



PUERPERAL INFECTION

Puerperal sepsis(Puerperal infection)

Introduction

- ❖Puerperium is the period of about six weeks after childbirth during which the mother's reproductive organs return to their original non-pregnant condition.
- ❖During this period the body tissues, in particular the genital and the pelvic organs, return to the condition in to pre- pregnancy state of the women.
- ❖Sepsis, the presence in tissues of harmful bacteria and their toxins, typically through infection of a wound.
- ❖Sepsis is a life-threatening condition that arises when the body's response to infection causes injury to its own tissues and organs.

DEFINITION OF PUERPERAL SEPSIS

- According to The World Health Organization (WHO), puerperal sepsis is defined as the infection of the genital tract occurring at labour or within 42 days of the postpartum period.



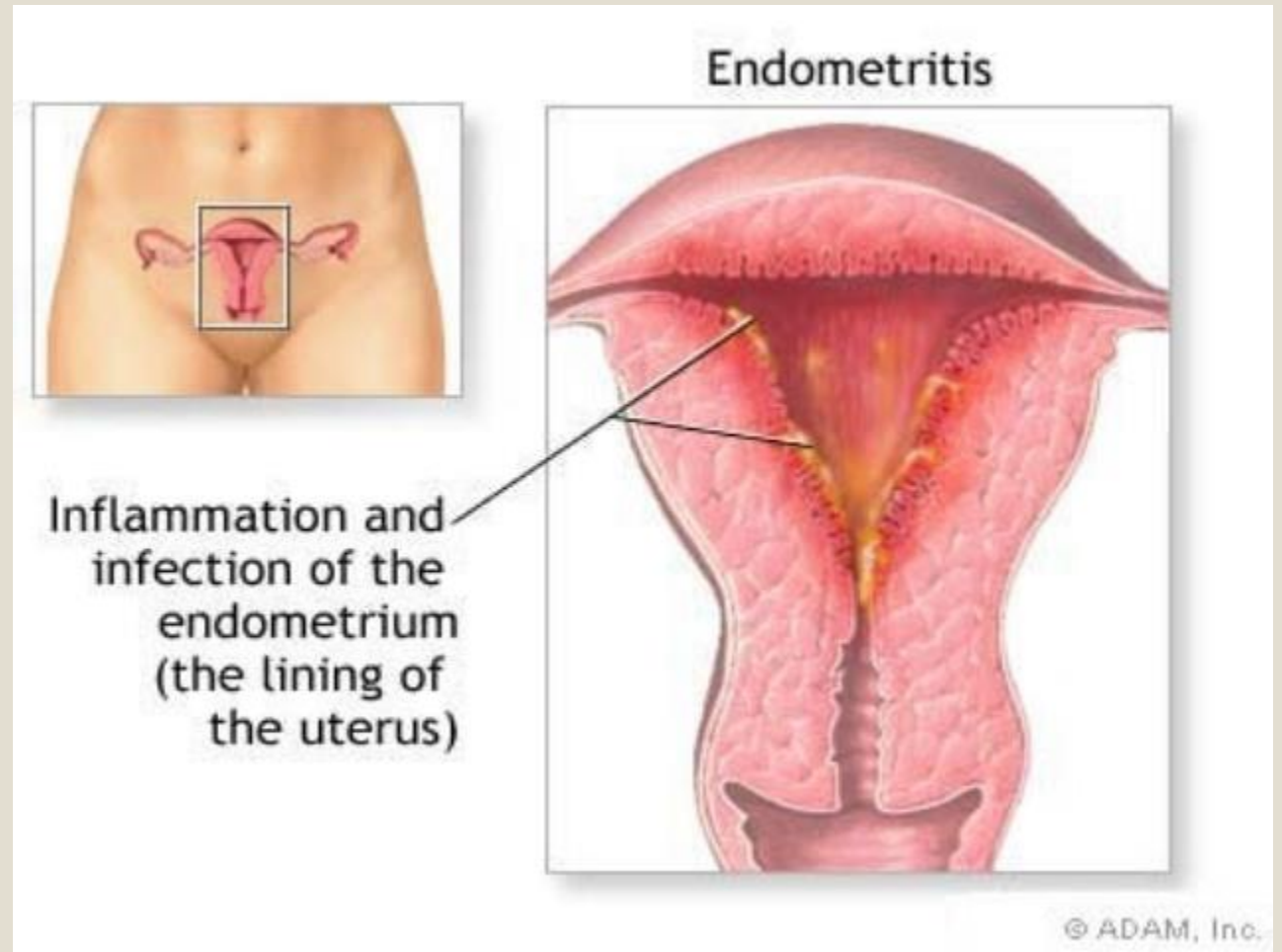
Definition

- An infection of the genital tract which occurs as a complication of delivery or miscarriage is termed as puerperal sepsis. (DC DUTTA)



The primary sites of infection

- ❑ Perineum
- ❑ Vagina
- ❑ Cervix
- ❑ Uterus.



PREDISPOSING FACTORS OF PUERPERAL SEPSIS:

ANTEPARTUM

- Malnutrition
- Anemia
- Preterm labor
- Early rupture/PROM/PPROM
- Precipitate delivery
- Immunocompromised (eg:AIDS)
- Diabetes
- Obesity
- Organisms of normal vaginal flora.

INTRAPARTUM

- Repeated vaginal examinations
- Dehydration
- Ketoacidosis during labor
- Traumatic vaginal delivery
- APH or PPH
- Retained bits of placental tissue or membranes
- Prolonged labor
- Obstructed labor
- Caesarean or instrumental delivery.

Organisms of normal vaginal flora Vaginal flora:

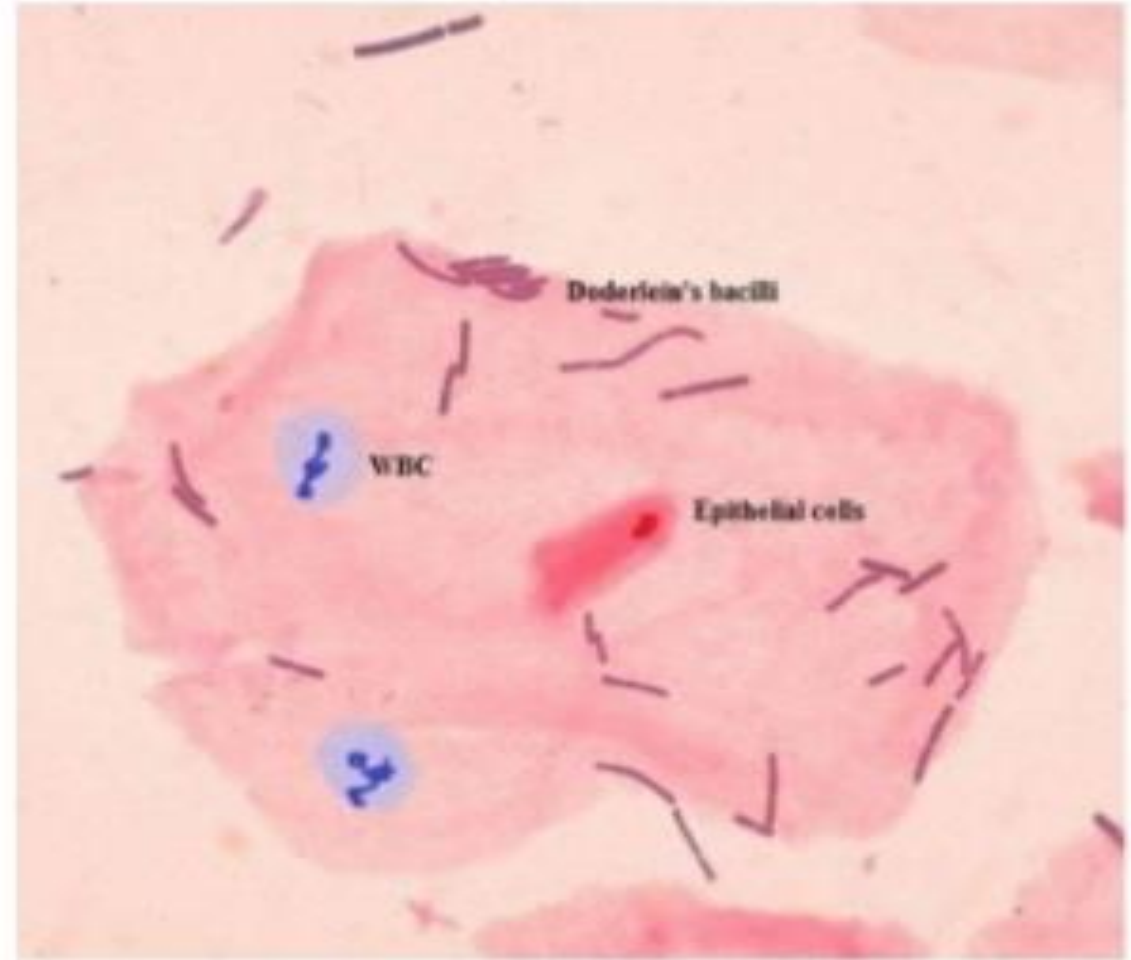
The vaginal flora in late pregnancy and at the onset of labor consists of the following organisms:

- ✓ Doderlein's bacillus
- ✓ *Candida albicans*
- ✓ *Staphylococcus aureus*
- ✓ *Streptococcus*
- ✓ *Escherichia coli*
- ✓ *Bacteroides* group
- ✓ *Clostridium welchii*

These organisms remain dormant and are harmless during normal delivery conducted in aseptic condition. Due to the factors mentioned above, the organisms gain foothold either in the traumatized tissues of the uterovaginal canal or in the raw decidua left behind or in the blood clots, especially at the placental site.

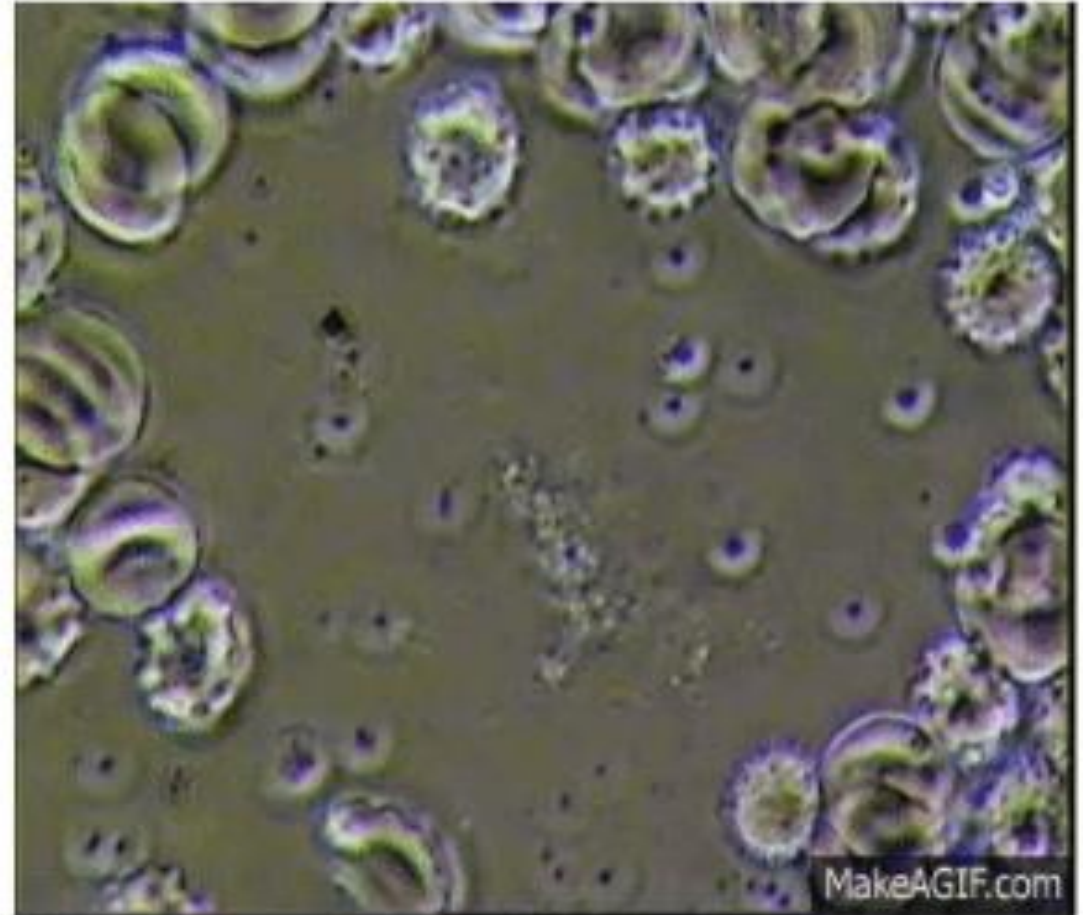
DODERLEIN'S BACILLI

These bacteria have a beneficial effect by inhibiting growth, adhesion or spread of other microorganisms.



Candida albicans

- *Candida albicans* is an opportunistic pathogenic yeast that is a common member of the human gut.
- It is usually a commensal organism, but can become pathogenic in immunocompromised individuals under a variety of conditions.



Escherichia coli

- It is commonly found in the lower intestine.
- It benefits their hosts by producing vitamin K, and preventing colonization of the intestine with pathogenic bacteria, having a symbiotic relationship.

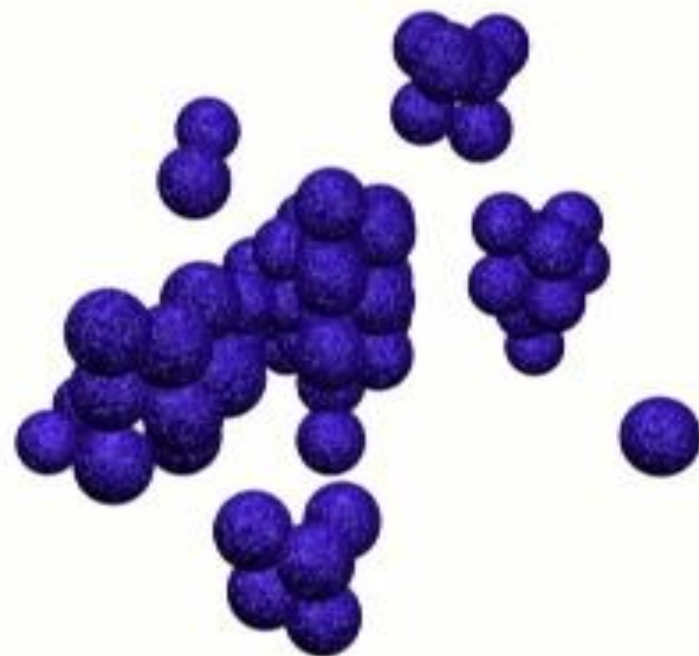


Staphylococcus aureus

- It is a commensal member of the normal flora of the body, frequently found in the nose respiratory tract gut mucosa and on the skin.



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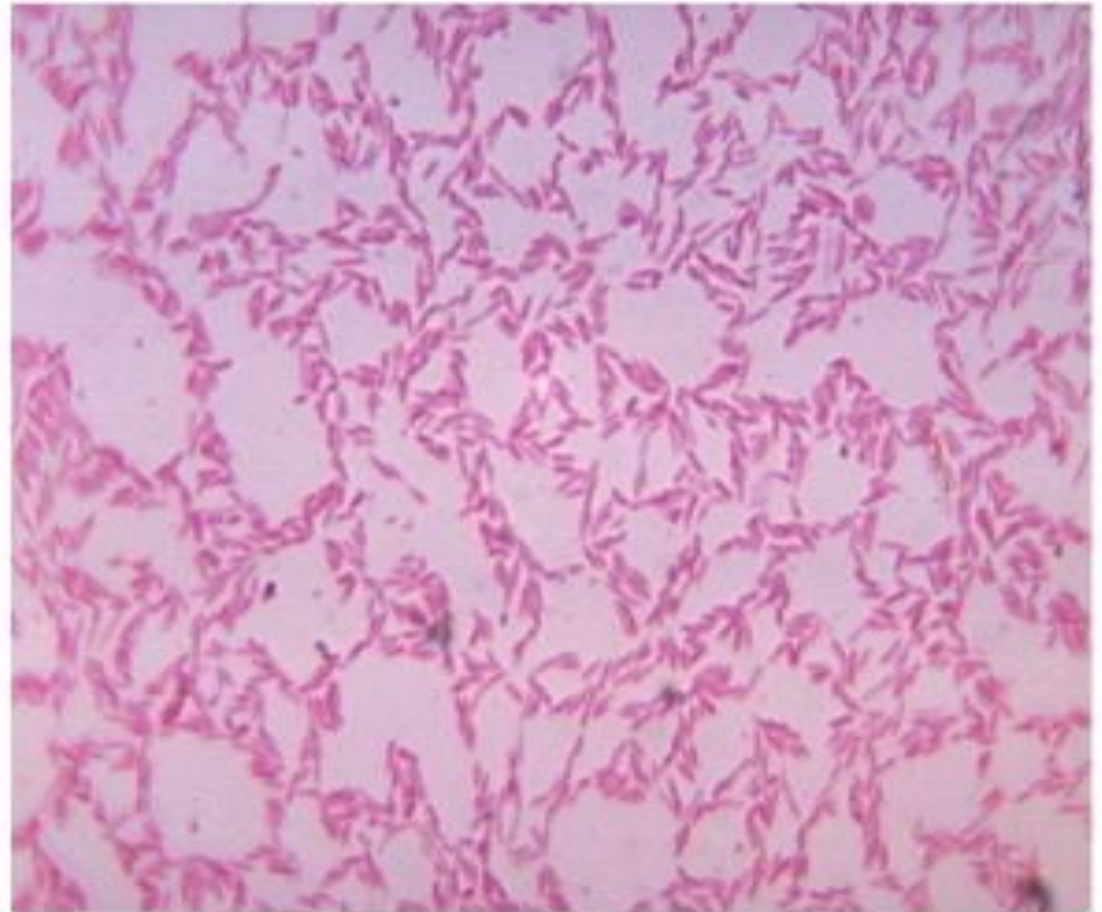


Sc 01

Staphylococcus aureus
MRSA

Bacteroides

- They are normally mutualistic organisms in gut help in processing of complex molecules eg: sugar to simpler ones in the host intestine.
- They convert these sugars to fermentation products which are beneficial to humans.
- They also have the ability to remove side chains from bile acids, thus returning bile acids to the hepatic circulation.



Clostridium welchii

- Found in the intestinal tract of humans
- Harmless in minor number.
- If there is infections then it may most commonly cause of food poisoning



www.bacteria.cz

Kim et al.

Clostridium perfringens

**CAUSAL
ORGANISMS**

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graph TD; A[CAUSAL ORGANISMS] --> B[AEROBIC BACTERIA]; A --> C[ANAEROBIC BACTERIA]; A --> D[OTHERS];
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**AEROBIC
BACTERIA**

**ANAEROBIC
BACTERIA**

OTHERS

AEROBIC

- Group A beta-hemolytic Streptococcus (GAS)
- Group B beta-hemolytic Streptococcus (GBS)-
Methicillin-resistant Staphylococcus aureus (MRSA)

ANAEROBIC

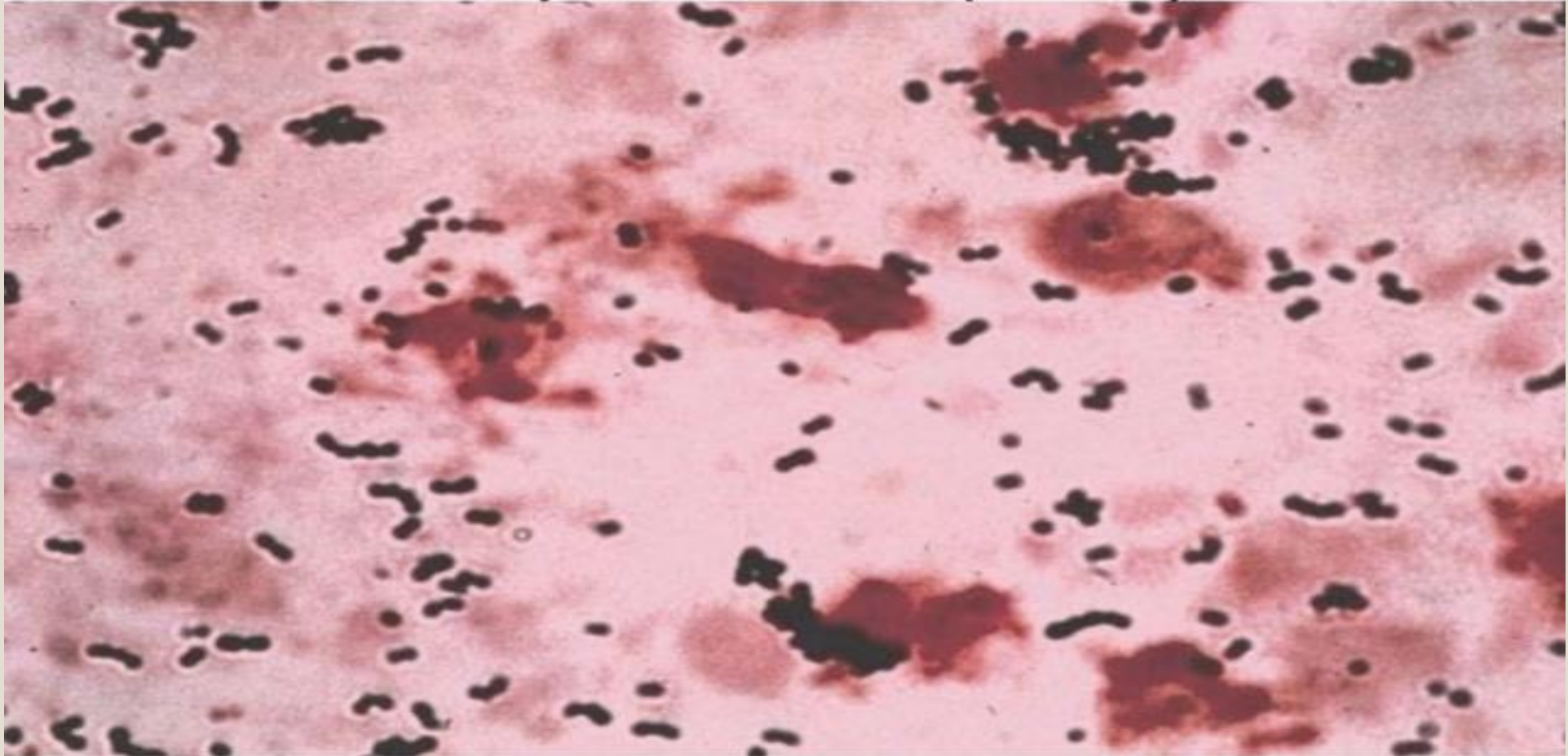
- Streptococcus, Peptococcus, Bacteroides (fragilis, bivius), Fusobacteria, Mobiluncus and Clostridia.

Others:- Staphylococcus pyogenes

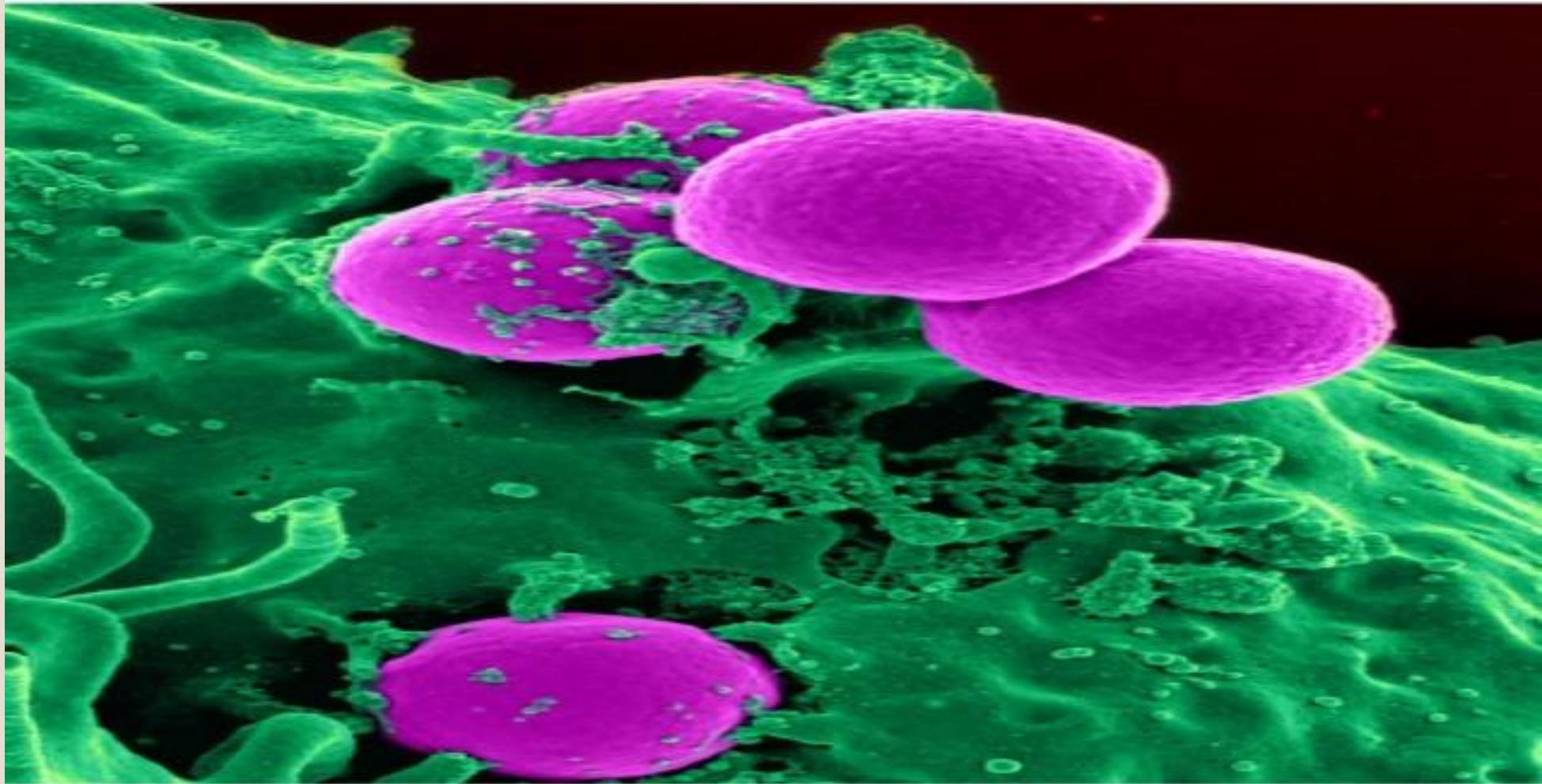
- S. aureus, E. coli, Klebsiella, Pseudomonas, Proteus, Chlamydia.

CAUSAL
ORGANISMS

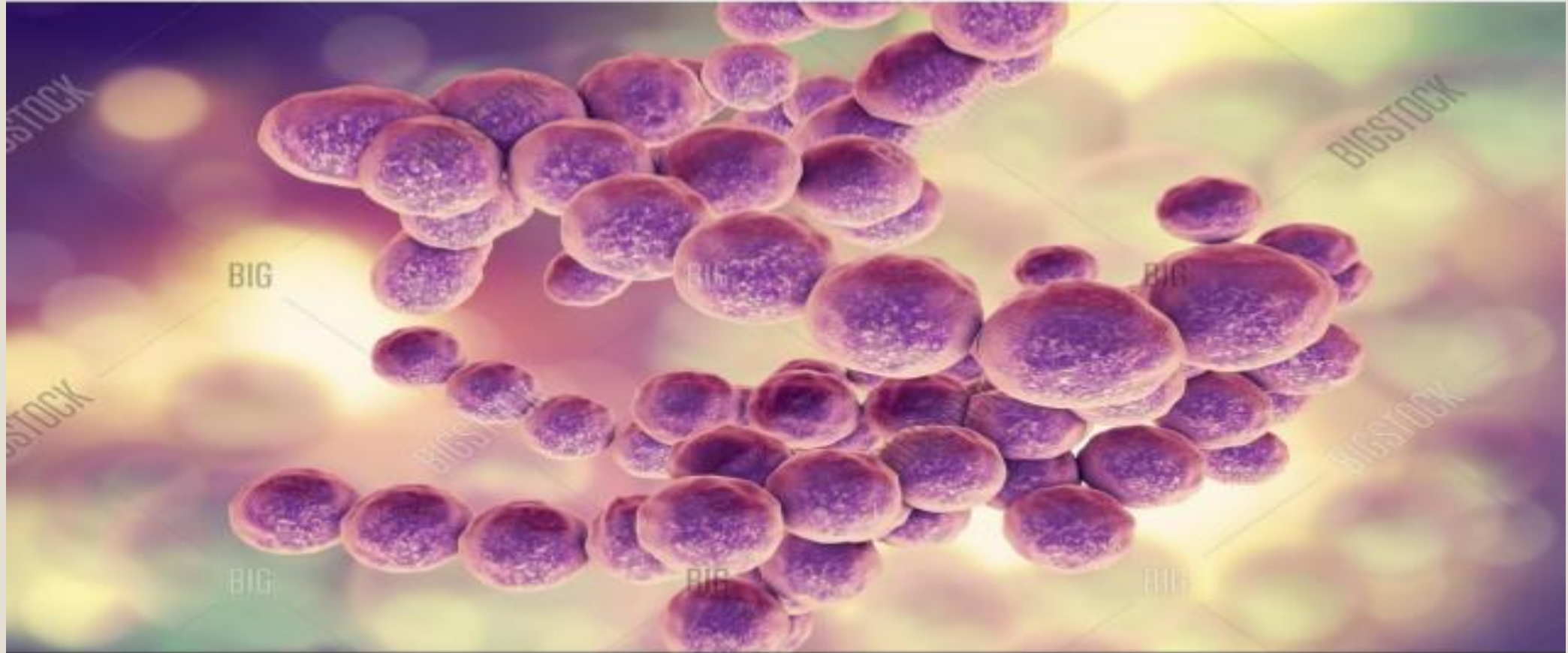
Group B beta-hemolytic Streptococcus (GBS)



Methicillin-resistant *Staphylococcus aureus* (MRSA)



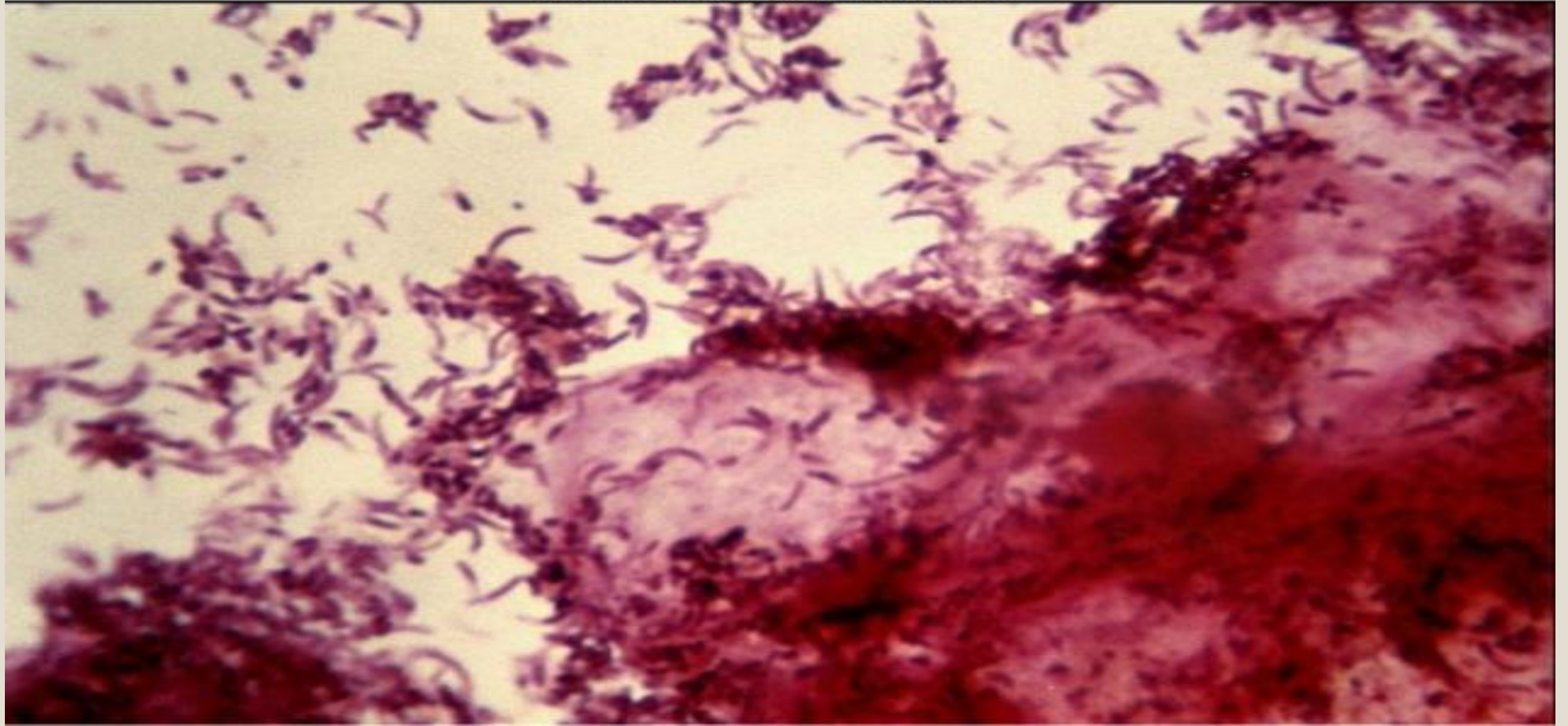
Peptococcus



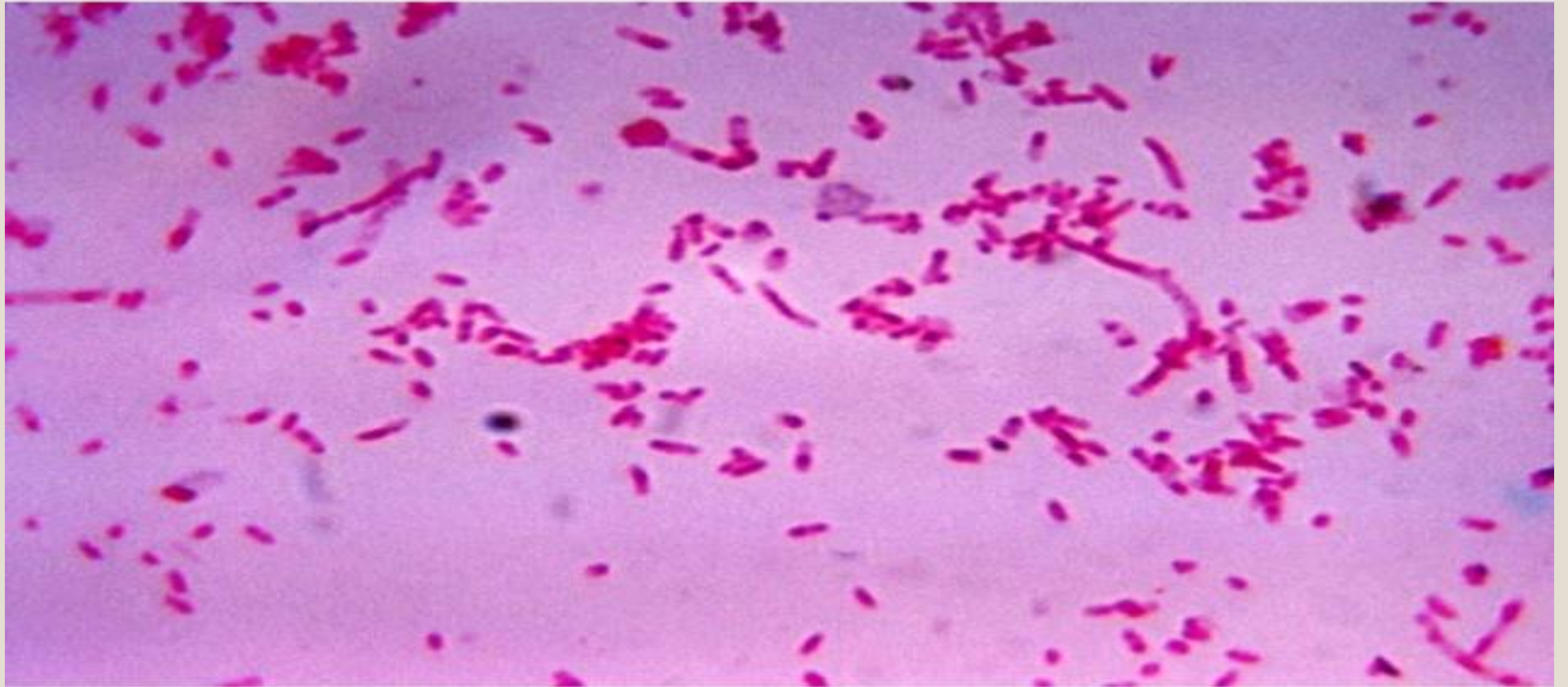
BIGSTOCK

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Mobiluncus



Fusobacteria

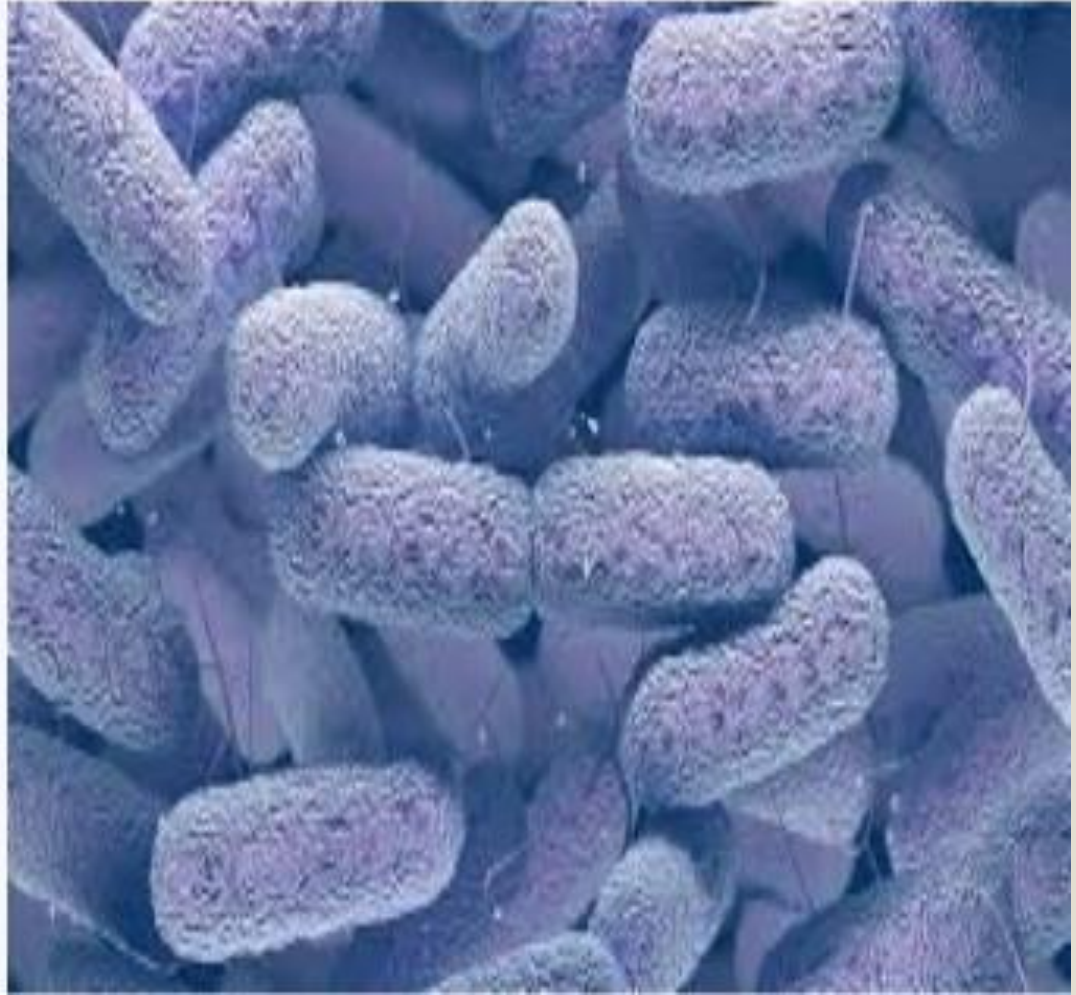


Klebsiella



Klebsiella pneumoniae

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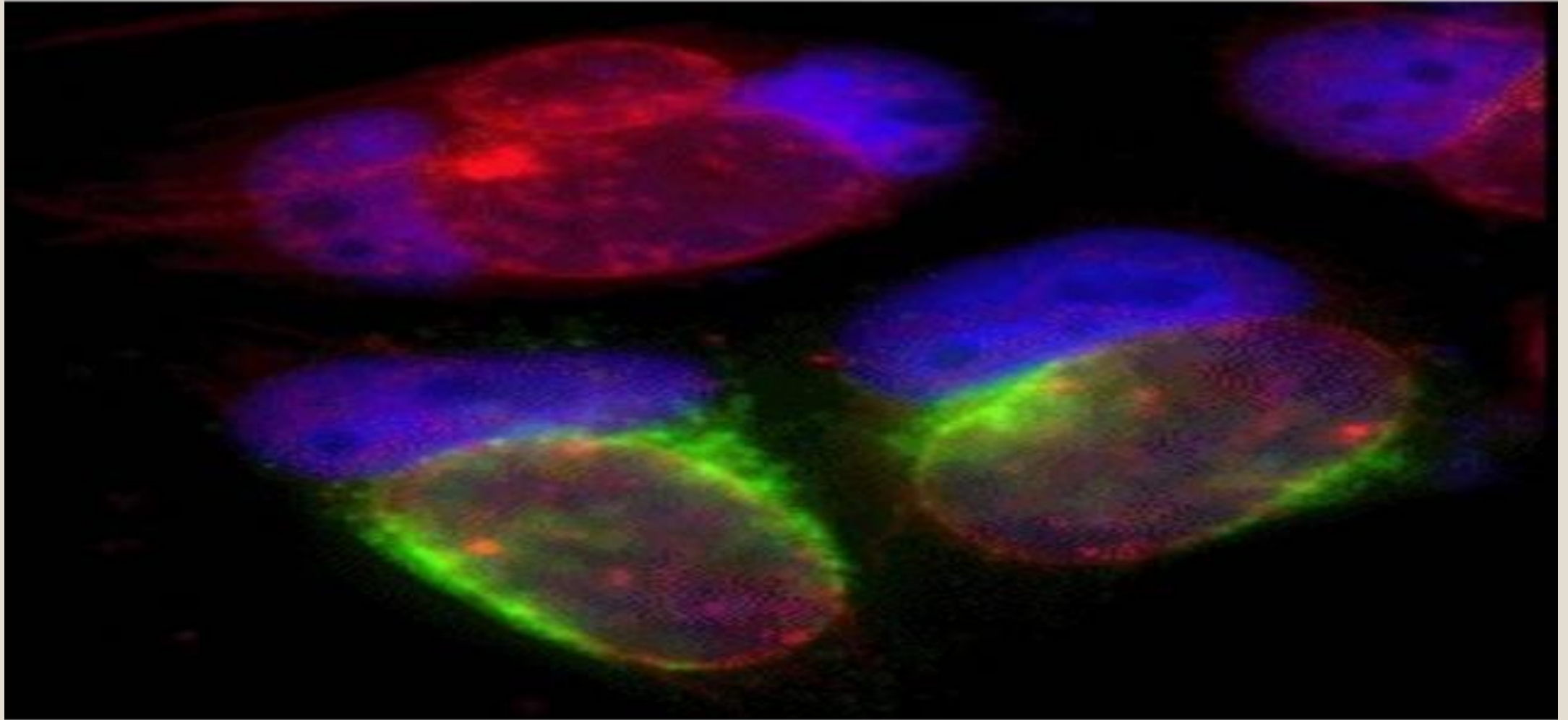
Pseudomonas



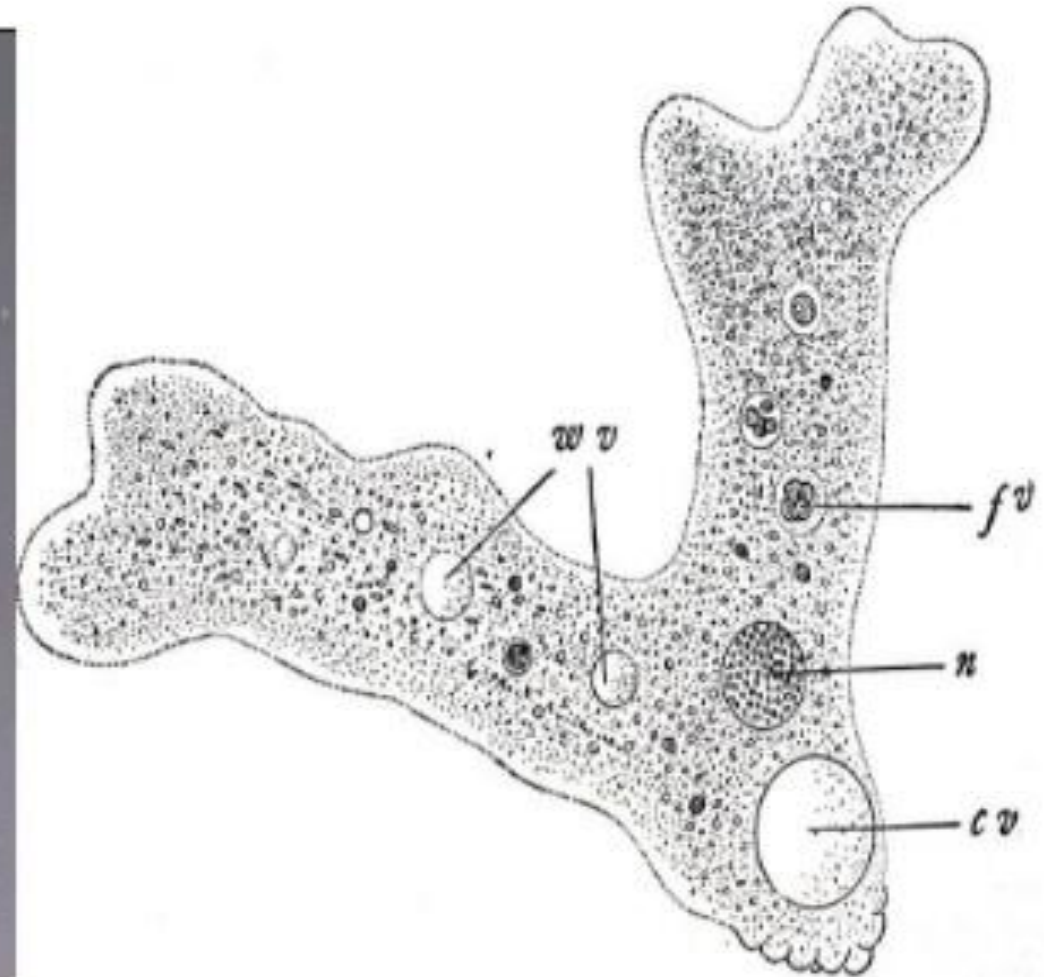
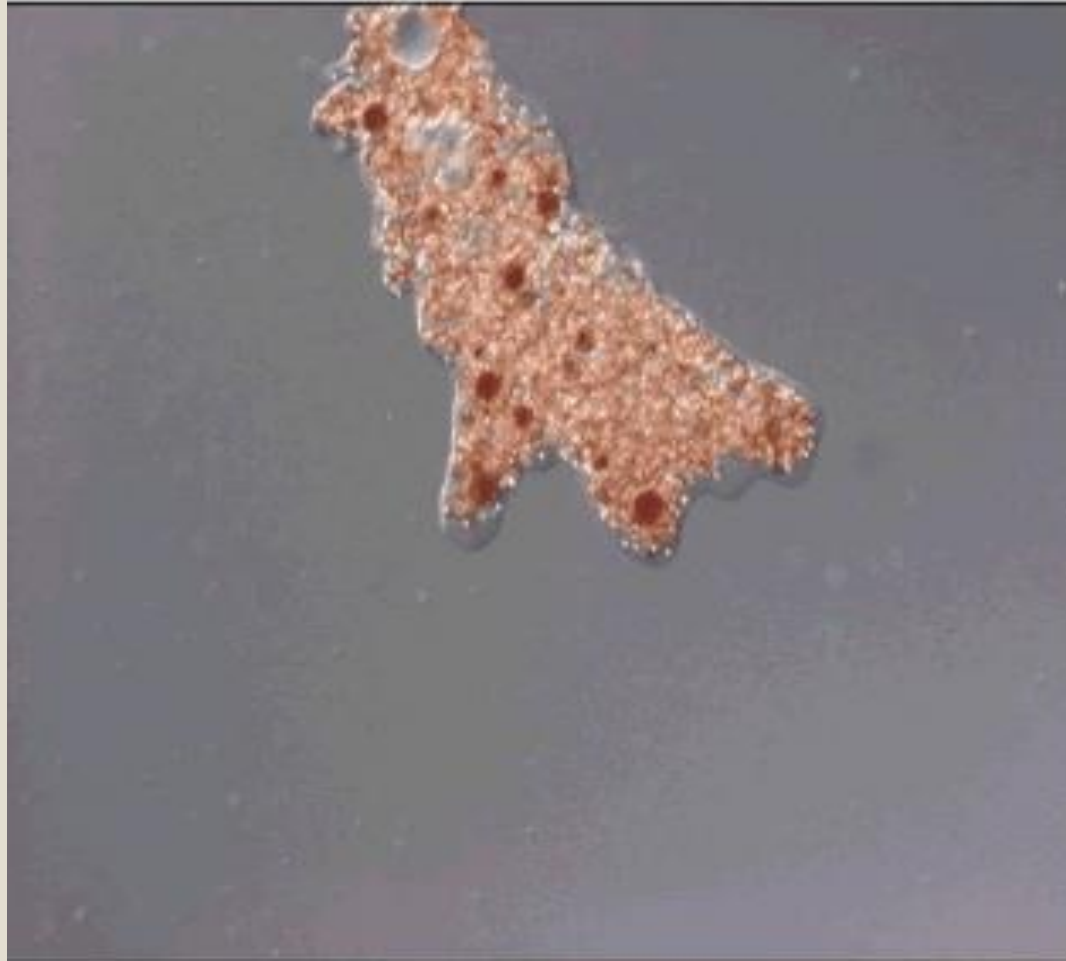
*Pseudomonas
aeruginosa*



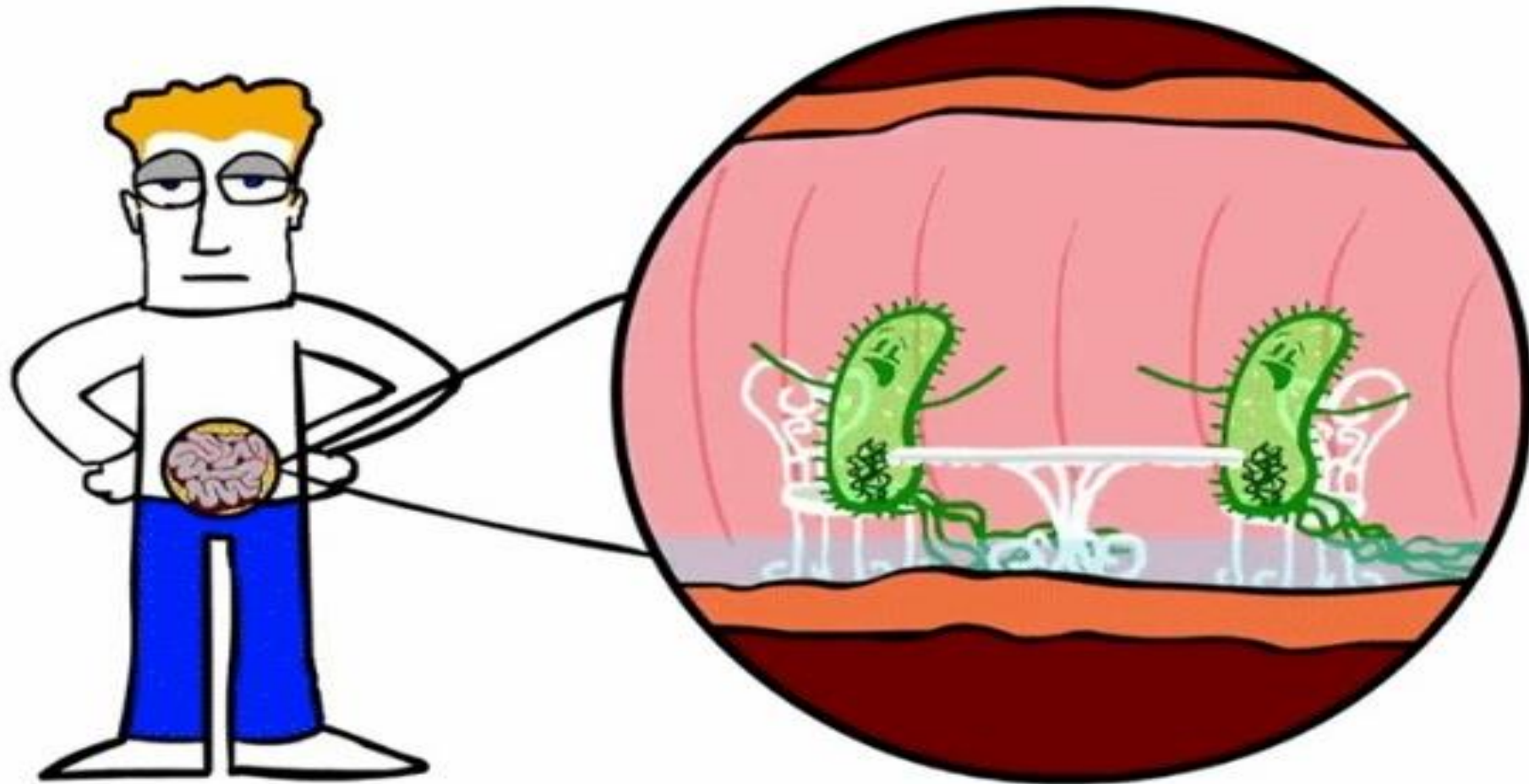
Chlamydia



Proteus



Sources of infection



- ❖ **Endogenous** where organisms are present in the genital tract before delivery. eg: Streptococcus
- ❖ **Autogenous** where organisms present elsewhere (skin, throat) in the body and migrate to the genital organs by bloodstream or by the patient herself. Eg: Beta-hemolytic Streptococcus, E. coli, Staphylococcus.
- ❖ **Exogenous** where infection is contracted from sources outside the patient (from hospital or attendants). Eg: Beta-hemolytic Streptococcus, Staphylococcus.

SOURCES

PATHOGENESIS

**BACTERIAL
INFECTION**

**Endogenous
Exogenous**

**Bacterial
colonization
(Aerobic,
Anaerobic and
others)**

Endometrium (placental implantation site), cervical lacerated wound, vaginal wound or perineal lacerated wound are the favorable sites for bacterial growth and multiplication.

The devitalized tissue, blood clots, foreign body (retained cotton swabs), and surgical trauma favour polymicrobial growth, proliferation and spread of infection.

This ultimately leads to metritis, parametritis, endomyometritis and/or cellulitis. Puerperal sepsis is commonly due to—(i) endometritis, (ii) endomyometritis, or (iii) endoparametritis or a combination of all these when it is called pelvic cellulitis.



SIGNS AND SYMPTOMS

- Local infection
- Uterine infection
- Spreading of infections

LOCAL INFECTION (WOUND INFECTION)

- ❖ Rise of temperature
- ❖ Generalized malaise
- ❖ Headache
- ❖ Local wound becomes red and swollen(PRISH)
- ❖ Pus
- ❖ Chills and rigor
- ❖ Sero purulent discharge.

rise of temperature



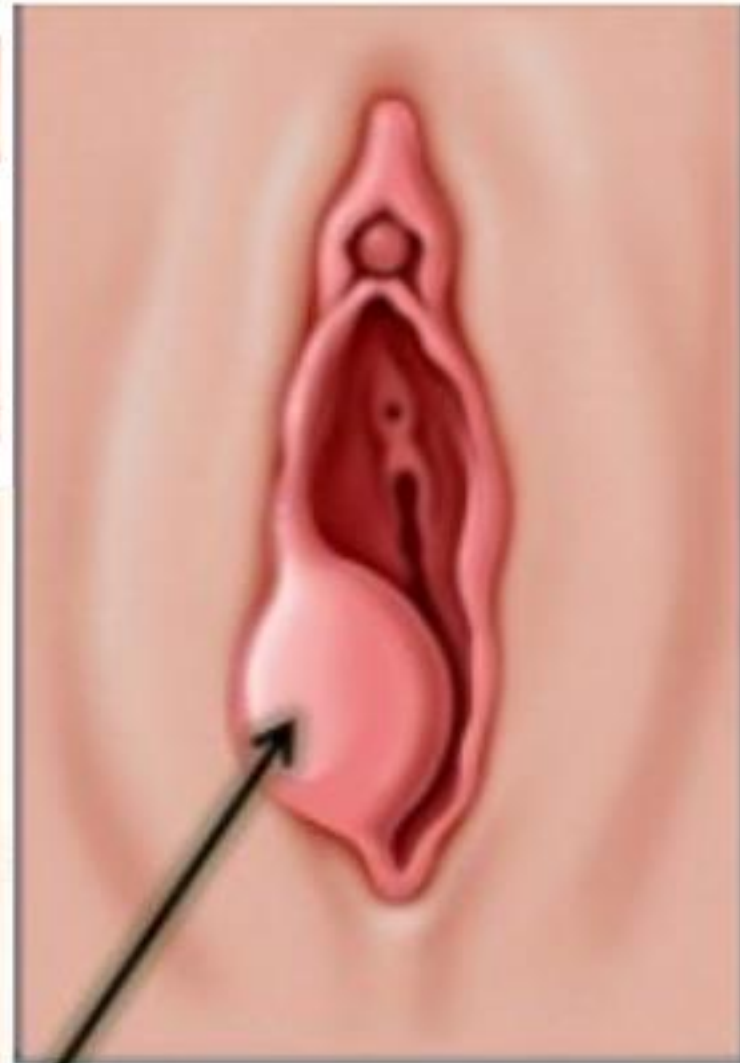
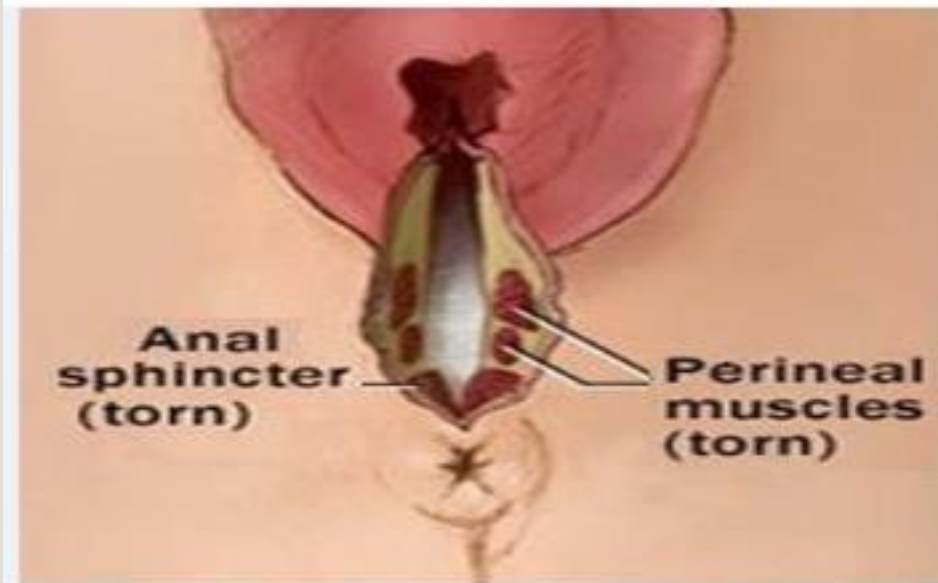
generalized malaise



Headache



PRISH (pain, redness, immobility, swelling, heat)



Pus



Chills and rigor



UTERINE INFECTION

MILD

- Rise in temperature ($>100.4^{\circ}\text{F}$)
- Rise in pulse rate (>90)
- Lochial discharge becomes offensive and copious
- The uterus is subinvoluted and tender (may be due to lochiostasis and lochiometra).

SEVERE

- High rise of temperature chills and rigor
- Pulse rate is rapid
- Breathlessness
- Abdominal pain
- Dysuria
- Lochiorrhea, green colour and foul odor
- Uterus may be subinvoluted, tender

Rise in pulse



Normal lochia discharge

Lochia Rubra
3-4 days
postpartum



Lochia Alba
10 days - 6 weeks
postpartum



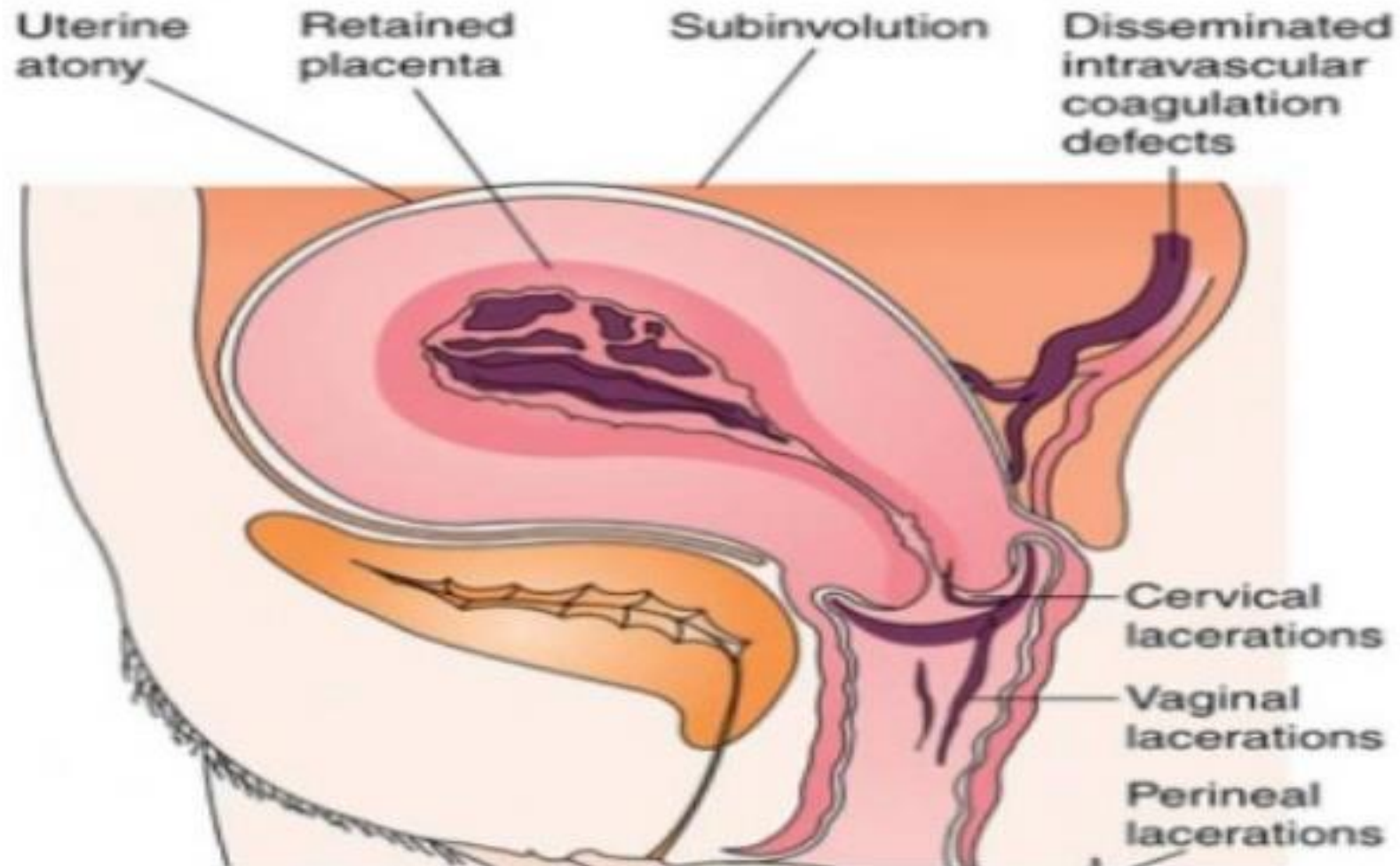
Lochia Serosa
3 weeks
postpartum



Lochial discharge becomes
offensive and copious



Subinvolution of uterus



Measure lochia



Scant: <2.5-cm (1-inch) stain



Light: 2.5- to 10-cm (1- to 4-inch) stain

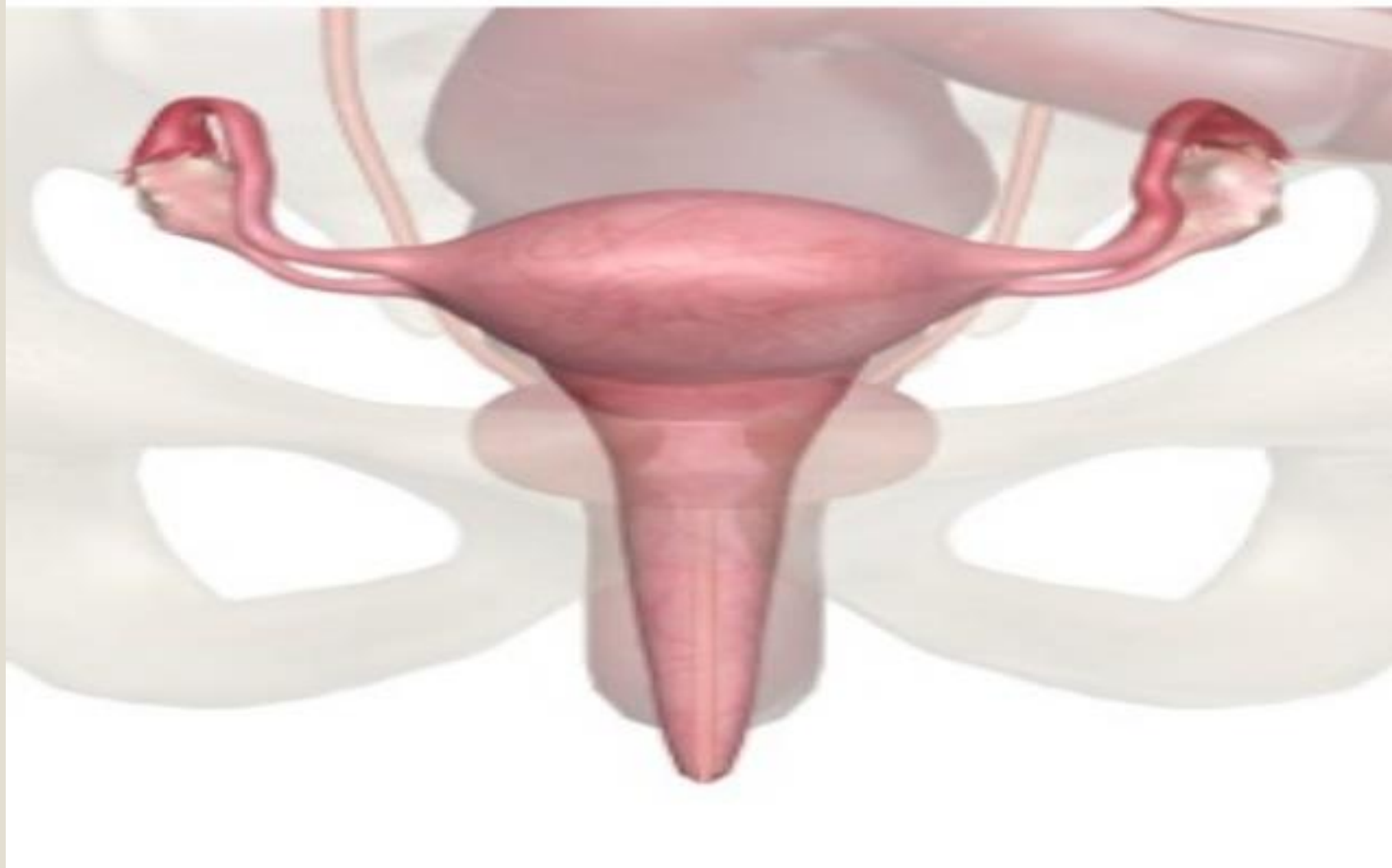


Moderate: 10- to 15-cm (4- to 6-inch) stain



Heavy: Saturated in 1 hour

lochiometra



COMPLICATION

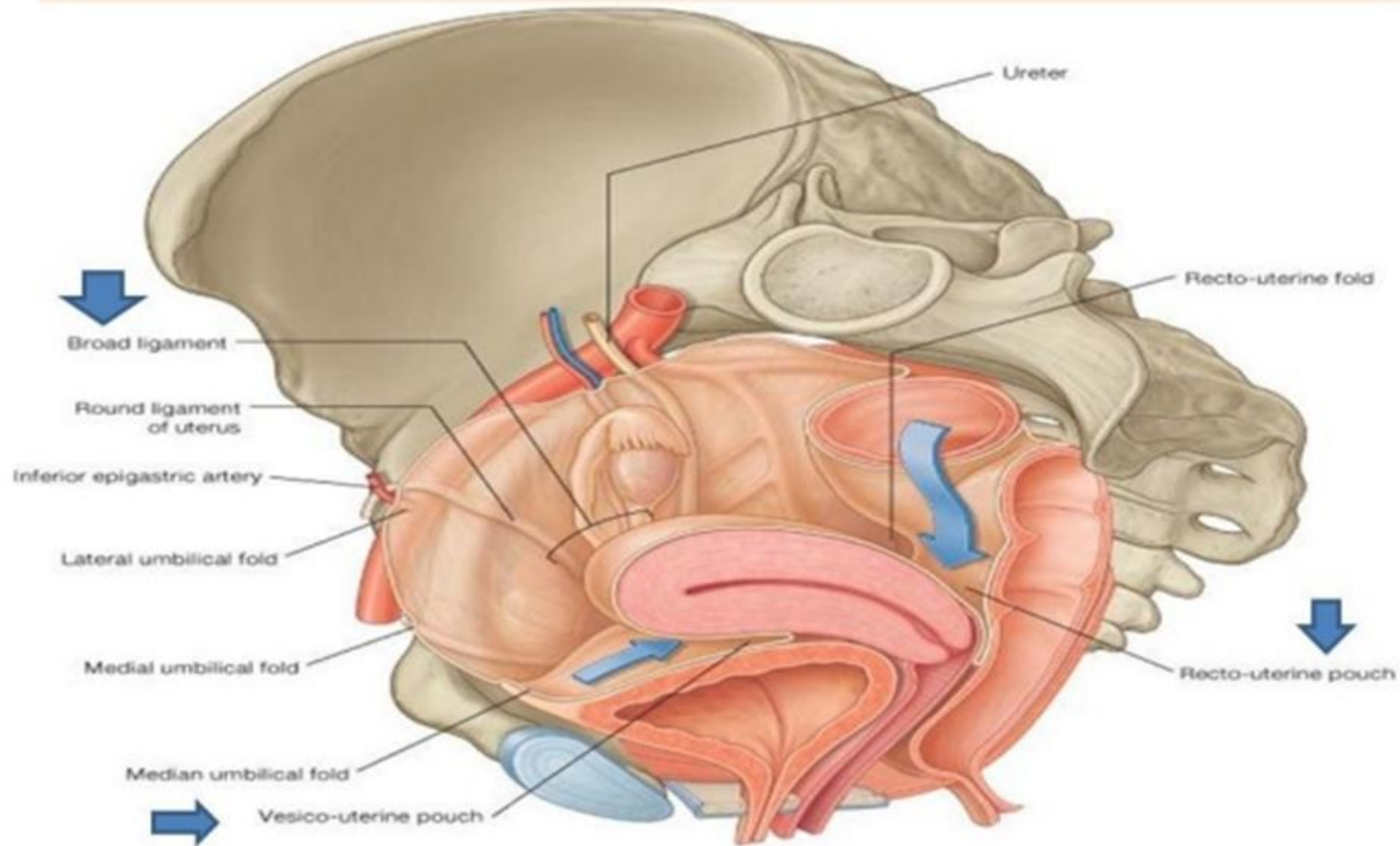
- Pelvic tenderness
- Pelvic peritonitis
- General peritonitis
- Tenderness on the fornix
- Endometritis, endomyometritis, endoparametritis
- Bulging fluctuant mass in the pouch of Douglas
- Pelvic abscess
- Phlebitis , Thrombophlebitis
- Bacteremia, endotoxic or septic shock
- Septicemia

COMPLICATIONS

SEPTICEMIA May lead to:-

- Streptococcal pharyngitis
- Rheumatic fever
- Rheumatic heart disease
- Scarlet fever
- Erysipelas
- Cellulitis
- Necrotizing fasciitis
- Streptococcal toxic shock syndrome

PELVIC PERITONEUM IN FEMALE



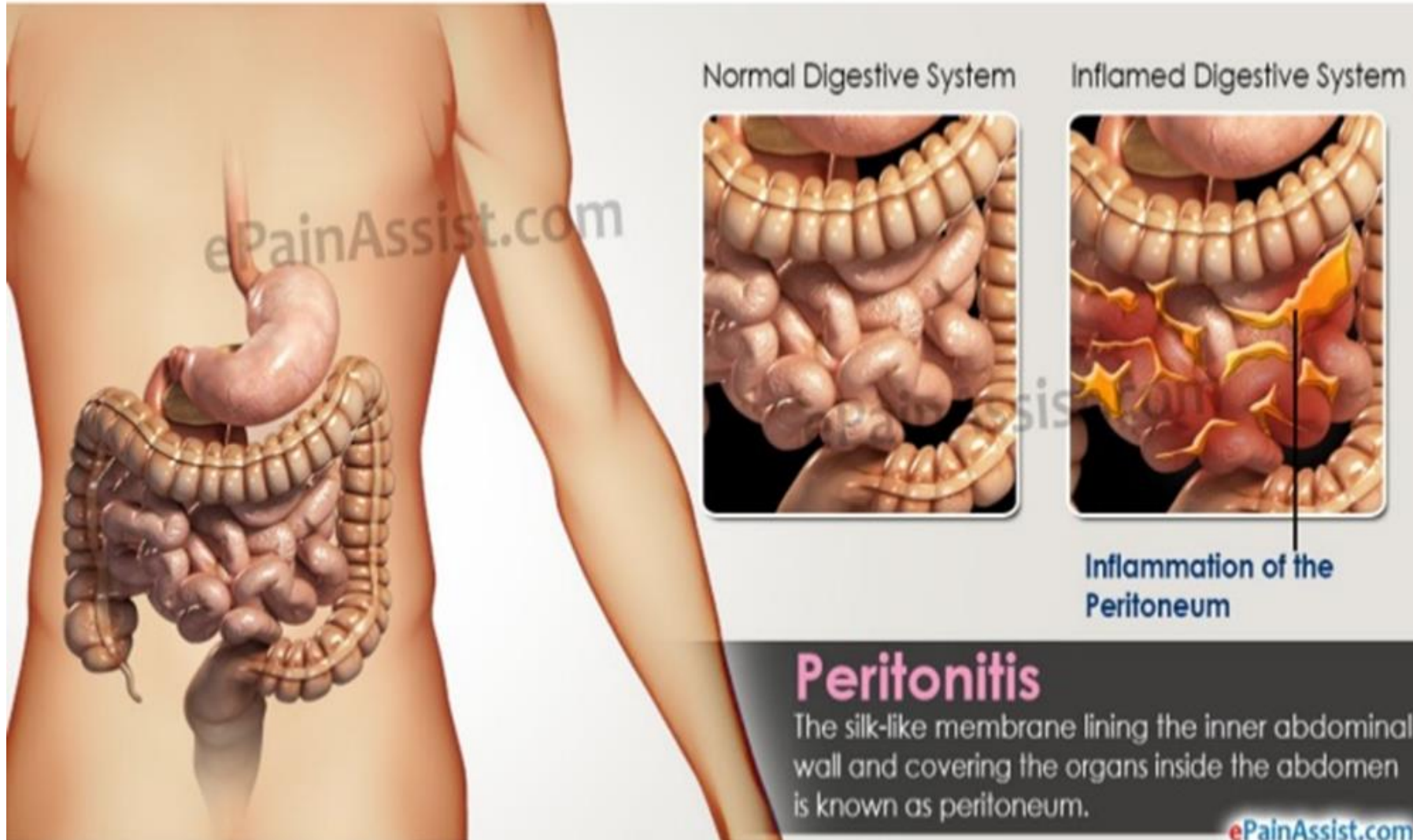
Pelvic peritonitis



Pelvic inflammatory disease. Note the adhesions between the uterus and the abdominal wall. These adhesions are commonly seen after a pelvic infection like PID.

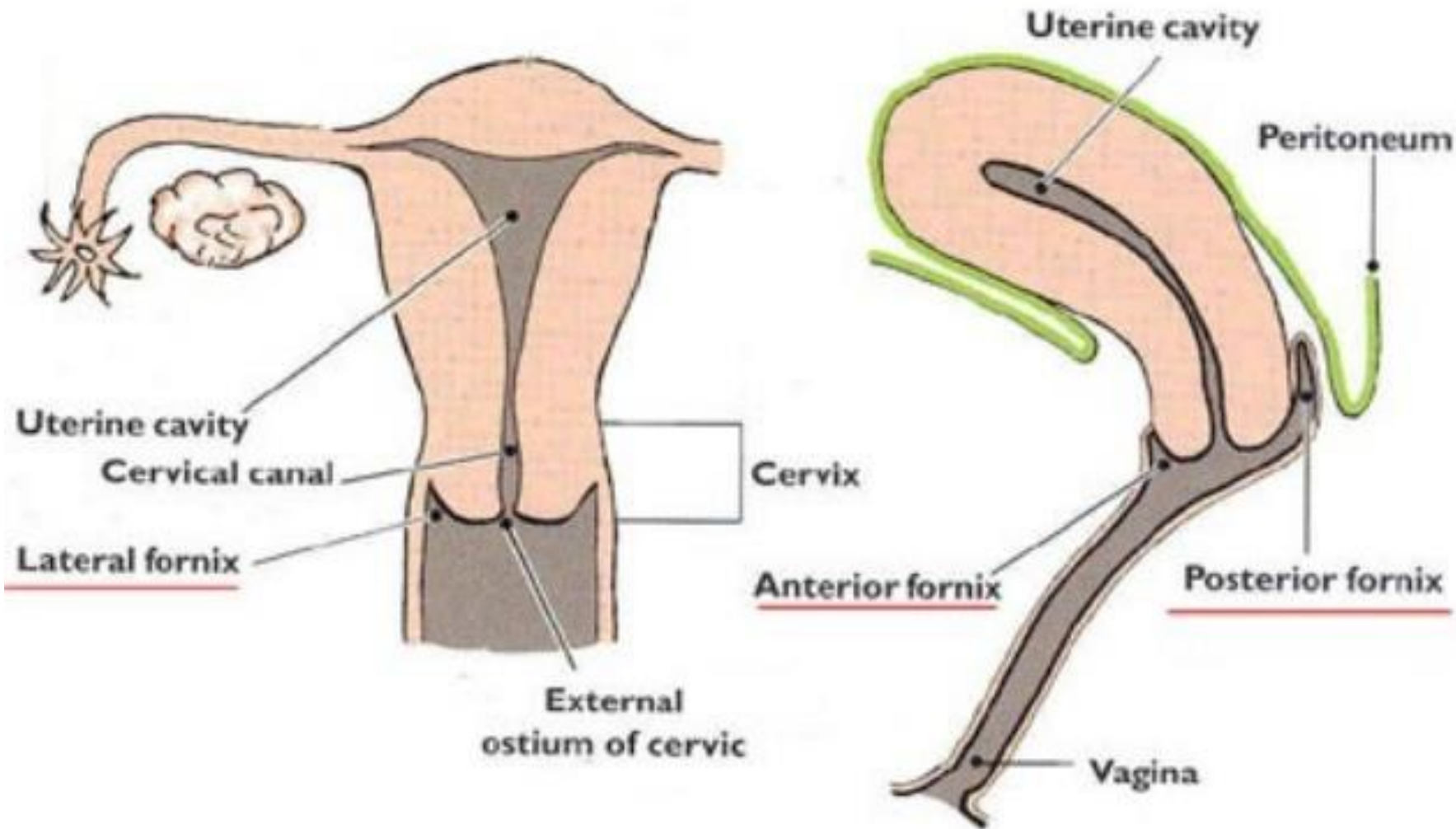
COMPLICATIONS

General peritonitis



COMPLICATIONS

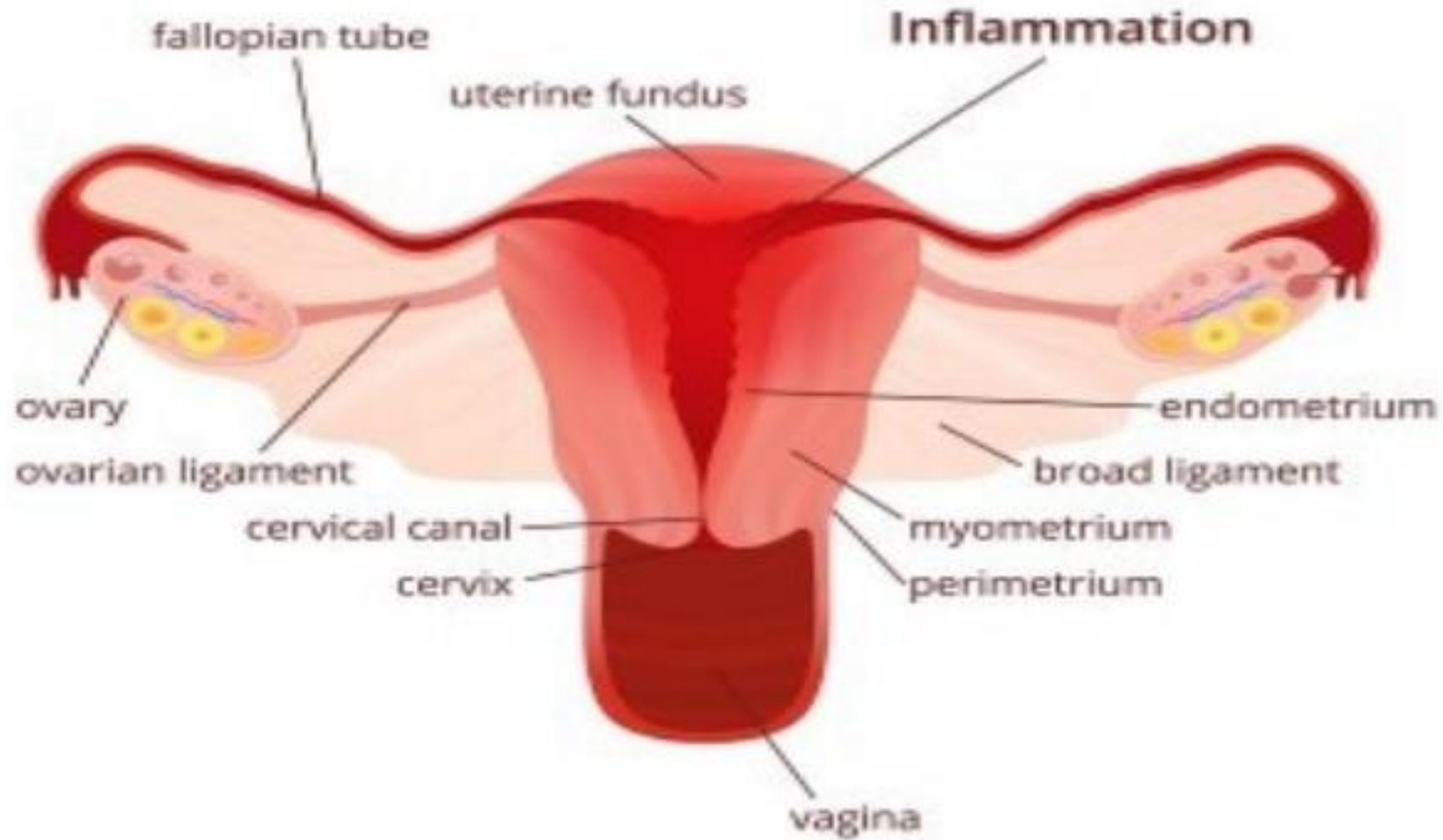
Fornix of vagina



COMPLICATIONS

ENDOMETRITIS

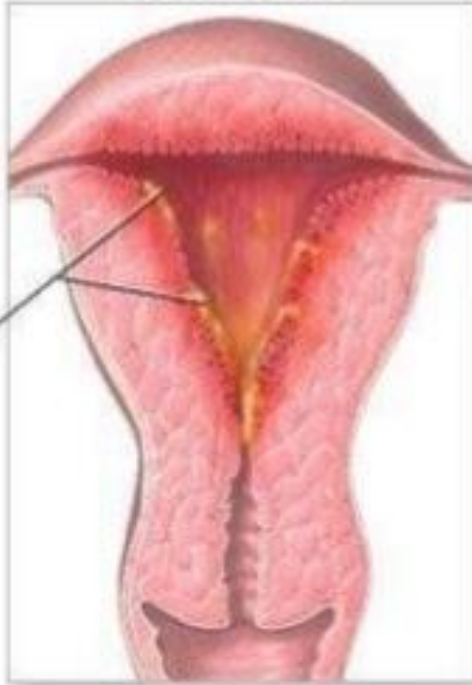
is inflammation of the endometrium



COMPLICATIONS



Endometritis



Inflammation and infection of the endometrium (the lining of the uterus)

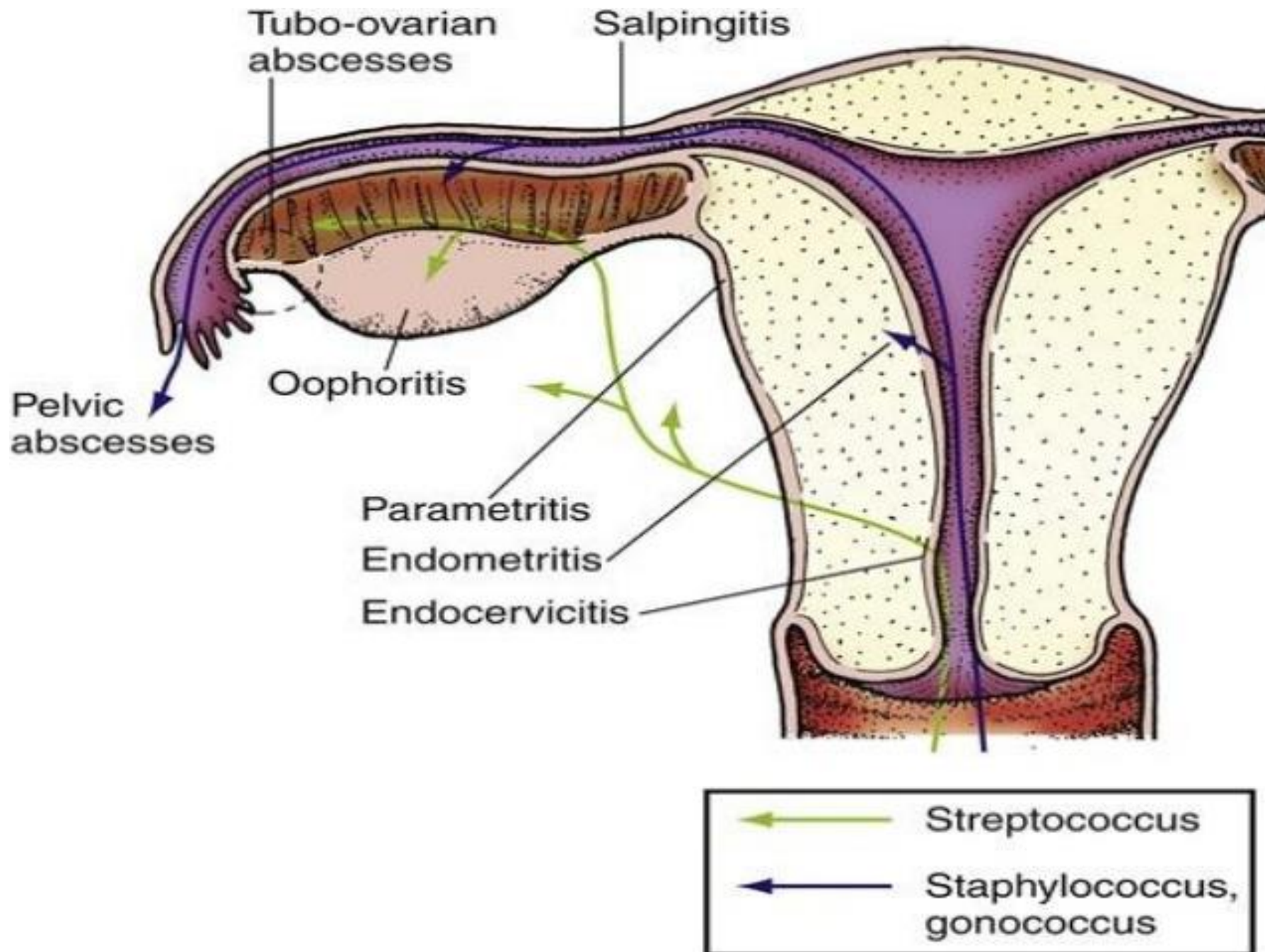
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A reproductive system with Endometritis

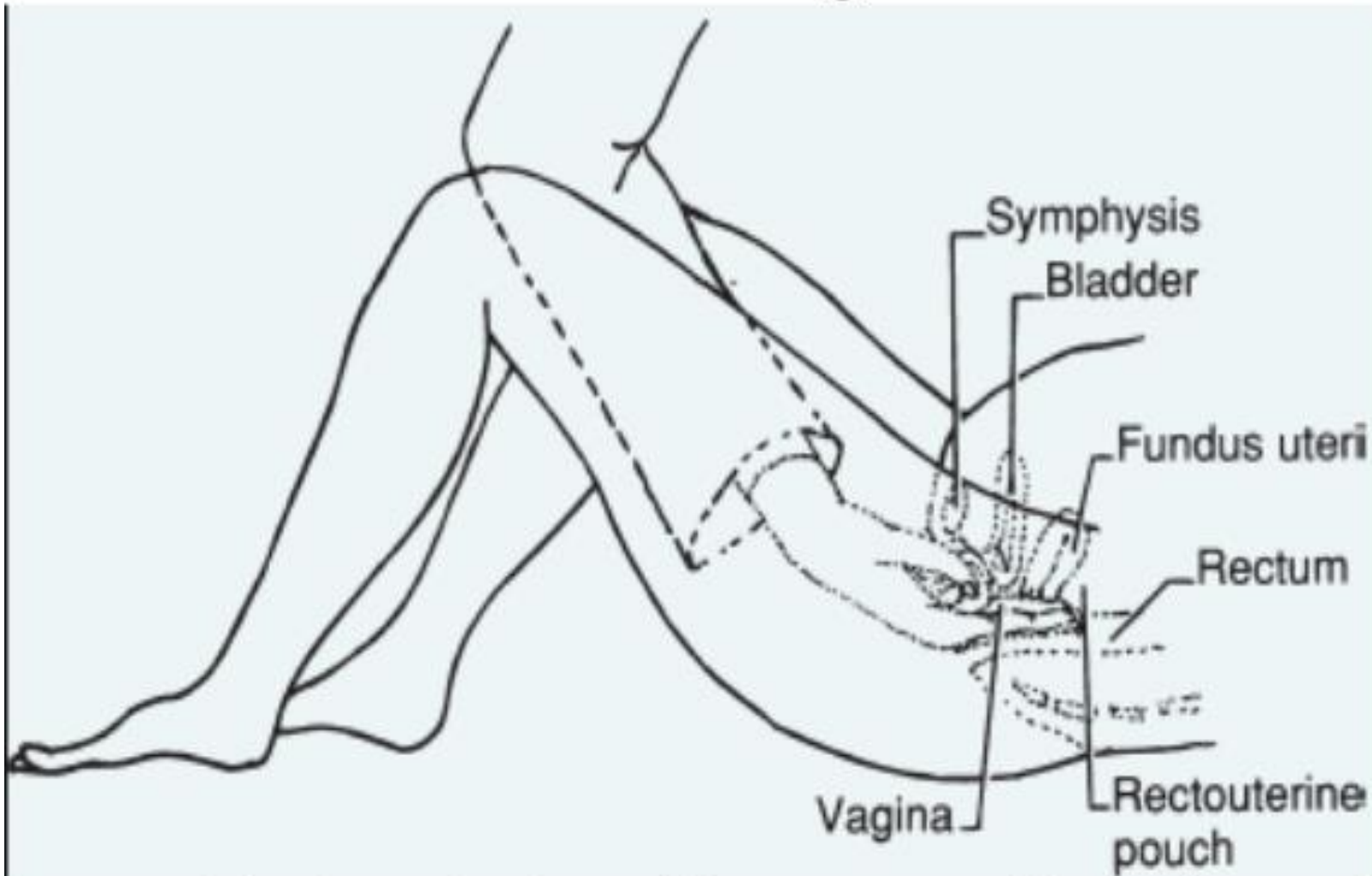
A reproductive system with growth of Endometriosis

COMPLICATIONS



COMPLICATIONS

bulging fluctuant mass in the pouch
of Douglas



COMPLICATIONS

Septic pelvic thrombophlebitis



COMPLICATIONS



DIAGNOSIS

DIAGNOSIS



DIAGNOSTIC EVALUATION

General principles in investigations are:

- (1) To locate the site of infection
- (2) To identify the organisms
- (3) To assess the severity of the disease.

Investigations of Puerperal Pyrexia includes:

- History
- Clinical examinations and
- Lab findings and investigations

DIAGNOSTIC EVALUATION

- History includes Antenatal, Intranatal and postnatal history of any high risk factor for infection like anemia, prolonged rupture of membranes or prolonged labor are to be taken.
- Clinical examination includes thorough general, physical and systemic examinations. Abdominal and pelvic examinations are done to note the involution of genital organs and locate the specific site of infection. Legs should be examined for thrombophlebitis or thrombosis.

DIAGNOSTIC EVALUATION continued

Investigations include:

- (1) High vaginal and endocervical swabs for culture in aerobic and anaerobic media and sensitivity test to antibiotics.
- (2) “Clean catch” midstream specimen of urine for analysis and culture including sensitivity test.
- (3) Blood for total and differential white cell count, hemoglobin estimation.
A low platelet count may indicate septicemia or DIC. Thick blood film should be examined for malarial parasites.
- (4) Blood culture, if fever is associated with chills and rigor.

DIAGNOSTIC EVALUATION continued

Other specific investigations:

- (5) Pelvic ultrasound to detect any retained bits of conception within the uterus, to locate any abscess within the pelvis or to collect samples (pus or fluid) from the pelvis for culture and sensitivity, and for color flow Doppler study to detect venous thrombosis.
- (6) CT and MRI is needed especially when diagnosis is in doubt or there is pelvic vein thrombosis.
- (7) X-ray chest (CXR) to detect any lung pathology like collapse and atelectasis (following inhalation anesthesia).
- (8) Blood urea and electrolytes to detect if renal failure develops later in the course of the disease
- (9) laparotomy- to further examine the abdominal organs

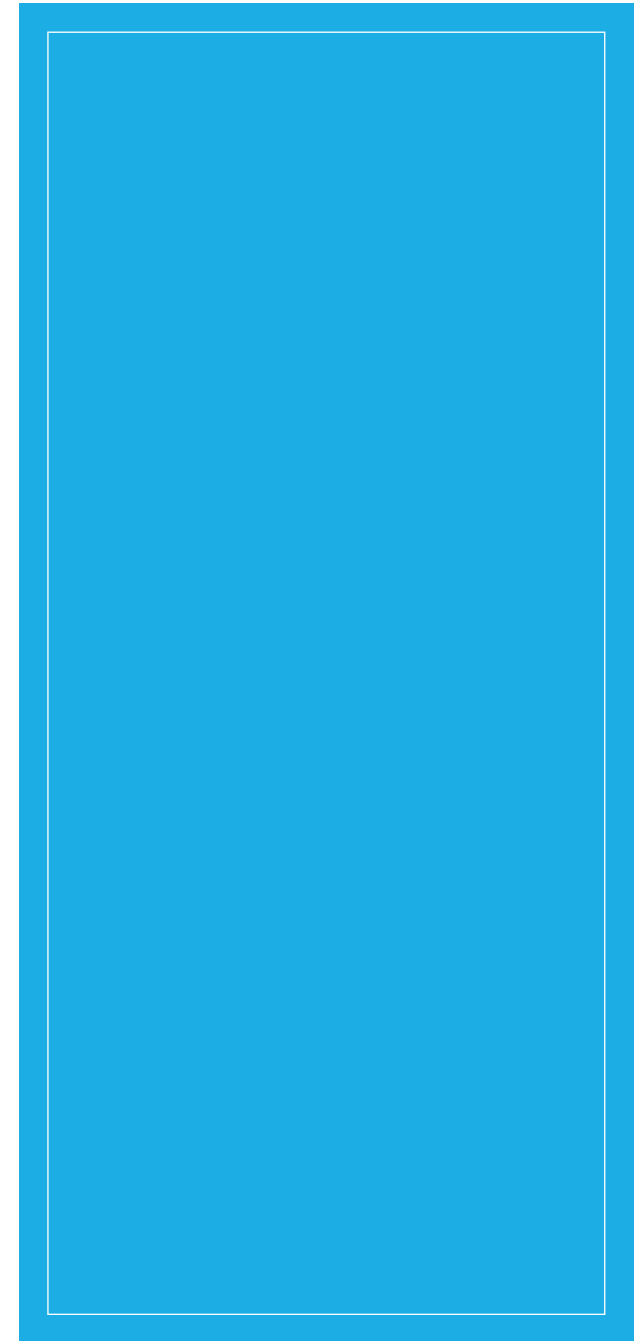
TREATMENT

MEDICAL MANAGEMENT

SURGICAL MANAGEMENT

NURSING MANAGEMENT

Medical management



Medical management

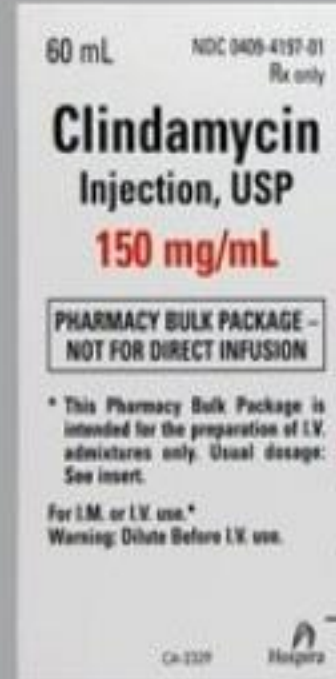
Antibiotics: Ideal antibiotic regimen should depend on the culture and sensitivity report.

- Gentamicin (1.5mg/kg/8 hourly) + Clindamycin (900mg/8 hourly)
- Metronidazole (500mg/12 hr)+ Penicillin (5 million units/6 hr)
- Clindamycin + aztreonam (2 gm/8hr) • Ampicillin (2gm/6hr) + gentamycin
- Antibiotic Regimens -A combination of either piperacillin-tazobactam or carbapenem
- Women with MRSA (Methicillin-resistant S. aureus) infection should be treated with vancomycin or teicoplanin.

Gentamicin + Clindamycin



1.5mg/kg/8 hourly



+



900mg/8hourly

Metronidazole + Penicillin



500mg/12 hr



+ 5 million units/6 hr

Clindamycin + aztreonam



Ampicillin + gentamycin



piperacillin-tazobactam



vancomycin , teicoplanin.



Surgical management



SURGICAL MANAGEMENT

**Stitches of
the
perineal
wound**

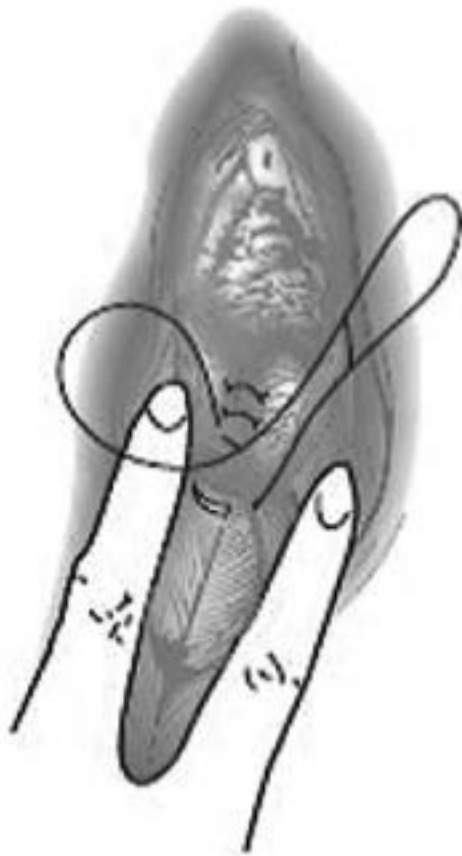
**Surgical
evacuation**

Colpotomy

Laprotomy

Hystrectomy

stitches of the perineal wound



a. Loose, continuous, non-locking
stitch to vaginal wall

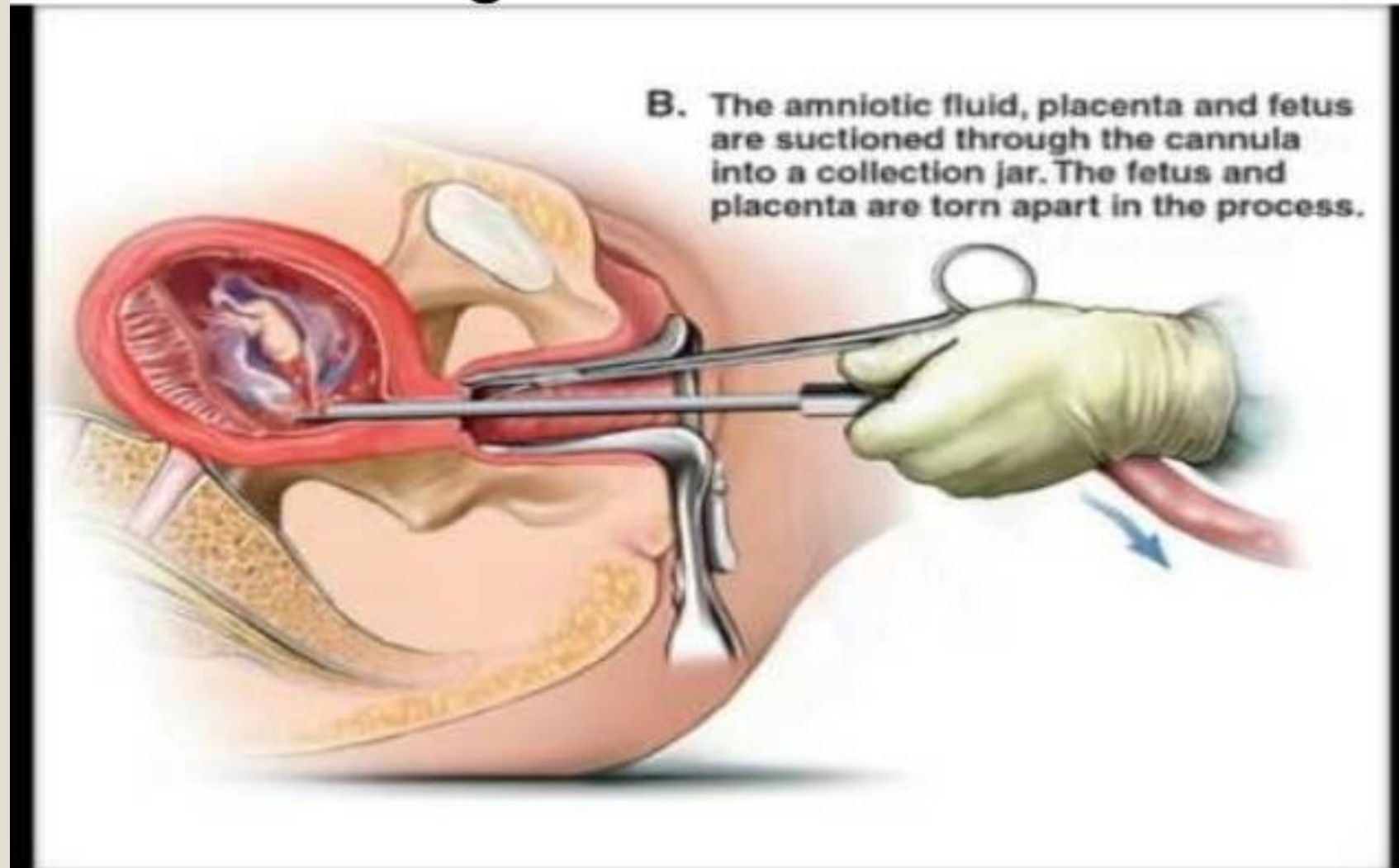


b. Loose, continuous, non-locking
stitch to perineal muscles

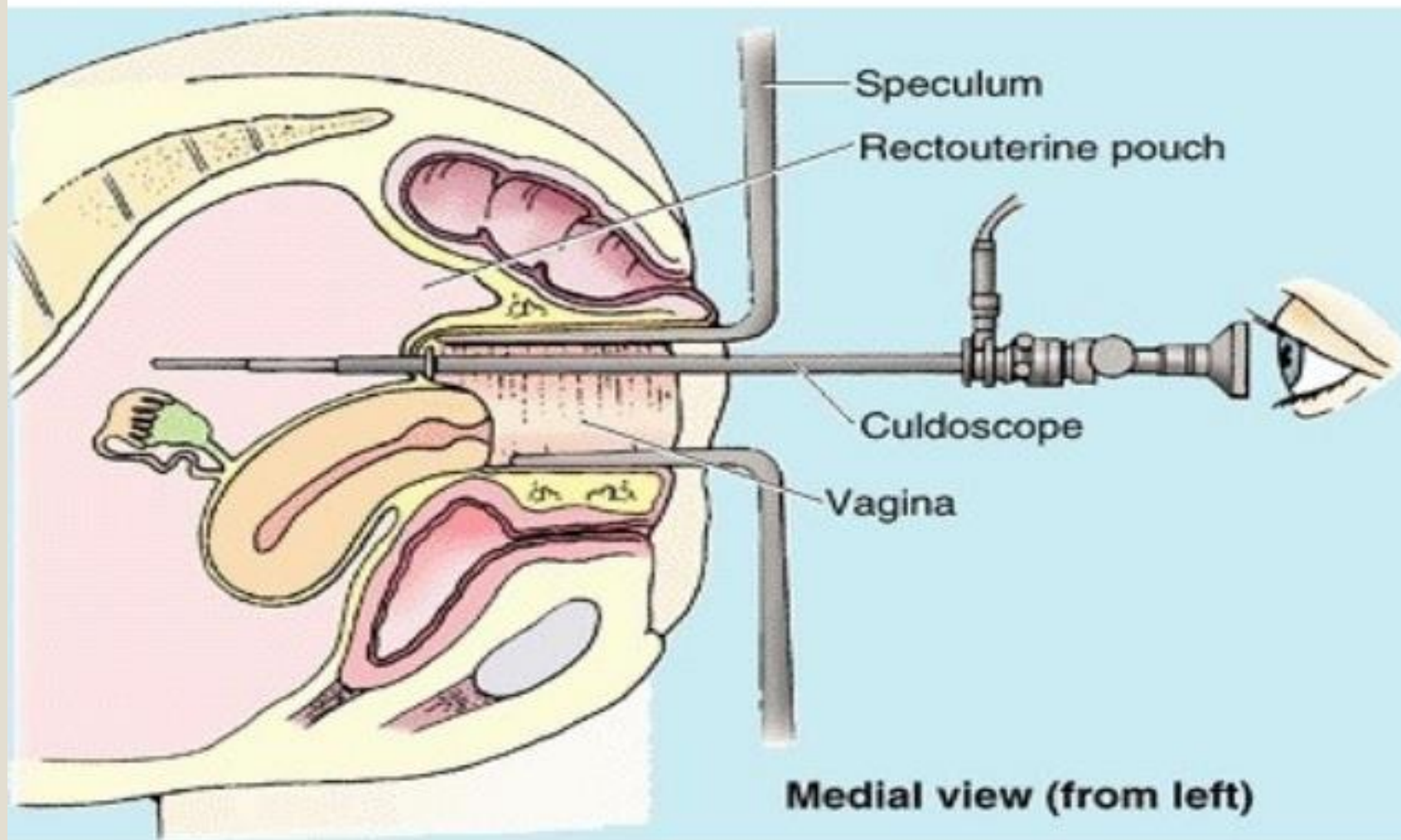


c. Closure of skin using a
loose subcutaneous stitch

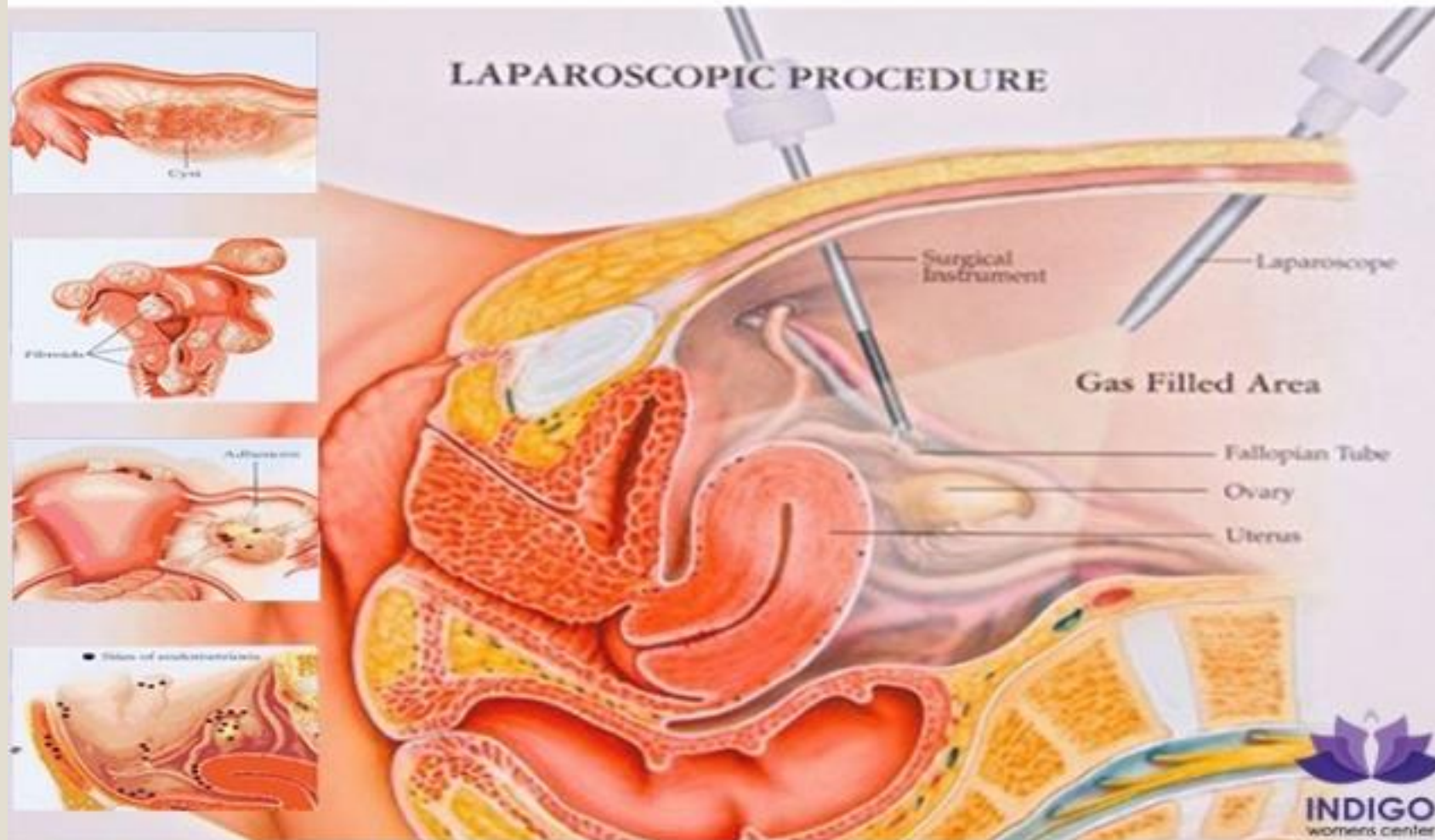
surgical evacuation



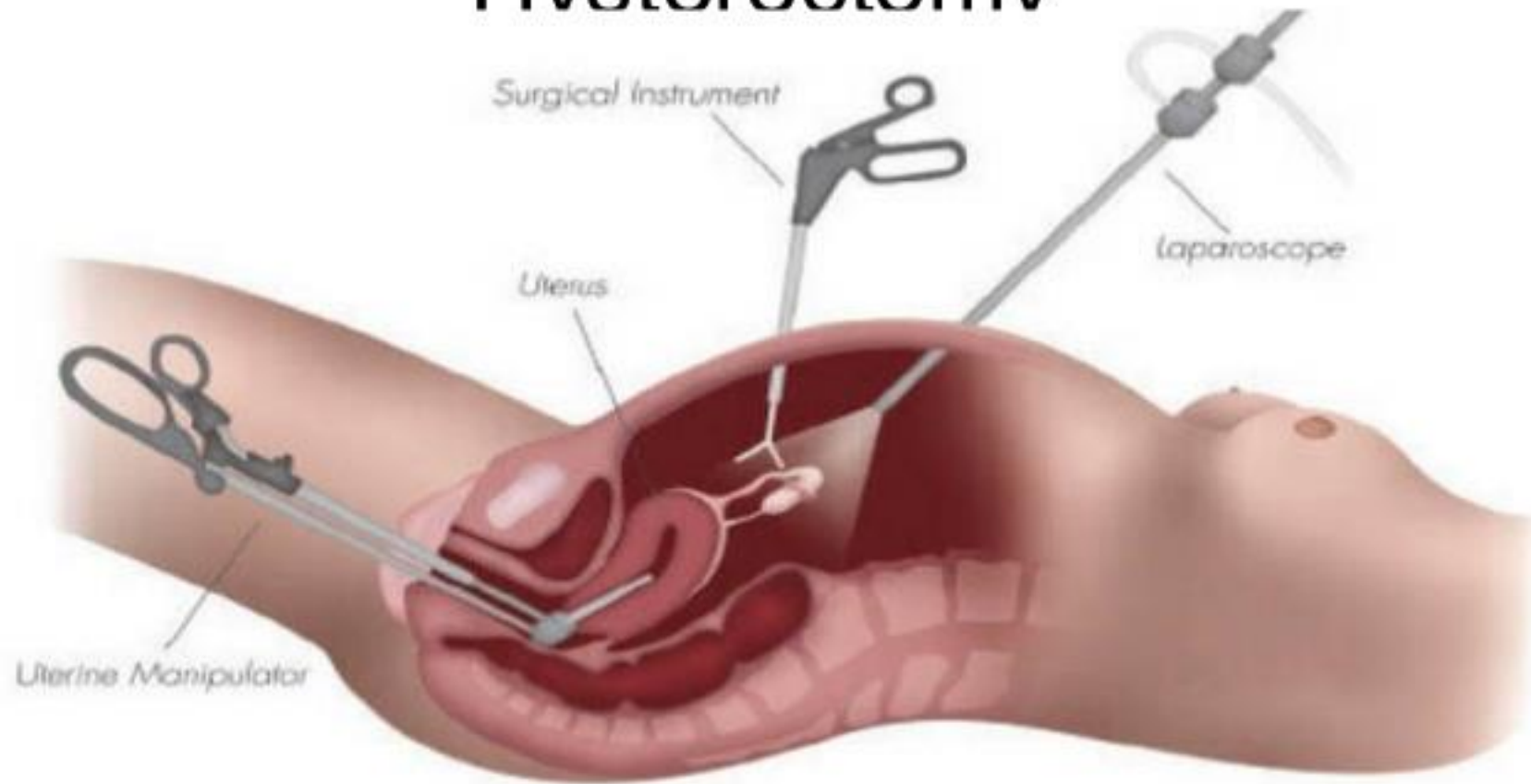
colpotomy



Laparotomy



Hvsterectomy



Laparoscopic Hysterectomy

Nursing management



Nursing management

- Isolation of the patient
- Adequate fluid and calorie
- Correcting Anemia
- Indwelling catheter
- A chart is maintained by recording pulse, respiration, temperature, lochial discharge, and fluid intake and output
- Ensure that wound is cleaned with sitz bath several times a day and is dressed with an antiseptic ointment
- Dehiscence of episiotomy or abdominal wound following cesarean section is managed by scrubbing the wound twice daily, debridement of all necrotic tissue and then closing the wound with secondary suture.



PROPHYLAXIS

PROPHYLAXIS:- Antenatal prophylaxis includes

- improvement of nutritional status (to raise hemoglobin level) of the pregnant woman and
- eradication of any septic focus (skin, throat, tonsils) in the body.

PROPHYLAXIS:- Intranatal prophylaxis include

- ✓ Full surgical asepsis during delivery
- ✓ Screening for Group B Streptococcus in a high risk patient
- ✓ Prophylactic use of antibiotic at the time of cesarean section has significantly reduced the incidence of wound infection, endometritis, urinary tract infection and other serious infections.

CONCLUSION

Postpartum infections, also known as childbed fever and puerperal fever, are any bacterial infections of the female reproductive tract following childbirth or miscarriage. Signs and symptoms usually include a fever greater than 38.0 °C (100.4 °F), chills, lower abdominal pain, and possibly bad-smelling vaginal discharge. It usually occurs after the first 24 hours and within the first ten days following delivery.

Thank
you.

