

Mini Review





Host-directed antiviral therapies — an emphasis on hiv post-exposure prophylaxis

Keywords: Host-directed therapies, Antivirals, HIV post-exposure prophylaxis, Immune dysregulation, HIV occupational exposure, Non-occupational exposure

Introduction and Background

Infectious diseases are the leading cause of mortality and morbidity worldwide and include bacterial, viral, fungal and parasitic infections.¹ The emergence of novel zoonotic pathogens together with the increasing incidence of treatment-resistant infections and diseases, has given rise to the need for alternative and different treatment strategies.¹ Host-directed antiviral therapy is a new concept within the modern medicine era and most literature data is based on multiple-drug resistance tuberculosis (TB) strains.² These host-directed therapies are products that can enforce or enhance the host's defence mechanisms or play an active role in modulating excessive host inflammatory responses.³ It must be understood that host-pathogen interactions are dependent on the causative microbe actually surviving without causing any harm or damage to the host. In turn, host factors can affect deliberate treatment outcomes, namely through the following categories:

Immune dysregulation

- a. Stress
- b. Malnutrition
- c. Immunosuppression

Co-morbidities

- a. Cancers
- b. Diabetes mellitus
- c. Chronic obstructive pulmonary disease (COPD) (4).

It is well-established that any infection may subside or progress to disease or the ultimate consequence of death and this depends on the innate and adaptive immune response.⁵ Host-directed therapies have the following actions and mechanisms, namely:

- a. Improvement and enhancement of the host cellular responses to pathogens;
- Targeting the disease process that causes and stimulates virulence factors;
- c. Activation of the repertoire of immune responses and by
- d. Activating the status of immunological memory.⁶

Host-directed therapies also evoke macrophage responses inducing free radicals, antimicrobial peptides, cytokines, chemokines, prostaglandins, autophagy and apoptosis.⁷

Volume 4 Issue 2 - 2016

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Received: December 01, 2016 | Published: December 05, 2016

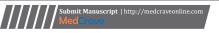
There are many different types of host-directed therapies and include the following products and agents, namely:

- a. Affordable and commonly used drugs for non-communicable diseases that show a reliable and good safety profile;
- Cellular therapies that use the patient's immune system or their mesenchymal stromal cells;
- c. Nutritional commercial products;
- d. Immunomodulatory agents and
- e. Biological products.8

Table 1 lists certain viral infections that are treated with host-directed products. 9-14

Table I Viral Infections Treated with Host-Directed Antiviral Therapies 9-14

Middle East Respiratory Syndrome Coronavirus –
Previously Known as a Novel Coronavirus
Hepatitis C Virus
Epstein-Barr Virus of the Herpes Virus Family
Human Immunodeficiency Virus Types one and two
An Arthropod-Borne Virus that can Exhibit Viral Haemorraghic Fever Signs
Cytomegalovirus of the Herpes Virus Family
A Virus Exhibiting Diverse Clinical Signs and Symptoms
A Respiratory-Borne Virus of Multiple and Emerging Strains
A Viral Haemorraghic Virus confined to Specific Geographic Regions





Human Immunodeficiency Virus (HIV) and Post-Exposure Prophylaxis

HIV is a retroviral disease that can be transmitted sexually, vertically from mother to child and through blood and blood products and many other body fluids. ^{15,16} To date there is no fully effective vaccine against HIV and treatment consists of a combination with three antiretroviral drugs. There are different classes of antiretroviral drugs and selected regimes of treatment are proposed. ¹⁷ Currently, there are research studies into other modalities of HIV treatment, namely:

- a. Monoclonal antibodies, such as the example of anti-PD-1 that activates and mobilizes antigen-specific T-cells. These T-cells create an immune checkpoint blockade that can suppress the HIV-1 RNA viral load.¹⁸ and
- b. Cellular therapy: mesenchymal stromal cells reduce the destructive actions of the inflammatory response and in turn these stromal cells also enhance tissue and organ repair.¹⁹

Table 2 shows a summary of recommendations for post-exposure prophylaxis for HIV exposure in adults and adolescents.²⁰ There are three broad approach categories to the recommendations for post-exposure prophylaxis, namely the clinical approach, the antiretroviral drug selection and community health issues.²¹

Table 2 Post-Exposure for Adults and Adolescents

HIV post-exposure drug regimen should be a combination of three antiretroviral drugs

A full one month course of antiretroviral drugs should be prescribed

The post-exposure antiretroviral drugs should be prescribed as soon as possible after the exposure (at initial assessment wherever possible)

Starter packs containing drugs for a limited number of days should not be uniformly accepted for full coverage for post-exposure management

Follow up management is essential

Exposed individuals should be seen and examined at regular intervals, such as at 2 weeks, 6 weeks, 3 months and up to 6 months post-exposure

Adherence counselling should be initiated and sustained.

Clinically, the exposed individuals should complete the full course of drug prescription, should be aware of and counselled to manage the drug side-effects and should also receive additional counselling for any resultant emotional problems.

Drug selection should be a three drug regimen and pregnant women should be managed according to the drug safety instructions in pregnancy. Education and community awareness should be encouraged.

Conclusion

Occupational exposures can be minimised by following stringently health and safety precautions (universal safety precautions). Safety and post-exposure prophylaxis protocols should be accessible and regularly reviewed. Hepatitis B vaccination programmes must be in place and education about the programme should be sustained.

Acknowledgments

None.

Conflicts of interest

None.

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