IJMPR 2021, 5(1), 20-23

International Journal of Modern Pharmaceutical Research

www.ijmpronline.com

ISSN: 2319-5878
IJMPR
Review Article

SJIF Impact Factor: 5.273

A REVIEW ON VIRAL INFECTIONS INCLUDING SPECIAL MAGNITUDE ON SYNTHETIC AND HERBAL REMEDIES

Mohini Upadhye*, Shailja Kadam and Priyanka Mule

P. E. Society, Modern College of Pharmacy (For Ladies), Moshi, Pune 412105, Maharashtra, India.

Received on: 04/12/2020
Revised on: 24/12/2020
Accepted on: 14/01/2021

***Corresponding Author**
Mohini Upadhye
P. E. Society, Modern College of Pharmacy (For Ladies), Moshi, Pune 412105, Maharashtra, India.

ABSTRACT

This review describes the viral infection of the interactions between stress proteins and viral components have been described in a large variety of experimental models at different stages of the viral life cycle depending on the type of virus and host cell. viruses get more important perform and functions for humans, plants, animals, and the environment. viral infections cause of death worldwide. in addition to the viruses such as influenza, Ebola, HIV/Aids, Smallpox and Pneumonia, Herpes, Rotavirus and Chicken Pox are responsible for emergent epidemics that threaten global health. This article provides an overview of clinically available antiviral drugs for the primary care physician, with a special focus on pharmacology, clinical uses, and adverse effects, also gives a special emphasis on important herbs used for treating these infections.

KEYWORDS: Ebola, HIV/Aids, Smallpox and Pneumonia.

INTRODUCTION

This review discusses the most common respiratory and gastrointestinal viral pathogens which can be easily transmitted in environments. viral respiratory tract infections in lung transplant recipients may be severe. Most pathogens gain access to the host through surfaces of the body that are exposed to the surrounding environment and rife with resident microorganisms, termed microbiota. Microbiota play an integral role in modulating host health[1]These diseases can be treated by antiviral drugs or vaccines. herbal, dietary, complementary, and natural therapies have been used widely for prevention and treatment of viral infections

VIRUS

A virus is a very tiny germs agent that lives inside the living cells or host cells. Viruses are present in almost every ecosystem on earth. a microorganism is smaller than the bacterium that cannot be grow or reproduce apart from a living cell. Viruses get a bad rap but they also more important perform and functions for humans, plants, animals, and the environment. They are made of genetic material inside of a protein coating and viruses have fatty envelope covering. Viruses need living cells to replicate or reproduce. There are thousands of viruses some more common than others. Viruses are cause the familiar infectious diseases such as the common cold, flu, corona virus and warts. They also cause severe illnesses such as HIV/AIDS, smallpox, and Ebola, Pneumonia, Herpes, Rotavirus and Chicken pox.Tissues were studied by light microscopy, immunohistochemistry to detect viral antigens, in situ hybridization to detect viral RNA, and by viral titration.[2]

Types of viral infection

1. Respiratory Viral Infections, 2.Foodborne Viral Infections, 3.Viralskin Infection, 4.Sexually Transmitted Viral Infections, 5.Other Viral Infection.

1. **Respiratory viral infection:** The most common type of viral infection is the Respiratory Infection. Respiratory infection is affecting the throat, upper airways and lungs, nose. These viruses are the most spread by inhaling droplets containing virus particles.The disease burden from respiratory infection is greater than that of any other cause of disease (232). In 2002, 18% of mortality for children younger than 5 years of age was caused by respiratory infections.[3]
2. **Foodborne viral infection:** Viruses are one of the most common causes of food poisoning. The symptoms of these infections vary depending on the virus involved. Hepatitis-A, Norovirus, Rotavirus. Risk assessment for transmission of emerging viruses through the food chain should include consideration of all means by which food could post a hazard, that is not just consumption.[6]
3. **Viral skin infection:** Viral skin infections can be range from the mild to severe and produce a rash. For example, Molluscum contagiosum, Herpes simplex virus-1 (HSV-1), Varicella-zoster virus (VZV) The infected cell expresses the viral genes, which are able to induce cell growth, proliferation and prevent apoptosis. This review focuses on Epstein-Barr virus, human papilloma virus, hepatitis C virus, hepatitis B virus, human herpes virus 8 and human T-cell leukemia virus, since they have been already established as causative agents of human cancer.Cutaneous viral warts are discrete benign

epithelial proliferations caused by the human papillomavirus.[5]

4. **Sexually transmitted viral infection:** Sexually transmitted viral infection is spread through the contact with bodily fluids.

It includes,

- Human papillomavirus (HPV)- is the most common sexually transmitted infection in the US.
- Hepatitis B- is a virus that causes inflammation in the liver.
- Genital herpes,
- Human immunodeficiency virus (HIV)

1. Other viral infection: Viruses are abundant in the world and cause many other infections ranging from mild to life-threatening.

Synthetic Virus

Synthetic virology is a branch of medicine committed in the study and engineering of synthetic artificial viruses. It is multidisciplinary research field at intersection of the virology, computational biology, synthetic biology and DNA nano-technology, from concepts and methodologies. These is a wide range of application for the synthetic viral technology such as medical treatments, investigative tools and reviving organisms. Details new progress in synthesis and sequence analysis of DNA inaccuracy at the heart of the recent transformation of molecular biology and emergence of the field synthetic biology. Sequencing is a DNA in the mega base (Mb) range is no longer an undertaking and applying the most advanced technology, it can be accomplished within less than a week. DNA synthesis acquire not still advanced to the efficiency of DNA sequencing but synthesizing DNA of 8−30 kilobase pairs (kbp) the genome size of most RNA viruses and many DNA viruses, it can be polished easily and largely a matter of available resources.

Synthetic Treatment

The common factor among these drugs is that they are artificial and don't come from a natural plant source. There is often regulation of these substances and they can be found being taken out in the open at convenience benefit stock and other such locality. Synthetic therapy is kind of treatment which uses artificial and human chemicals to improve but all in medical biotechnology synthetic therapy is more accurately defined as to create to cure diseases and a human. Synthetic drugs are those materials that are produced absolutely from chemical reaction in a laboratory.

Synthetic Drug Prescribed

1. **Acyclovir**: Acyclovir is a synthetic guanosine analogue used for treating Herpes Simplex Virus (HSV) and Varicella Zoster Virus (VZV) infections. Intravenous (IV) acyclovir provides attractive tissue and fluid penetration, including the Cerebrospinal Fluid (CSF), As oral acyclovir provides moderate bioavailability of 15%-30%.
2. **Brivudin:** Brivudin is a 5′-halogenated thymidine nucleoside analog that highly active against HSV-1 and VZV. Brivudin is phosphorylated by viral TK and cellular kinases to brivudin-triphosphate, which is serves as a competitive inhibitor of viral DNA polymerase, thereby terminating viral DNA synthesis. Herpes zoster simplex is available for treatment in some countries.
3. **Cidofovir**: Cidofovir is the nucleoside analog used for the treatment of CMV, other herpes viruses and DNA viral infections. It is present as an Intravenous formulation and oral prodrug of cidofovir is under the clinical development. These inspection lipid ester formulation of the cidofovir keep enhanced bioavailability, resulting in improve 50% inhibitor concentrations.
4. **Famciclovir**: It is a diacetyl 6-deoxy equal of penciclovir. Oral famciclovir is immediately absorbed and achieve a bioavailability of 77%. Famciclovir is metabolized into penciclovir, reach peak plasma penciclovir concentrations within 1 hour**.**
5. **Foscarnet**: It is a nonnucleoside pyrophosphate analog that is given intravenously for the therapy of herpes viruses. Pharmacokinetic is the difficult by a high extent of nephrotoxicity and by its deposition and subsequent gradual release from bone**.**
6. **Penciclovir**: It is an acyclic guanine analogue that is chemically related to acyclovir. Valacyclovir an L-valyl ester prodrug of acyclovir, provides a higher bioavailability (55%) than oral acyclovir.
7. **Valganciclovir:** Valganciclovir is the L-valyl ester prodrug of ganciclovir. Oral valganciclovir is well absorbed and converted to ganciclovir by first-pass intestinal or hepatic metabolism.

1. **Antiviral drugs for Influenza**

A. **M_2 Inhibitors: Amantadine,** Amantadine is a symmetric tricyclic amine that inhibits replication of influenza A virus by impairing the function of the membrane protein M_2,

B. **Rimantadine**. Rimantadine is a symmetric tricyclic amine that inhibits influenza virus.

C. **Neuraminidase Inhibitors: Oseltamivir.** Oseltamivir phosphate is a prodrug of oseltamivir carboxylate, which is an inhibitor of neuraminidase that is essential in the replication of influenza A and B viruses, Zanamivir**.** It is an inhaled neuraminidase inhibitor that is used for the therapy and prophylaxis of influenza A and B viruses.

D. **Antiviral drugs for hepatitis and other viruses**

E. **Interferons:** Interferons are naturally occurring proteins produced in response to viral infection.

F. **Ribavirin:**It is a synthetic nucleoside analogue of guanine, available in oral, aerosolized and IV formulations. Oral ribavirin is absorbed extensively but its bioavailability is only 65% because of first-pass metabolism**.**

G. **Nucleotide Analogues for CHB**

H. **Adefovir**: Adefovir dipivoxil is an acyclic nucleotide analogue of adenosine monophosphate,

Emtricitabine. Emtricitabine is an analogue of cytidine. Although not currently approved for the treatment of CHB, emtricitabine has been used clinically in combination with tenofovir in HIV/HBV–coinfected patients.

Entecavir: Entecavir, a nucleoside guanosine analogue is considered one of the most potent agents for the treatment of patients with CHB, including those resistant to lamivudine.

Lamivudine: Lamivudine is a nucleoside analogue of cytosine. Oral lamivudine provides bioavailability of about 85%, and peak serum concentrations occur in 1.0 to 1.5 hours. Hepatic metabolism is low, and up to 70% is excreted unchanged by the kidneys.

Telbivudine: Telbivudine is a synthetic thymidine nucleoside analogue.

enofovir: Tenofovir disoproxil fumarate, an acyclic nucleoside phosphonate diester analogue of adenosine monophosphate, is considered one of the most potent anti-HBV drugs.

a) Protease Inhibitors for the Treatment of CHC

Boceprevir: Boceprevir is a linear peptidomimetic ketoamide serine protease inhibitor that was recently approved for the treatment of CHC, particularly for genotype 1.

Telaprevir: Telaprevir is an orally available inhibitor specific to the HCV nonstructural 3/4A serine protease. It inhibits HCV replication by binding reversibly to nonstructural 3 serine protease.

Disadvantages of Viral Synthetic Treatment

- High immunogenicity
- High production cost
- Low packaging capacity
- Most of them are instable, toxic and non-biocompatible
- Low biodegradability, low efficacy
- toxicity at high dose, difficult preparation, low transformation efficiency

Herbs with Antiviral Activity

Since ancient times, herbs have been used as natural treatments for various illnesses, including viral infections. Due to their concentration of potent plant compounds, many herbs help fight viruses and are favoured by practitioners of natural medicine. At the same time, the benefits of some herbs are only supported by limited human research, so you should take them with a grain of salt. For centuries, cultures around the world have relied on traditional herbal medicine to meet their healthcare needs.

1. **Oregano:** Oregano is a popular herb in mint family that known for its important medicinal qualities. Its plant compounds which include carvacrol offer antiviral properties. Oregano oil and isolated carvacrol reduce the activity of Murine Norovirus within 15 minutes of hazards, MNV is highly contagious and primary cause of the stomach, flu in humans.
2. **Sage:** A member of the mint family sage is an aromatic herb that has long been used in traditional medicine to treatment viral infections. The antiviral properties of sage are mostly applied to compounds is called safficinolide and sage one which are found in the leaves and stem of plant. This herb may fight human immunodeficiency virus type-1 which can lead to AIDS.
3. **Basil:** Many types of basil including the sweet and holy varieties may fight certain viral infections. For example, one found that sweet basil extracts, including the compounds like apigenin and ursolic acid, displayed potent effects against herpes viruses, hepatitis B and enterovirus. Holy basil also known as tulsi has been shown to increase immunity which may help fight viral infections
4. **Lemon balm:** Lemon balm is the lemony plant that is commonly used in the teas and seasonings. It also lionised for the its medicinal qualities. Lemon balm is extract and is concentrated source of dominant essential oils and plant compounds that have antiviral activity. Test-tube research has shown that it has antiviral effects against avian influenza (bird flu), herpes viruses, HIV-1, and enterovirus 71, that can cause severe infections in new-born and youth kids.
5. **Rosemary:** Rosemary is frequently used in the cooking but besides has beneficial applications due to the its numerous plant compounds that including the oleanolic acid. Oleanolic acid have displayed antiviral activity across herpes viruses, HIV, influenza, and hepatitis in animal and test-tube studies. Rosemary extract had demonstrated antiviral effects across herpes viruses and hepatitis A which affect the liver.
6. **Echinacea:** Echinacea is one of the most popular used to the ingredient in herbal medicine due to its impressive health benefit properties. they can Many parts of the plant, including to flowers, leaves and roots, they are used for natural remedies. Echinacea purpurea there a variety produces cone-shaped flowers.
7. **Sambucus:** Sambucus is a father of plant family. Elderberries are made into the variety of products such as elixirs and pills, which are used to naturally treat viral infections the flu and common cold.
8. **Astragalus:** It is the flowering herb popular in traditional Chinese medicine. They are boasts Astragalus polysaccharide (APS), That have significant immune increasing and antiviral quality. they are combats herpes viruses, hepatitis C, and avian influenza H9 virus. APS may be protecting human astrocyte cells the mostly abundant type of the cell in central nervous system, with herpes from infection.

9. **Ginseng:** which can be found in Korean and American varieties, it is the root of plants in the Panax family. they can Long used in traditional Chinese medicine; it has been shown to be the particular effective at fighting viruses. In animal and test-tube studies Korean red ginseng extract has exhibited significant effects across RSV, herpes viruses, and hepatitis A. this Compounds in ginseng called ginsenosides have antiviral effects against hepatitis B, norovirus, and coxsackie viruses, which are associated with the several serious diseases, including an infection of the brain called meningoencephalitis.
10. **Dandelion**: Dandelions are widely regarding as weeds but have been studies for multiple medicinal properties, it including potential antiviral effects. Test-tube research indicates that dandelion may combat hepatitis B, HIV and influenza. Dandelion extract inhibits the replication of dengue, a mosquito borne virus that causes dengue fever. This disease which can be fatal triggers symptoms like high fever, vomiting and muscle pain.

CONCLUSION

There is ongoing need to combat existing and emerging viral infections calls for continued collaboration between medicinal chemists and biomedical researchers to identify and develop new therapies, harnessing both 'serendipitous' screening strategies and rational design for the discovery of newer antiviral agents. And finally, from a global health perspective, continued efforts are required to make these therapies available to all those that need them are highly warranted.

REFERENCE

1. Michael Burk, Karim El-Kersh, Mohamed Saad, Timothy Wiemken, Julio Ramirez, Rodrigo Cavallazzi, Viral infection in community-acquired pneumonia: a systematic review and meta-analysis European Respiratory Review, 2016; 25: 178-188.
2. Eyckmans T, Wollants E, Janssens A, Schoemans H, Lagrou K, Wauters J, et al. Coxsackievirus A16 encephalitis during Obinutuzumab therapy, Belgium, 2013. Emerg Infect Dis., 2014; 20: 913–5.
3. John S. Tregoning, Jürgen SchwarzevAmerican Society for Microbiology Journals Respiratory Viral Infections in Infants: Causes, Clinical Symptoms, Virology, and Immunology Clin Microbiol Rev., 2010 Jan; 23(1): 74–98.
4. Jeanne-Marie Hament, Jan L.L. Kimpen, Andre Fleer, Tom F.W. Wolfs Respiratory viral infection predisposing for bacterial disease: a concise review FEMS Immunology and Medical Microbiology, 1999; 26: 189-195.
5. W. Garrett Nichols,1 Angela J. Peck Campbell,2,3,4 and Michael Boeckh2,4, Respiratory Viruses Other than Influenza Virus: Impact and Therapeutic Advances, Clinical Microbiology Reviews, Apr. 2008; 274–290.
6. Kenmoe, S., Bigna, J.J., Modiyinji, A.F. et al. Epidemiology of respiratory viral infections in people with acute respiratory tract infections in Africa: the VARIAFRICA systematic review and meta-analysis protocol. Syst Rev, 2019; 8: 122.
7. Bulletin of the World Health Organization, Acute respiratory infections: a review*A. BULLA1 & K. L. HITZE2Acute respiratory infections (ARI) constitute one of the, 1978; 56(3): 481498.
8. Iturriza-Gomara M, O'Brien SJ. Foodborne viral infections. Curr Opin Infect Dis., 2016; 29(5): 495-501.
9. Common skin infections in childrenMichael J Sladden, specialist registrar and Graham A Johnston, BMJ., 2004 Jul 10; 329(7457): 95–99.
10. Williamson DA, Chen MY. Emerging and Reemerging Sexually Transmitted Infections. N Engl J Med., 2020; 382(21): 2023-2032.
11. Carrillo-Infante C, Abbadessa G, Bagella L, Giordano A. Viral infections as a cause of cancer (review). Int J Oncol, 2007; 30(6): 1521-1528.
12. Wilks J, Golovkina T Influence of Microbiota on Viral Infections. PLoS Pathog, 2012; 8(5): e1002681.
13. Vincent Ki, MD and Coleman Rotstein, Bacterial skin and soft tissue infections in adults: A review of their epidemiology, pathogenesis, diagnosis, treatment and site of care Can J Infect Dis Med Microbiol, 2008 Mar; 19(2): 173–184.
14. Aly R. Ecology and epidemiology of dermatophyte infections. J Am Acad Dermatol, 1994; 31: S21-5
15. Higgins EM, Fuller LC, Smith CH. Guidelines for the management of tinea capitis. Br J Dermatol, 2000; 143: 53-8.
16. Bronson DM, Desai DR, Barskey S. An epidemic of infection with Trichophyton tonsurans revealed in a twenty year survey of fungal pathogens in Chicago. J Am Acad Dermatol, 1983; 8: 322-30.
17. Fuller LC, Child FJ, Midgley G, Higgins EM. Diagnosis and management of scalp ringworm. BMJ, 2003; 326: 539-41.
18. Fuller LC, Child FC, Midgley G, Higgins EM. Scalp ringworm in south-east London and an analysis of a cohort of patients from a paediatric dermatology department. Br J Dermatol, 2003; 148: 985-8.