



Adenovirus: A Comprehensive Review on the Causes and the Effects

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DESCRIPTION

Adenoviruses are a diverse family of double-stranded DNA viruses that can infect a wide range of hosts, including humans, animals, and birds. This research article provides a comprehensive review of adenoviruses, covering their structure, replication cycle, pathogenesis, and the clinical significance of various adenovirus serotypes. We also discuss the diagnostic methods, treatment options, and the potential for adenovirus-based therapies. Understanding adenovirus biology is critical in managing and preventing the associated diseases, making this review a valuable resource for researchers and healthcare professionals. Adenoviruses have been extensively studied due to their significant medical and scientific importance. These viruses are associated with a broad spectrum of diseases in humans, ranging from mild respiratory infections to severe pneumonia and conjunctivitis. Additionally, adenoviruses have applications in gene therapy and vaccine development. This review aims to consolidate the current knowledge on adenoviruses, providing an in-depth examination of their biology, clinical significance, diagnostic techniques, and therapeutic approaches. Adenoviruses belong to the Adenoviridae family, and their structure is well-defined. They are non-enveloped, icosahedral viruses with a double-stranded DNA genome. The capsid consists of 252 capsomers and is composed of three major proteins hexon, penton base, and fiber. These proteins play crucial roles in host cell attachment and viral entry. Adenoviruses are further classified into serotypes based on their capsid protein composition, with over 100 human serotypes identified to date. Adenovirus infection initiates with viral attachment to host cell receptors, facilitated by the fiber protein. Following attachment, the virus enters the host cell via endocytosis. The viral DNA is then released into the nucleus, where it undergoes transcription, replication, and assembly. Late gene products are synthesized, leading to the formation of mature viral particles. Cell lysis occurs, releasing progeny virions, which can go on to infect neighbouring cells. Adenoviruses primarily infect respiratory, ocular, and gastrointestinal mucosal surfaces. These infections can result in a range of clinical manifestations,

from mild symptoms to severe diseases. Specific serotypes are associated with particular clinical presentations. For example, adenovirus serotype 3 is often linked to acute respiratory disease outbreaks, while serotype 37 is a common cause of epidemic keratoconjunctivitis. Adenoviruses are implicated in various clinical conditions, including acute respiratory infections, gastroenteritis, and ocular diseases. Severe adenovirus infections can occur in immunocompromised individuals, leading to pneumonia, hepatitis, and disseminated disease. In recent years, adenoviruses have garnered attention due to their potential use in gene therapy, oncolytic virotherapy, and vaccine development. Adenovirus infection initiates with viral attachment to host cell receptors, facilitated by the fiber protein. Following attachment, the virus enters the host cell via endocytosis. The viral DNA is then released into the nucleus, where it undergoes transcription, replication, and assembly. Late gene products are synthesized, leading to the formation of mature viral particles. Cell lysis occurs, releasing progeny virions, which can go on to infect neighboring cells. Adenoviruses primarily infect respiratory, ocular, and gastrointestinal mucosal surfaces. These infections can result in a range of clinical manifestations, from mild symptoms to severe diseases. Specific serotypes are associated with particular clinical presentations. For example, adenovirus serotype 3 is often linked to acute respiratory disease outbreaks, while serotype 37 is a common cause of epidemic keratoconjunctivitis. Adenoviruses are implicated in various clinical conditions, including acute respiratory infections, gastroenteritis, and ocular diseases. Severe adenovirus infections can occur in immunocompromised individuals, leading to pneumonia, hepatitis, and disseminated disease. In recent years, adenoviruses have garnered attention due to their potential use in gene therapy, oncolytic virotherapy, and vaccine development.

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CONFLICT OF INTEREST

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