



# *X-Plain* *Meningitis*

## Reference Summary

### Introduction

Meningitis is a very serious infection of the fluid that surrounds the brain and spinal cord.

Meningitis can be fatal. However, if found early, it can be treated.

This reference summary will help you understand what causes meningitis, and how it can be diagnosed, treated and prevented.

### Meningitis

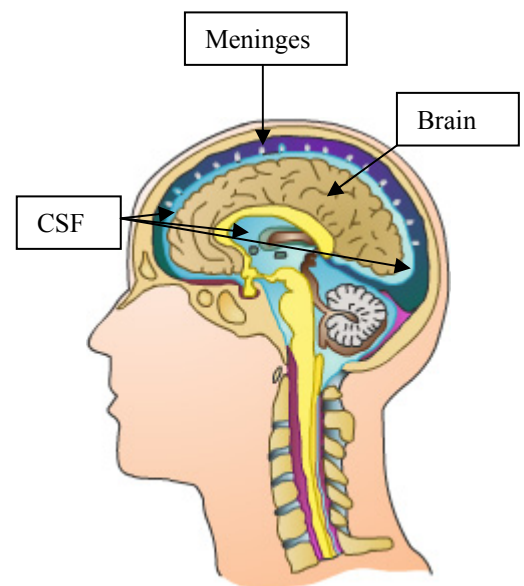
The brain and the spinal cord are the command centers of the body. They allow us to

- speak
- hear
- understand
- see
- move
- feel

A clear fluid, called cerebro-spinal fluid or CSF, surrounds the brain and spinal cord. CSF is a clear fluid that looks like water. CSF acts as a shock absorber and protects the brain and spinal cord from injury.

Membranes called meninges protect the brain, spinal cord and CSF. Meninges help prevent CSF from leaking to the outside.

Meningitis is an infection of the CSF, the fluid surrounding the brain, and the spinal cord. People sometimes refer to meningitis as spinal meningitis.



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## Causes

Bacteria and viruses are organisms that can infect the meninges and CSF. When a virus infects the CSF, it is called viral meningitis. When bacteria infect the CSF, it is called bacterial meningitis. Bacteria are bigger than viruses under a microscope.

It is important to know whether meningitis is caused by a virus or bacterium so it can be properly treated. Viral meningitis is usually less severe and may need no specific treatment.

Bacterial meningitis can be quite severe and may result in brain damage, hearing loss or learning disability if not treated early.

For bacterial meningitis, it is important to know what type of bacteria is causing the meningitis. Antibiotics are essential in treating patients with bacterial meningitis and can also prevent some types of bacteria from spreading and infecting other people.



## Symptoms

The symptoms of meningitis in anyone over the age of 2 years include

- high fever
- headache
- stiff neck

These symptoms can develop in several hours, or they may take 1 - 2 days.

Other symptoms of meningitis may include nausea, vomiting, difficulty seeing in bright light, confusion and sleepiness.

In newborns and small infants, the classic symptoms of fever, headache, and neck stiffness may be difficult to detect, so infants may:

- be slow or inactive
- be irritable
- vomit often
- not eat well

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As meningitis progresses, patients of any age may have seizures. A seizure is a sudden, violent, uncontrollable contraction of muscles. A seizure may also be a sudden but brief loss of contact for a few moments; the person appears to be daydreaming.

## Diagnosis

Early diagnosis and treatment of meningitis are very important in order to limit serious complications. If symptoms occur, the patient should see a doctor immediately.

The doctor suspects a diagnosis of meningitis after obtaining a detailed medical history and doing a physical examination. Headache, neck stiffness and increased sleepiness are common signs of meningitis.

A sample of spinal fluid is grown in a lab to see if the meningitis bacteria exist. If so, the final diagnosis is made.

A spinal fluid sample is taken by performing a spinal tap. For a spinal tap, a needle is inserted into an area of the lower back and fluid from the spinal canal is withdrawn.



It may take 1-2 days for the bacteria to be grown from the CSF in the lab. Meanwhile, other tests on the CSF can help the doctor decide whether meningitis is present and whether it is due to a bacteria or a virus.

Some tests the doctor might request on the CSF sample include:

- Checking the number of cells
- Checking levels of sugar and protein
- Looking for bacteria under the microscope using staining techniques

Identification of the type of bacteria responsible is important so the doctor knows which antibiotics to prescribe.

A CAT scan of the brain may need to be done to make sure that the symptoms are not due to other brain diseases such as tumors, bleeds and abscesses.

Blood can also be drawn to check whether the white blood cell count is higher than normal. White blood cells help fight infections.

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## Treatment

There are a number of antibiotics that treat bacterial meningitis. However, it is important that treatment is started early in the course of the disease.

Antibiotic treatment for most common types of bacterial meningitis should reduce the risk of dying from meningitis to below 15%, although the risk is higher among the elderly.

The antibiotics are given intravenously and are usually started as soon as the diagnosis is suspected. Once the bacteria causing the specific attack are identified, the antibiotics can be changed if needed.

Patients are also usually given IV fluid and kept under close observation. The spinal tap may have to be repeated to make sure that the meningitis has been treated successfully.

Meningitis due to viruses is usually not as severe as bacterial meningitis. It does not usually require any antibiotics or antiviral medications; the patient is treated with IV fluids, rest and close observation.

## Complications

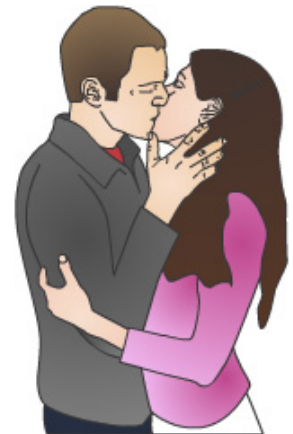
Bacterial meningitis tends to have a much higher risk of complications than viral meningitis.

Meningitis can affect the hearing nerve, resulting in permanent deafness.

Meningitis could also lead to severe brain damage, learning disability or even death. Fortunately, early diagnosis and treatment can keep damage to a minimum.

## Spreading Infection

Some forms of bacterial meningitis are contagious, meaning they can spread from person to person. Bacteria are spread through the exchange of respiratory and throat secretions, which could happen during coughing or kissing.



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Fortunately, the bacteria that cause meningitis are not usually as contagious as the common cold or flu, and they are not spread by casual contact such as breathing the air where a person with meningitis has been.

Sometimes the bacteria that cause meningitis spread to people who have had close or prolonged contact with the patient

People who would be considered at increased risk of acquiring meningitis include:

- household members
- anyone in the same daycare
- anyone in direct contact with oral secretions, such as a boyfriend or girlfriend

People who are often in close contact with a person who has some types of bacterial meningitis should get antibiotics to protect themselves.

Meningitis cases should be reported to state or local health departments to assure follow-up of close contacts and protect against outbreaks.

Although large epidemics of meningitis do not typically occur in the United States, some countries experience large epidemics. An epidemic is when the disease spreads significantly in the population. Overseas travelers should check to see if a vaccine against meningitis is recommended for their trip.



## Vaccination

There are vaccines against some of the bacteria that cause meningitis. They are very safe and effective. Ask your doctor if you should be vaccinated against meningitis.

Some countries have large epidemics of meningitis. In 1996, 213,658 people in West Africa had meningitis and 21,830 died from it.

People traveling to areas that could have an epidemic of meningitis should be vaccinated at least 1 week before departure if possible. Recommendations about areas where the meningitis vaccine would be useful can be obtained by calling the Centers for Disease Control and Prevention at (404) 332-4565.

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## Summary

Meningitis is inflammation of the fluid surrounding the brain and the spinal cord. It can be a very serious and possibly fatal disease.

Understanding and recognizing the symptoms of meningitis are important for early diagnosis. The earlier the diagnosis and treatment are, the less likely are the complications of the disease. Headache, neck stiffness, photophobia, increased sleepiness and unresponsiveness are all signs of meningitis.

Knowing whether meningitis is caused by a virus or bacterium is important in choosing a treatment option. Viral meningitis is usually less severe and resolves without treatment, while bacterial meningitis can be quite severe and may result in brain damage, hearing loss or learning disability.

Treatment of bacterial meningitis involves antibiotics. Vaccines are also available to prevent certain types of bacterial meningitis. Ask your doctor if you should be vaccinated against meningitis.

If you are traveling overseas, particularly to developing countries in Africa, ask your doctor or call the Centers for Disease Control and Prevention at (404)-332-4565 to check if you should be vaccinated.



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