

Hepatitis Basics



Keeping
Your Liver
Healthy

HBV Drug Resistance

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Introduction

A virus is one of the smallest living organisms known. The hepatitis B virus (HBV for short) is a DNA virus of a family called hepadnavirus. HBV was identified by Dr. Blumberg and colleagues in 1967 and they were also responsible for the development of a blood test to identify the hepatitis B virus. Dr. Blumberg and colleagues are also responsible for the development of the first hepatitis B vaccine in 1969. For his discovery of HBV Dr. Blumberg won the Nobel Prize in Medicine in 1976.

HBV Medications

In the years following the discovery of HBV there were many advances in the development of vaccines to protect against HBV as well as medications approved by the Food and Drug Administration (FDA) to treat chronic hepatitis B. There are two types of medications used to treat chronic hepatitis B – interferon and antiviral pills. The FDA approved medications to treat chronic hepatitis B are listed below.

Replication

The replication process of the hepatitis B virus is a complex one that uses various

enzymes or proteins of the hepatitis B virus to make more copies of itself. The entire process is not completely understood – but the medications used to treat chronic hepatitis B block either a part of the replication process or boost the immune system to help the body fight HBV.

The HBV antiviral pills used to treat hepatitis B act by blocking the hepatitis B virus from replicating or making more copies of itself. Interferon is a medication that helps to boost the body's immune system to help kill the

Treatments Approved by the FDA to Treat Chronic Hepatitis B

Generic Name	Trade Name	Manufacturer	Date Approved for Hepatitis B
Interferon alfa-2b	INTRON® A	Merck/Schering	1991
Lamivudine	EPIVIR-HBV®	GlaxoSmithKline	1998
Adefovir dipivoxil	HEPSERA™	Gilead Sciences	2002
Entecavir	BARACLUDE™	Bristol-Myers Squibb	2005
Peginterferon alfa-2a	PEGASYS®	Genentech/Roche	2005
Telbivudine	TYZEKA™	Idenix/Novartis	2006
Tenofovir	VIREAD™	Gilead Sciences	2008



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virus. Since interferon does not directly attack the virus – it helps the body to kill the virus – you don’t have to worry about the hepatitis B virus ‘escaping’ the medicine and developing resistance. The HBV pills, however, are a different story. In some instances the hepatitis B virus is able to ‘escape’ the way the pills fight the virus – slightly change their genetic material so that the pills are no longer effective in killing off the virus. When this happens it is called drug resistance. This happens when the virus can “escape” the drug’s effects. There are many reasons why people develop drug resistance:

- The drugs may not be strong enough to exert enough strength or power to prevent the virus from ‘escaping’ the

effects of the drug

- The dose that has been shown to prevent the drug ‘escaping’ is not taken as directed – such as missing or forgetting to take the drug
- Food – the drug may need to be taken with food to increase the way the drug is absorbed in the body making it more potent and better able to prevent the virus from escaping from the drug

This is why it is so important to take all of the medicines exactly as directed by your doctor or nurse. If you don’t take them as directed you may develop drug resistant HBV. Also it’s important to know that some HBV drugs (pills) are more likely to ‘resist’ the drugs.

The problem of resistance can mean that you may become sicker or that you may not be able to take drugs that may be developed in the future. The first line of drugs used to treat chronic hepatitis B – entecavir and tenofovir – are recommended due to the low rate of drug resistance. Treatment with Peginterferon alfa-2a does not lead to drug resistance.

Below is a chart of the current drugs used to treat chronic hepatitis B and their resistance rates (if any) for developing resistance.



Drug/Brand name	Type	Year Approved	Resistance
Interferon alfa-2a (Intron A)	Interferon	1991	None
Lamivudine (Epivir-HBV)	Nucleoside reverse transcriptase inhibitor	1998	14 - 32% at Year 1; 60 - 70% at year 5
Adefovir (Hepsera)	Nucleoside reverse transcriptase inhibitor	2002	0% at year 1; 29% at year 5
Entecavir (Baraclude)	Nucleoside reverse transcriptase inhibitor	2005	1.2% in treatment naïve at year 6; 57% in lamivudine resistant at year 6
Peginterferon alfa-2a (Pegasys)	Interferon	2005	None
Telbivudine (Tyzeka)	Nucleoside reverse transcriptase inhibitor	2006	25% in HBeAg positive at year 2; 11% in HBeAg negative at year 2
Tenofovir (Viread)	Nucleoside Reverse transcriptase inhibitor	2006	0% at year 4; adefovir resistant HBV should be treated with tenofovir and another HBV antiviral

The information in this fact sheet is designed to help you understand and manage HCV and is not intended as medical advice. All persons with HBV should consult a medical practitioner for diagnosis and treatment of HBV.

For more information about the hepatitis B, visit the following websites.
Hepatitis B Foundation: www.hepb.org • HIVandHepatitis.com

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