Lebeer, J Virol Antivir Res 2021, 10: 3
DOI:10.37532/jva.2021.10(3).217

Journal of Virology & Antiviral Research

Opinion Article

A SCITECHNOL JOURNAL

Viral Respiratory Infection Pathogenesis

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Introduction

As researchers discuss concerning viral pathogenesis, we must consider the characteristics and influences of the viral pathogen, the hosts, and the environment. A person is exposed to many infectious agents during his or her life, but due to factors such as physical and chemical host barriers, most do not develop a disease. In certain cases, viruses manage to get through these defences and kill people; however, a “biological” infection is a different storey. However, a "biological battle" will break out between pathogenicity determinants and early host defences. If the virus manages to get through these first lines of defence, it will trigger a form of highly specialised and precise defence. In most cases, this defence can result in infection control and, eventually, disease eradication.

Furthermore, once the infection has been created, the factors or viral virulence determinants as well as the physiological conditions of the host cell will decide the infection's path. A virus is pathogenic if it can infect and cause disease in a host, and virulent if it causes more serious disease than another virus of the same strain, while both are pathogens.

Viral pathogenesis

The process or mechanisms that cause an injury or disease, in this case caused by a viral infection, are referred to as "pathogenesis." The outcome of a viral infection is determined by factors such as the virus's origin, the host, and the environment [1]. The number of infectious particles, the route to the target tissue, the rate of multiplication, and the virus's impact on cell function are among them.

Mutations

Virulence is a polygenic trait that cannot be attributed to a single property of the virus, but it is often linked to characteristics that promote viral replication and cellular injury. For example, virulent viruses multiply rapidly at the high temperatures present during the disease, preventing the synthesis of interferon and other immune-related macromolecules. Viral virulence is an indicator as to just how dangerous a virus is.

Virulence genes

Virulence is a part of the problem is that many of the results of viral pathogenesis are the product of immune response processes, both innate and adaptive, and these effects cannot be reproduced in tissue culture assays [2]. Another issue that restricts research is that no one knows exactly what is being examined. Some mutations result in protein function being lost, decreased, or increased, while others affect the degree of transcription, translation, or replication of genetic information.

Cellular virulence Genes

Several studies have shown that some cellular genes can be used to predict virulence. Genes encoding components of the host immune response, such as proteins needed for T- and B-cell function, as well as cytokines, are among the candidate genes [3]. Proteins that have these genes altered do not execute their functions correctly, which can have negative consequences during viral infection.

Virus Induced cell damage

This damage can be caused by viral replication as well as the host's innate or adaptive immune response; we'll focus on those caused by viruses.Cytopathic viruses have direct effects on cells. Viruses induce morphological changes in living organisms' cells as well as in vitro culture cells, which is known as cytopathic effect (CPE). During viral infection, cells can react differently, resulting in a different ECP for each type of virus, which could help us identify the virus. However, there are times when the cells seem to be unchanged. The ECP is a symptom of the infectious process, and it is characterised as "morphological and functional changes in cells caused by a virus that are visible under a microscope.

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Citation: *Labeer S (2021) Antiviral Techniques. J Virol Antivir Res 10 (3): 217*

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Received: May 08, 2021 **Accepted:** May 22, 2021 **Published:** May 29, 2021

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