

**CHAPTER 24**  
**INFECTIONS OF THE CENTRAL NERVOUS SYSTEM**

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**THE CENTRAL NERVOUS SYSTEM**

- ◆ The central nervous system (CNS) comprises the brain and spinal cord
- ◆ The blood-brain barrier protects the CNS from infection but can prevent drugs getting to the CNS if an infection does occur
- ◆ Swelling and inflammation can have disastrous results for the CNS

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**ROUTES FOR INFECTIONS OF THE CNS**

- ◆ The CNS is well protected structurally and employs a blood-brain barrier to prevent infections
- ◆ Organisms that move from the blood to the cerebrospinal fluid can cause meningitis
- ◆ Most CNS infections result from bacteremia or viremia from distal infections

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### **ROUTES FOR INFECTIONS OF THE CNS**

- ◆ In some cases, infection comes from locations close to or in direct contact with the CNS, such as the middle ear or the sinuses
- ◆ Bacterial and fungal CNS infections require immediate and aggressive treatment. Viral CNS infections are more difficult to treat, and therapy includes mostly supportive care

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### **MENINGITIS**

- ◆ Meningitis is an infection of the meninges and can be caused by bacteria, viruses, fungi, or parasitic pathogens
- ◆ Bacterial meningitis is more severe than viral meningitis, but can be treated with antibiotics

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### **TETANUS AND BOTULISM**

- ◆ Tetanus and botulism are serious infections (or intoxications) that can be devastating
- ◆ Both tetanus and botulism are caused by exotoxins produced by the pathogens

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## TETANUS AND BOTULISM

- ◆ Tetanus toxin is a neurogenic toxin that blocks postsynaptic inhibition of the spinal motor reflexes, which leads to spasmodic contraction of muscles
- ◆ Botulism toxin moves from the intestinal tract to the CNS via the blood and inhibits the release of acetylcholine, causing muscular paralysis

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## VIRAL INFECTIONS OF THE CNS

- ◆ There are two types of viral CNS infection: acute and persistent
- ◆ Acute viral CNS infections include rabies, polio, and viral encephalitis
- ◆ There are no treatments for acute viral infections but there are effective vaccines
- ◆ Some persistent CNS infections are caused by conventional agents such as measles, rubella, and enterovirus

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## PRIONS

- ◆ Prions are infectious proteins and are not associated with nucleic acids

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### FUNGAL INFECTIONS OF THE CNS

- ◆ Fungal CNS infections are primarily opportunistic and are usually restricted to patients who are immunocompromised
- ◆ The most important fungal CNS infection is cryptococcosis, caused by *Cryptococcus neoformans*, the only encapsulated fungus

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### PARASITIC INFECTIONS OF THE CNS

- ◆ CNS infections caused by the free-living amebas *Naegleria* and *Acanthamoeba* are rare but almost always fatal

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