SERIOUS PEDIATRIC INFECTIONS

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KSU & KFMC

Serious Pediatric Infections

Objectives

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PEDIATRIC INFECTIOUS DISEASES *SPECIAL CONSIDERATIONS

- First exposure
- Immature immune system
- Limited reserve
- Non-specific signs/symptoms
- Age-dependent aetiology
- One agent and different syndromes
- Several agents and one syndrome

GUIDELINES FOR STUDY OF I.D.

- Etiology
- Pathogenesis
- Clinical manifestations/course:
  - -Immunocompetent
  - -Immunocompromized
- Epidemiology:
  - -Mode of transmition
  - -Incubation period
  - - Reservoir
  - -Period of communicability
  - -Susceptible individuals

GUIDELINES FOR STUDY OF I.D.

- Diagnosis
- Complications
- Management
  - -Treatment
  - - Prevention
  - - Infection control

SERIOUS PEDIATRIC INFECTIONS

1. Meningitis and encephalitis
2. Neonatal sepsis
3. Epiglotitis
4. Bacteremias
5. Osteomyelitis
6. Septic arthritis
7. Endocarditis
8. Tuberculosis,….ect.

BACTERIMIA

- Transient
- “Occult “
- Serious
  - fulminant with shock
  - with focal infection
  - associated with IVD

Bacterial Meningitis

MENINGITIS

- Etiology
- Pathogenesis
- Molecular pathophysiology
- Clinical Manifestations
- Diagnosis
- Therapy
- Complications
- Prevention
  - Chemoprophylaxis
  - Vaccination

BACTERIAL MENINGITIS

ETIOLOGY

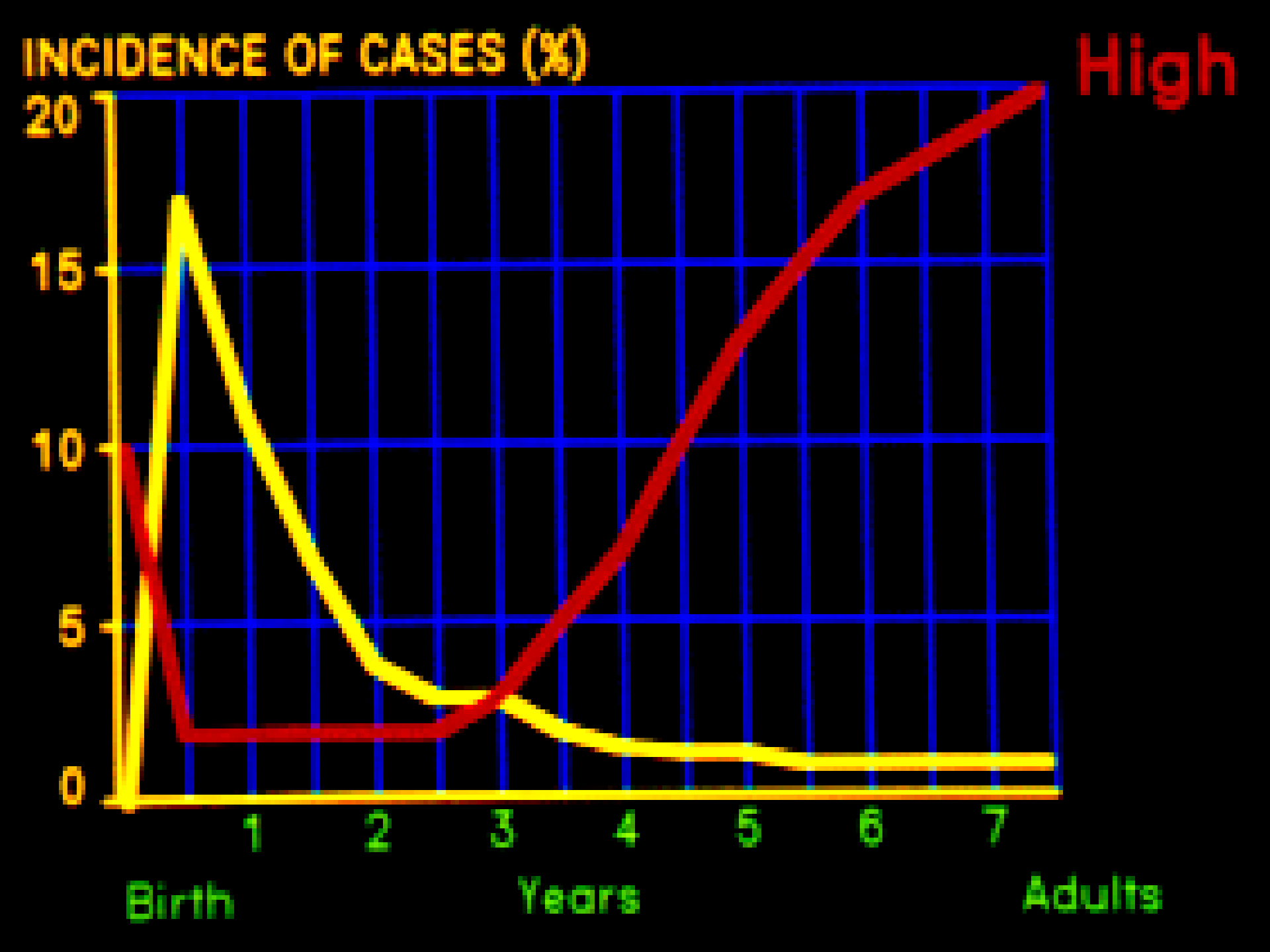
Determined by:

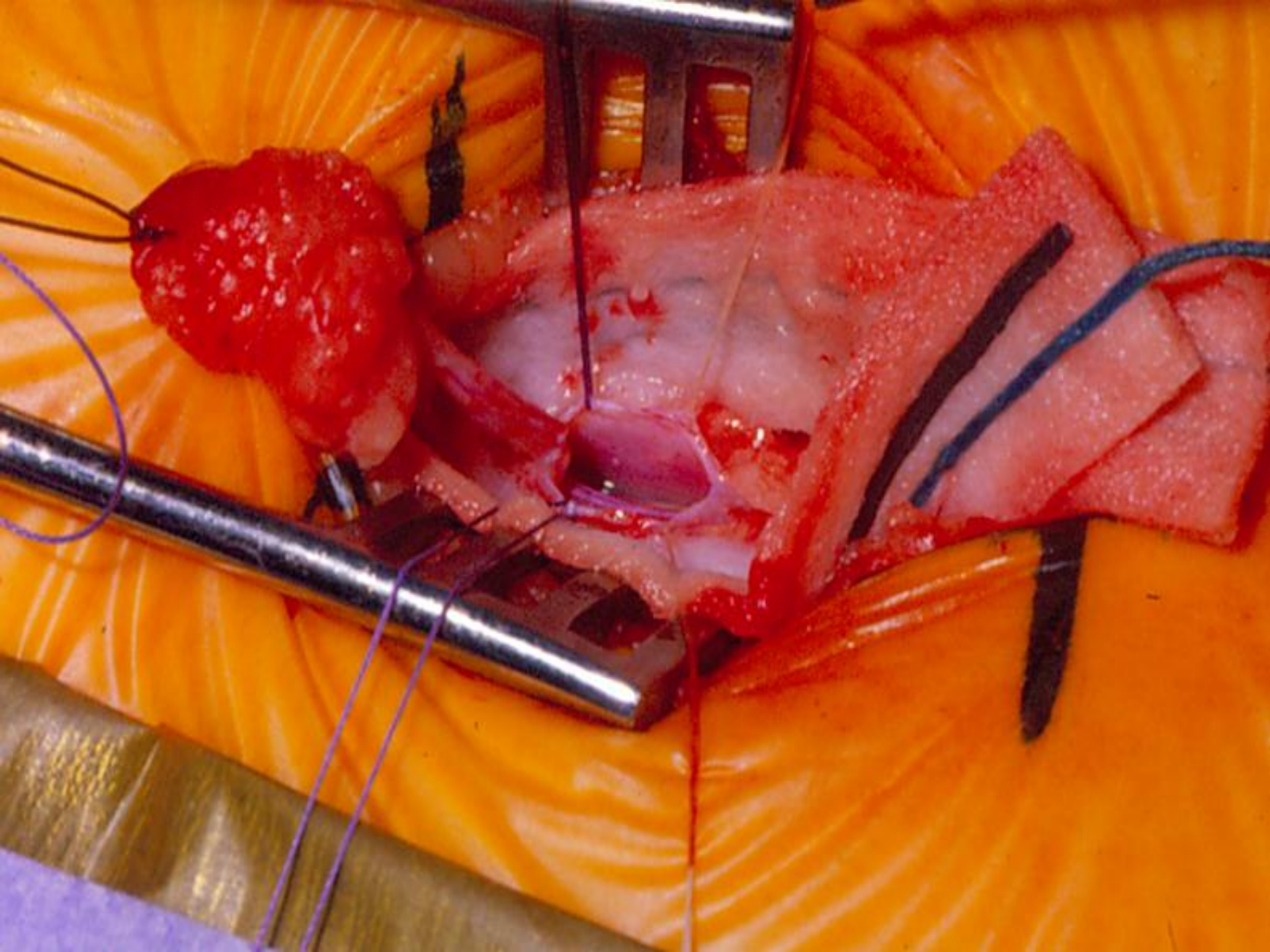
(I) AGE

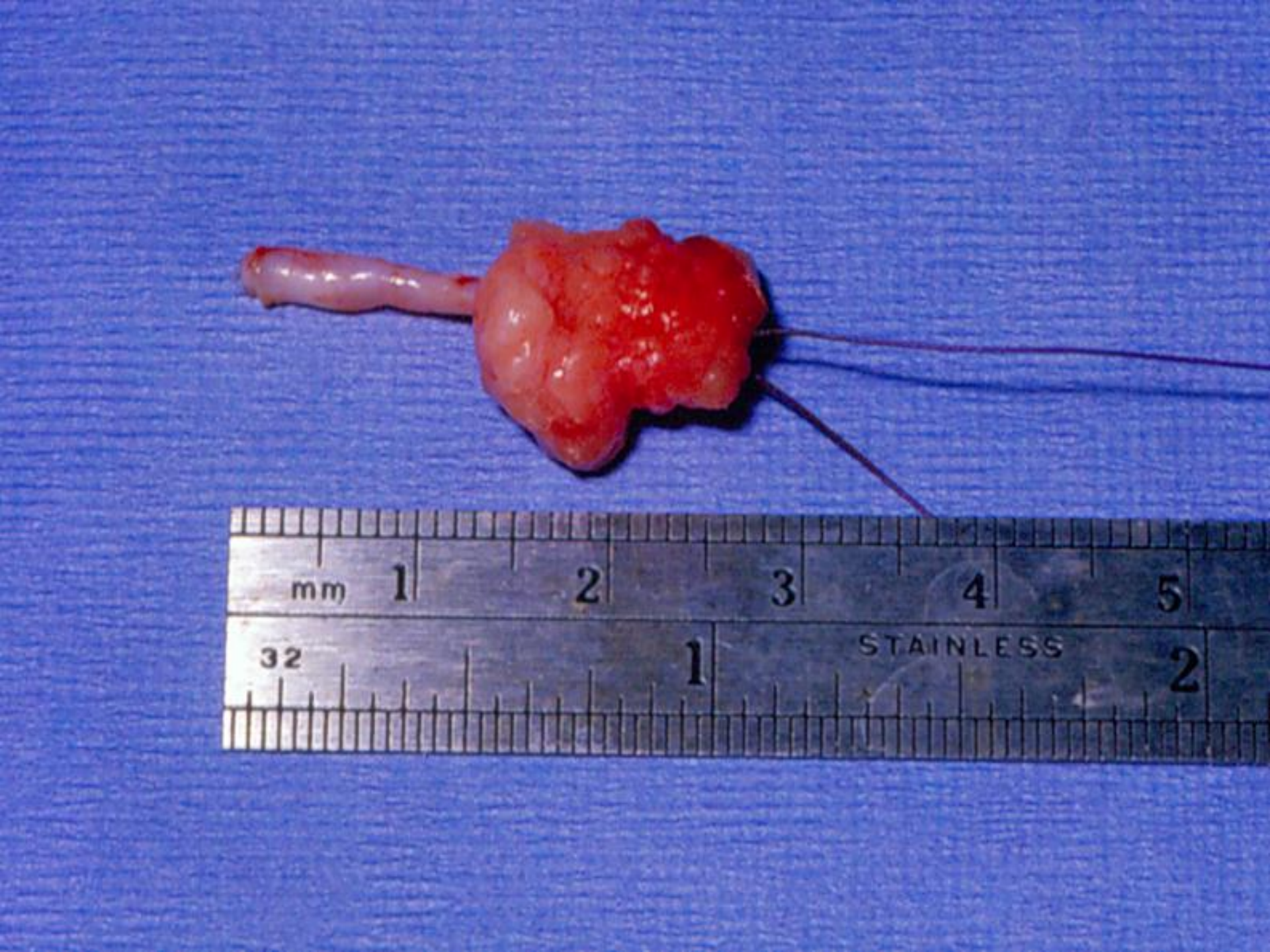
- Neonate
- 3 mos – 5 years
- > 10 years

(II) SPECIAL RISK FACTORS:

- Post traumatic
- Post neurosurgical
- Ventricular Shunts
- Immunocompromized


INCIDENCE OF CASES (%)
High
20
15
10
5
0
1
2
3
4
5
6
7
Birth
Years
Adults




mm 1 2 3 4 5
32 1 STAINLESS 2

PATHOGENESIS

Mucosal Colonization

⇩

Local Invasion

⇩

Bacteremia

⇩

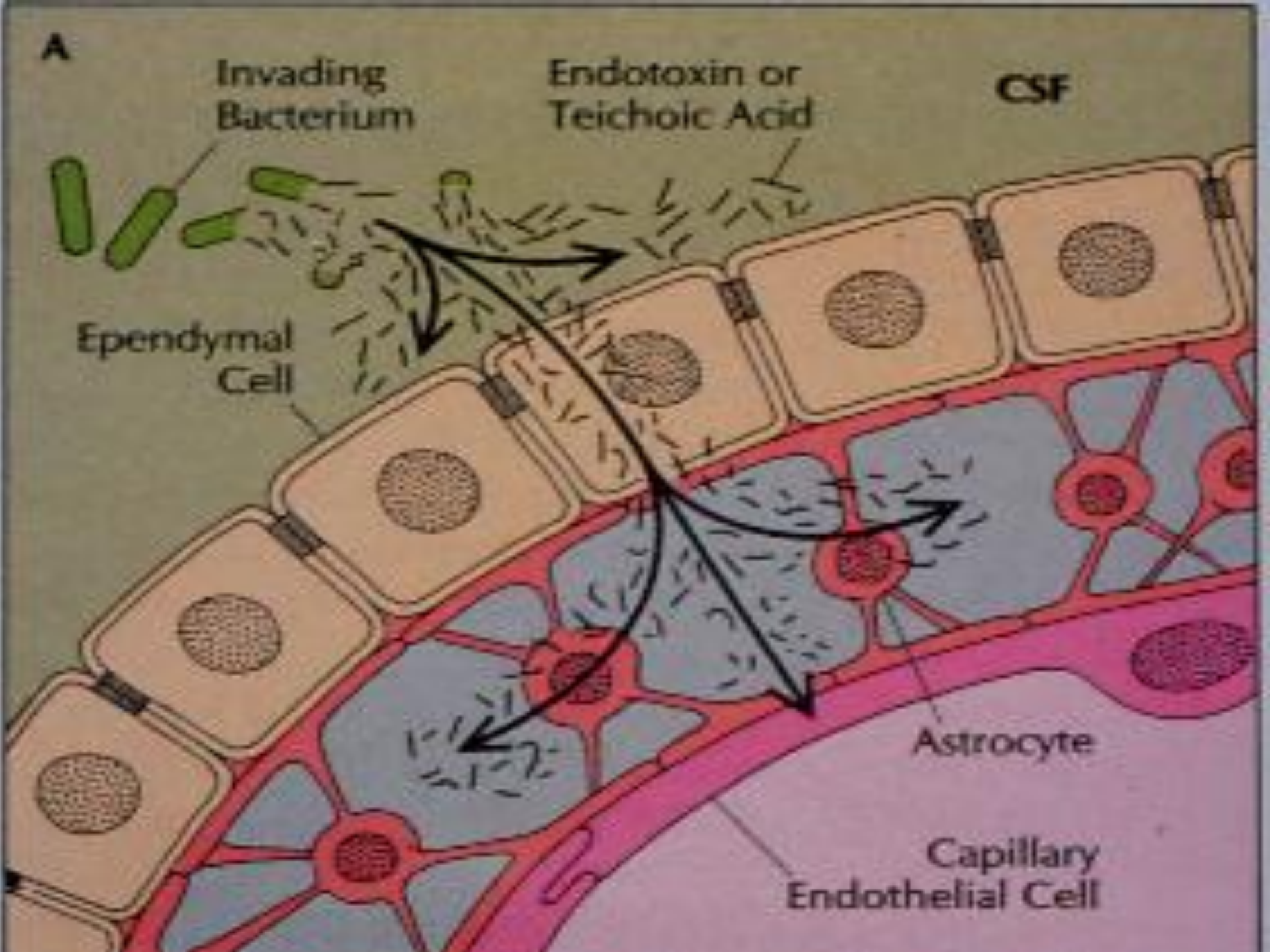
Meningeal Invasion

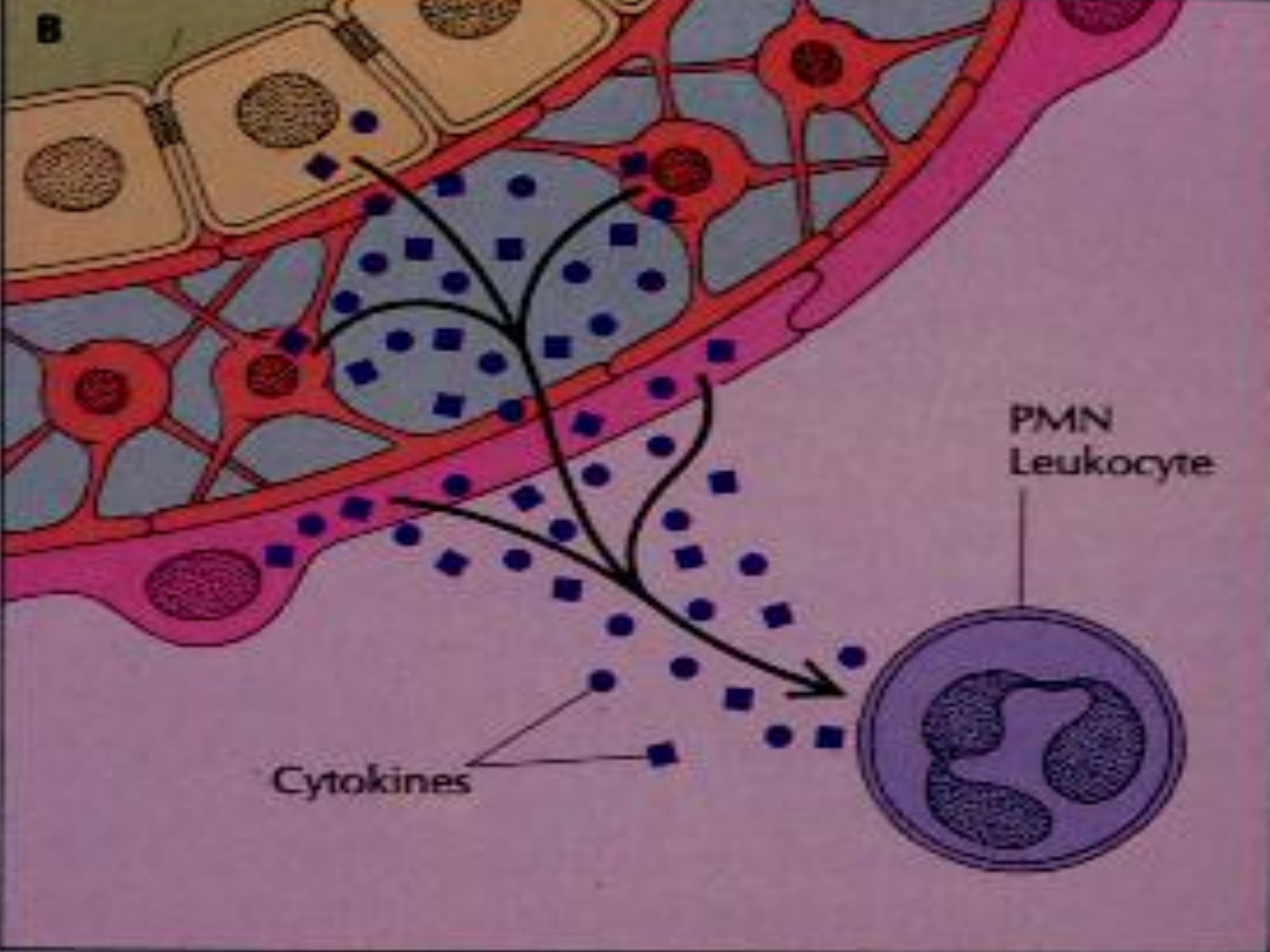
⇩

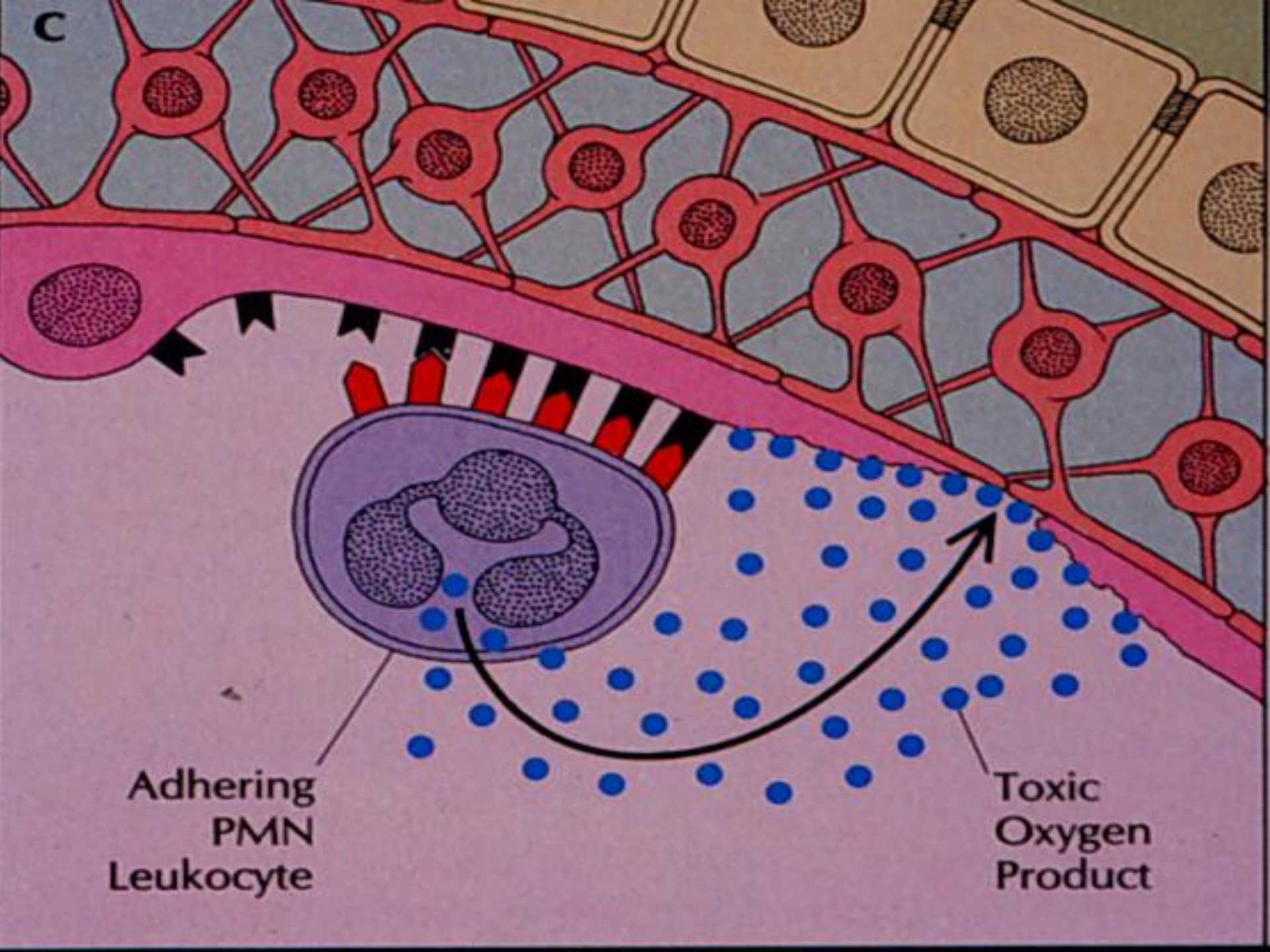
Bacterial Replication

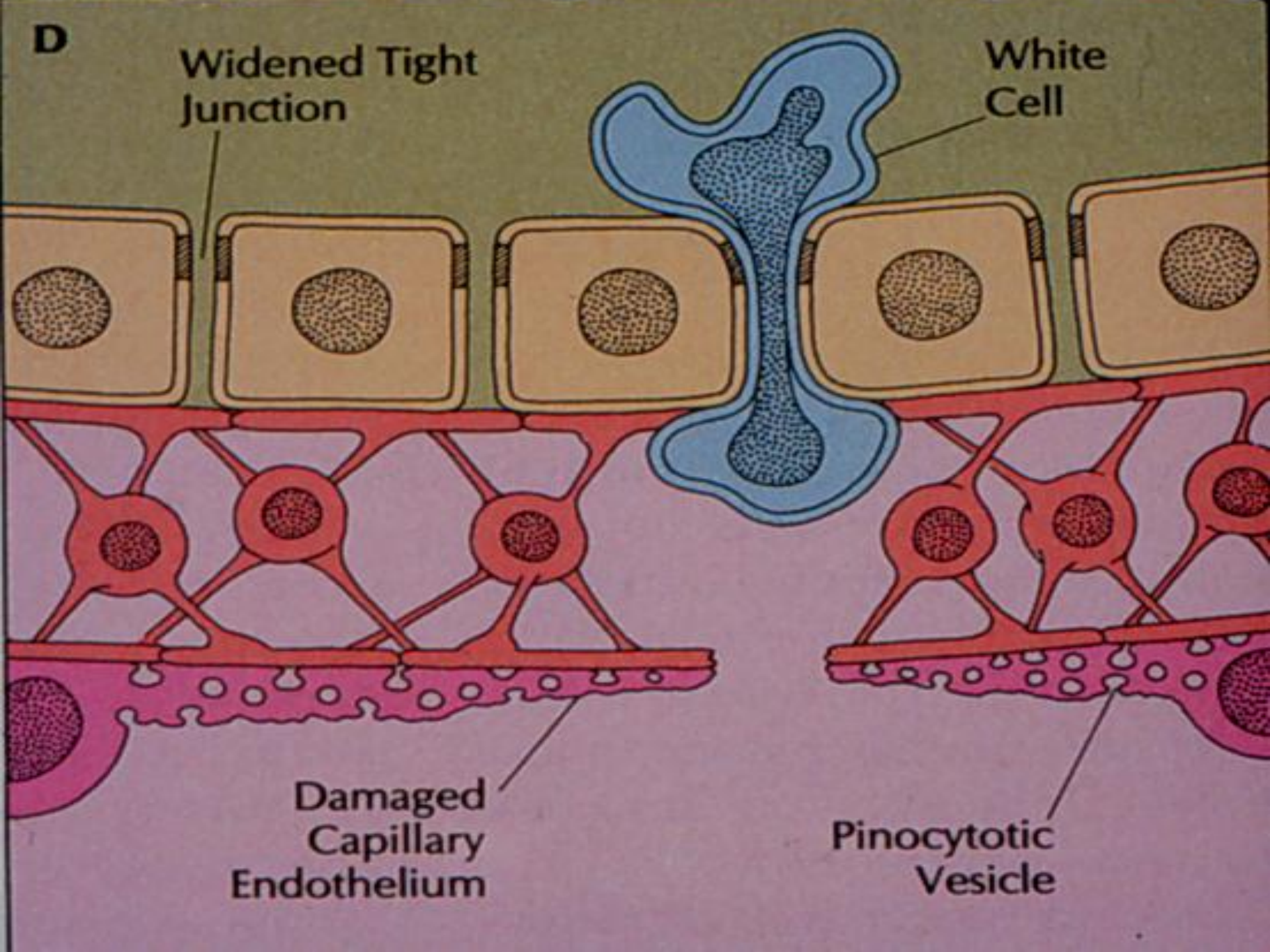
⇩

Sub-arachnoid space Inflammation

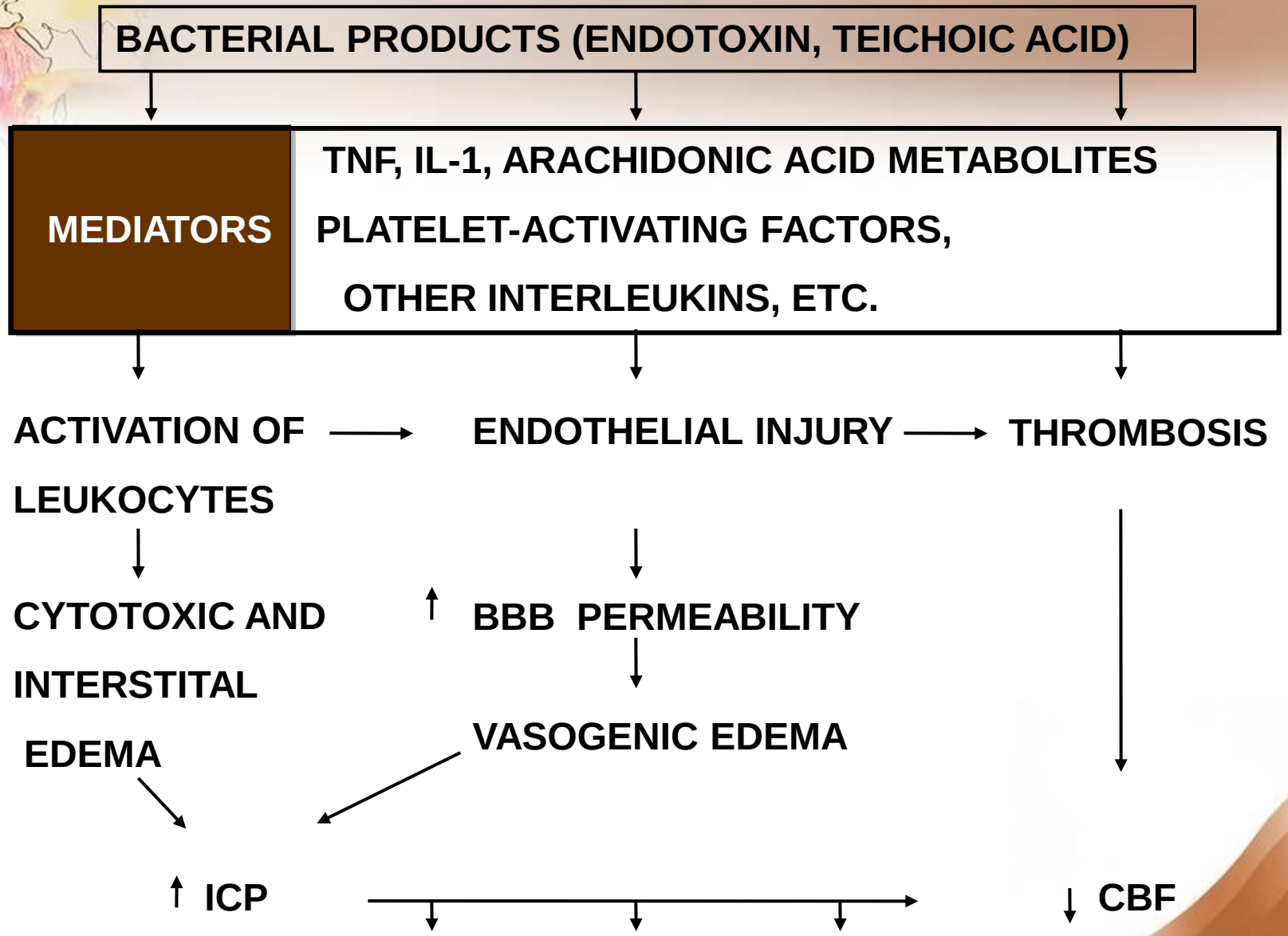

A
Invading Bacterium
Endotoxin or Teichoic Acid
CSF
Ependymal Cell
Astrocyte
Capillary Endothelial Cell


B
PMN
Leukocyte
Cytokines

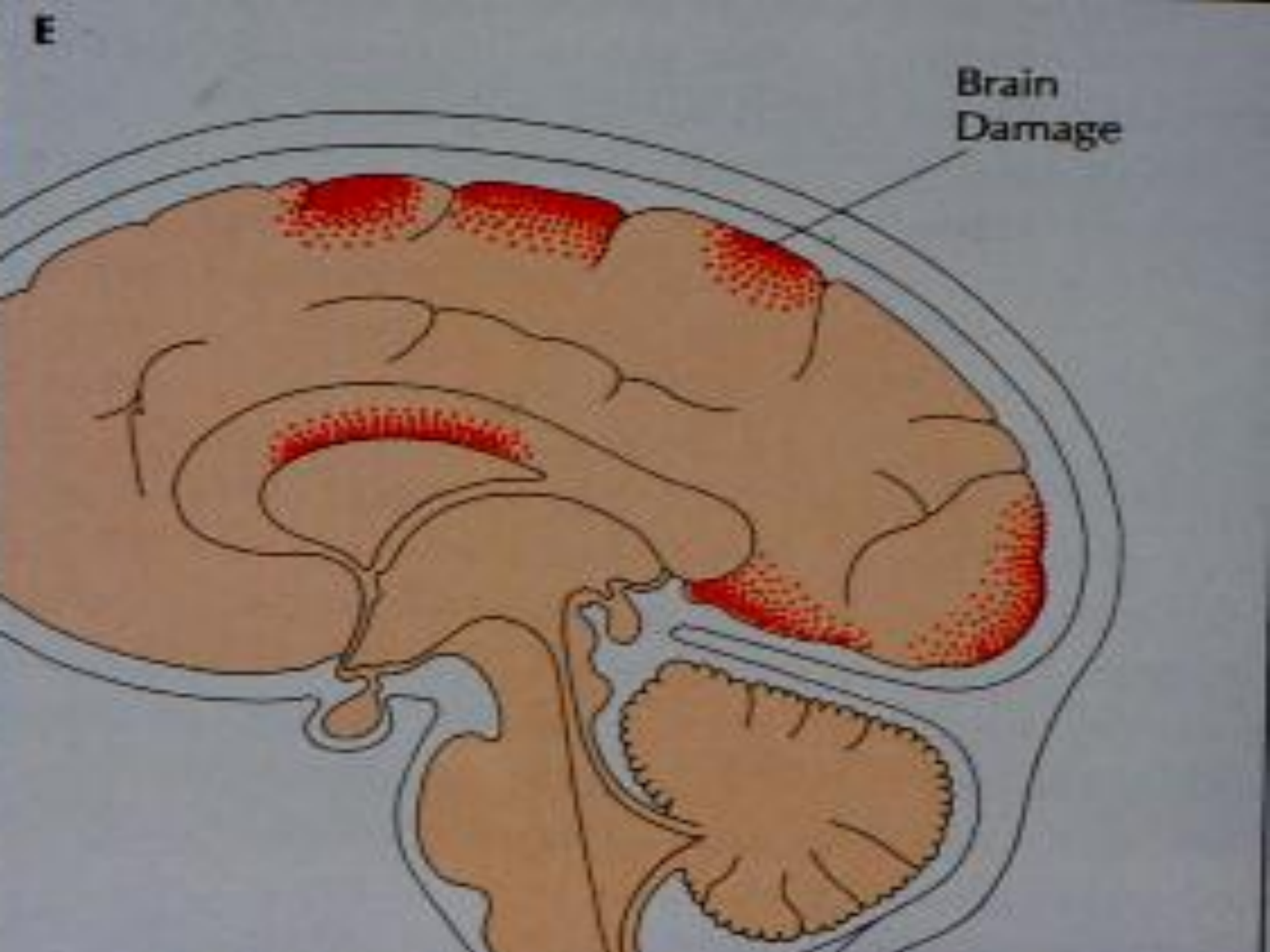

c
Adhering
PMN
Leukocyte
Toxic
Oxygen
Product


D
Widened Tight Junction
White Cell
Damaged Capillary Endothelium
Pinocytotic Vesicle

MOLECULAR PATHOPHYSIOLOGY OF BACTERIAL MENINGITIS



E



CLINICAL PRESENTATION

- IN NEONATE
- IN OLDER CHILDREN

DIAGNOSIS

- CBC
- BLOOD CULTURE
- CSF:

- Color

-Cell count and diff.

- Chemistry:

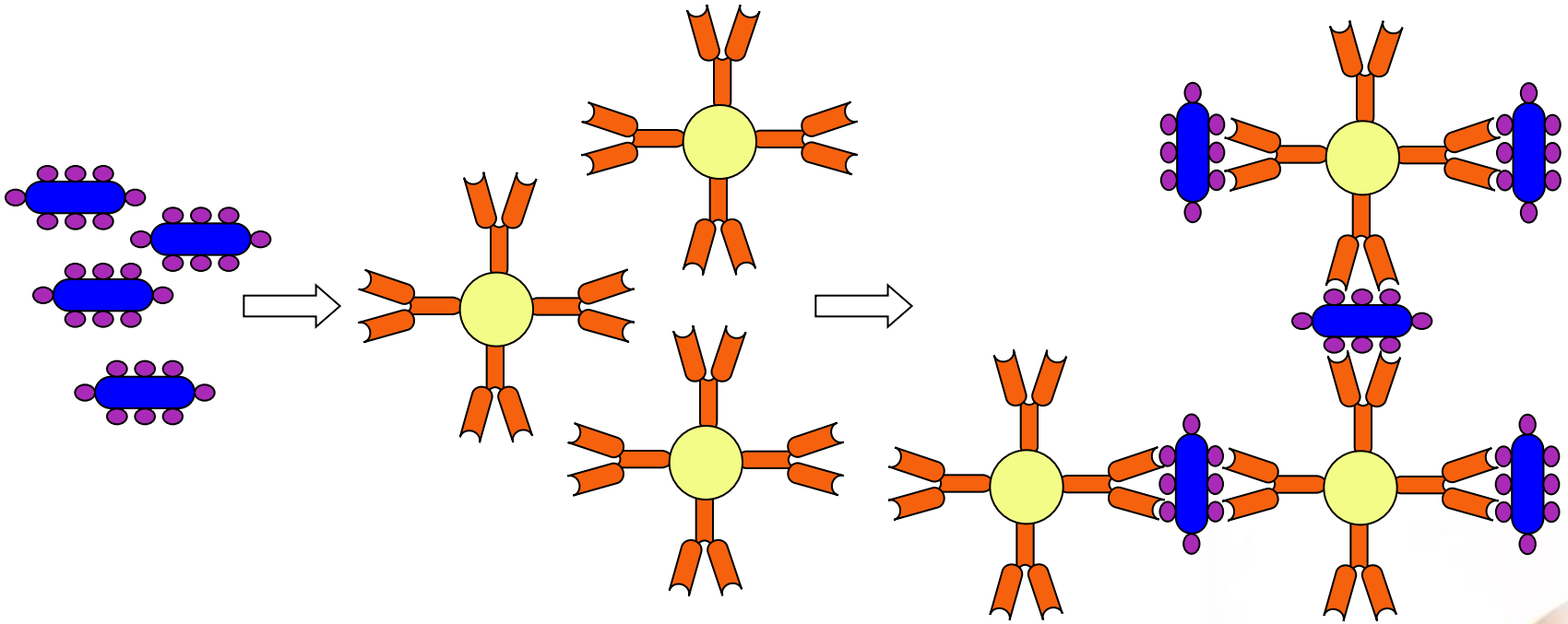
Sugar & Proteins

- Gram stain

-Latex agglutination

-Culture

LATEX AGGLUTINATION OR CO-AGGLUTINATION



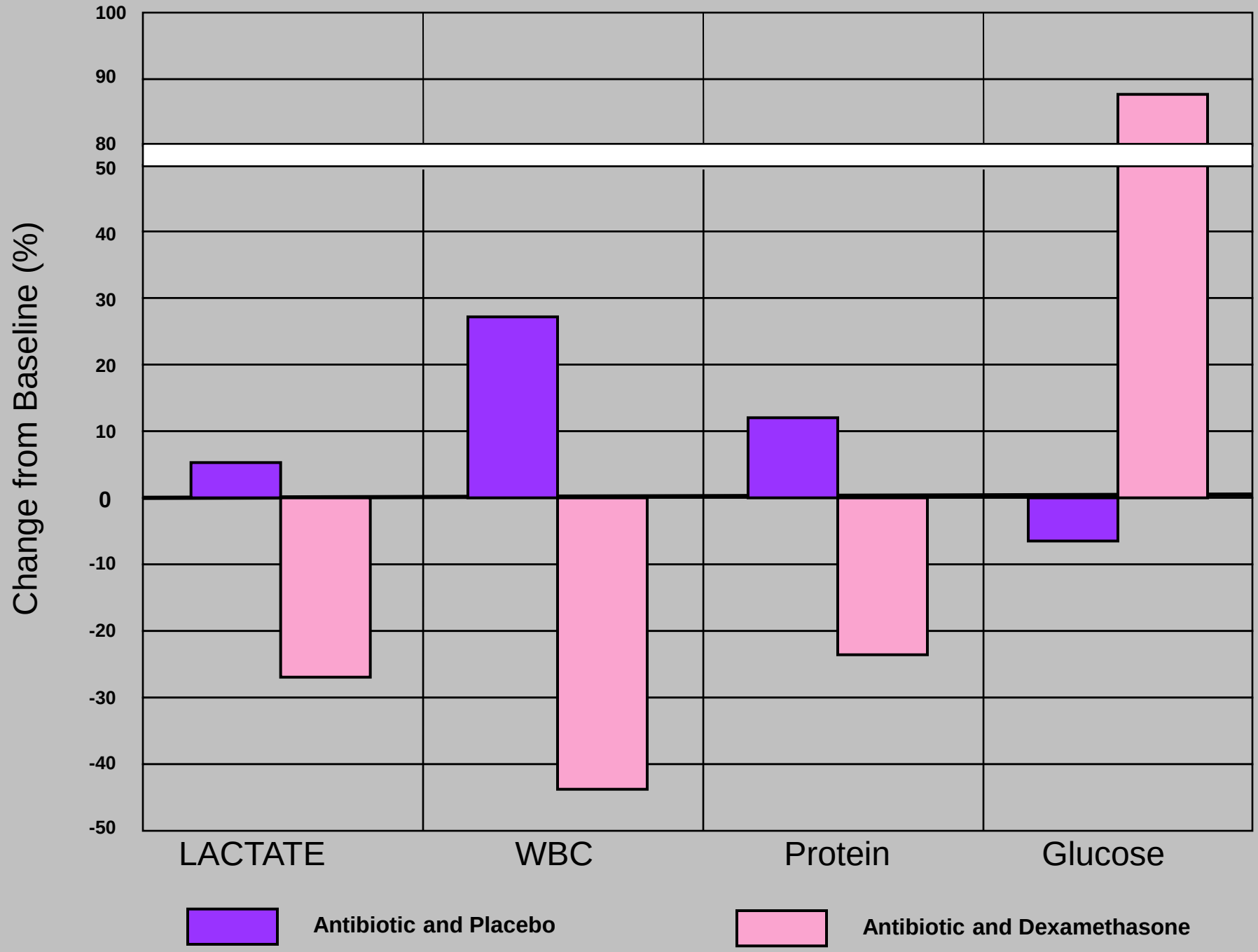
bacteria in CSF or urine sample with surface antigen on bacterial cells

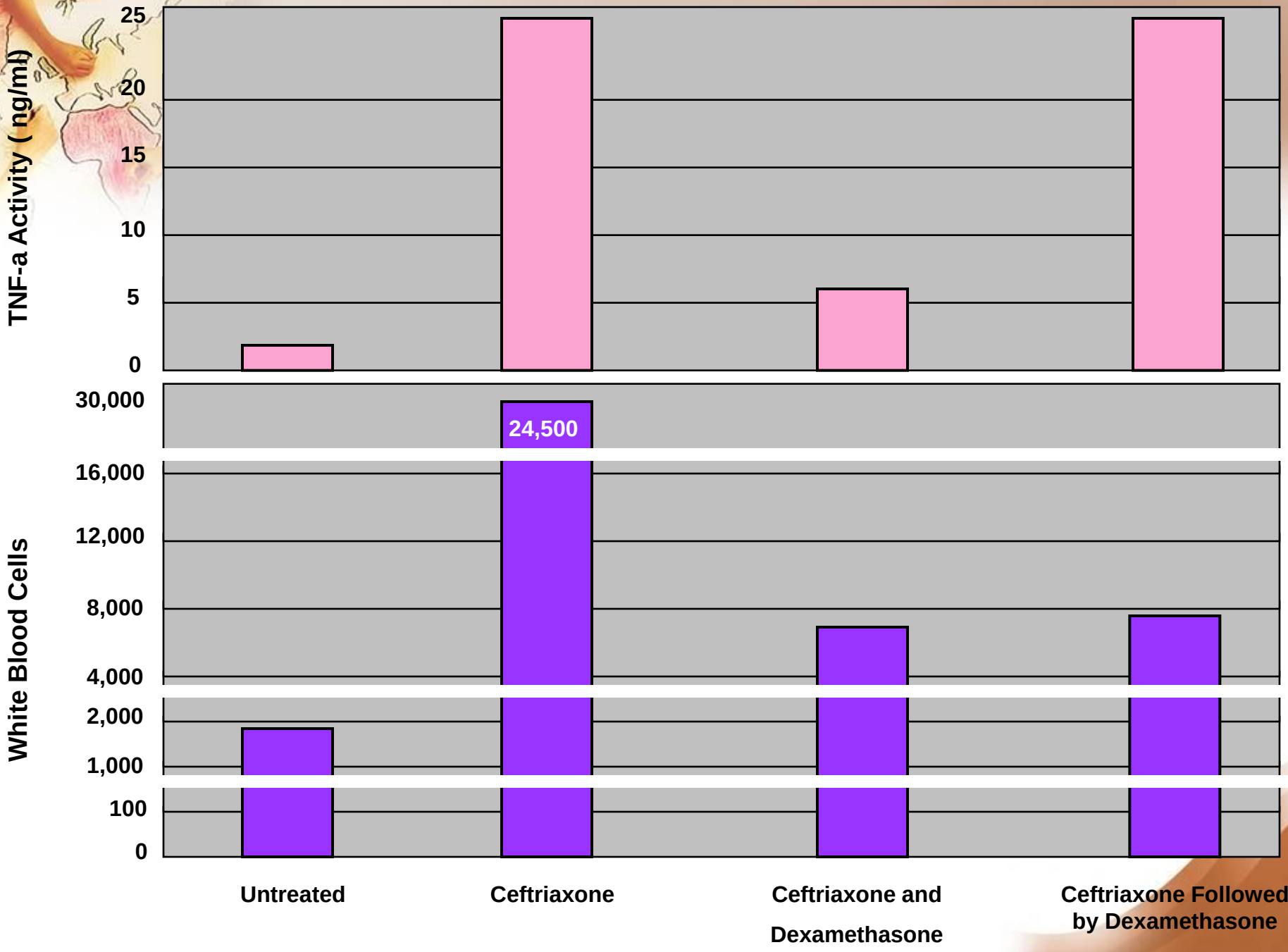
specific antibody bound to inert carrier particles (eg. Latex beads)

agglutination of carrier particles

MANAGEMENT

- Supportive care
- Antibiotics
  - **Which one ?**
  - **How much ?**
  - **For how long ?**
- Dexamethason ?

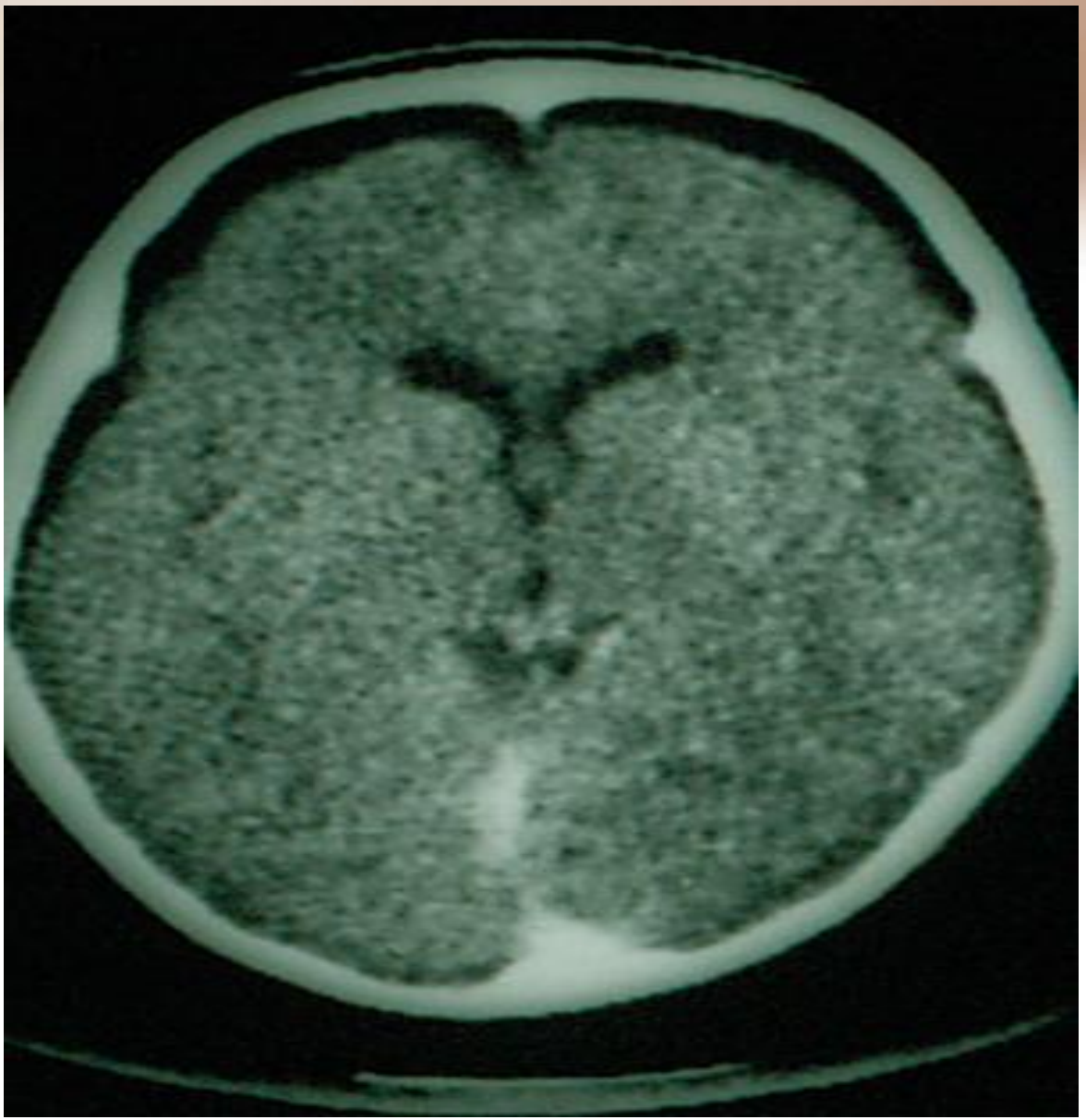

100
90
80
50
40
30
20
10
0
-10
-20
-30
-40
-50
Change from Baseline (%)
LACTATE
WBC
Protein
Glucose
Antibiotic and Placebo
Antibiotic and Dexamethasone

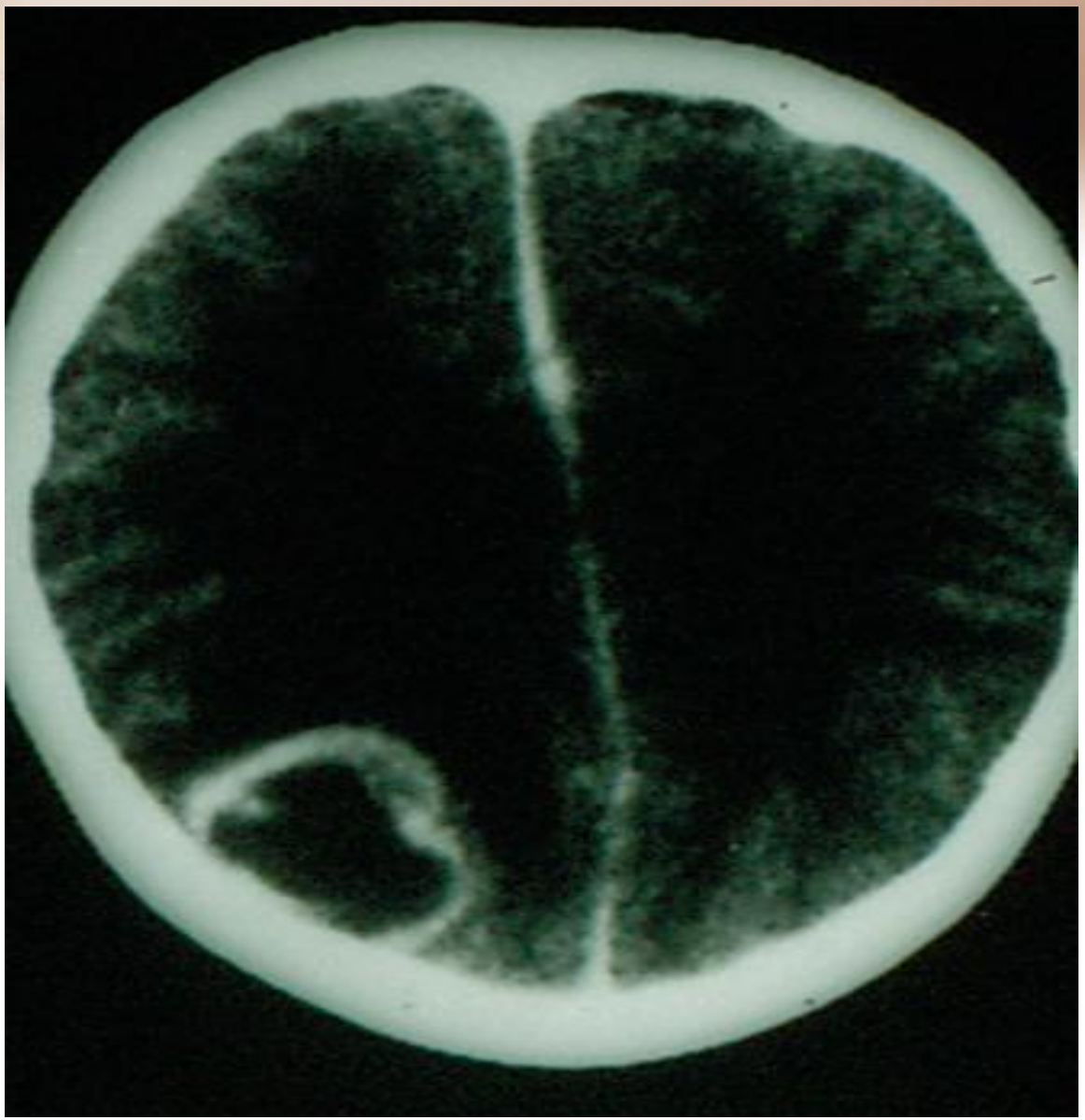

TNF-a Activity (ng/ml)
25
20
15
10
5
0
White Blood Cells
30,000
24,500
16,000
12,000
8,000
4,000
2,000
1,000
100
0
Untreated
Ceftriaxone
Ceftriaxone and Dexamethasone
Ceftriaxone Followed by Dexamethasone

COMPLICATIONS

- EARLY

- LATE





PREVENTION

☆ Chemoprophylaxis

- **Rationale**
- **Protocol**

☆ Vaccination

PATHOGENESIS

Mucosal Colonization

⇓ ⇐ Chemoprophylaxis

Local Invasion

⇓ ⇐ Vaccination

Bacteremia

⇓ ⇐ Antibiotic therapy

Meningeal Invasion

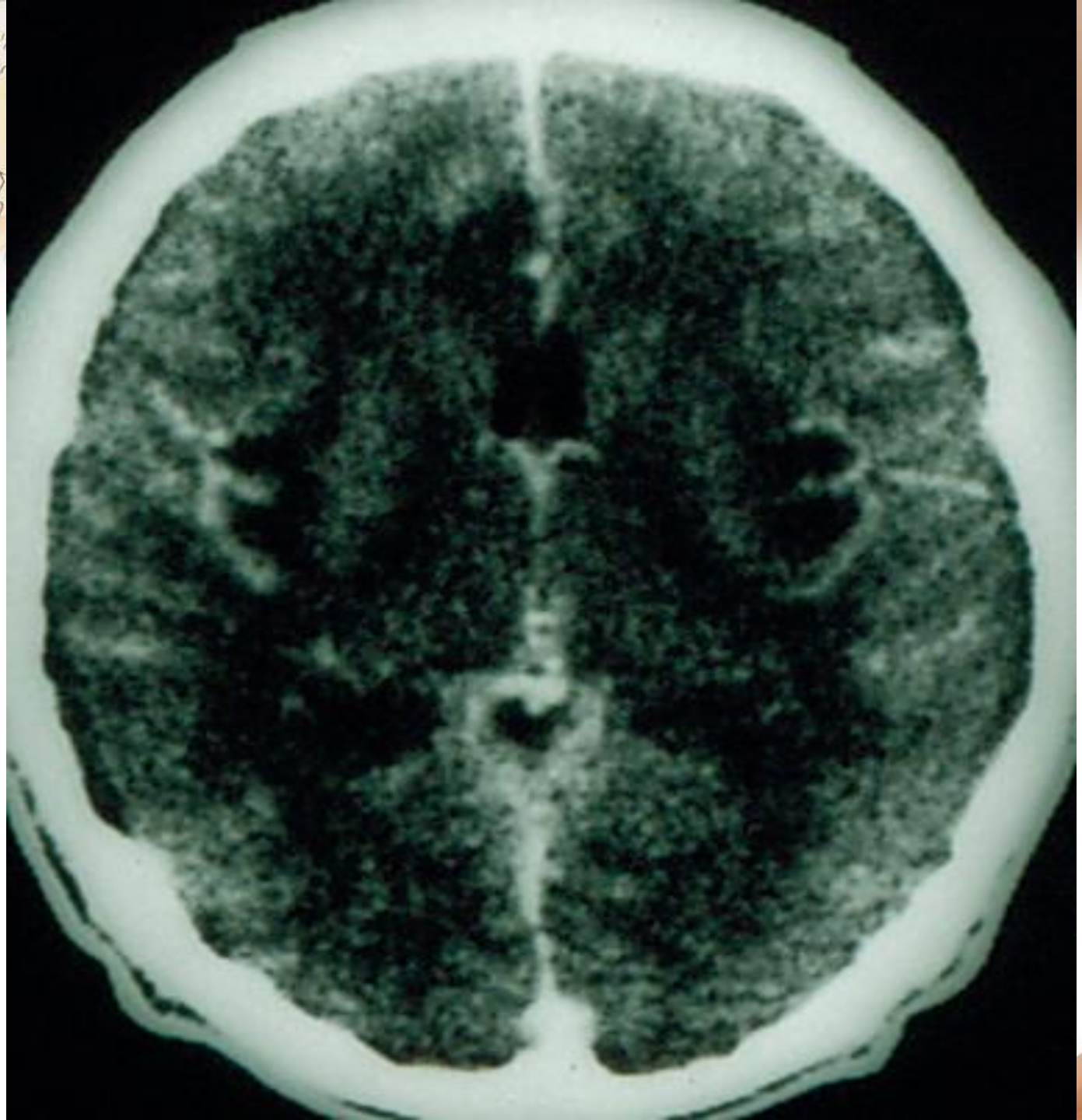
⇓

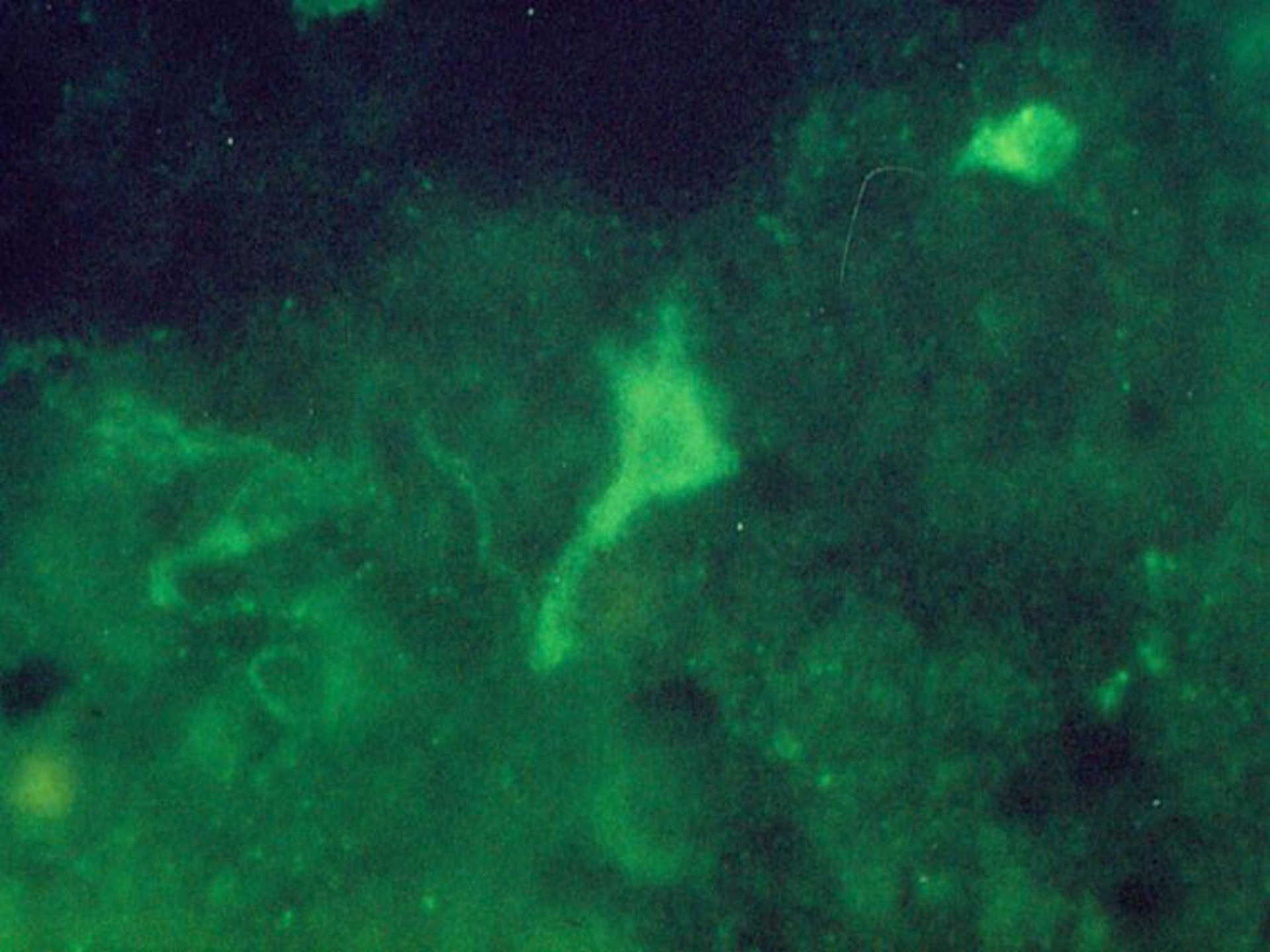
Bacterial Replication

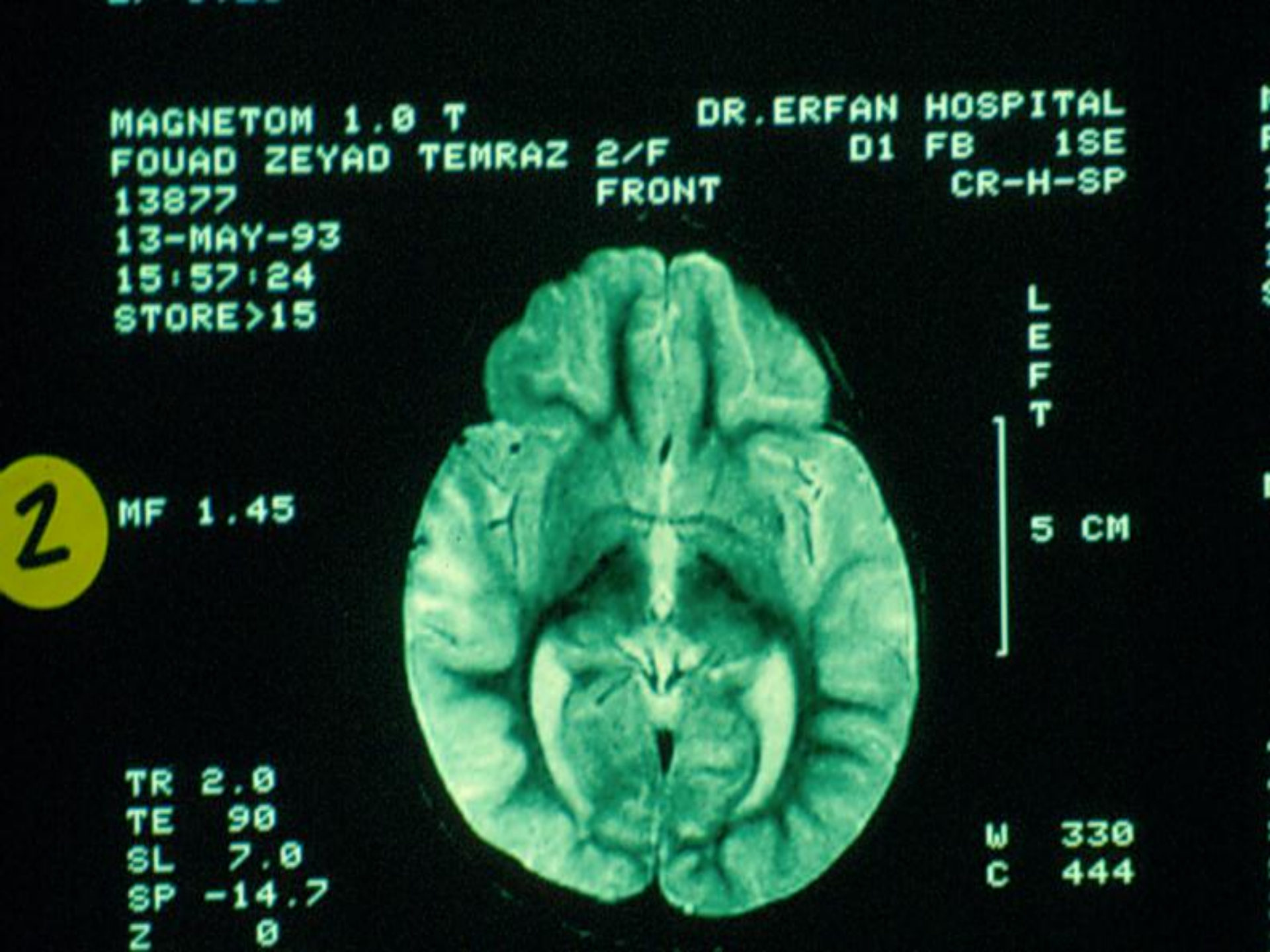
⇓

Sub-arachnoid space Inflammation

Encephalitis






MAGNETOM 1.0 T
FOUAD ZEYAD TEMRAZ 2/F
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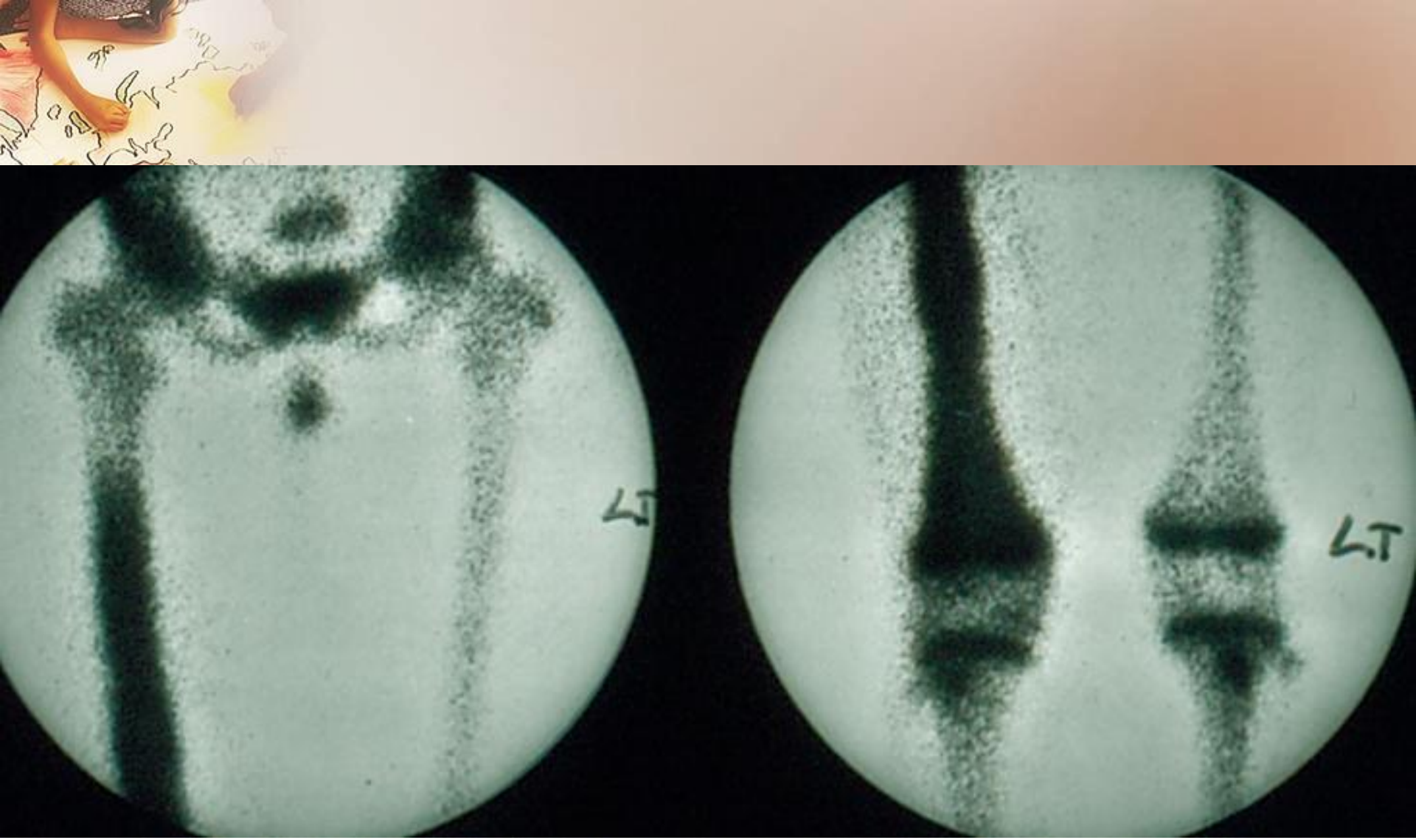
STORE>15
DR.ERFAN HOSPITAL
D1 FB 1SE
FRONT
CR-H-SP
LEFT
5 CM
2
MF 1.45
TR 2.0
TE 90
SL 7.0
SP -14.7
Z 0
W 330
C 444

Osteoarticular infections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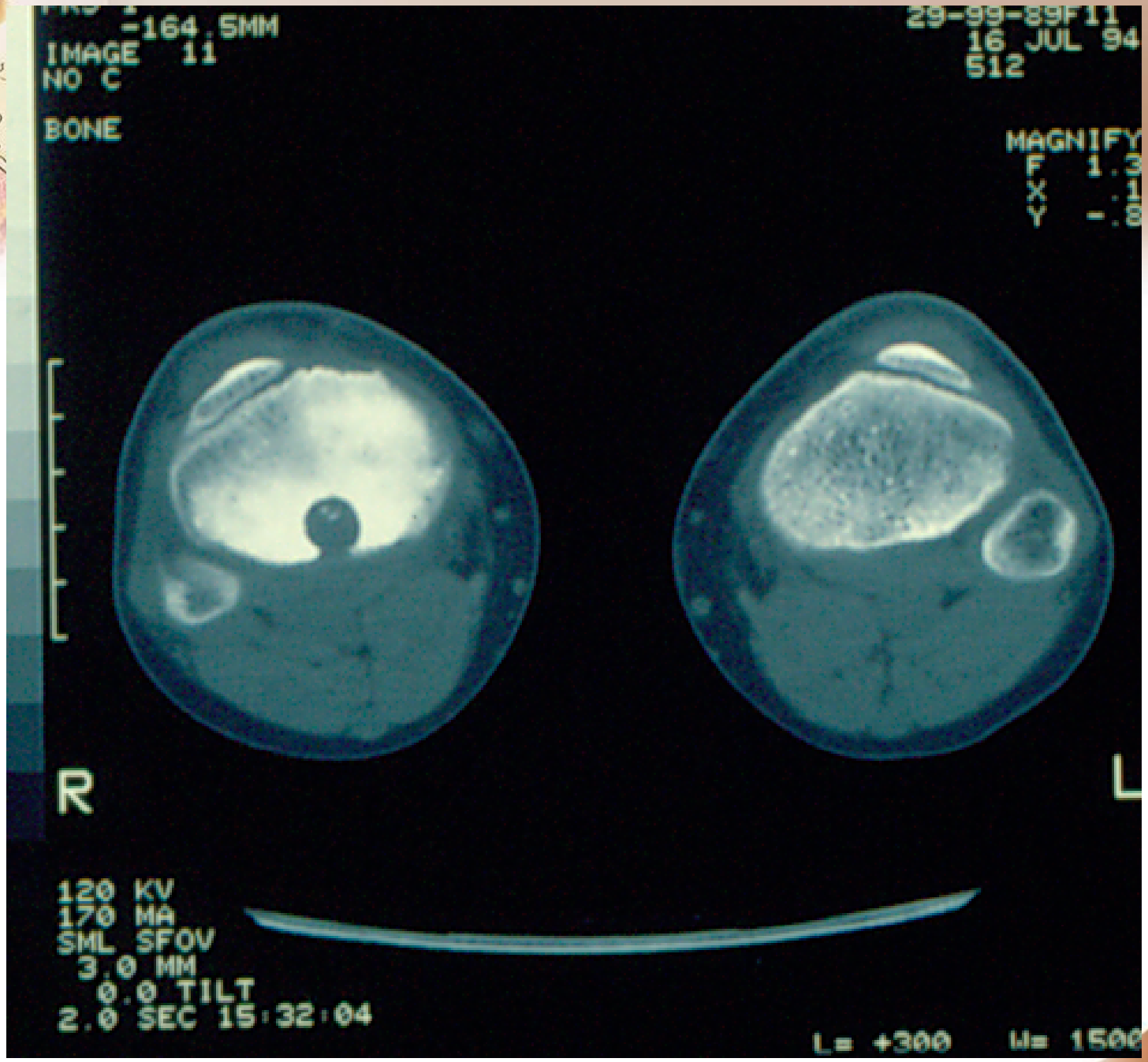
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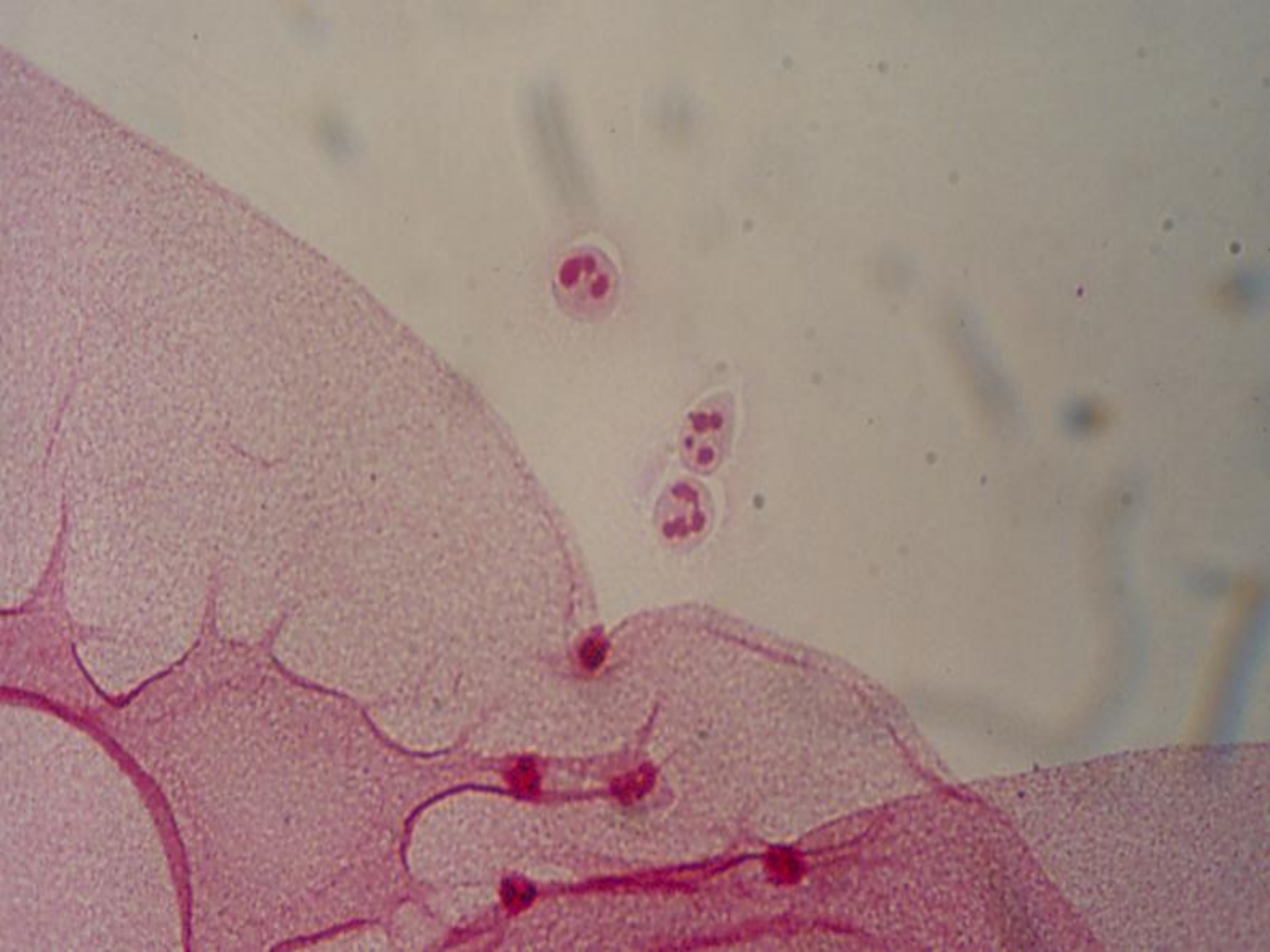
W= 1500



Congenital infections

(TORCHS)

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