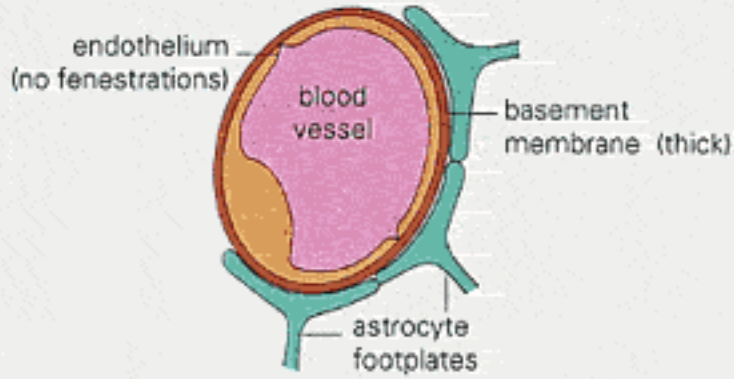
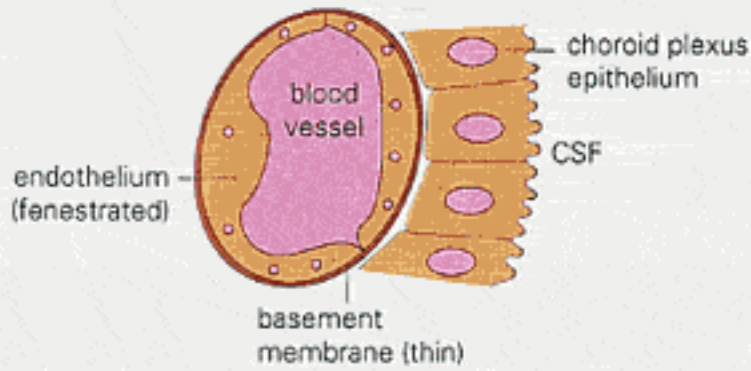


blood-brain barrier



blood-CSF barrier



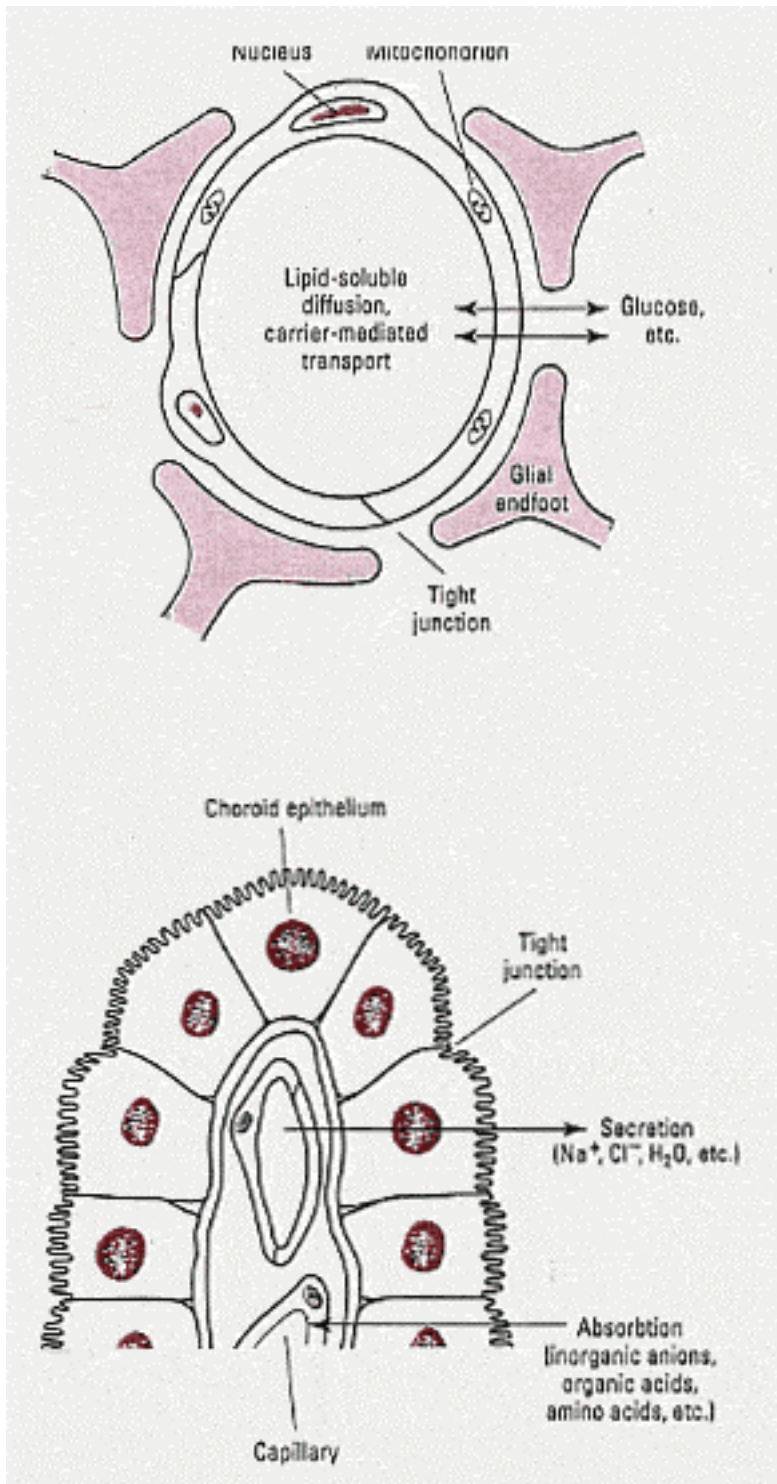
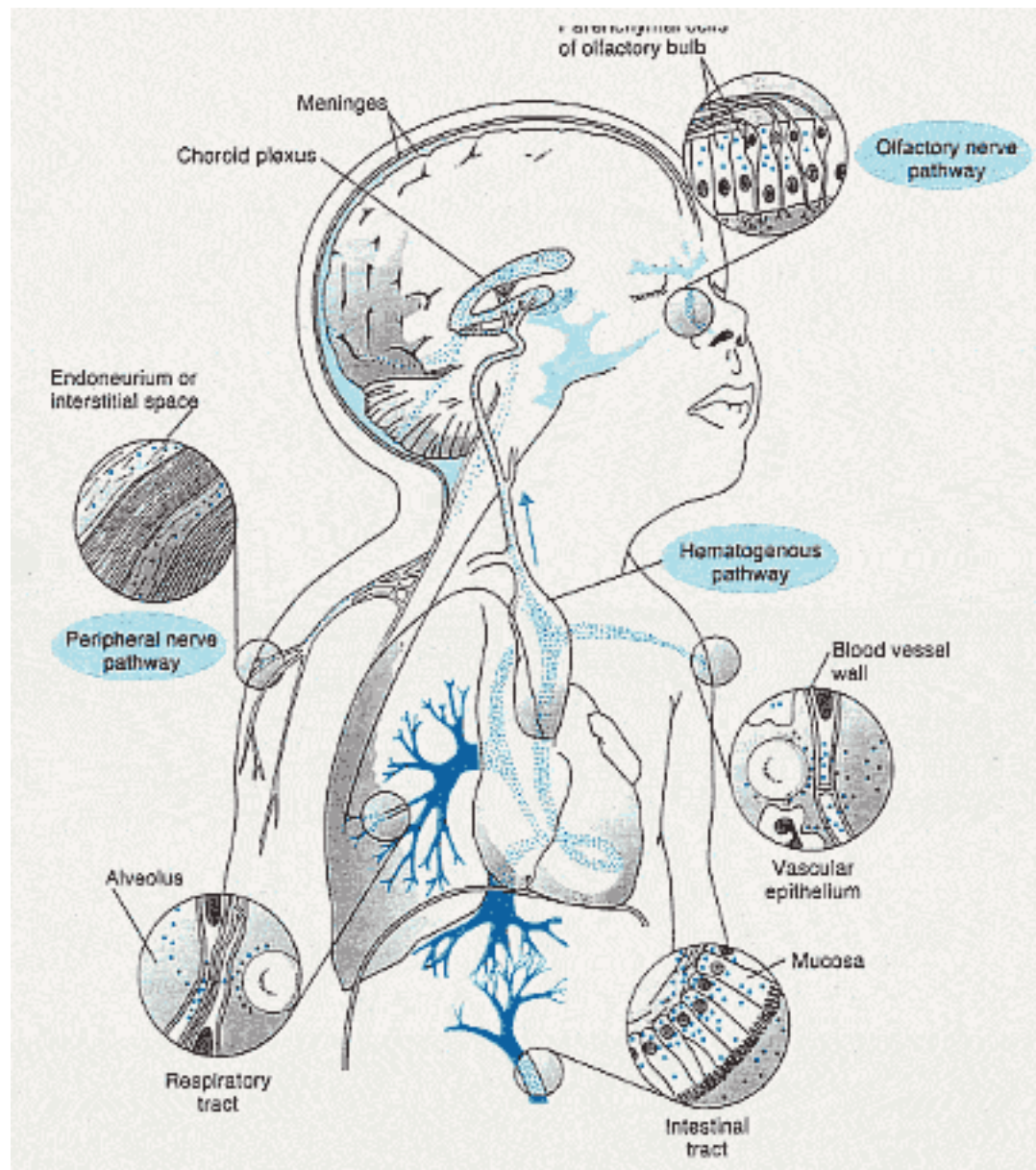
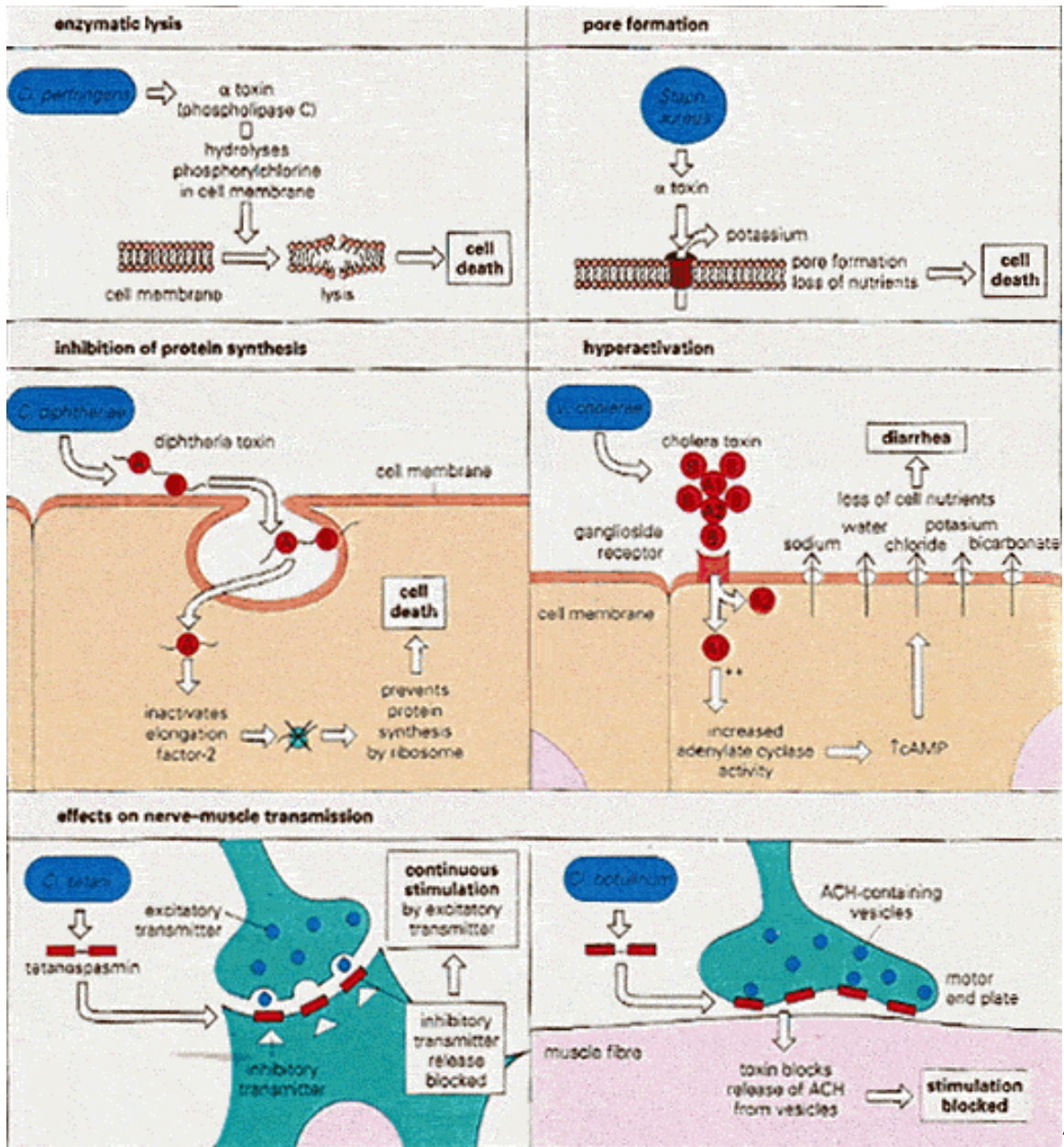
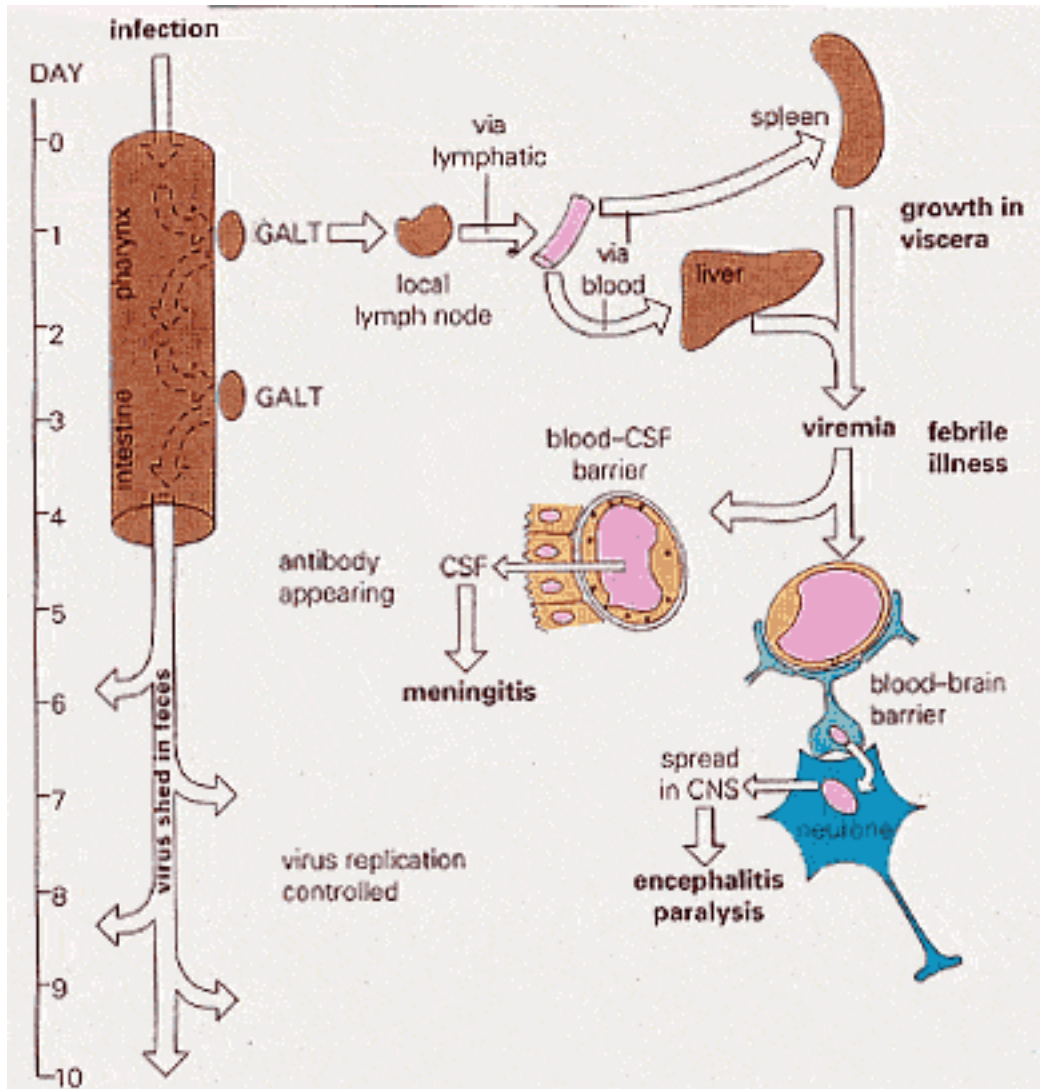


Table 32-2. Concentration of various substances in human CSF and plasma.

Substance	CSF	Plasma	Ratio CSF/Plasma
Na ⁺ (meq/kg H ₂ O)	147.0	150.0	0.98
K ⁺ (meq/kg H ₂ O)	2.9	4.6	0.62
Mg ²⁺ (meq/kg H ₂ O)	2.2	1.6	1.39
Ca ²⁺ (meq/kg H ₂ O)	2.3	4.7	0.49
Cl ⁻ (meq/kg H ₂ O)	113.0	99.0	1.14
HCO ₃ ⁻ (meq/L)	25.1	24.8	1.01
P _{CO₂} (mm Hg)	50.2	39.5	1.28
pH	7.33	7.40	...
Osmolality (mosm/kg H ₂ O)	289.0	289.0	1.00
Protein (mg/dL)	20.0	6000.0	0.003
Glucose (mg/dL)	64.0	100.0	0.64
Inorganic P (mg/dL)	3.4	4.7	0.73
Urea (mg/dL)	12.0	15.0	0.80
Creatinine (mg/dL)	1.5	1.2	1.25
Uric acid (mg/dL)	1.5	5.0	0.30
Lactic acid (mg/dL)	18.0	21.0	0.86
Cholesterol (mg/dL)	0.2	175.0	0.001







**COMMON SIGNS AND SYMPTOMS IN ACUTE
MENINGITIS AND ENCEPHALITIS**

Meningitis	Adult	Headache Fever Neck and back pain Meningism Nausea and vomiting	Kernig's sign Brudzinski's sign Photophobia Lethargy or coma Seizures
	Infant	Fever Irritability Lethargy Refusal to feed Strange cry	Bulging fontanelles Convulsions Ophisthotonus Seizures
Encephalitis	Fever Vomiting Psychiatric alteration Focal neurologic deficits	Stupor or coma Seizures Electroencephalographic changes	

21j

COMMON NEUROLOGIC SEQUELAE OF BACTERIAL MENINGITIS

Deficit	Approximate frequency (%)
Hearing loss	15-30
Parenchymal damage	5-30
Cerebral palsy	5-10
Learning disabilities	5-20
Seizure disorder	<5
Cortical blindness	<5
Cerebral herniation	3-20
Hydrocephalus	2-3

21k

Table 4-7. Common causes of bacterial meningitis by age group.¹

Pathogen	Age < 2 Months	Age 2 Months to 15 Years	Age > 16 Years
<i>H influenzae</i>		✓ ²	
<i>N meningitidis</i>		✓	✓
<i>S pneumoniae</i>		✓	✓
<i>E coli</i>	✓		
Other gram-negative bacilli	✓		✓ ³
Group B streptococci	✓		
Other streptococci	✓		
<i>L monocytogenes</i>	✓		✓

¹Modified and reproduced, with permission, from Swartz M: Acute bacterial meningitis. In: *Infectious Diseases*. Gorbach SL, Bartlett JG, Blacklow NR (editors). Saunders, 1992.

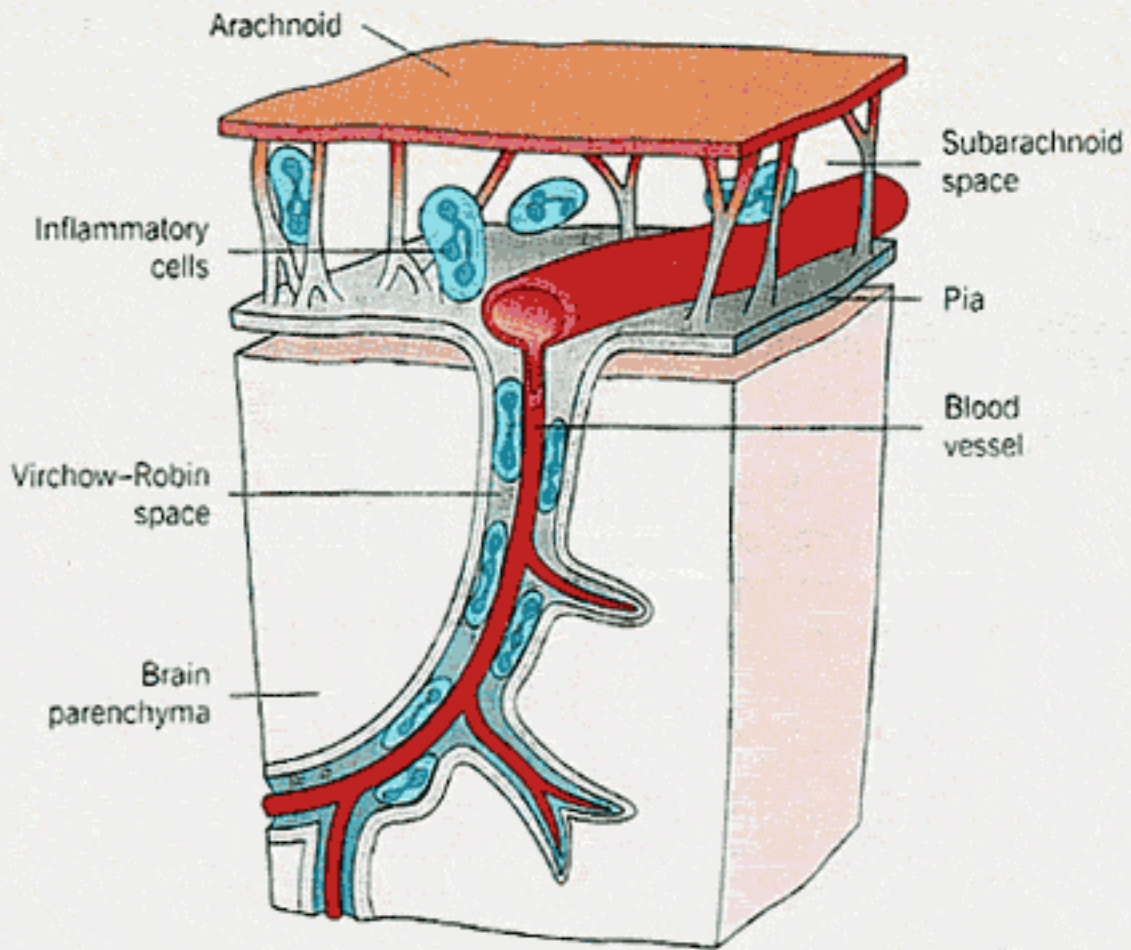
²In nonimmunized children.

³Pathogen in the elderly.

VIRAL MENINGITIS		
virus	virus group	comments
herpes simplex virus	alpha herpesvirus	uncommon; may follow genital infection with HSV.
mumps	paramyxovirus	a quite common complication
lymphocytic choriomeningitis	arenavirus	uncommon infection from urine etc. of mice, hamsters carrying the virus
poliovirus, coxsackievirus, echovirus etc.	picornaviruses (enterovirus group)	commonly seen (especially due to echoviruses) although an uncommon complication of infection
Japanese encephalitis	togavirus	India, South East Asia, Japan
Eastern and Western equine encephalitis	togavirus	East and West USA
louping ill	togavirus	Scotland
HIV	retrovirus	may occur early after infection

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SUBARACHNOID AND PERIVASCULAR INFLAMMATION



RELEVANT CNS ANATOMY

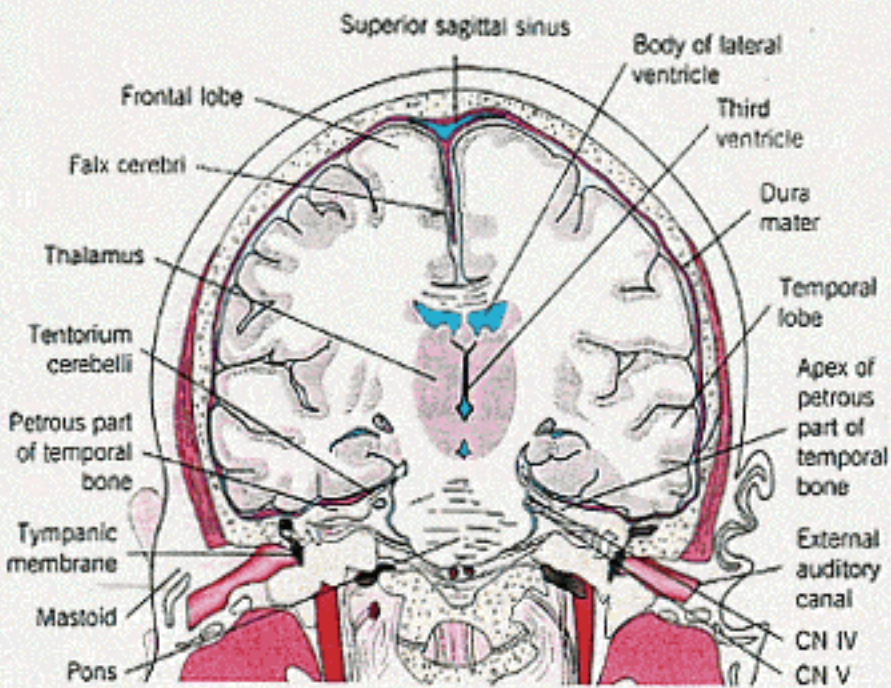
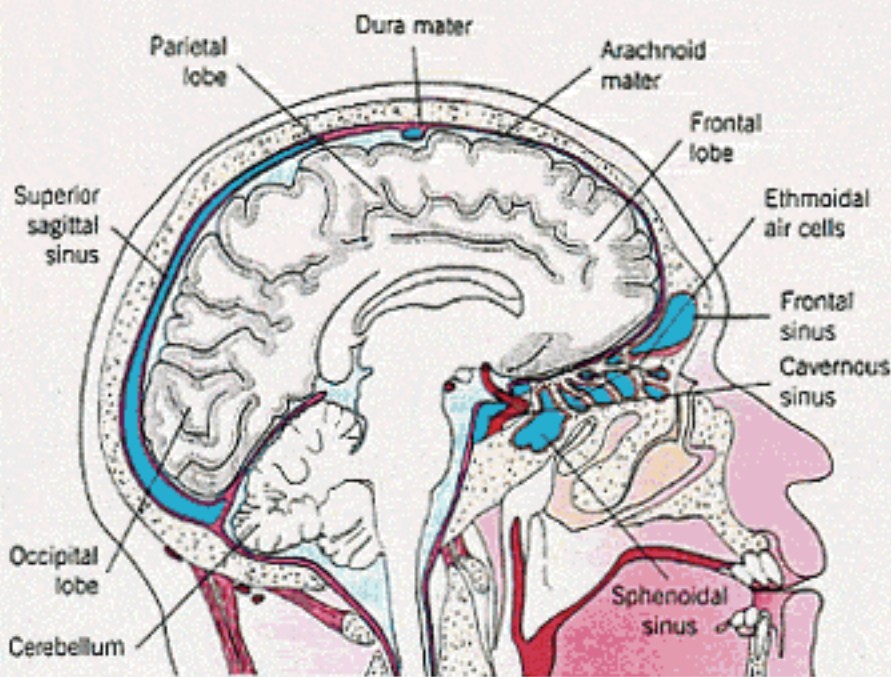


Table 7-2. Values of cerebrospinal fluid in various infectious conditions

Condition	Appearance	Cellularity	Glucose level
Normal	Clear	0-5/ μ l, lymphocytes	50-80 mg/dl
Bacterial meningitis	Cloudy	1,000-10,000 neutrophils	Decreased
Fungal meningitis	Hazy or clear	Increased, lymphocytes	Decreased
Viral meningitis	Clear or hazy	Increased, lymphocytes	Normal
Abscess	Cloudy	Increased, mixed population	Normal
Neurosyphilis	Clear	Slight increase in lymphocytes	Normal