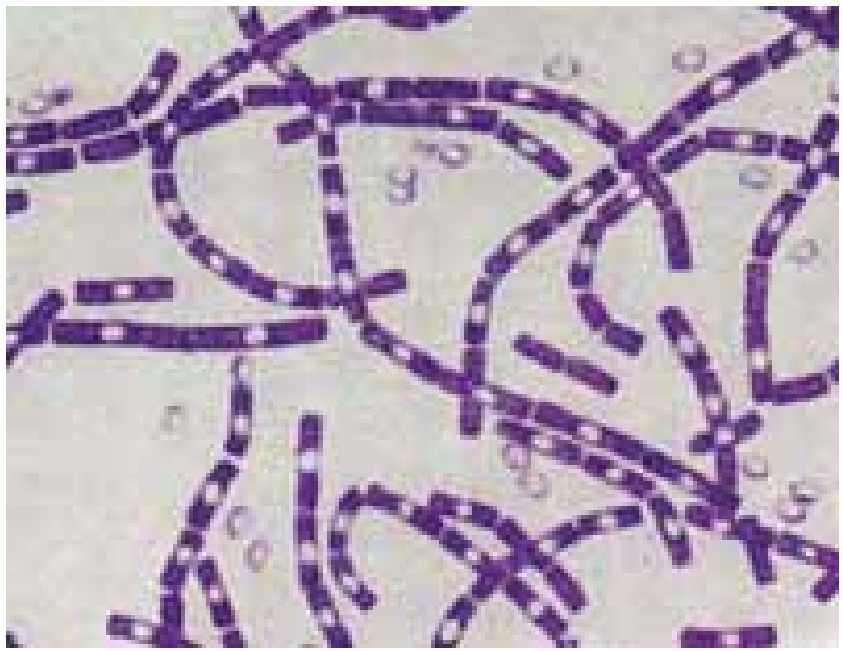
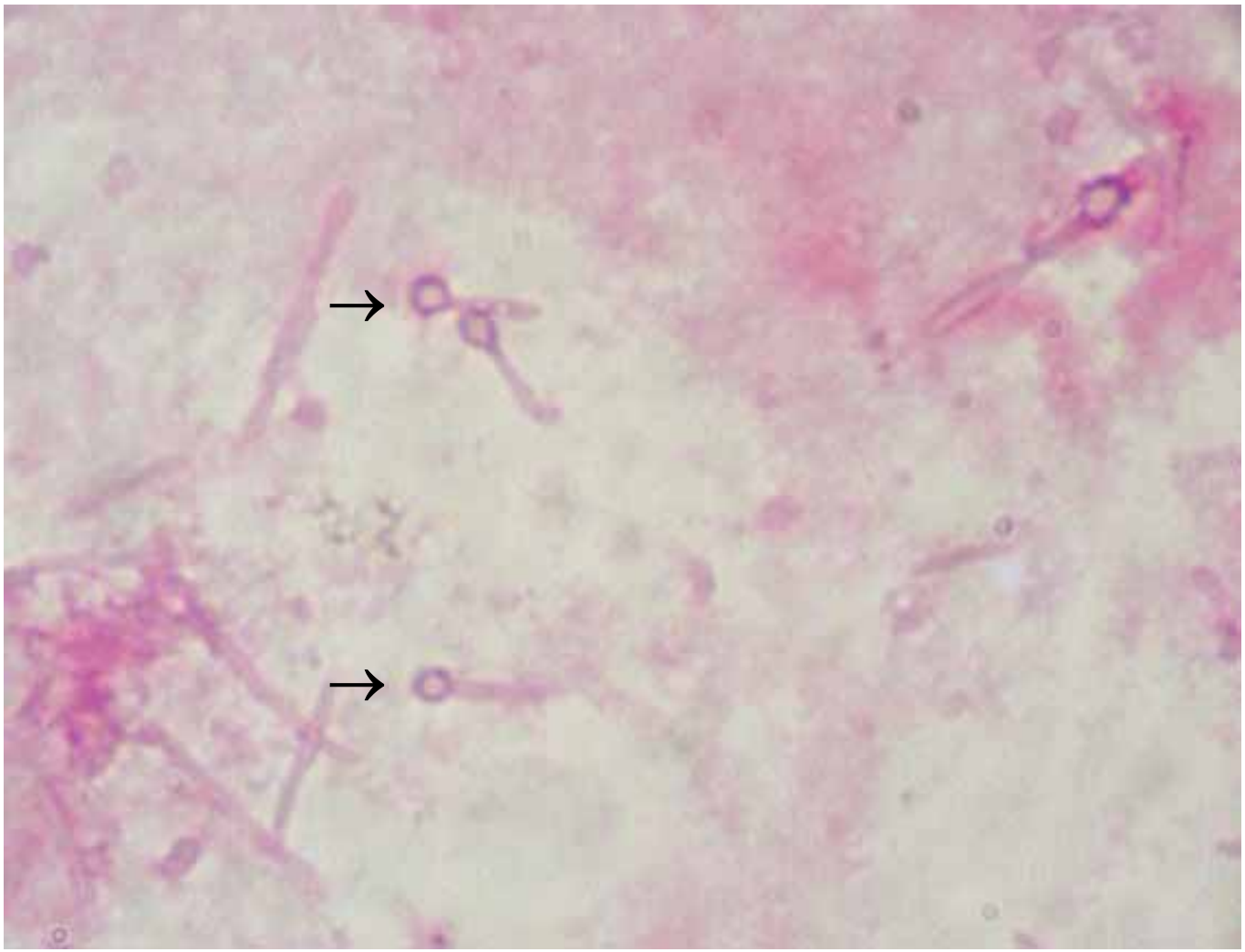
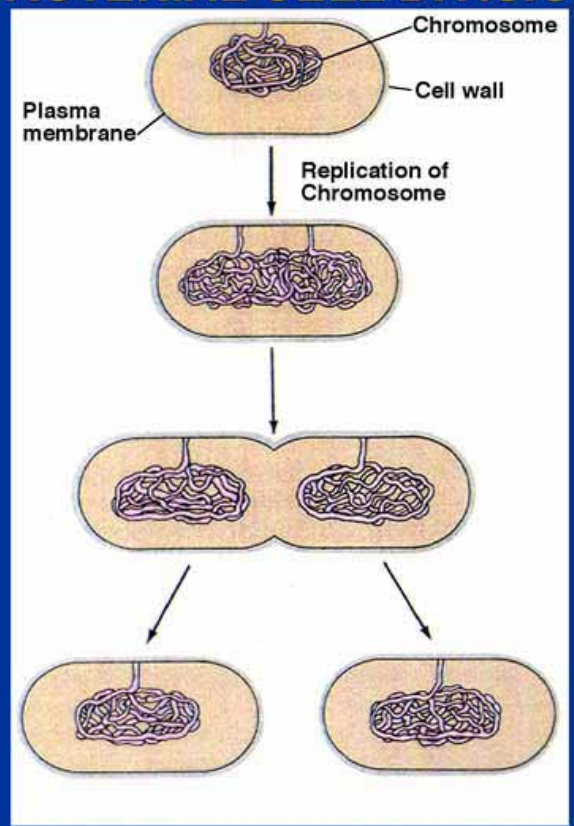


Clostridium botulinum spores

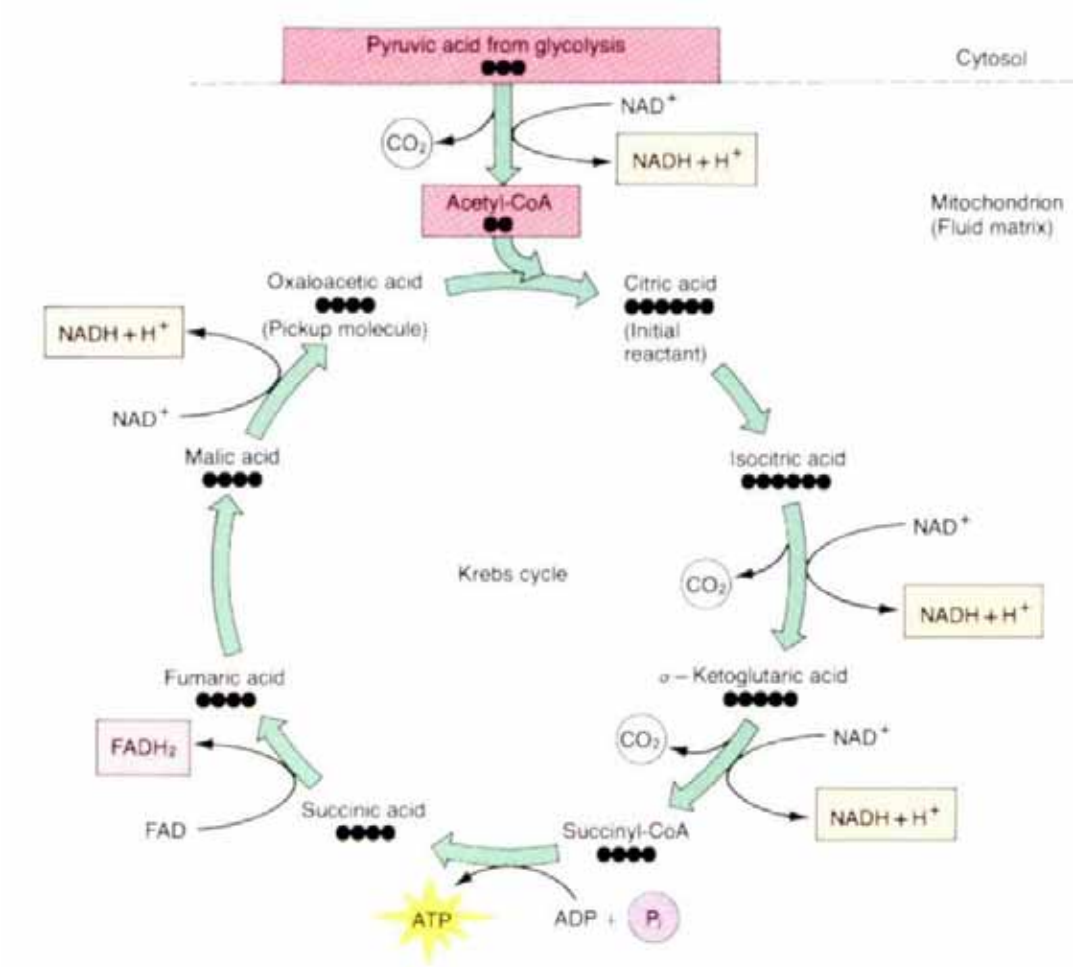
Clostridium tetani spore

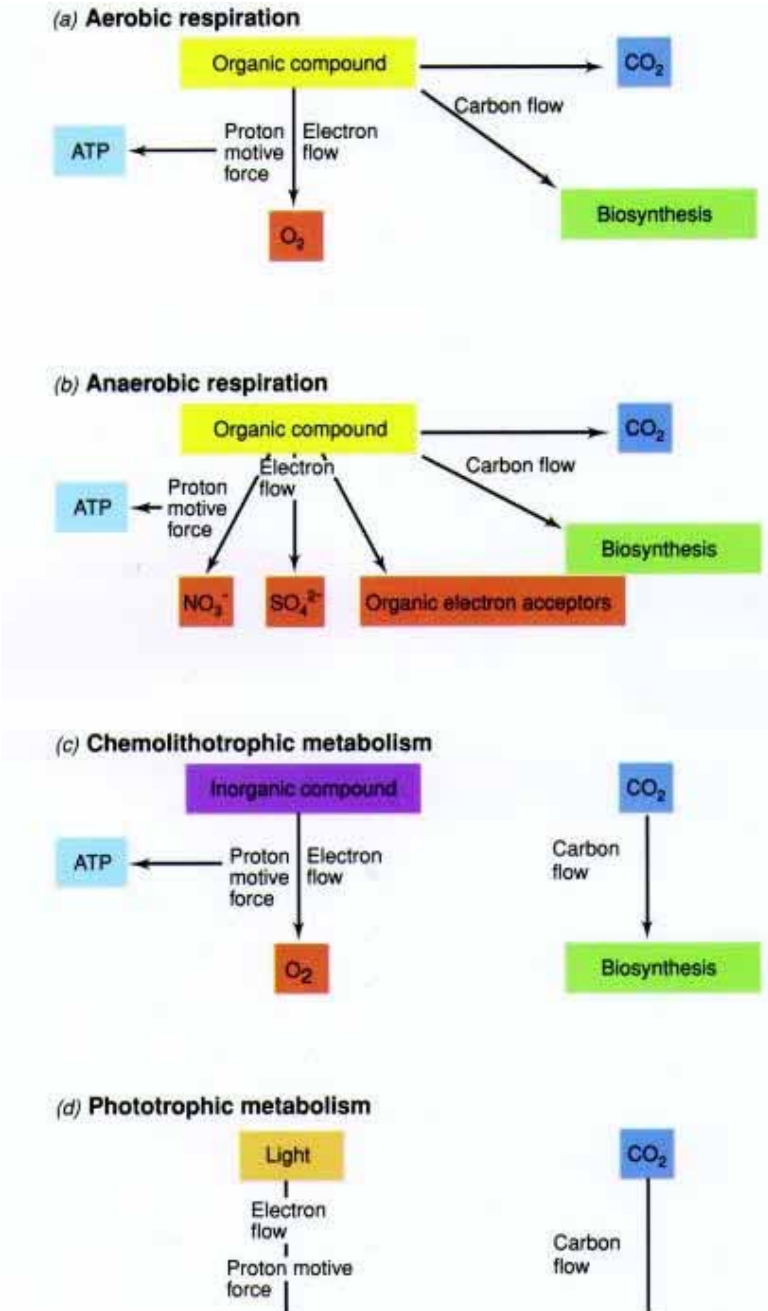


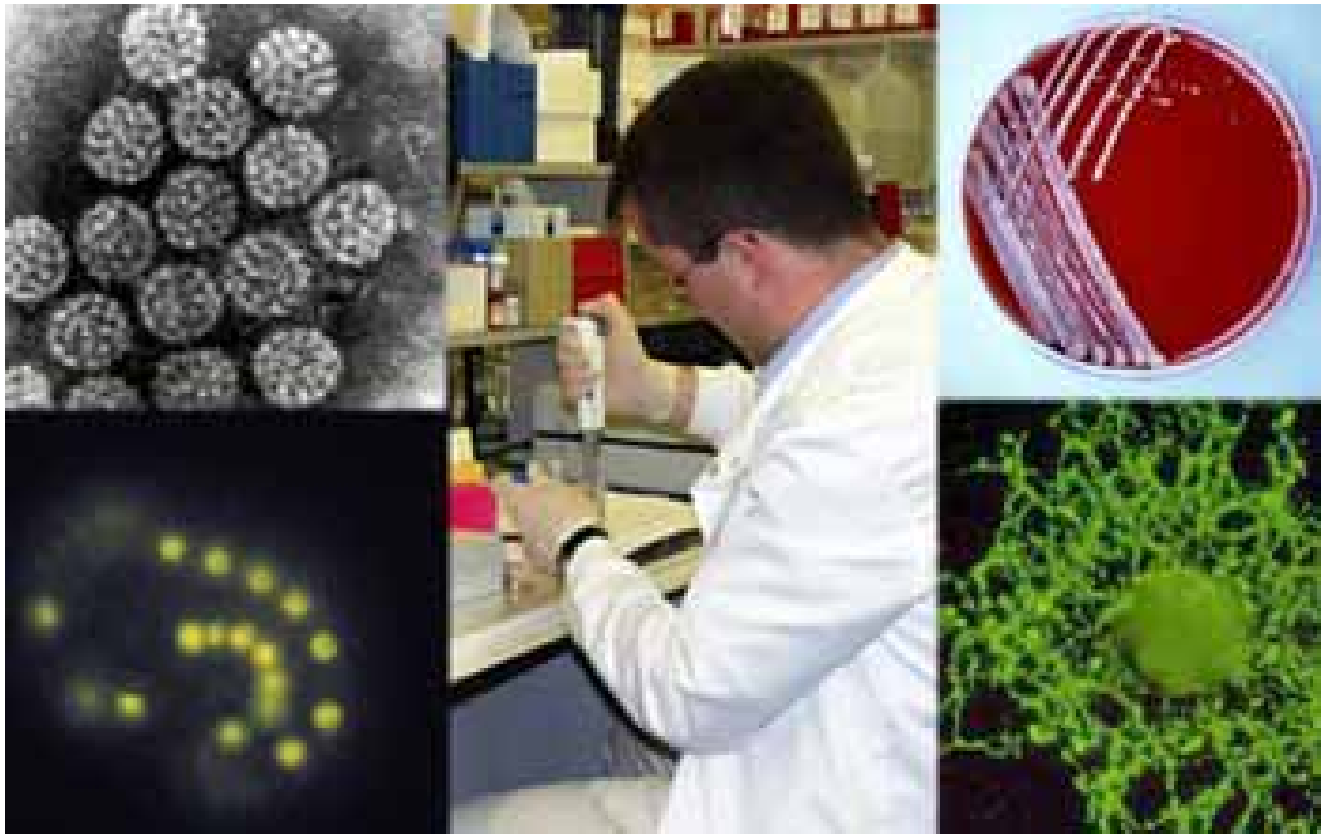
BACTERIAL CELL DIVISION

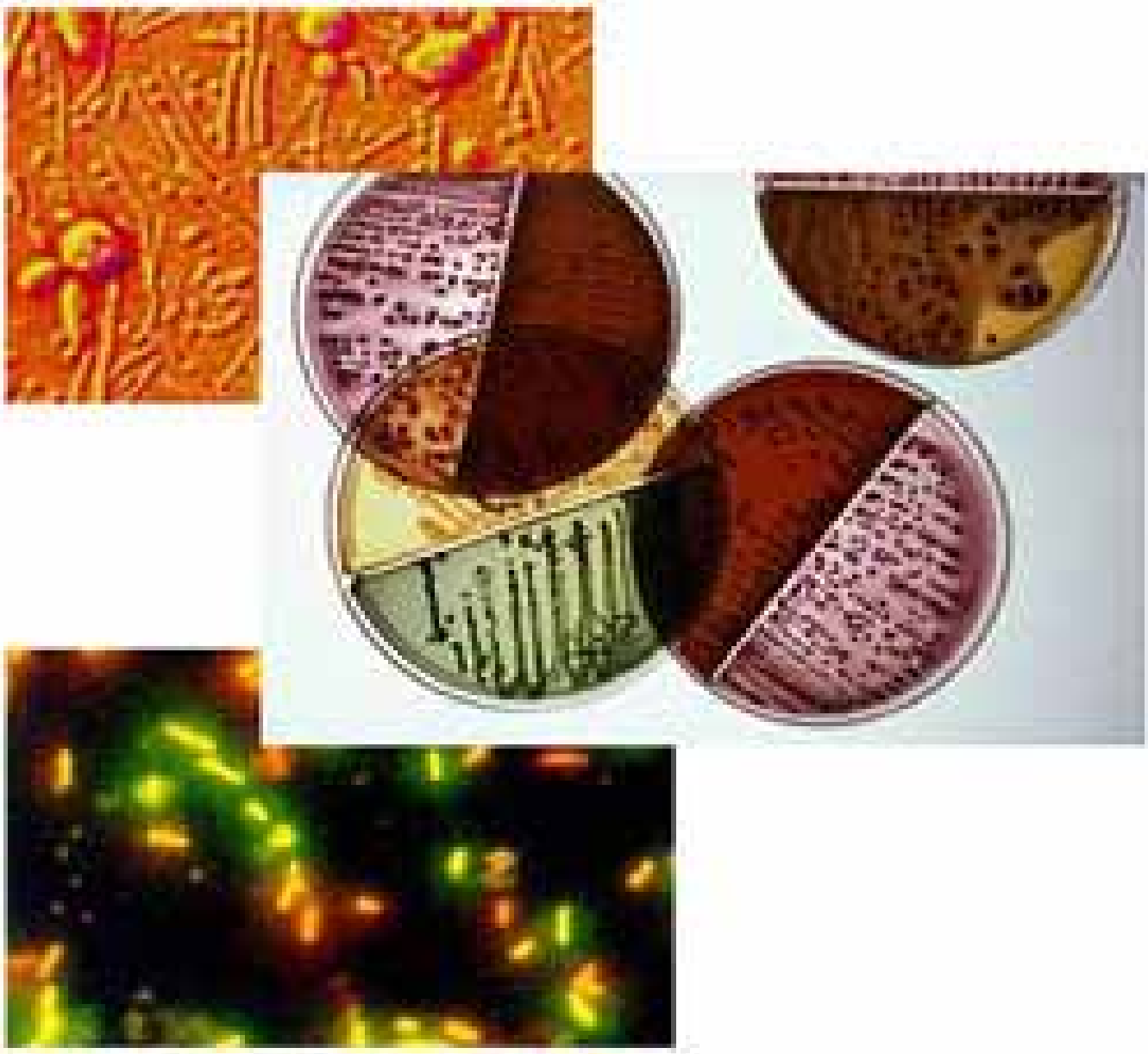


Aerobic metabolism

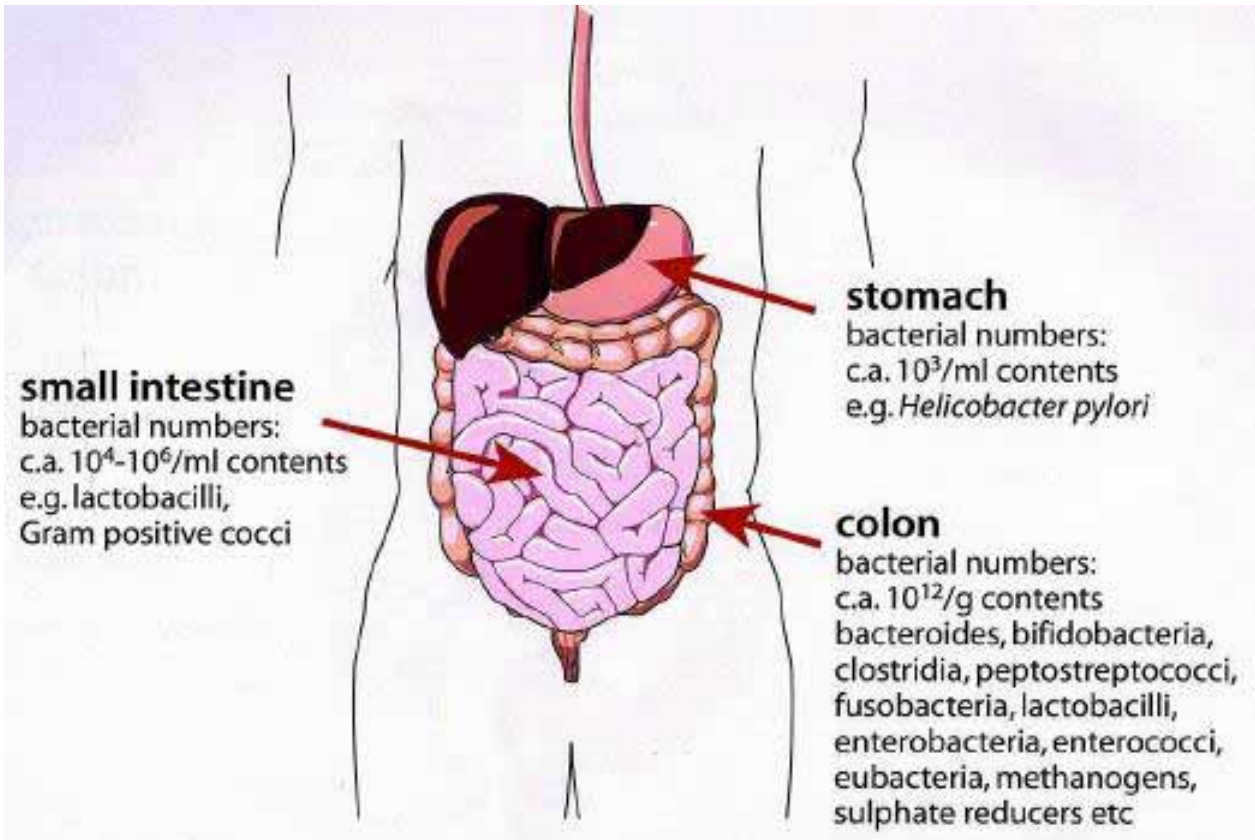


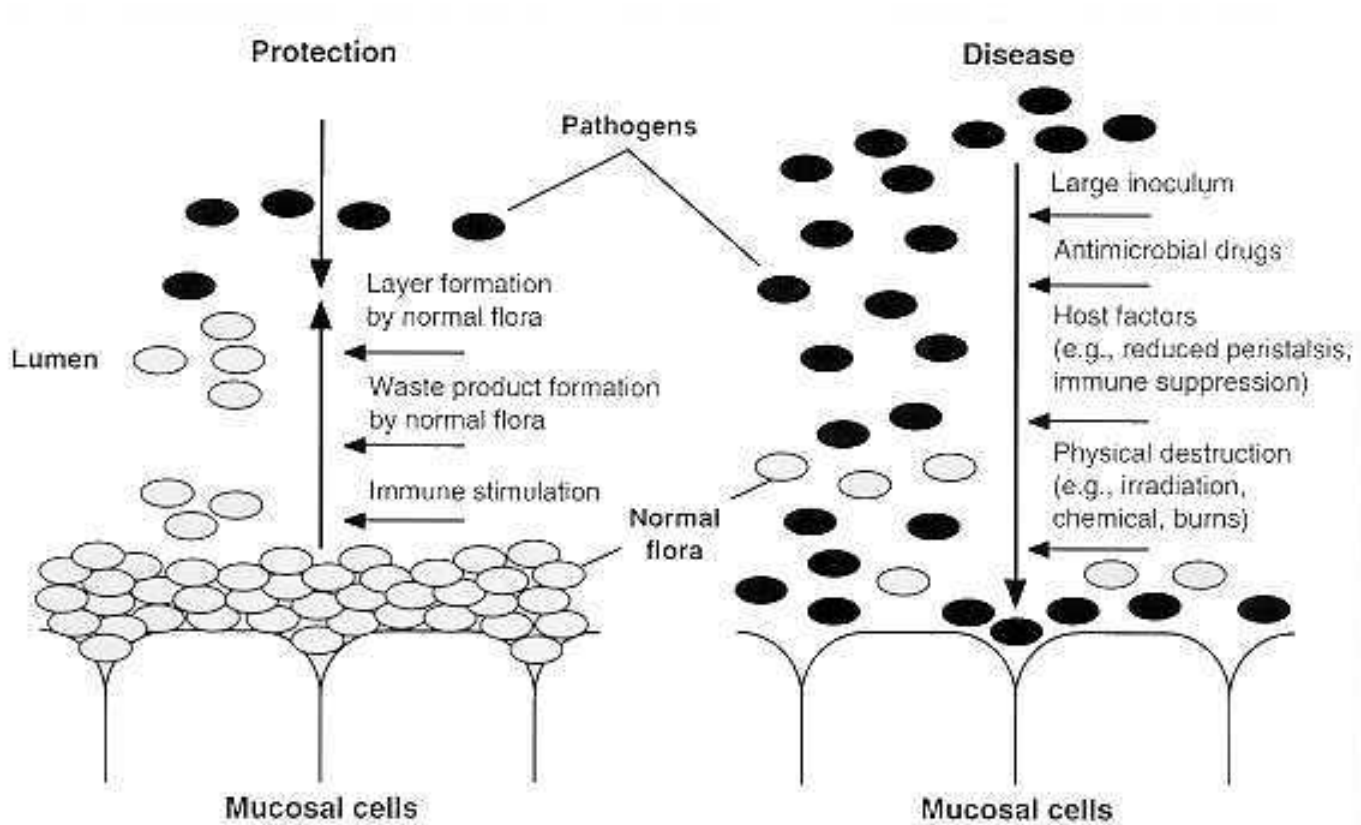

(a) Aerobic respiration
Organic compound
CO_2
Carbon flow
ATP
Proton motive force
Electron flow
Biosynthesis
O_2
(b) Anaerobic respiration
Organic compound
CO_2
Carbon flow
Electron flow
ATP
Proton motive force
Biosynthesis
NO_3^-
SO_4^{2-}
Organic electron acceptors
(c) Chemolithotrophic metabolism
Inorganic compound
CO_2
ATP
Proton motive force
Electron flow
Carbon flow
O_2
Biosynthesis
(d) Phototrophic metabolism
Light
CO_2
Electron flow
Carbon flow
Proton motive force





Flora batterica normale




Protection
Disease
Pathogens
Lumen
Layer formation
by normal flora
Waste product formation
by normal flora
Immune stimulation
Normal
flora
Large inoculum
Antimicrobial drugs
Host factors
(e.g., reduced peristalsis,
immune suppression)
Physical destruction
(e.g., irradiation,
chemical, burns)
Mucosal cells
Mucosal cells

- **Colonizzazione delle superfici (recettori)**

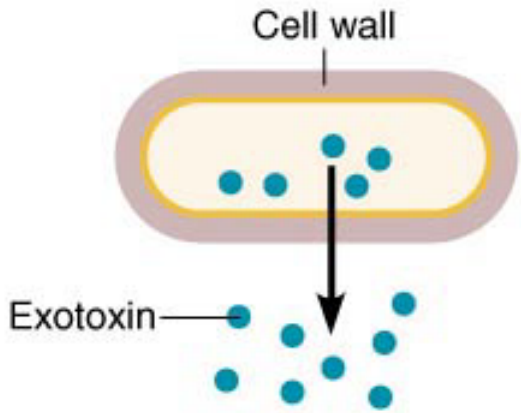
- **Invasività:** capacità del batterio di penetrare in un tessuto dopo avervi aderito

danno meccanico
enzimi batterici
capsula
resistenza alla endocitosi

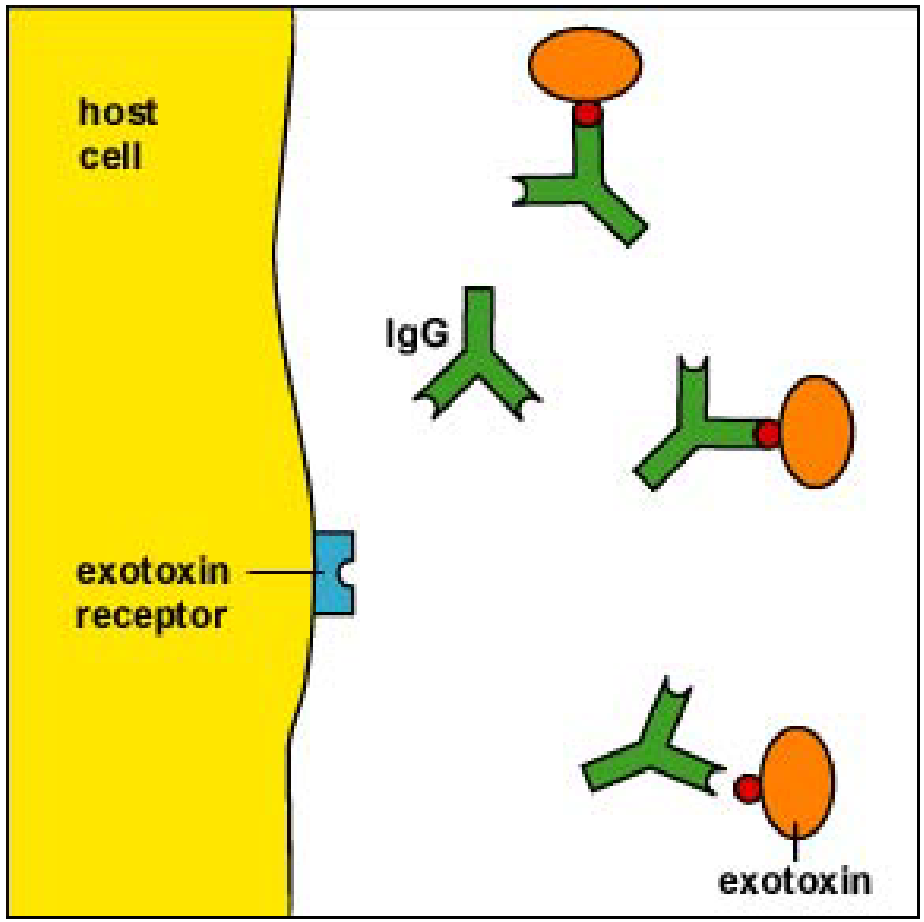
Azione patogena (tossine):

Esotossine (neurotossine, citotossine, enterotossine)
Endotossina

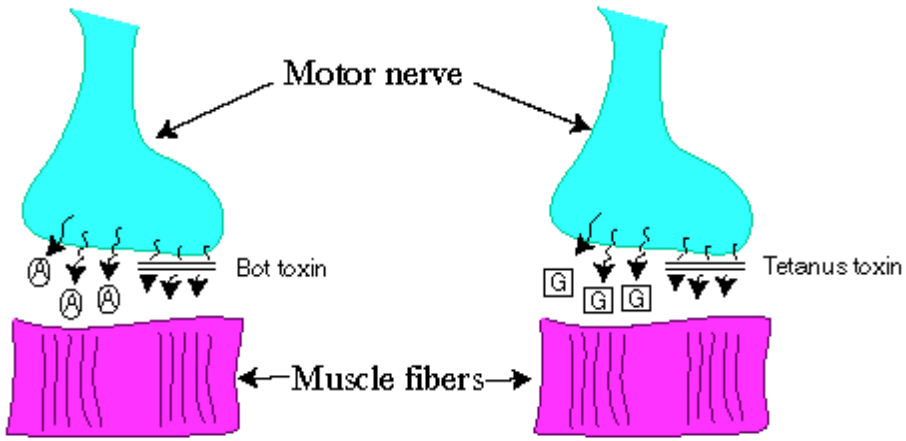
EXOTOXIN



Exotoxins are produced inside mostly gram-positive bacteria as part of their growth and metabolism. They are then released into the surrounding medium.


host
cell
IgG
exotoxin
receptor
exotoxin

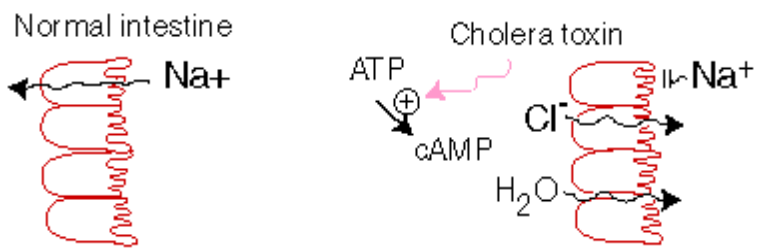
Neurotoxins



Acetylcholine release induces muscle contraction.
Bot toxin blocks acetylcholine release, causes flaccid paralysis

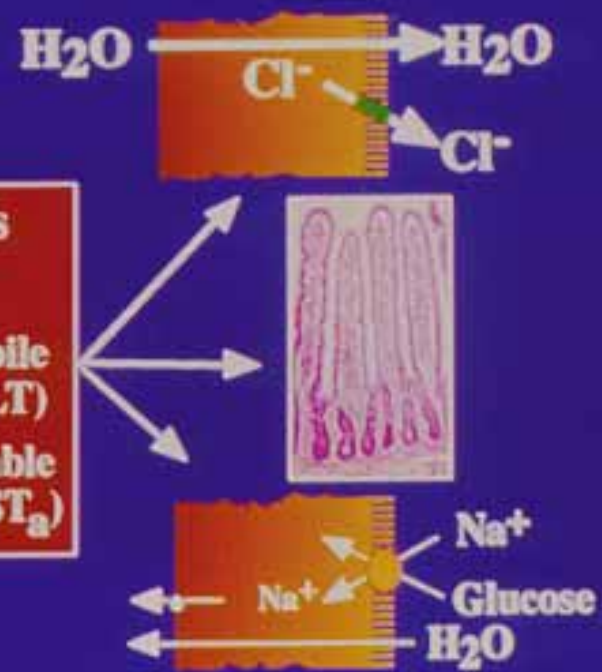
Glycine release induces muscle relaxation.
Tetanus toxin blocks glycine release, causes spastic or twitching paralysis; lockjaw, for example

Enterotoxins



Enterotoxins of E. coli and Salmonella have similar modes of actions

Bacterial enterotoxins causing secretory diarrhea have several characteristic features



Examples

- *Cholera* toxin
- *E. Coli* heat labile enterotoxin (LT)
- *E. Coli* heat stable enterotoxin (ST_a)

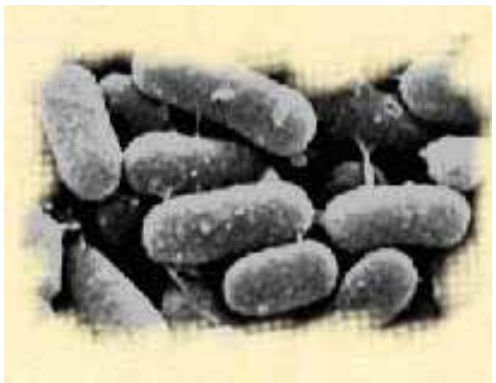
FEATURES

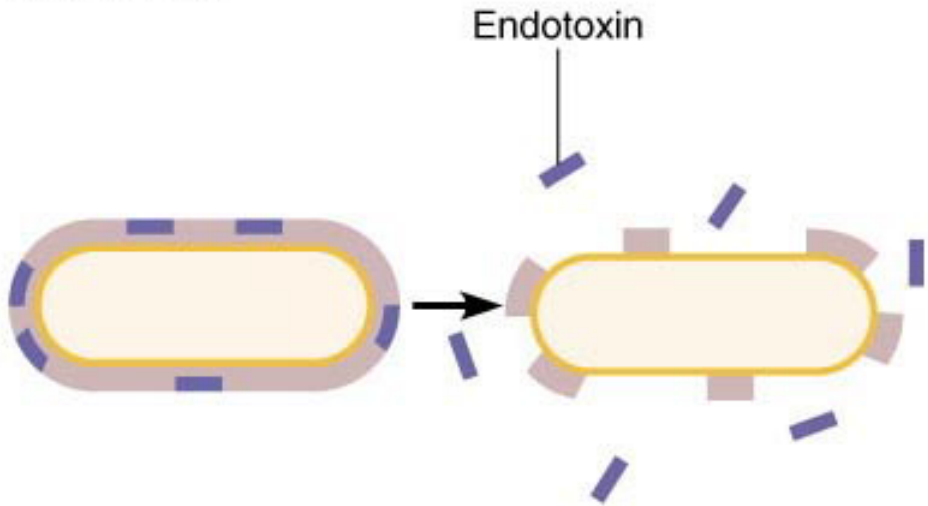
Stimulation of net intestinal secretion

No morphological damage

No impairment of Na-dependent solute absorption

ENDOTOXIN





Endotoxins are part of the outer portion of the cell wall of gram-negative bacteria.
They are liberated when the bacteria die and the cell wall breaks apart.

L'endotossina è un componente della membrana esterna dei batteri Gram negativi

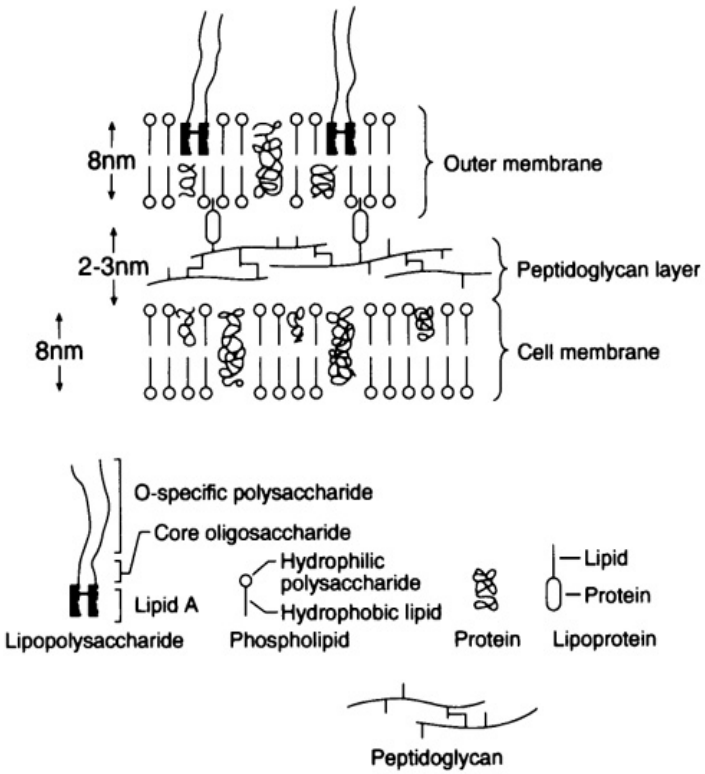


Fig. 1. Diagram of cell membrane and cell wall in Gram-negative bacteria.

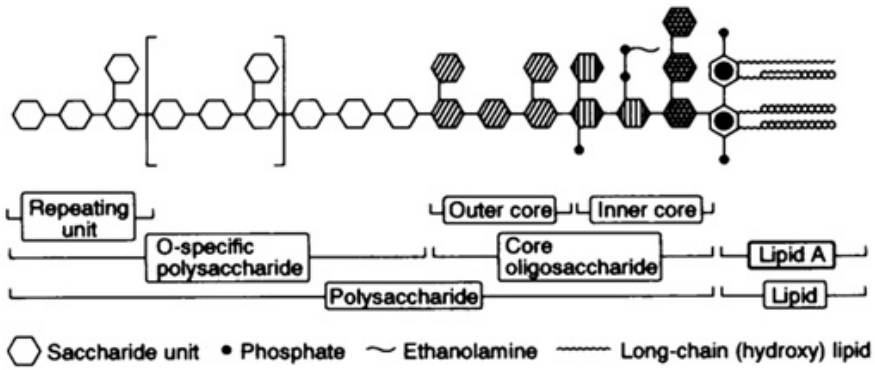
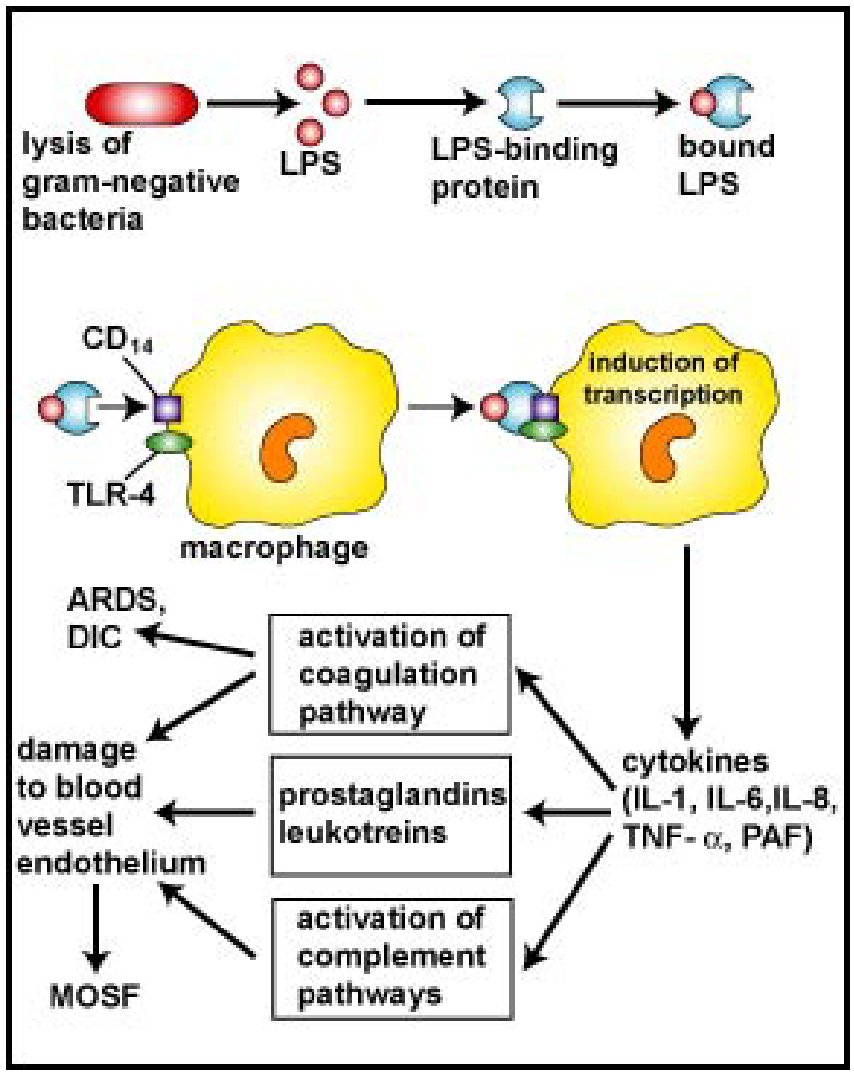


Fig. 2. Structure of lipopolysaccharide of enterobacteria.

Come agisce l'endotossina



Staphylococcus aureus

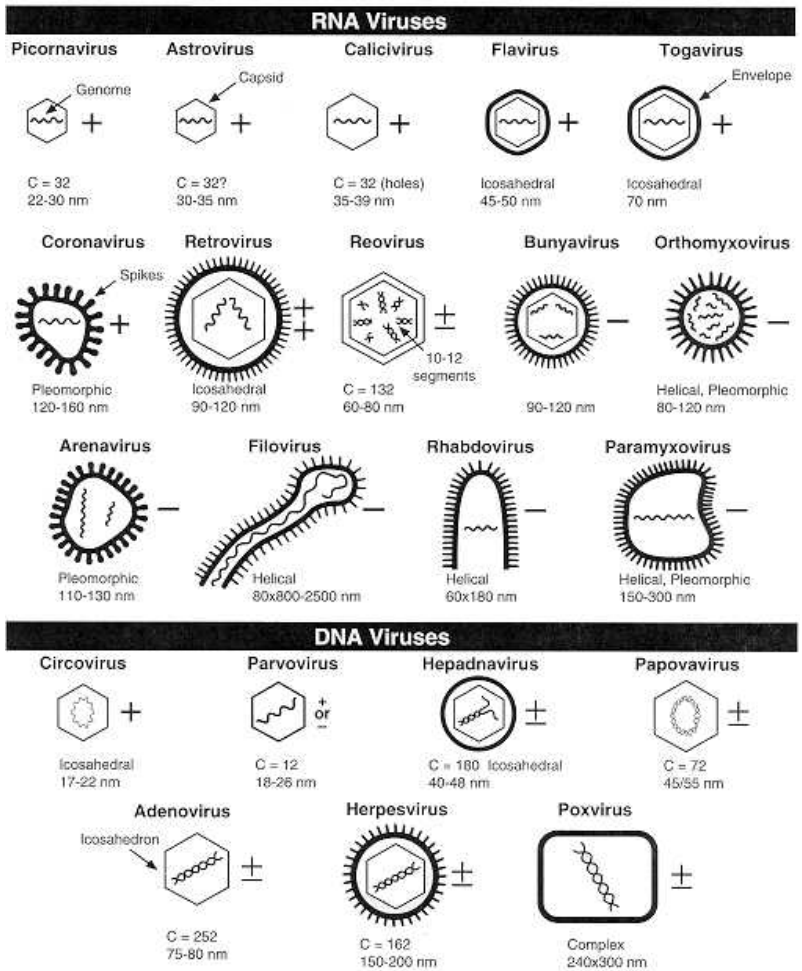
Sifilide

Sifilide

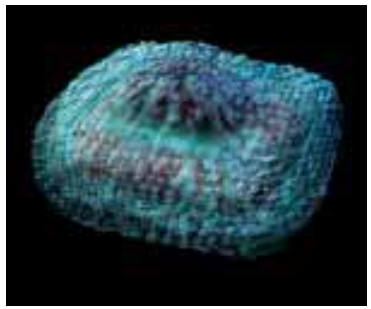
Impetigine da stafilococco

I VIRUS

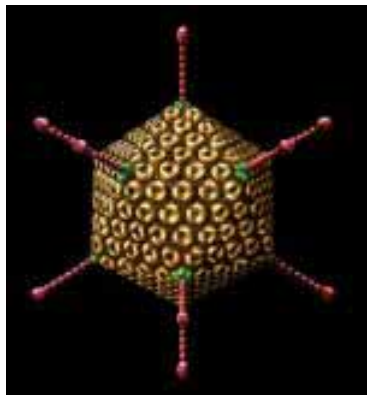
Classificazione dei virus



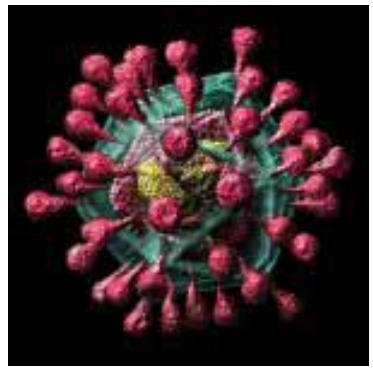
Esempi



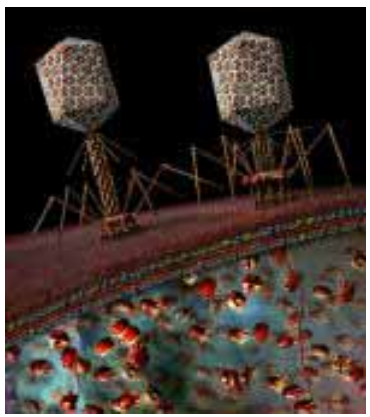
poxvirus



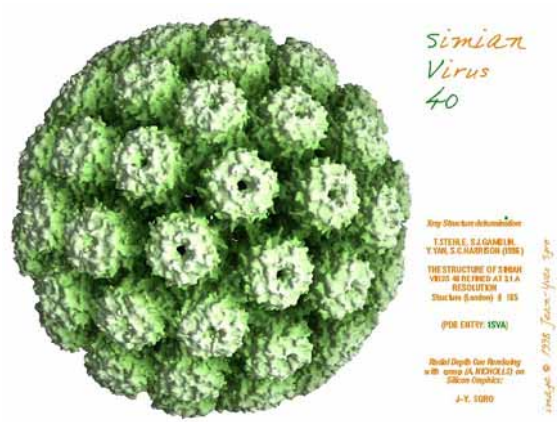
adenovirus



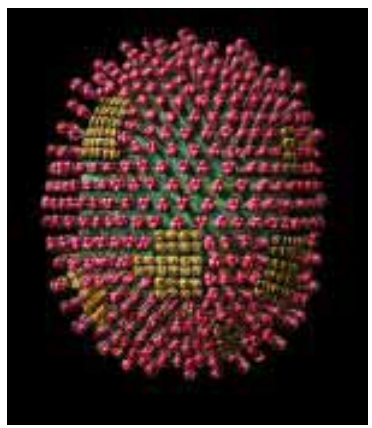
coronavirus



batteriofago



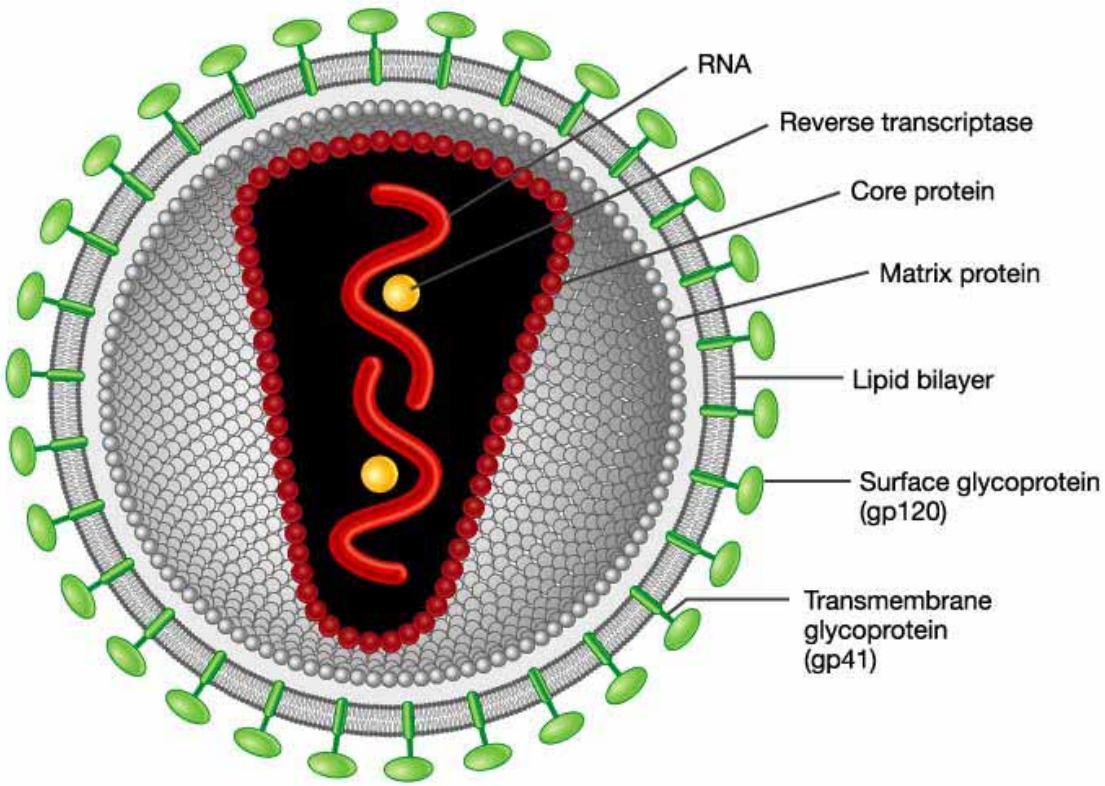
papovavirus



Influenza virus

Struttura di un virus

- Genoma
- Capside proteico
- +/- envelope



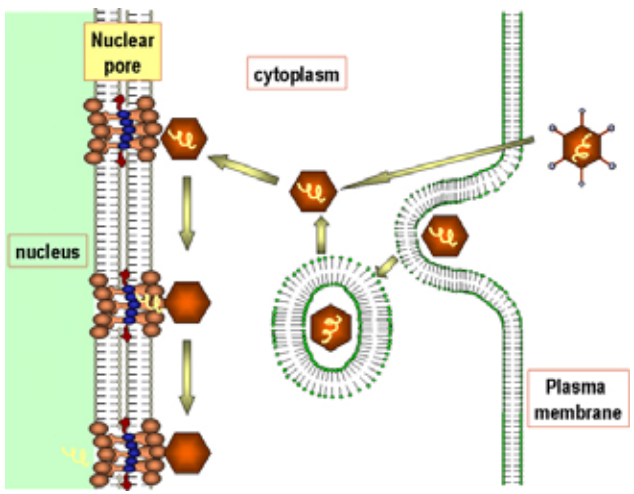
Replicazione virale

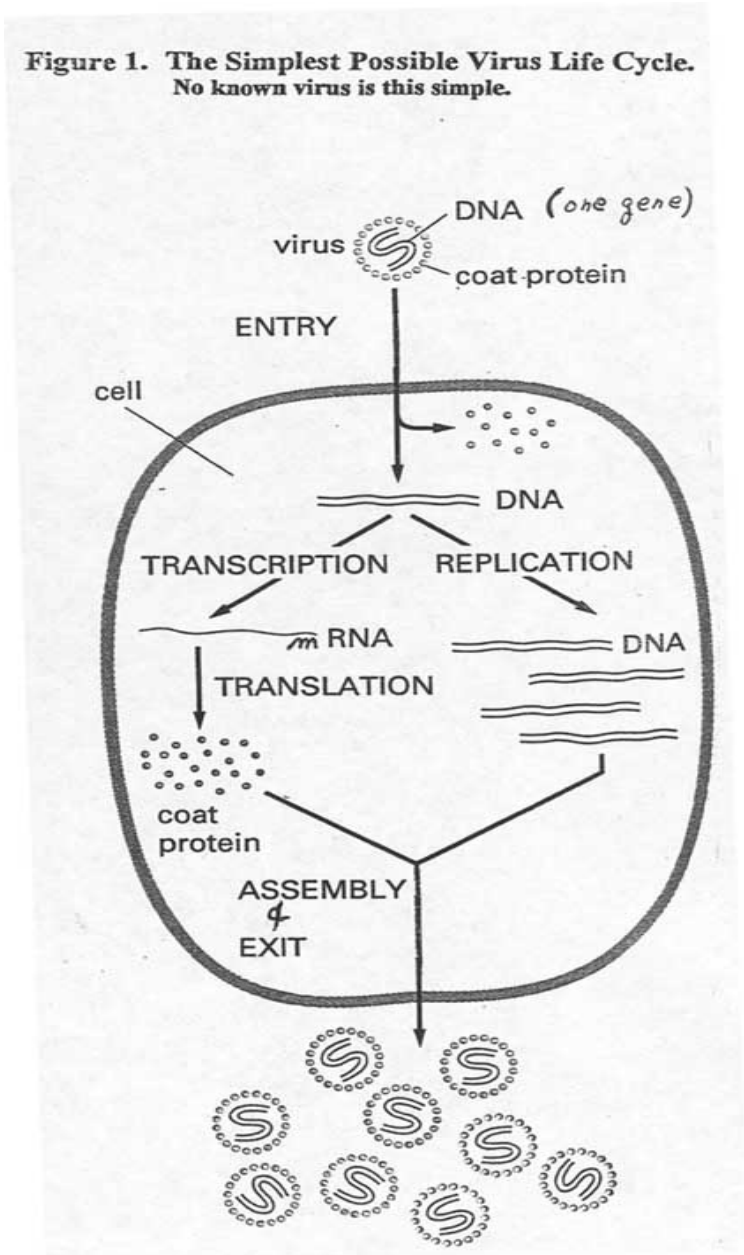
Steps principali

- Adsorbimento (recettore)
- Ingresso
- Spoliazione
- Replicazione genoma virale e trascrizione geni virali
- Assemblaggio nuove particelle virali
- Fuoriuscita (lisi cellulare; gemmazione)

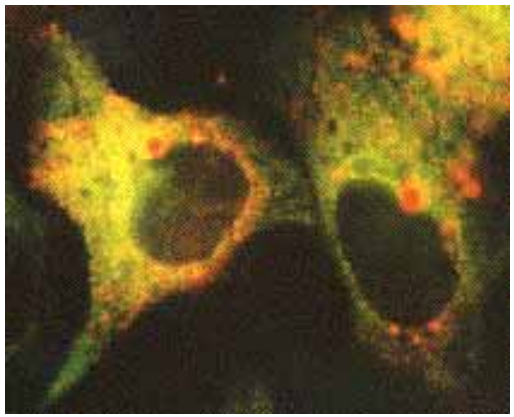
Replicazione virale

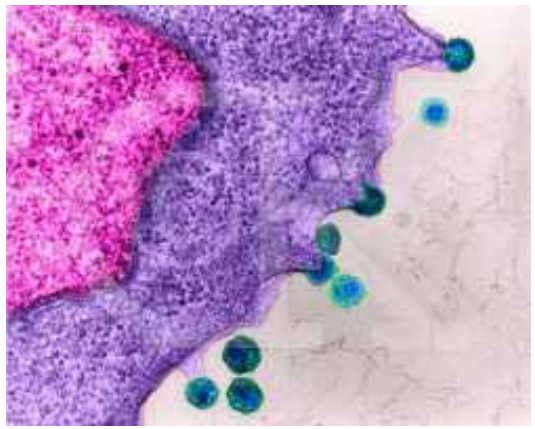
Esempio



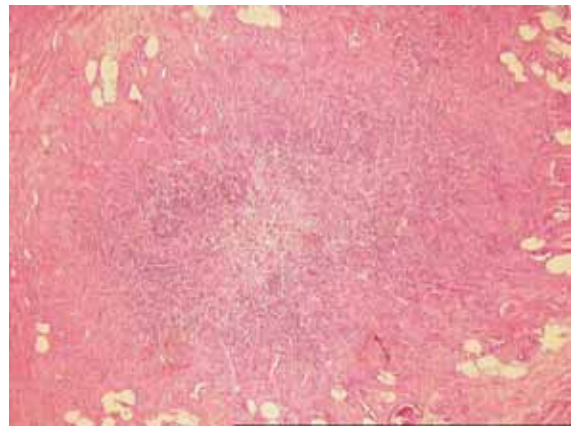


Esempi di effetti citopatici virali

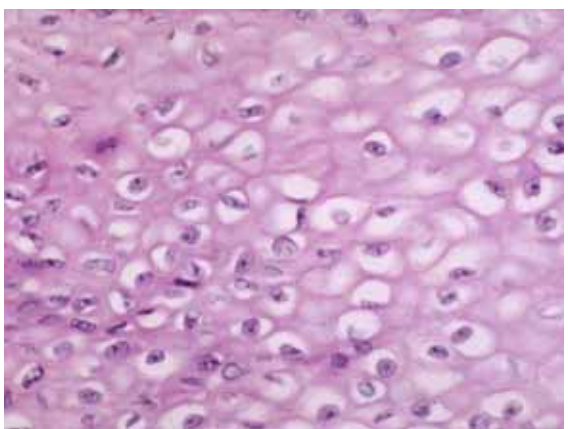




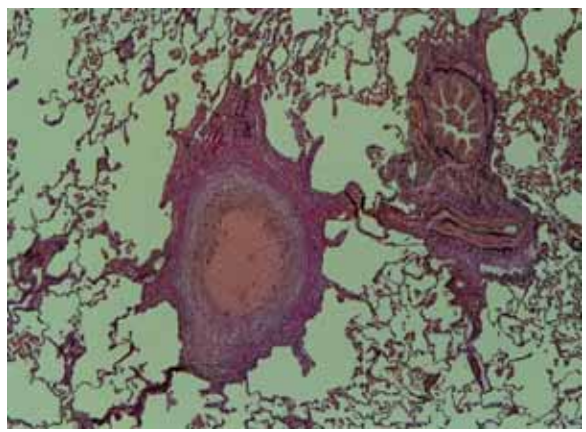
HIV



Herpes virus



papillomavirus



Virus della varicella

Azione patogena dei virus

1. Ingresso
   - passivo (immissione diretta)
   - attivo (superamento barriere mucose)

2. Replicazione
   - primaria (spesso nel sito di ingresso): Infezione localizzata
   - secondaria (coinvolgimento di altri organi e tessuti): Infezione disseminata

1 e 2 dipendono dalla presenza di recettori cellulari e dalla permissività dell cellula

3. Lesioni
   - diretta conseguenza dell'azione citopaticoa del virus
   - effetto dell'attivaxione delle risposte immunitarie

Lesioni provocate direttamente dall'azione citopatica del virus

Infezioni citocide
Infezioni latenti
Infezioni persistenti
Infezioni neoplastiche (trasformazione)

Lesioni conseguenti all'attivazione delle risposte immunitarie

Lisi immunitaria delle cellule infettate
Alterazione delle cellule immunocompetenti
lesioni di cellule e organi non infetti

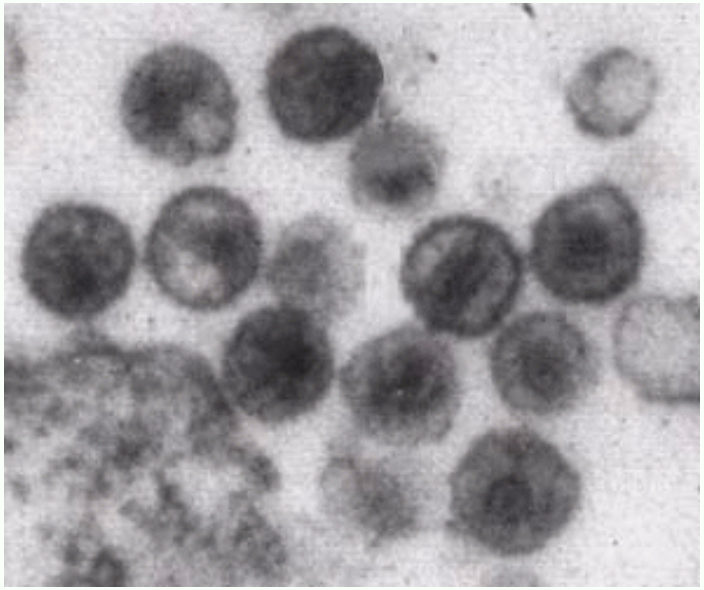
rosolia

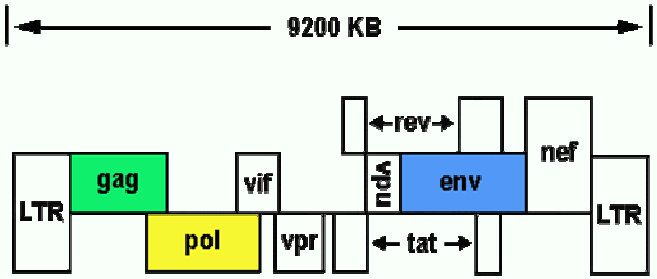
Papillomi genitali

varicella

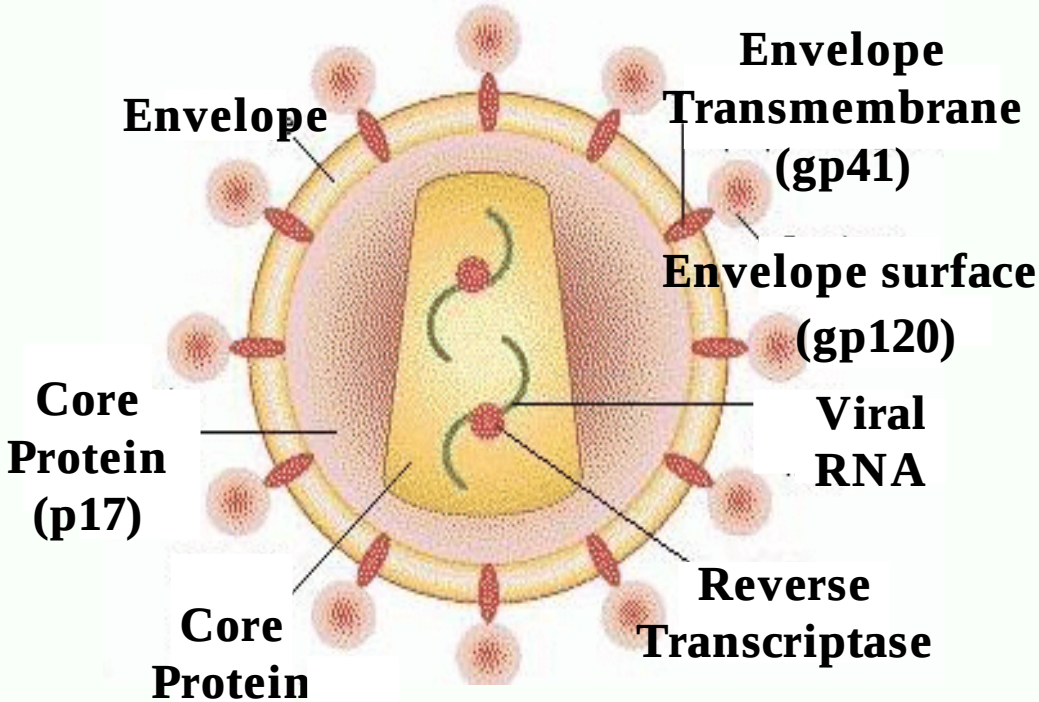
vaiolo

HIV particles

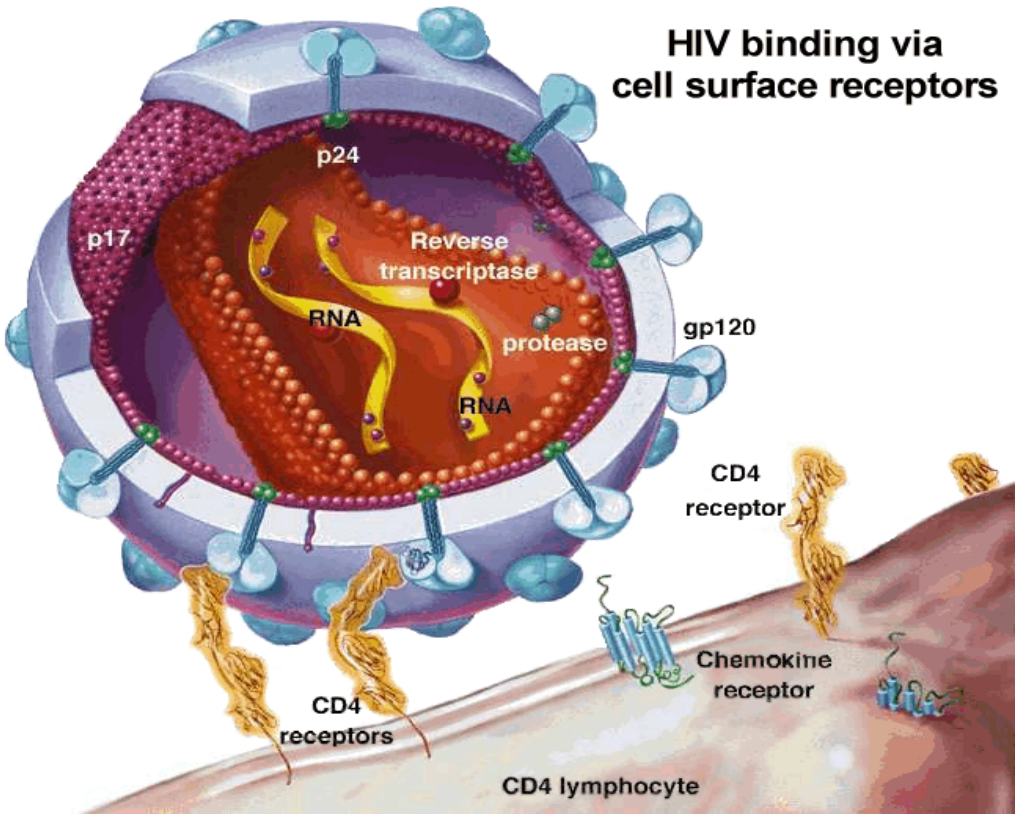




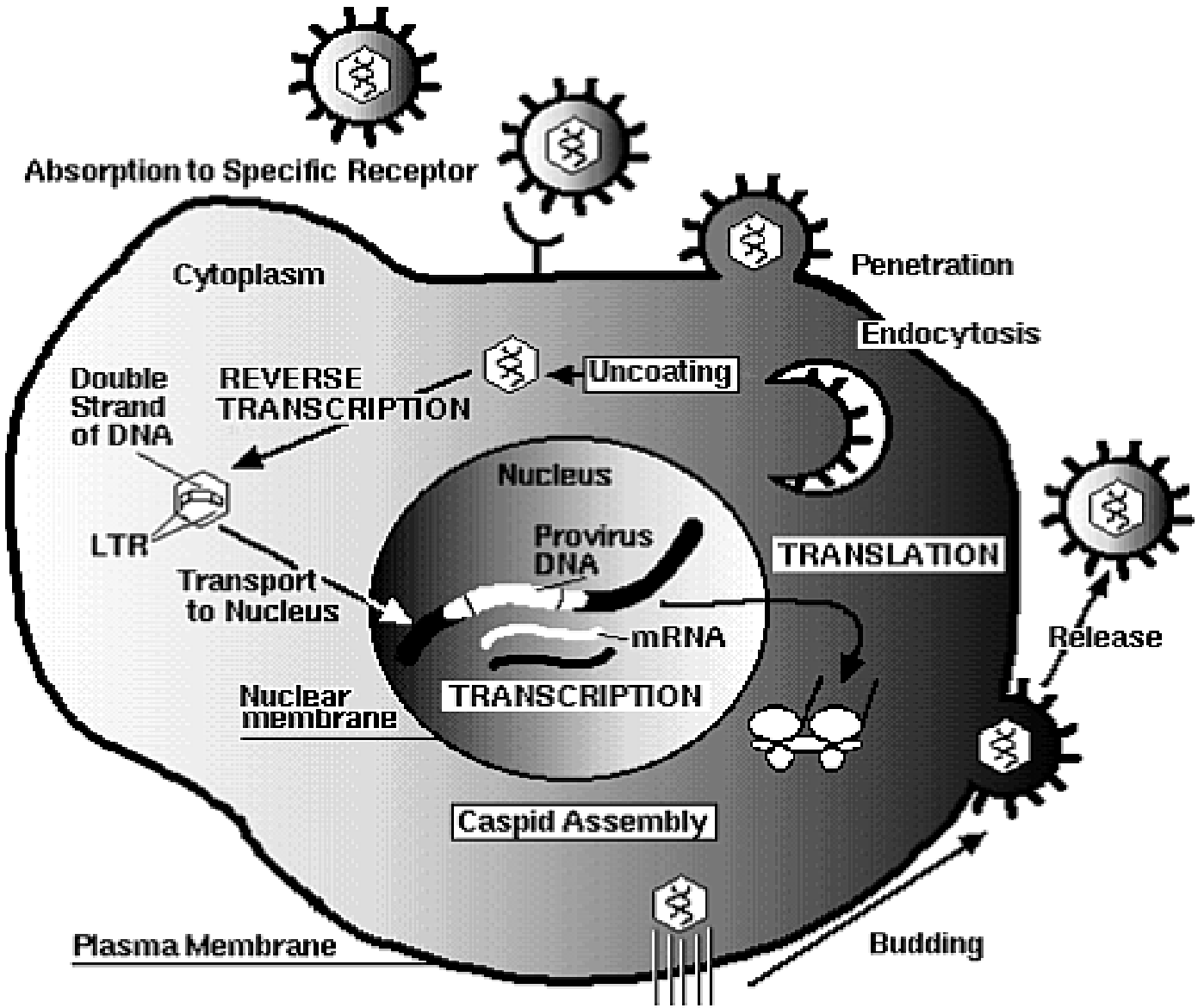
HIV-1 genome



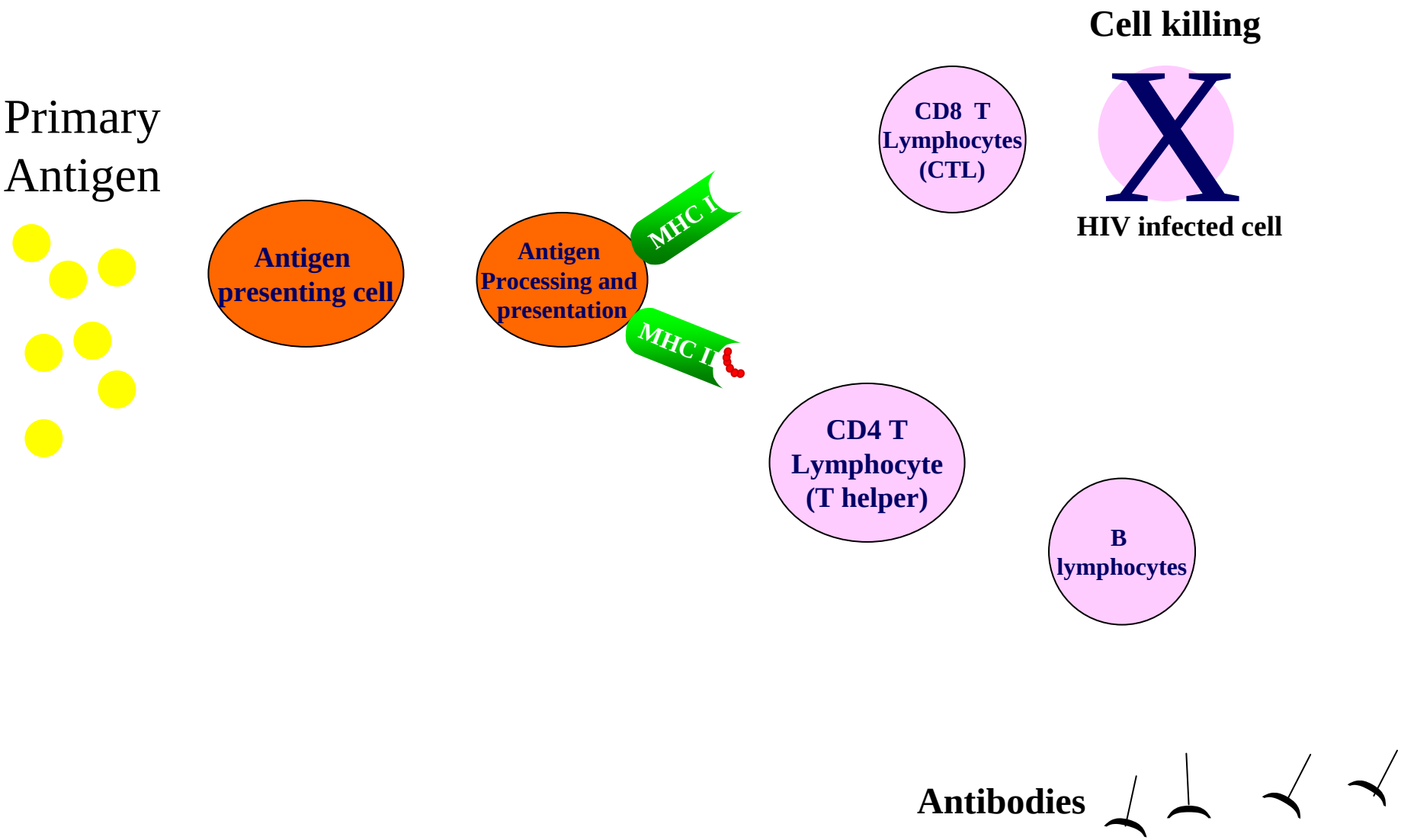
L’interazione gp120-CD4-corecettore determina la fusione dell’envolope e membrana cellulare



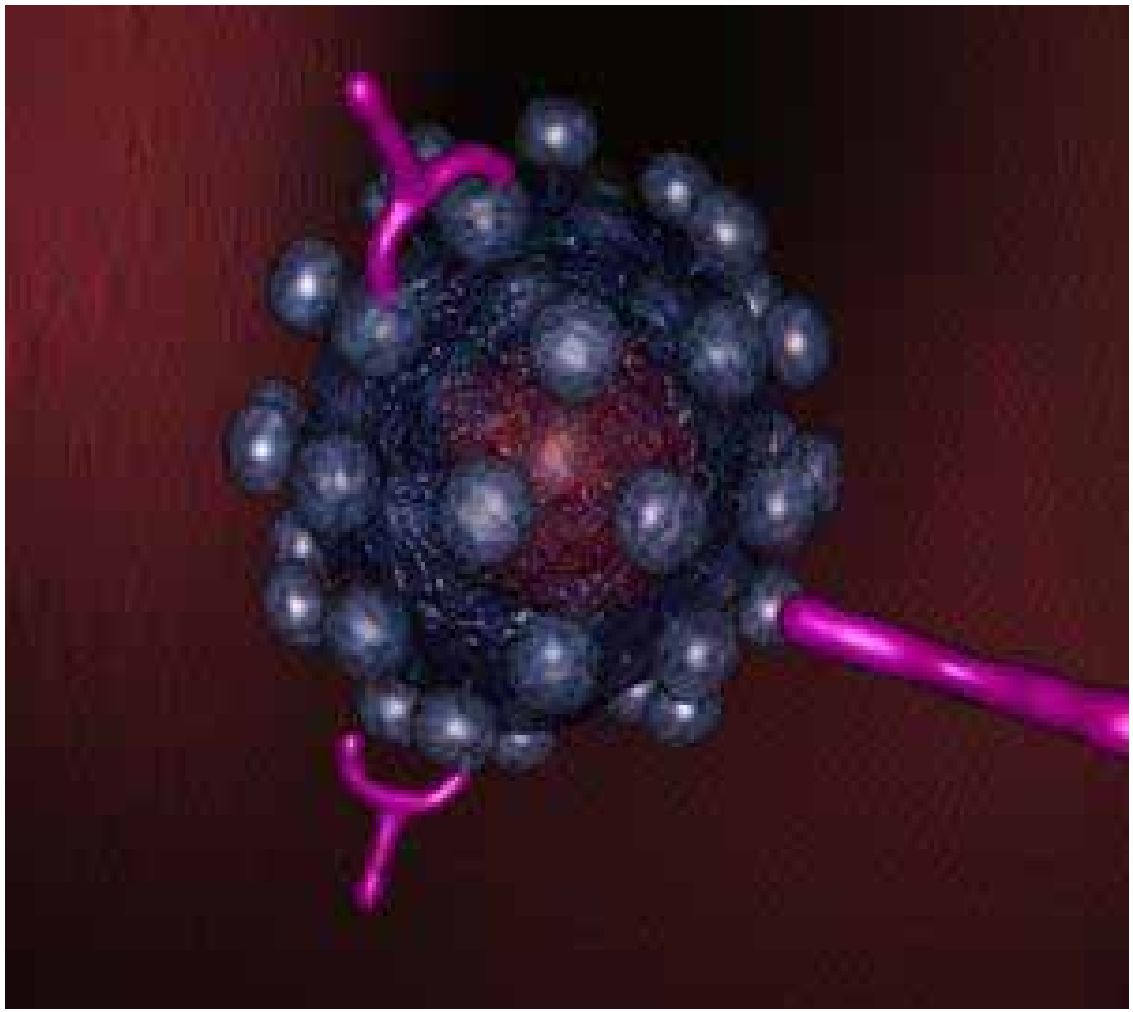
HIV Replication



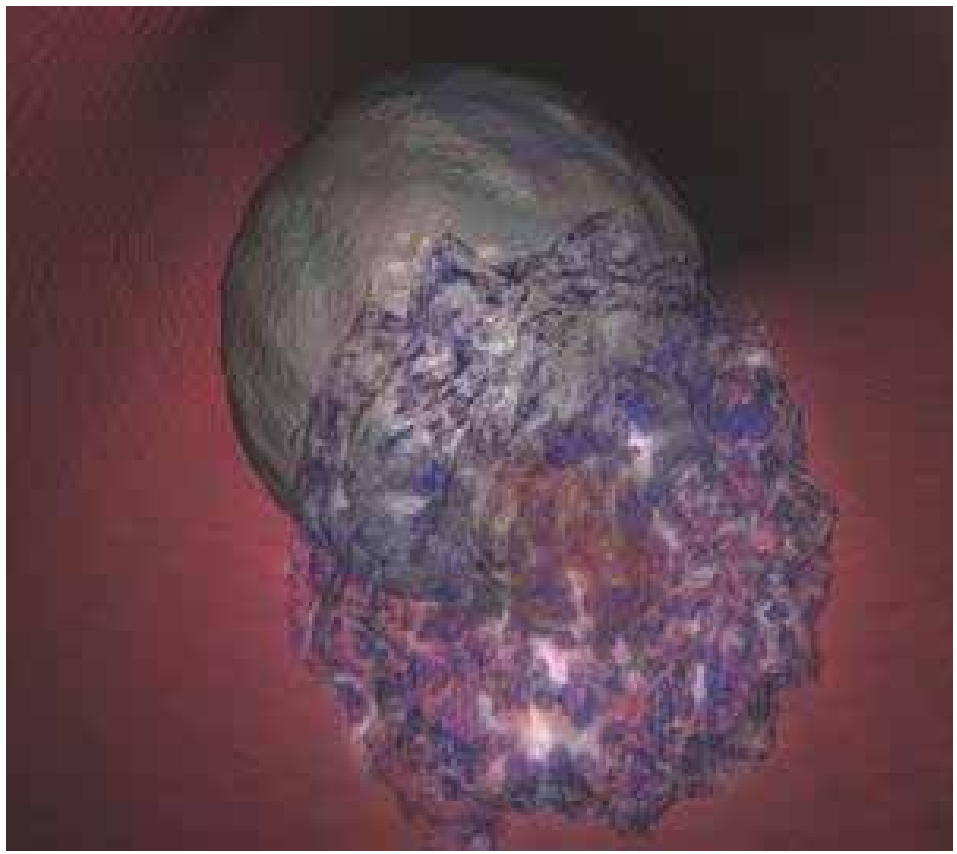
Risposta immune (umorale e cellulare) riduce la viremia dopo la fase acuta dell'infezione primaria



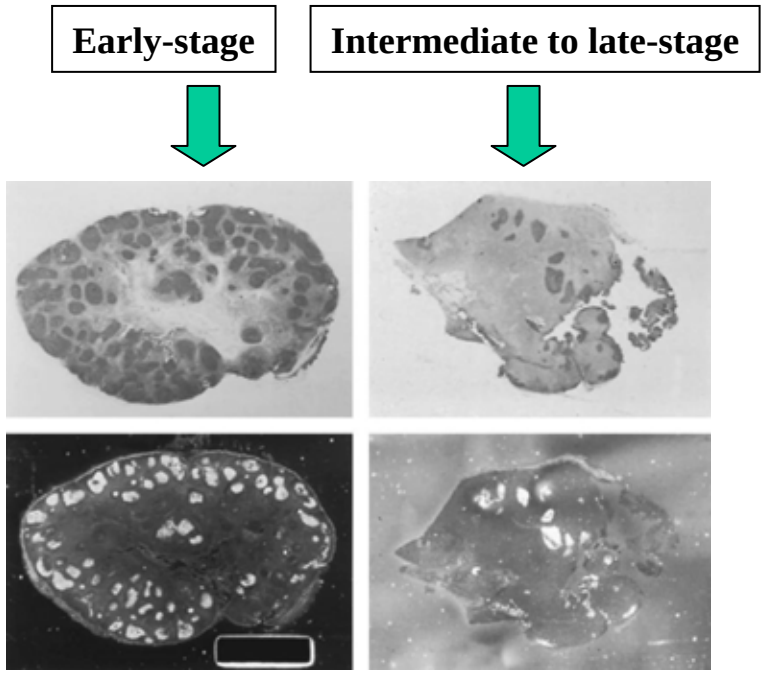
Antibodies binding to HIV



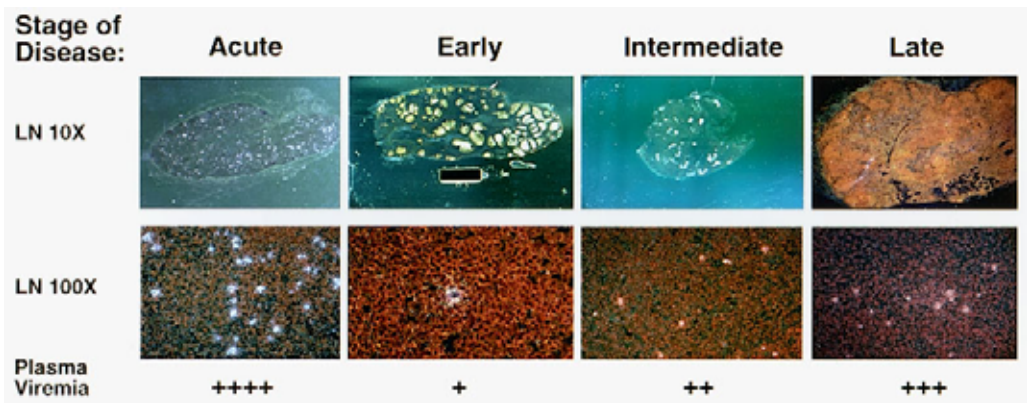
Killing of a HIV-infected cell by a lymphocyte (CTL)



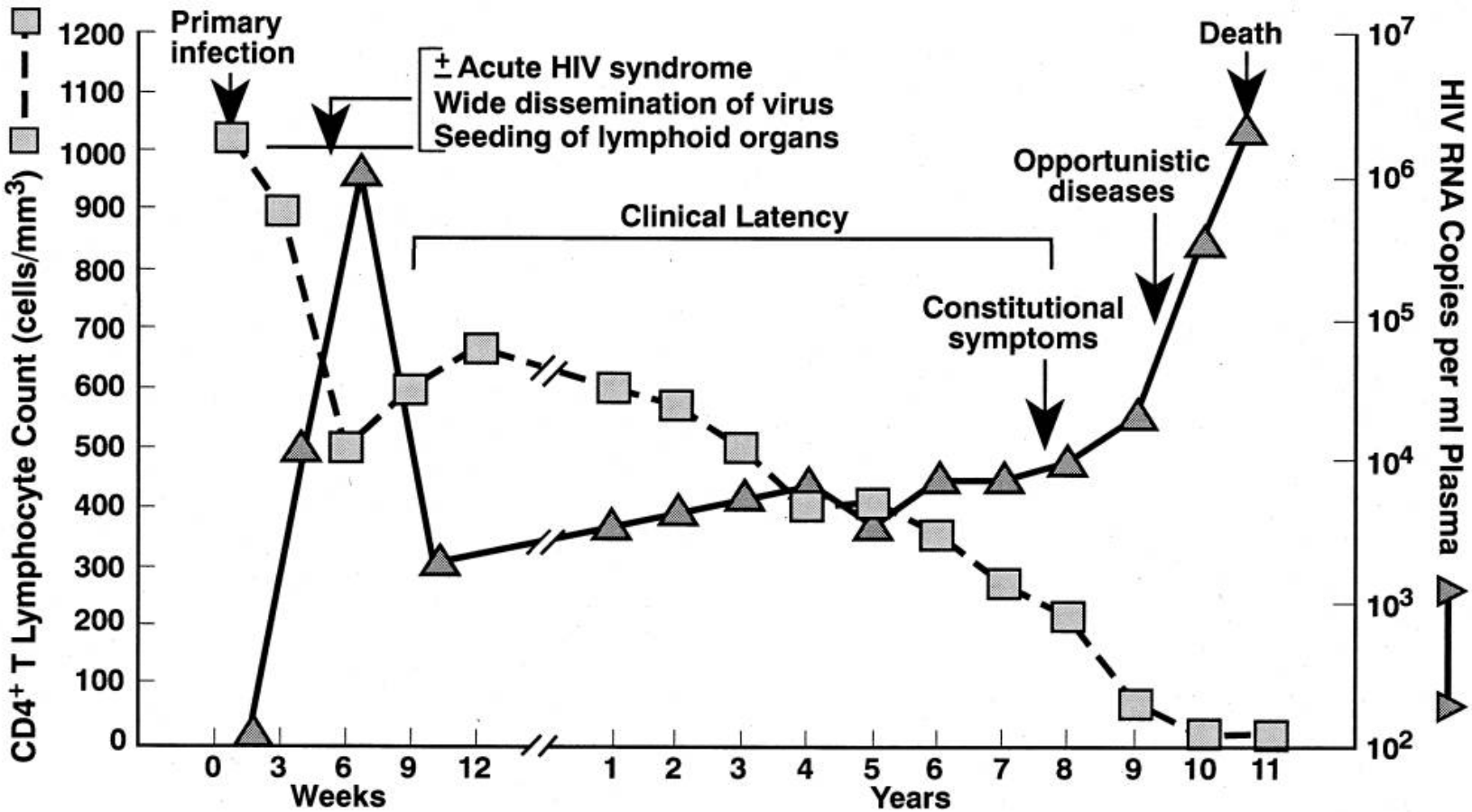
Il virus non è eliminato e continua a replicarsi in alcuni siti "serbatoio" distruggendo lentamente il sistema immunitario



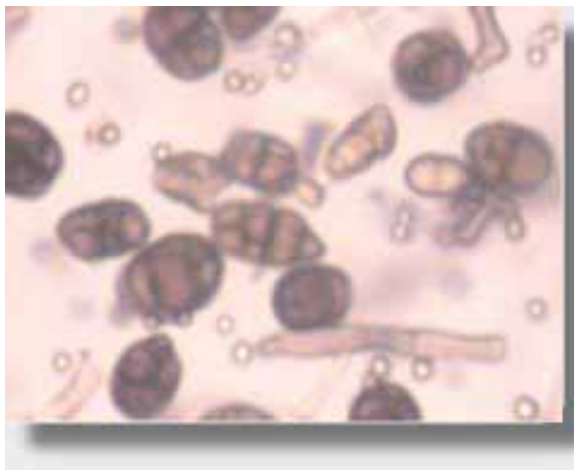
In situ hybridization



Parametri virologici e cellulari durante l'infezione naturale da HIV

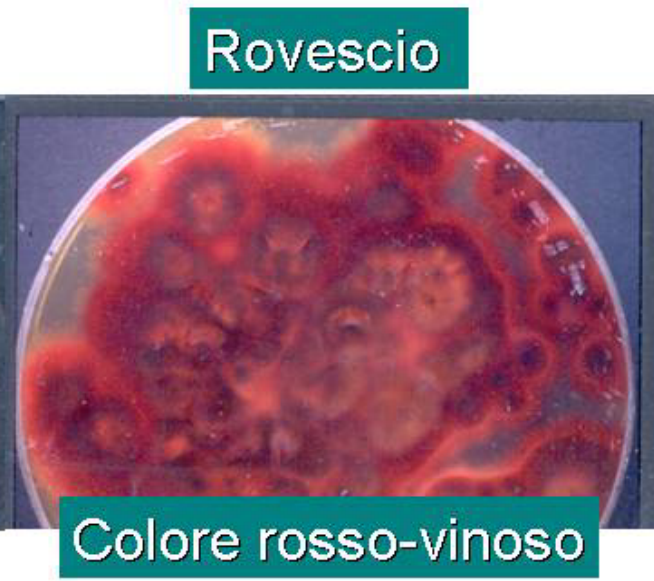


Miceti

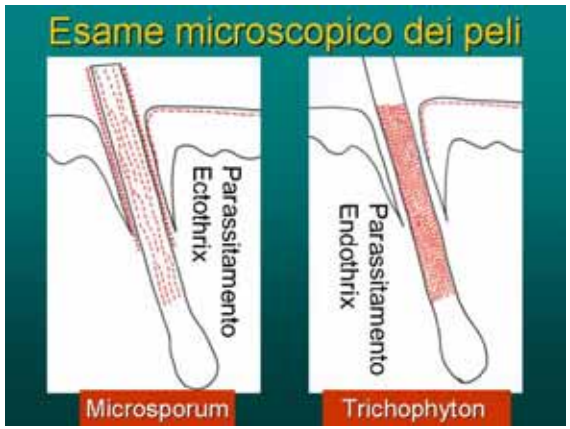


Trichophyton rubrum

Superficie lanuginosa (con umbone centrale) o polverulenta



Micosi superficiali



Vie di trasmissione delle infezioni

Vie di trasmissione

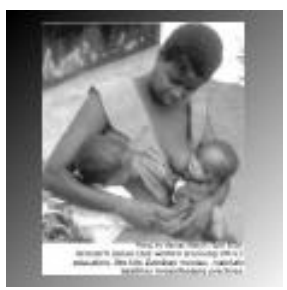
aerogena

sessuale

ematica

Madre-feto

allattamento



The most common methods of transmission of HIV are:

Unprotected sex with an infected partner

Sharing needles with infected person

Almost eliminated as risk factors for HIV transmission are:

Transmission from infected mother to fetus

Infection from blood products

Infezioni nosocomiali (più spesso batteriche)

- Causate da micro-organismi patogeni che si sviluppano in ospedale e vengono contratte dai pazienti durante il periodo di degenza

- Possono colpire lo staff sanitario (medico, paramedico etc.)

Sorgenti

endogene (microflora del paziente stesso)
esogene (microflora diversa da quella del paziente; altri pazienti, visitatori, personale, alimenti, cateteri, apparecchiature per per endovenosa, dialisi etc.)