OPEN ACCESS Freely available online

Virology & Mycology

Opinion Article

Mycoviruses: The Viral Agents within Fungi

Kyung Son*

Department of Applied Biology, Shinshu University, Nagano, Japan

DESCRIPTION

Viruses are often associated with causing diseases in humans, animals and plants. However, there is another fascinating realm of viral existence within the fungal kingdom. Mycoviruses or fungal viruses, are viruses that specifically infect fungi. These enigmatic and diverse entities have captured the attention of scientists due to their unique characteristics and potential applications.

Discovery and classification

Mycoviruses were first discovered in the 1960s when abnormal growth patterns were observed in certain fungi. Electron microscopy and advanced molecular techniques have since been used to identify and classify these viruses. Mycoviruses exhibit remarkable diversity and are classified into several families, including Chrysoviridae, Partitiviridae, Totiviridae, Hypoviridae and many others. Each family exhibits distinct characteristics, such as genome structure, replication strategy and mode of transmission.

Causes

Mycovirus infections are caused by the transmission and introduction of mycoviruses into fungal hosts. The exact mechanisms of mycovirus infection are still being studied, but here are some known causes and modes of transmission:

Horizontal transmission: Mycoviruses can be horizontally transmitted between fungal individuals of the same or different species. This can occur through various means, including direct contact between infected and uninfected fungi, hyphal fusion (anastomosis) or through mechanisms such as cell-to-cell passage, co-infection or viral particles present in the environment.

Vertical transmission: Mycoviruses can also be vertically transmitted from parent fungi to their offspring. This occurs when the mycovirus is present in the reproductive structures of the fungus, such as spores or other propagules. The transmission can happen through sexual or asexual reproduction, ensuring the passage of the mycovirus to subsequent generations.

Indirect transmission: Mycoviruses can be indirectly transmitted through vectors, such as fungi-associated organisms. These vectors can include nematodes, mites or other insects that interact with fungi during their life cycle. The vectors can acquire mycoviruses from infected fungi and subsequently transfer them to new fungal hosts.

Impact on fungi

Hypovirulence: One of the most significant findings related to mycoviruses is their ability to cause hypovirulence in fungi. Hypovirulence refers to a weakened or attenuated virulence in the infected fungal host. Some mycoviruses can suppress fungal pathogenicity, reducing their ability to cause diseases in plants and trees. This discovery has opened doors for the development of eco-friendly strategies to manage plant diseases, such as utilizing hypovirulent strains of fungi as biocontrol agents.

Altered phenotypes: Mycoviruses can induce changes in fungal phenotypes, including altered growth patterns, pigmentation, sporulation and morphology. These phenotypic alterations can have both positive and negative effects on the fungi, influencing their ecological interactions and overall fitness.

Genetic recombination and evolution: Mycoviruses can integrate into the fungal genome and interact with the host's cellular machinery, leading to genetic recombination. This process can result in the emergence of novel fungal strains, potentially influencing their evolutionary trajectory and adaptability.

Applications and future perspectives

The study of mycoviruses holds promising implications in various areas:

Biological control: Exploiting mycoviruses for biocontrol purposes could provide sustainable and environmentally friendly alternatives to chemical pesticides. Hypovirulent strains can be harnessed to suppress pathogenic fungi, thus reducing the reliance on harmful chemicals in agriculture and forestry.

Biotechnology and industry: Mycoviruses may serve as valuable tools in biotechnological applications. They can be utilized to

Correspondence to: Dr. Kyung Son, Department of Applied Biology, Shinshu University, Nagano, Japan, E-mail: ksng@on.kr

Received: 29-May-2023, Manuscript No. VMID-23-24556; **Editor assigned:** 31-May-2023, Pre QC No. VMID-23-24556 (PQ); **Reviewed:** 14-Jun-2023, QC No. VMID-23-24556; **Revised:** 21-Jun-2023, Manuscript No. VMID-23-24556 (R); **Published:** 28-Jun-2023, DOI: 10.35248/2161-0517.23.12.268

Citation: Son K (2023) Mycoviruses: The Viral Agents within Fungi. Virol Myco. 12:268

genetically manipulate fungi for the production of enzymes, pharmaceutical compounds, biofuels and other valuable bioproducts.

Understanding virus-host interactions: Studying mycoviruses provides insights into the intricate relationships between viruses and their fungal hosts. This knowledge can help us unravel fundamental aspects of viral ecology, evolution and host-pathogen interactions.

CONCLUSION

Mycoviruses represent an intriguing and relatively unexplored field of virology. Their impact on fungi, including hypovirulence induction and phenotypic alterations, has far-reaching implications in plant health, agriculture and biotechnology. Further studies into the diversity, transmission and molecular mechanisms of mycoviruses will undoubtedly shed light on their potential applications and expand the understanding of the intricate world of fungal-viral interactions.