Journal of Interdisciplinary Histopathology, 2024
VOL 12, NO. 04, PAGE 01-02

SHORT COMMUNICATION

Open Access

Pathogen Insights: Analysing the Science of Infectious Disease Pathology

Cohen Edugyan*
Department of Pathology, Tel Aviv University, Tel Aviv, Israel

ARTICLE HISTORY
Received: 27-Jun-2024, Manuscript No. EJMJIH-24-144178;
Editor assigned: 01-Jul-2024, PreQC No. EJMJIH-24-144178 (PQ);
Reviewed: 15-Jul-2024, QC No. EJMJIH-24-144178;
Revised: 22-Jul-2024, Manuscript No. EJMJIH-24-144178 (R);
Published: 29-Jul-2024

About the Study

Infectious disease pathology is a field of medicine and science dedicated to studying the processes by which microorganisms, such as bacteria, viruses, fungi, and parasites, cause diseases in humans and other living organisms. It surrounds a wide range of disciplines, including microbiology, immunology, pathology, epidemiology, and clinical medicine. Understanding infectious disease pathology is fundamental for the prevention, diagnosis, and treatment of infectious diseases, which continue to pose significant challenges to global public health.

Pathogen-host interaction

One of the essential concepts in irresistible malady pathology is the pathogen-host interaction. Pathogens can enter the body through different courses, such as inward breath, ingestion, or through breaks in the skin [1]. Once inside the body, they encounter the host's immune system, which consists of a complex network of cells, tissues, and molecules designed to defend against invading pathogens. The result of this interaction depends on numerous components, counting the destructiveness of the pathogen, the host's safe status, and natural variables [2].

Pathogen evasion strategies

Pathogens implement various strategies to evade or overcome the host's immune defences. Some pathogens produce toxins that damage host tissues or interfere with immune function. Others have evolved mechanisms to evade detection by the immune system or to manipulate host cells for their own benefit [3]. For example, certain viruses can integrate their genetic material into the host genome, allowing them to persist within the host indefinitely.

Variation in pathogen impact

The pathology of infectious diseases can vary widely depending on the type of pathogen involved, the route of transmission, and the target tissues or organs affected. For instance, respiratory viruses like influenza primarily target the respiratory tract, causing symptoms such as cough, fever, and shortness of breath [4]. In contrast, gastrointestinal pathogens like Salmonella or Norovirus infect the digestive system, leading to symptoms like diarrhoea, vomiting, and abdominal pain.

Mechanisms of tissue damage

Infectious disease pathology also contains the study of how pathogens cause damage to host tissues and organs. This damage can result from direct effects of the pathogen, such as cell lysis or toxin production, as well as indirect effects mediated by the host's immune response [5]. Inflammation, for example, is a common feature of many infectious diseases and can contribute to tissue damage and organ dysfunction.

Factors influencing disease severity

The severity of infectious diseases can range from mild and self-limiting to severe and life-threatening [6]. Factors that influence disease severity include the virulence of the pathogen, the host's underlying health status, and the presence of coexisting medical conditions. Certain populations, such as infants, the elderly, and individuals with weakened immune systems, are particularly vulnerable to severe infections [7].

Chronic and persistent infections

In addition to causing acute illness, some infectious agents can also lead to chronic or persistent infections. Chronic infections may result from the ability of certain pathogens to evade immune clearance or to establish latent infections within host cells [8]. Examples of chronic infectious diseases include HIV/AIDS, hepatitis B and C, and tuberculosis.

Diagnosis of infectious diseases

The diagnosis of infectious diseases relies on a

Contact: Dayan Adafuge, E-mail: adaf_day.8923@gmail.com

combination of clinical evaluation, laboratory testing, and imaging studies. Pathologists are fundamental to diagnosis of infectious diseases by examining tissue samples, body fluids, and other specimens for evidence of infection. This may involve identifying pathogens directly using techniques such as microscopy, culture, or molecular testing, or detecting signs of tissue damage or inflammation [9].

Treatment of infectious diseases

Treatment of infectious diseases typically involves antimicrobial medications, such as antibiotics, antivirals, or antifungals, depending on the type of pathogen involved [10]. However, the emergence of antimicrobial resistance presents a growing challenge to the effective treatment of infectious diseases, highlighting the need for continued research and development of new therapeutic agents.

Infectious disease pathology is a multidisciplinary field that is fundamental to understanding the mechanisms by which pathogens cause disease, as well as in the diagnosis and treatment of infectious diseases. By elucidating the underlying mechanisms of infection and host response, researchers and clinicians can develop strategies to prevent and control infectious diseases and improve public health outcomes.

References

[1] Pierantoni F, Maruzzo M, Gardi M, Bezzon E, Gardiman MP, Porreca A, et al. Immunotherapy and urothelial carcinoma: An overview and future prospectives. Crit Rev Oncol 2019;143: 46–55.

[2] Daassi D, Mahoney KM, Freeman GJ. The importance of exosomal PDL1 in tumour immune evasion. Nat Rev Immunol 2020;20: 209–215.

[3] Inaguma S, Wang Z, Lasota J, Sarlomo-Rikala M, McCue PA, Ikeda H, et al. Comprehensive immunohistochemical study of programmed cell death ligand 1 (PD-L1): Analysis in 5536 cases revealed consistent expression in trophoblastic tumors. Am J Surg Pathol 2016;40: 1133–1142.

[4] Cha JH, Chan LC, Li CW, Hsu JL, Hung MC. Mechanisms controlling PD-L1 expression in cancer. Mol Cell 2019;76: 359–370.

[5] Nimmagadda S. Quantifying PD-L1 expression to monitor immune checkpoint therapy: Opportunities and challenges. Cancers (Basel) 2020;12: 1–26.

[6] Lopez-Beltran A, López-Rios F, Montironi R, Wildsmith S, Eckstein M. Immune checkpoint inhibitors in urothelial carcinoma: Recommendations for practical approaches to PD-L1 and other potential predictive biomarker testing. Cancers (Basel) 2021;13: 1424.

[7] Ghate K, Amir E, Kuksis M, Hernandez-Barajas D, Rodriguez-Romo L, Booth CM, et al. PD-L1 expression and clinical outcomes in patients with advanced urothelial carcinoma treated with checkpoint inhibitors: A meta-analysis. Cancer Treat Rev 2019;76: 51–56.

[8] Xu J, Wei L, Liu H, Lei Y, Zhu Y, Liang C, et al. CD274 (PD-L1) Methylation is an independent predictor for bladder cancer patients' survival. Cancer Invest 2022;40: 228–233.

[9] Blinova E, Samishina E, Deryabina O, Blinov D, Roshchin D, Shich E, et al. Expression of p53 protein associates with anti-PD-L1 treatment response on human-derived xenograft model of GATA3/CR5/6-negative recurrent nonmuscular invasive bladder urothelial carcinoma. Int J Mol Sci 2021;22: 9856.

[10] Ziaran S, Harsanyi S, Bevizova K, Novakova ZV, Trebaticky B, Bujdak P, et al. Expression of E-cadherin, Ki-67, and p53 in urinary bladder cancer in relation to progression, survival, and recurrence. Eur J Histochem 2020;64: 3098.