

Leveraging drug repurposing for host-oriented therapies in the battle against Ebola infections

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ABSTRACT

In the context of Ebola, the focus has shifted towards host-oriented therapies, aiming to disrupt the virus-host interaction and enhance the body's defense mechanisms.

INTRODUCTION

Ebola Virus Disease (EVD) has emerged as a formidable global health threat, with sporadic outbreaks causing widespread fear and devastation. The urgency to find effective treatments has led scientists to explore innovative strategies, one of which is drug repurposing—a method that involves identifying new therapeutic uses for existing drugs.

Understanding Ebola Virus and host interaction

To comprehend the significance of drug repurposing in the context of Ebola infections, it is crucial to delve into the intricate dance between the virus and its host. The Ebola virus, a member of the Filoviridae family, employs a multifaceted strategy to evade the host's immune system. By understanding the molecular intricacies of this interaction, researchers can identify potential targets for repurposed drugs.

Drug repurposing: a cost-effective strategy

Drug development is a time-consuming and costly endeavor. Drug repurposing, however, presents a cost-effective alternative. Existing drugs have already undergone rigorous testing for safety, allowing for a faster transition to clinical trials. This approach is particularly appealing in the case of Ebola, where the need for rapid intervention is paramount.

Host-oriented therapies: disrupting the virus lifecycle

Host-oriented therapies focus on targeting the host factors that the virus manipulates to proliferate within the body. Unlike traditional antiviral drugs that directly target the virus, these therapies seek to fortify the host's defences, creating an inhospitable environment for viral replication. This approach not only tackles the specific virus

under consideration but also holds promise for combating future viral threats.

Drug repurposing success stories

Several drugs initially developed for unrelated conditions have shown the potential to inhibit Ebola virus replication. Chloroquine, an antimalarial drug, has exhibited inhibitory effects on Ebola virus entry into host cells. Additionally, favipiravir, originally designed for influenza treatment, has demonstrated antiviral activity against Ebola. These success stories underscore the untapped potential of existing drugs in the fight against emerging infectious diseases.

Challenges and considerations

While drug repurposing offers a promising avenue, challenges abound. The identification of suitable candidates requires a nuanced understanding of the virus-host interaction. Moreover, repurposed drugs must be carefully evaluated for their safety and efficacy in the context of Ebola infections. Balancing the urgency of intervention with rigorous testing poses a formidable challenge for researchers and regulatory bodies alike.

Ethical considerations in drug repurposing

As researchers explore the repurposing of drugs for Ebola treatment, ethical considerations come to the forefront. Issues such as informed consent, equitable access to treatment, and the potential exploitation of vulnerable populations must be carefully navigated. Striking a balance between expeditious research and ethical responsibility is imperative to ensure the integrity of drug repurposing endeavours.

The road ahead: collaborative research and global preparedness

The fight against Ebola requires a collaborative and global effort. International cooperation in research, data sharing, and resource allocation is essential to accelerate the identification and validation of

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repurposed drugs. Moreover, proactive measures must be taken to build a robust infrastructure for responding to emerging infectious diseases, ensuring a swift and coordinated response in the face of future threats.

CONCLUSION

In the quest to combat Ebola infections, the integration of drug repurposing as host-oriented therapies offers a beacon of hope. This innovative approach leverages the wealth of existing pharmaceutical knowledge to repurpose drugs for a new battleground. As we navigate the complexities of this strategy, it is essential to remain vigilant, addressing ethical concerns and fostering global collaboration. In the intersection of drug repurposing and host-oriented therapies, we may find the key to not only treating Ebola but also fortifying our defences against the ever-evolving landscape of infectious diseases.

Looking towards the future, the evolution of drug repurposing for host-oriented therapies in treating Ebola infections holds immense potential. Continued research should focus on unravelling the intricate host-virus interactions, enabling the identification of novel drug targets. Advances in genomic and proteomic technologies will play a pivotal role in understanding the molecular nuances of Ebola infections, paving the way for more precise and effective repurposed drug candidates. Additionally, collaborative efforts between pharmaceutical industries, research institutions, and global health organizations will be instrumental in expediting the translation of promising candidates from bench to bedside.

As we navigate the uncharted territory of infectious diseases, the integration of artificial intelligence and machine learning in drug discovery processes may further accelerate the identification of repurposable compounds. The future of combating Ebola infections lies in a multidisciplinary approach that combines cutting-edge science, ethical considerations, and global collaboration to usher in a new era of resilience against emerging viral threats.