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## Brain-eating amoeba: '*Naegleria Fowleri*'

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### Abstract

A brain-eating amoeba is called *Naegleria Fowleri*. It is fatal because it usually results in death 3 to 7 days following the onset of symptoms. Although the first instance of the brain-eating amoeba was discovered in Australia, it is thought to have originated in the United States. Warm water sources, slowly moving rivers, untreated swimming pools, and untreated drinking water supplies are all places where it can be found. It enters the body through the nose and can result in a coma, seizures, changed mental status, headache, fever, stiff neck, loss of appetite, and vomiting. It can even cause death. *Naegleria Fowleri* is known as the "brain-eating amoeba" because it consumes brain tissue. It results in primary amoebic meningoencephalitis, a risky infection (PAM).

Recently, A 50-year-old person just passed away in South Korea as a result of this deadly virus. He is thought to have brought this *Naegleria Fowleri* illness with him from Thailand, where he spent 4 months before coming back to South Korea. Microscopic *Naegleria Fowleri* is present. The *Naegleria Fowleri* infection is challenging to diagnose. Only when a doctor suspects PAM and suggests a biopsy will specialized lab testing be used to find the amoeba in the patient's cerebrospinal fluid. Not every laboratory performs specific tests. PAM is uncommon and challenging to identify and detect; 75% of diagnoses are typically made after the disease has claimed a victim's life. The correct treatment of municipal water or swimming pools can stop this dangerous infection.

*Naegleria Fowleri* has so far been identified as the source of PAM in over 16 nations, including India, and has been discovered on all continents. The CDC predicts that as temperatures rise around the world, more people will become infected with *Naegleria Fowleri* since the amoeba primarily lives in warm freshwater bodies. The organism may sometimes survive at even greater temperatures and thrives best in high temperatures up to 46 °C.

**Keywords:** Brain-eating Amoeba, *Naegleria Fowleri*, PAM (Primary Amoebic Meningoencephalitis), CDC (Centres for disease control & prevention)

### Introduction

An amoeba is called *Naegleria Fowleri*. It is miniscule, ranging in size from 8 micrometers to 15 micrometers, depending on its stage of life and surroundings. According to the US Centers for Disease Control and Prevention, *Naegleria Fowleri* can cause human infection (CDC). It was initially identified in Australia in 1965, and warm freshwater systems like hot springs, rivers, and lakes frequently contain it. The only species of *Naegleria* that causes primary amoebic meningoencephalitis is the *fowleri* species (PAM).

### Fatality of PAM caused by the brain-eating amoeba

The CDC mentions the fatality of PAM is as such that only four people have survived out of 154 known infected individuals in the United States from 1962 to 2021. More than 97% of the people infected with *N. fowleri* die.

South Korea on Monday reported its first case of infection from *Naegleria Fowleri* or "brain-eating amoeba", according to The Korea Times. The authorities said a 50-year-old Korean national, who had recently returned from Thailand, died 10 days after showing symptoms of the rare yet fatal infection. Prior to arriving in South Korea on December 10, the man spent four months in Thailand, according to the Korea Disease Control and Prevention Agency (KDCA). After experiencing headaches, vomiting, neck stiffness, and slurred speech the next day, he was brought to the emergency hospital, according to the report. Dec. 21 marked the man's passing. His death was determined to have been caused specifically by an illness brought on by *Naegleria Fowleri* after a battery of tests were conducted by health authorities.

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**Naegleria loves very warm water. It can survive in water as hot as 115 F. Naegleria is found in:-**

- Warm lakes, ponds, and rock pits
- Mud puddles
- Warm, slow-flowing rivers, especially those with low water levels
- Untreated swimming pools and spas
- Untreated well water or untreated municipal water
- Hot springs and other geothermal water sources
- Thermally polluted water, such as runoff from power plants
- Aquariums
- Soil, including indoor dust
- Splash pads for children
- Water parks

**Risk factors**

Over 60% of U.S. cases are in children age 13 or younger.  
About 80% of cases are in males.

**Mode of infection**

Since the amoeba travels through the nose, infections are most frequently brought on by water sports like water skiing, diving, and water skiing that drive water into the nose. However, infections have been reported in persons who have dipped their heads in hot springs or cleaned their nostrils with neti pots containing tap water that hasn't been disinfected.

The CDC claims that *N. fowleri* typically consumes bacteria. However, once inside people, the amoeba feeds on the brain. The substances that nerve cells utilize to interact with one another are what draw *N. fowleri* amoebas to them. The olfactory nerve carries the amoebas from the nose into the frontal lobe of the brain. In two to 15 days, symptoms start to show. Death typically happens 3 to 7 days following the onset of symptoms. The median number of days from the onset of symptoms to death is 5.3. Few patients have been documented to have survived infection on a global scale.

A person infected with *N. fowleri* cannot spread the infection to another person.

**First Symptoms after the infection.**

The CDC says the first signs of PAM start showing within one to 12 days after the infection. At first, PAM may seem like viral meningitis. Symptoms include:

- Headache
- Fever
- Stiff neck
- Loss of appetite
- Vomiting
- Altered mental state
- Seizures
- Coma

There may also be hallucinations, drooping eyelids, blurred vision, and loss of sense of taste.

**Diagnosis of Infection with Brain-Eating Amoeba**

It is difficult to diagnose. Only if PAM is suspected, the

doctor may ask for specific lab tests that look for the amoeba in cerebrospinal fluid, biopsy, or tissue specimens. Provided the lab must have the facility of specialized tests. As PAM is rare and difficult to diagnose and detect, 75% of the diagnoses are usually made after the disease causes death.

**Management of Naegleria Fowleri**

A combination of medications, frequently containing amphotericin B, azithromycin, fluconazole, rifampin, miltefosine, and dexamethasone, is used to treat primary amebic meningoencephalitis (PAM). These medications are utilized because they have been used to treat patients who survived and are believed to have activity against *Naegleria Fowleri*. The newest of these medications, miltefosine, has demonstrated amoeba-killing effectiveness against free-living amoebae in the laboratory, including *Naegleria Fowleri*. However, very few patients manage to recover.

**Prevention of Infection of N. fowleri**

Saltwater is an inhospitable environment for *Naegleria*. It is incapable of surviving in municipal water that has been thoroughly treated, either for swimming pools or other uses. Avoid splash pads that haven't been treated. Avoid engaging in some water sports and activities in warm, still waters in the late summer, such as diving and jumping in, water skiing, and underwater swimming wearing a nose clip when sailing, playing, or swimming in warm water.

**Future recommendations to control N. fowleri**

1. Developing Rapid Test to detect the infection of *N. fowleri*
2. Water can be tested for brain-eating amoeba:- experts can collect water samples from a lake or a pool, concentrate it and grow it in the lab to check for *N. fowleri*. The samples can then be tested for the amoeba using certain lab tests.

**Conflict of Interest**

Not available

**Financial Support**

Not available

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**How to Cite This Article**

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