

# Periodic graphics

A collaboration between C&EN and  
Andy Brunning, author of the popular  
graphics blog **Compound Interest**

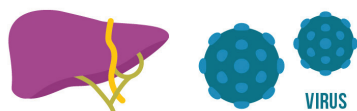
More  
online

To see more of  
Brunning's work, go to  
**compoundchem.com**.  
To see all of C&EN's  
Periodic Graphics,  
visit **cenm.ag/  
periodicgraphics**.

## HEPATITIS TREATMENTS

May is Hepatitis Awareness Month in the U.S. Here we look at the five types of viral hepatitis and some of the drugs that can treat the disease.

### WHAT IS HEPATITIS?



Hepatitis is inflammation of the liver, usually caused by a viral infection. But liver damage from alcohol consumption or, in rare cases, autoimmune conditions can cause the inflammation.

### TYPES OF VIRAL HEPATITIS



#### SPREAD BY FOOD OR WATER CONTAMINATION



Types A and E usually don't require treatment. Recovery time is one to two months.

#### SPREAD BY INFECTED BLOOD OR BODILY FLUIDS



Types B and C often require treatment to cure. Chronic cases can lead to cirrhosis and liver cancer.

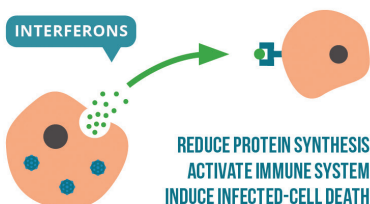
Type D can infect only people with type B hepatitis.



#### VACCINATION POSSIBLE



### INTERFERON THERAPY

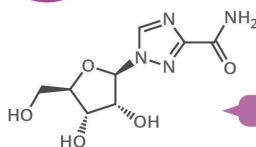


Cells infected by pathogens release signaling proteins called interferons. These molecules serve as a warning to nearby cells, activating antiviral responses. Hepatitis B and C viruses can inhibit interferon signaling to evade the body's antiviral responses.

#### SYNTHETIC INTERFERONS

PEGYLATED INTERFERON  $\alpha$ -2A

PEGYLATED INTERFERON  $\alpha$ -2B

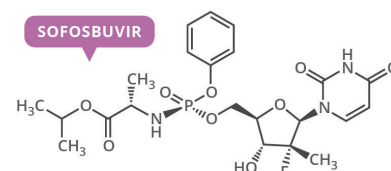


RIBAVIRIN

Injection of synthetic  $\alpha$  interferons can treat chronic hepatitis B or C, enhancing the patient's immune response to the viruses. The interferons are usually administered with an antiviral drug such as ribavirin. In some patients, this therapy is not effective, and it can cause flu-like symptoms as a side effect.

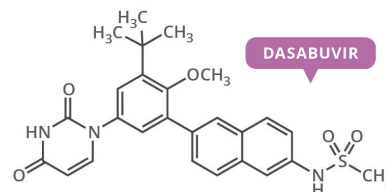
### ANTIVIRAL DRUGS

In the past seven years, multiple direct-acting antivirals (DAAs) have been developed to treat chronic hepatitis. The drugs disrupt virus replication and infection. Some examples of commonly used DAAs are shown below. Often they are used in combination, and some are more effective against certain virus genotypes.



SOFOSBUVIR

APPROX. \$84,000 FOR 12-WEEK COURSE



DASABUVIR

APPROX. \$63,000 FOR 12-WEEK COURSE

Combinations of antiviral drugs are superseding interferon-based treatments because, in almost all cases, the antivirals can clear the hepatitis infection while causing fewer side effects. Cost is the only downside.