Common Attribute 4.0 International License

doi.org/10.54393/pjhs.v1i2.19

and causing illness. They are a feature of the lymphatic system in humans. Lymph nodes are made up of immune cells that analyze the external threat and then operate, duplicate, and to tackle that

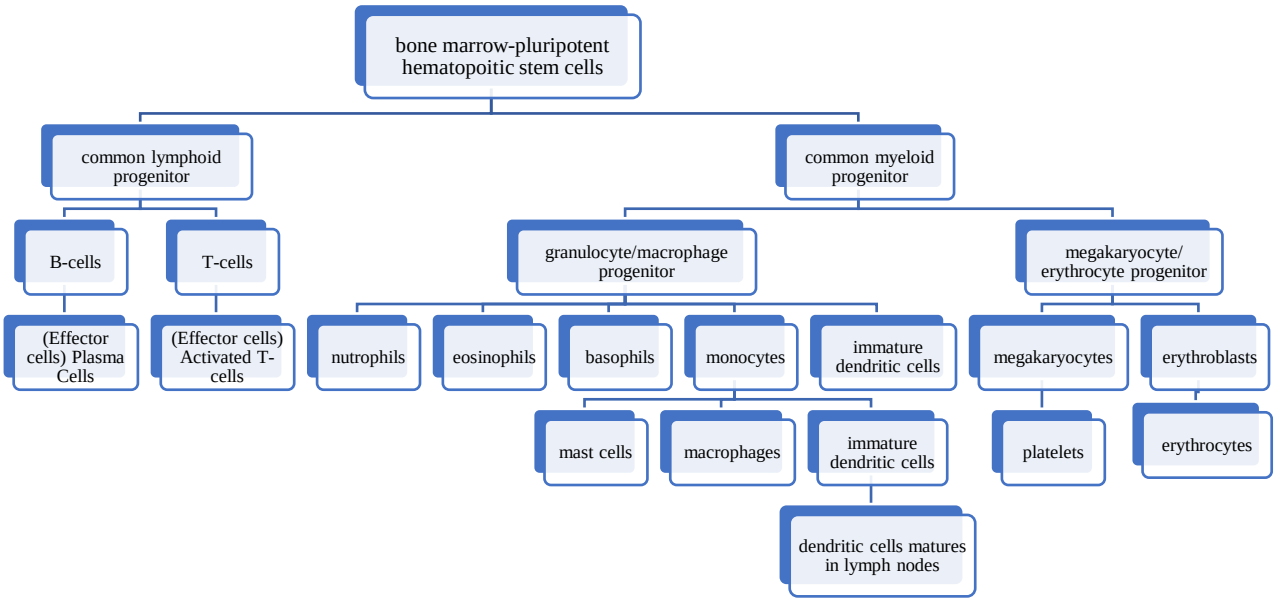

Figure 1: All the cellular components of blood, originating from hematopoietic stem cells of the bone marrow.

danger, specialized lymphocytes (white blood cells) are distributed. Lymph nodes may be found all throughout the body, including in the neck, underarms, and groin. Lymph nodes that are swollen and Squishy symptoms indicate that your system is battling an illness. ***Thymus;*** This little organ under your breastbone in your upper chest aids in the maturation of a particular type of white blood cell. This cell's specific mission is to learn to recognize and recall an assailant so that an assault may be planned quickly the next time the attacker is met [9]. ***Spleen;*** It delivers white blood cells, that protect your body from foreign invaders. It furthermore filters your blood, destroys old red blood cells, and filters your urine. ***Stomach and bowel;*** Many bacteria are destroyed by stomach acid shortly after they reach the body. In addition, in your intestines, you contain good bacteria that fight pathogenic bacteria [10]. ***Tonsils and adenoids;*** Because they are placed in the esophagus and nasal tube, the adenoids can capture foreign invaders (such as bacteria or viruses) as soon as they enter your body. They include immune cells that create antibodies in order to protect oneself from foreign invaders that cause infections in the throat and lungs [11].

Types of Immune System Responses

A multiplex network comprises of cellular and humoral constituents, it is necessary for efficient immunity to have cells that not only interfere with each other but are also affected by numerous environmental and host variables. The monocyte, neutrophil, and natural killer (NK) compartments represent the initial line of defense for innate immunological responses among immune cells ***Adaptive immune system or (behavioral immune response);*** The adaptive immune system, also known as the acquired immune system, is a part of the immune system that comprises of specialized, systemic cells and processes that kill infections by inhibiting their proliferation. Immunological memory is the result of the vertebrate immune system's response to a specific antigen [12]. Innate and adaptive immune systems are separated into two categories, each with its own role [13]. **(**i)Innate immune system or cell-mediated immune response. (ii)Adaptive immune system or behavioral immune response. ***Innate***

Copyright © 2020, PJHS, Published by CrossLinks International Publishers
This work is licensed under a Creative Common Attribute 4.0 International License

doi.org/10.54393/pjhs.v1i2.19

immune system or (cell-mediated immune response); Anti-infection systems in the body's immune response can be engaged swiftly if a pathogen attacks. The innate immune system is a set of defenses that help to keep viruses, bacteria, parasites, as well as other foreign substances through your body or limit their ability to spread and move about it. The innate immune system is made up of the following components: *Physical Barriers*; It includes the skin, GI tract, respiratory tract, nasopharynx, cilia, eyelashes, and other body hair, *Defense Mechanisms;* These substances include discharges, mucus, bile, gastric juice, saliva, tears, and sweat, and *General Immune Responses;* Inflammatory response, response, and non-specific cellular responses are only a few examples. The inflammatory response aggressively pulls immune cells to the infection site by increasing blood flow to it. Vaccination and immunization are included. T cells and B cells, as well as dendritic cells (DCS), are responsible for adaptive immune responses, which can be produced simultaneously. Although lymphocyte-dependent adaptive immune responses result in long-term immunological memory and antigen specificity, they are more time-consuming to generate [14]. Via germline-encoded pattern recognition receptors, the innate immune system senses infections and tissue damage (PRRs). They initially look for pathogen-related molecular patterns, then damage-related molecular patterns. The actions of PRRs include phagocytosis, cell movement, pathogen or cell death, and cytokine synthesis, all of which act swiftly in response to their engagement yet are observed to be non-specific. These innate immune responses are typically highly helpful in removing invading infections. Both the cellular and humoral arms of our immune system are essential for a successful immune response. Inter-individual Variation is driven by elements that are highlighted by their correlations. Despite the fact that microbial exposure has decreased in modern society, pollutants, stress, and other factors that lead to immunological dysfunction has grown, and it is obvious that the modern diet also affects the immune system [15].

REFERENCES

1. Gouveia BC, Calil IP, Machado JP, Santos AA, Fontes EP. *Immune receptors and co-receptors in antiviral innate immunity in plants*. Frontiers in microbiology. 2017 Jan;7:2139. doi: 10.3389/fmicb.2016.02139.
2. Soares MP, Teixeira L, Moita LF. *Disease tolerance and immunity in host protection against infection*. Nature Reviews Immunology. 2017 Feb;**17**(2):83-96. doi: 10.1038/nri.2016.136.
3. Barreiro LB, Quintana-Murci L. *Evolutionary and population (epi)genetics of immunity to infection*. Hum Genet. 2020 Jun;**139**(6-7):723-732. doi: 10.1007/s00439-020-02167-x.
4. Boes KM, Durham AC. *Bone marrow, blood cells, and the lymphoid/lymphatic system*. Pathologic basis of veterinary disease. 2017:724. doi: 10.1016/B978-0-323-35775-3.00013-8
5. Charles A, Janeway J, Travers P, Walport M, Shlomchik MJ. *Principles of innate and adaptive immunity. Immunobiology: the immune system in health and disease*. 5th (New York: Garland Science). 2001:26-31.
6. Mitroulis I, Ruppova K, Wang B, Chen LS, Grzybek M, Grinenko T, et al. *Modulation of myelopoiesis progenitors is an integral component of trained immunity*. Cell. 2018 Jan;172(1-2):147-161. doi: 10.1016/j.cell.2017.11.034.
7. Locati M, Mantovani A, Sica A. *Macrophage activation and polarization as an adaptive component of innate immunity*. Adv Immunol. 2013;**120**:163-84. doi: 10.1016/B978-0-12-417028-5.00006-5.
8. Matsuzawa-Ishimoto Y, Hwang S, Cadwell K. *Autophagy and inflammation. Annual Review of Immunology*. 2018 Apr;36:73-101. doi: 10.1146/annurev-immunol-042617-053253.
9. Fung TC, Olson CA, Hsiao EY. *Interactions between the microbiota, immune and nervous systems in health and disease*. Nature neuroscience. 2017 Feb;**20**(2):145-155. Doi: 10.1038/nn.4476

Copyright © 2020, PJHS, Published by CrossLinks International Publishers
This work is licensed under a Creative Common Attribute 4.0 International License

doi.org/10.54393/pjhs.v1i2.19

10. Tahir F, Ahmed J, Malik F. *Post-splenectomy sepsis: a review of the literature*. Cureus. 2020 Feb;**12**(2). doi:10.7759/cureus.6898
11. Kumpitsch C, Koskinen K, Schöpf V, Moissl-Eichinger C. *The microbiome of the upper respiratory tract in health and disease*. BMC biology. 2019 Dec;**17**(1):1-20. doi: 10.1186/s12915-019-0703-z.
12. Martins R, Carlos AR, Braza F, Thompson JA, Bastos-Amador P, Ramos S, Soares MP. *Disease tolerance as an inherent component of immunity*. Annual review of immunology. 2019 Apr 26;**37**:405-437. doi: 10.1146/annurev-immunol-042718-041739.
13. Hillion S, Arleevskaya MI, Blanco P, Bordron A, Brooks WH, Cesbron JY, Kaveri S, Vivier E, Renaudineau Y. *The innate part of the adaptive immune system*. Clinical reviews in allergy & immunology. 2020 Apr;**58**(2):151-154. doi: 10.1007/s12016-019-08740-1.
14. Netea MG, Domínguez-Andrés J, Barreiro LB, Chavakis T, Divangahi M, Fuchs E, *et al.*, *Defining trained immunity and its role in health and disease*. Nat Rev Immunol. 2020 Jun;20(6):375-388. doi: 10.1038/s41577-020-0285-6. Epub 2020 Mar 4.
15. Albuquerque RG, Rocha MA, Bagatin E, Tufik S, Andersen ML. *Could adult female acne be associated with modern life?*. Archives of dermatological research. 2014 Oct 1;306(8):683-8. doi: 10.1007/s00403-014-1482-6.

Copyright © 2020, PJHS, Published by CrossLinks International Publishers
This work is licensed under a Creative Common Attribute 4.0 International License