

PAM

Primary Amoebic Meningoencephalitis

Naegleria fowleri

The organism is a single cell protozoa (amoeba), Naegleria fowleri, that is the causal agent for PAM. The route of entry into the body is through the nasal cavity and children are the most susceptible to the disease. The organism travels through the nasal cavity directly to the brain where it causes an almost always fatal infection similar to bacterial or viral meningitis.

The freshwater amoeba is found all around the world in soil and fresh water and has even been found in swimming pools. The amoeba is most active when the water temperature is greater than 80 degrees.

PAM infection **can only occur** when a number of conditions occur at the same time:

- a. The amoeba must be present in the water.
- b. The amoeba must be able to multiply to large numbers. (Greater than 80 degrees water temperature in stagnant, calm waters.)
- c. Water containing the amoeba must get up the victims nose. (Water must be forcefully inhaled. The PAM infection can not result from swallowing water containing the pathogenic amoeba.)

PAM infection can be prevented by following a few common sense precautions:

- a. Never swim in stagnant or polluted water. Stay in deeper more open areas of the lake.
- b. Avoid underwater swimming and hold your nose or use nose plugs when jumping into natural waters.
- c. Swim in properly maintained pools.

Thankfully, PAM is extremely rare. Less than three cases are reported each year nationwide. Every year many more deaths and injuries result from diving into shallow waters, or natural waters that hide rocks and debris, while using alcohol or drugs, while boating or swimming, and from leaving children unattended in water for even short periods of time.

Unfortunately, in addition to pathogenic freshwater amoebas, there are other protozoa, bacteria, and viruses in fresh water all capable of infecting swimmers with everything from mild stomach discomfort to severe gastrointestinal illness. Some of these organisms are found naturally in lakes and streams while others are carried from wastewater sources including septic systems and runoff from animal and wildfowl areas. Amazingly, few infections are reported by lake visitors.

If the water feels warm and there is no wave action or water movement, bacteria can be expected to be present and one should be cautious about swimming. Persons who do allow their children in lakes, ponds, and streams at this time should be aware of meningitis symptoms.

Symptoms include:

- Severe headache
- high fever
- stiff neck
- nausea
- vomiting
- seizures
- hallucinations as the condition worsens

For more information contact your local health department or state environmental quality office.