



**Medical Analysis
Department**

Trichomonas vaginalis & Dipstick analysis

Parasitology (MA 301)

Summer School

Lab 3

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August 26, 2026

Trichomonas vaginalis

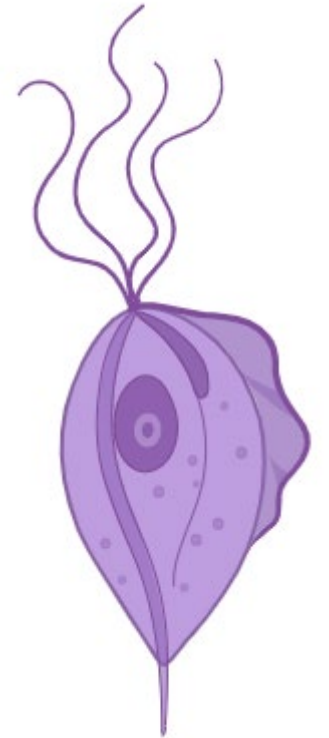
Introduction

Trichomonas differs from other flagellates, as they exist only in the trophozoite stage. The cystic stage is not seen.

The genus *Trichomonas* has three species, which occur in

humans :

1. *T. vaginalis*
2. *T. hominis*
3. *T. tenax*



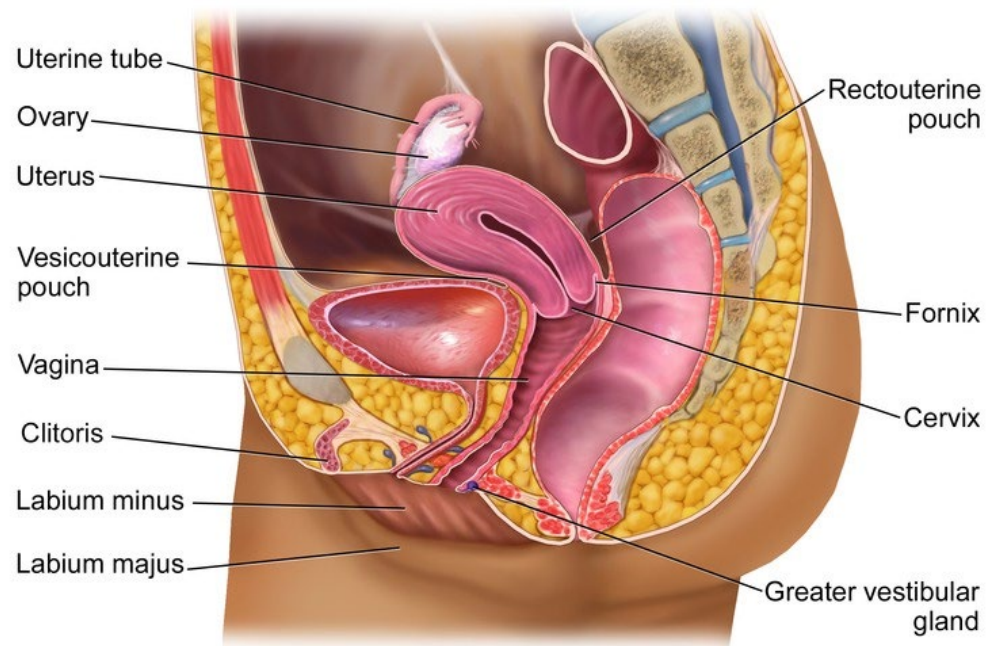
Distribution

T: vaginalis was first observed by Donne (1836) in vaginal secretion.

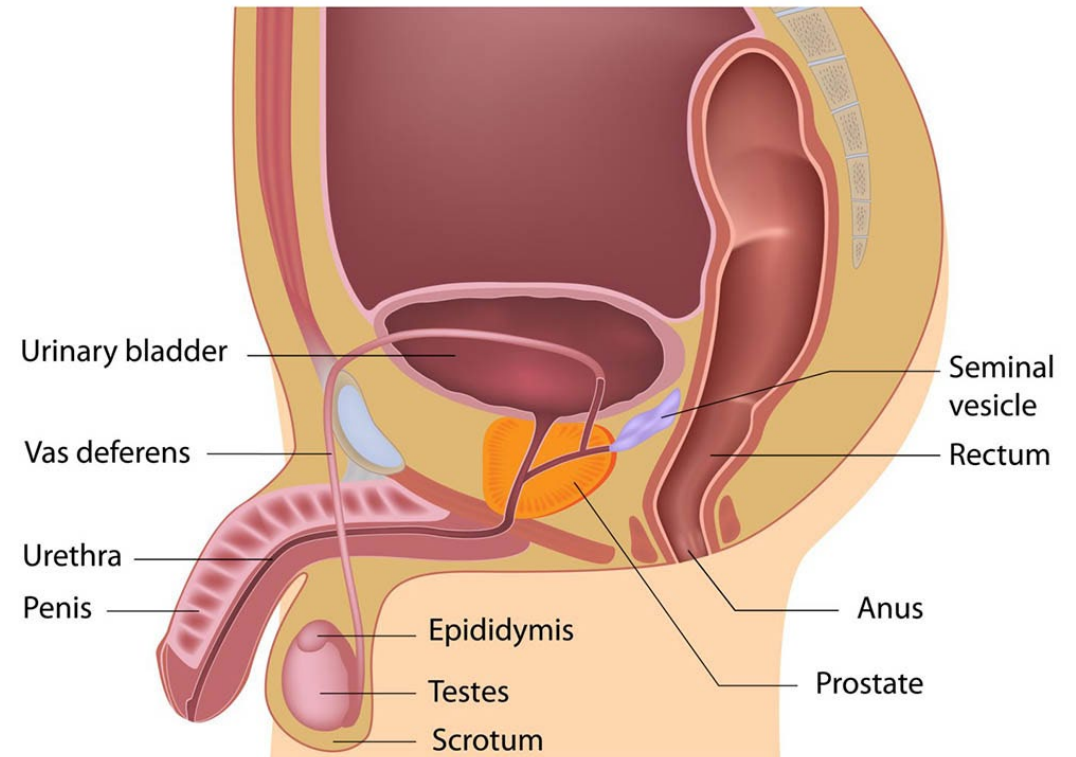
Prevalence of trichomoniasis varies from 5% patients at hospitals to 75% in sexual workers.

Habitat

In females, it lives in vagina and cervix and may also be found in Bartholin's glands, urethra and urinary bladder. In males, it occurs mainly in the anterior urethra but may also be found in the prostate and preputial sac.



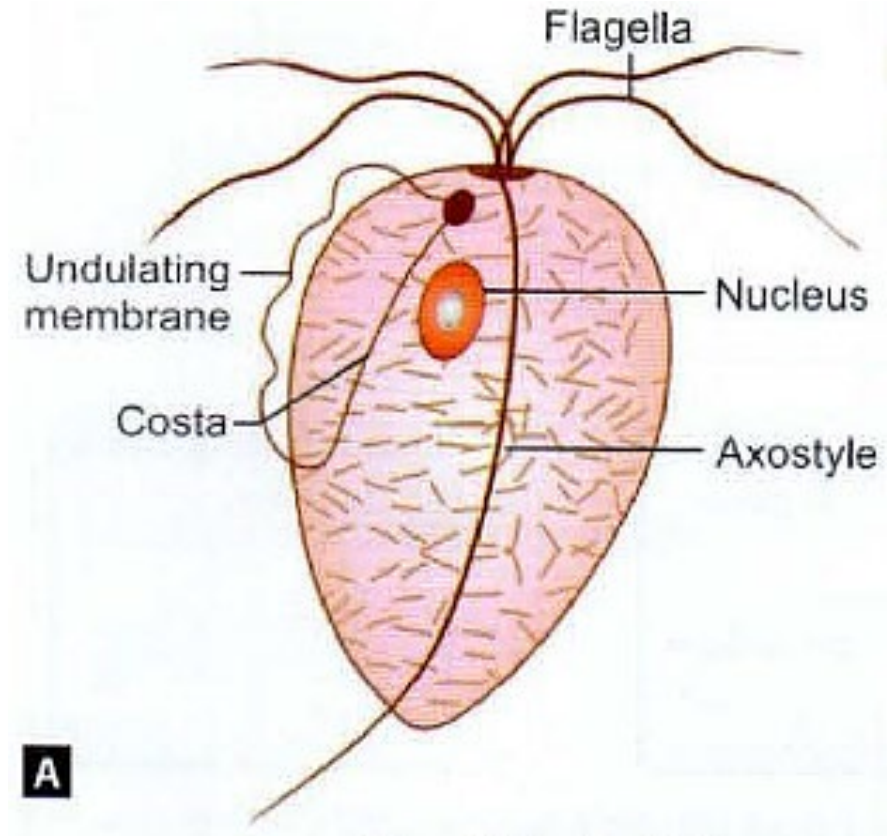
The Female Reproductive System



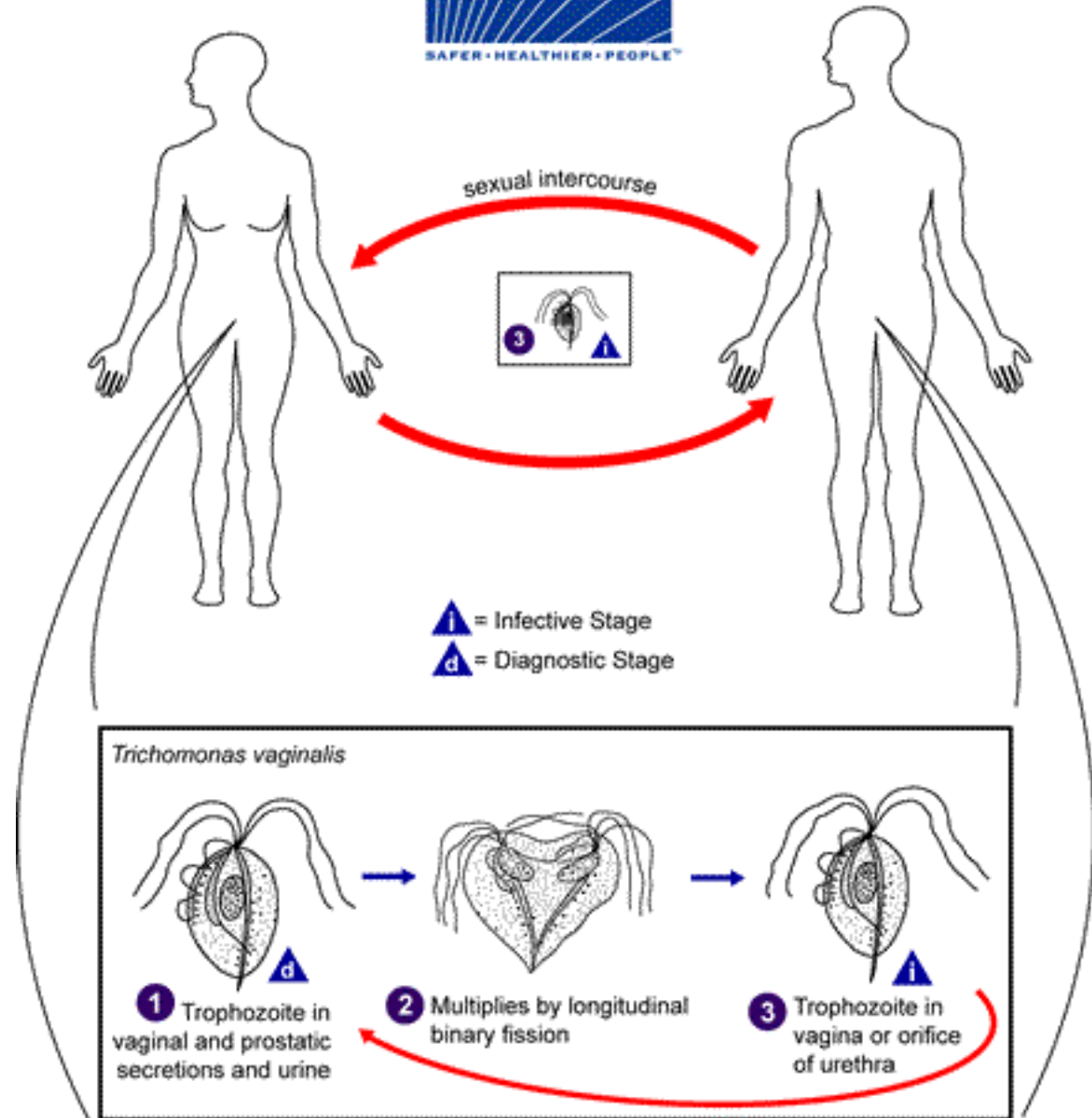
Morphology

Trophozoite

- It is pear-shaped or ovoid and measures 10-30 μm in length and 5-10 μm in breadth with a short undulating membrane reaching up to the middle of the body.
- It has four anterior flagella and fifth running along the outer margin of the undulating membrane, which is supported at its base by a flexible rod, costa.
- A prominent axostyle runs throughout the length of the body and projects posteriorly like a tail.
- It is motile with a rapid jerky or twitching type movement.



Life Cycle

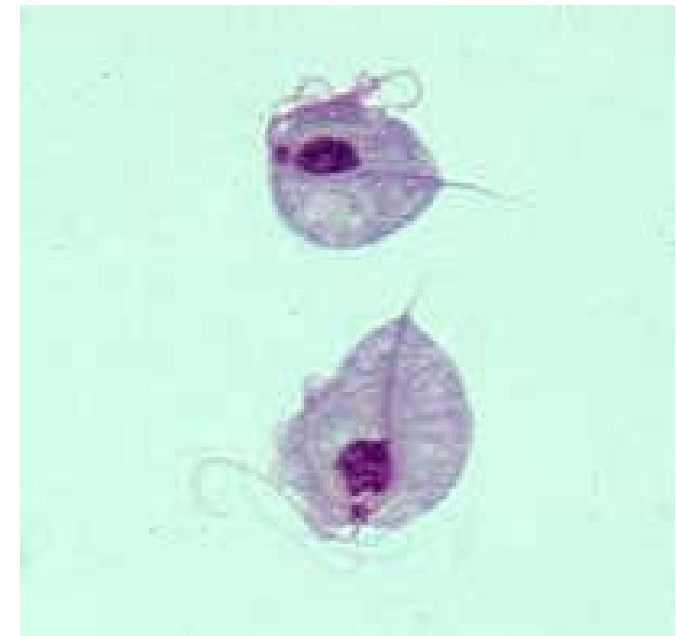


Laboratory Diagnosis

1. Microscopic examination

Wet mount:

Vaginal or urethral discharge is examined microscopically in a saline wet mount preparation for characteristic jerky and twitching motility and shape. In males, trophozoites may be found in urine or prostatic secretions. An abundance of leukocytes is seen.



Laboratory Diagnosis

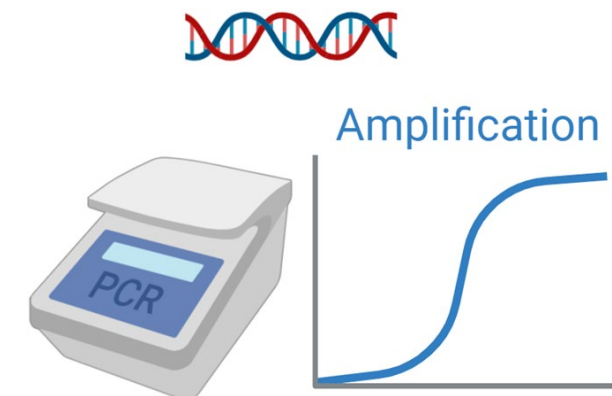
2. Serology

Enzyme-linked immunosorbent assay is used for the demonstration of *T. vagina*/is antigen in vaginal smear using a monoclonal antibody



3. Molecular method:

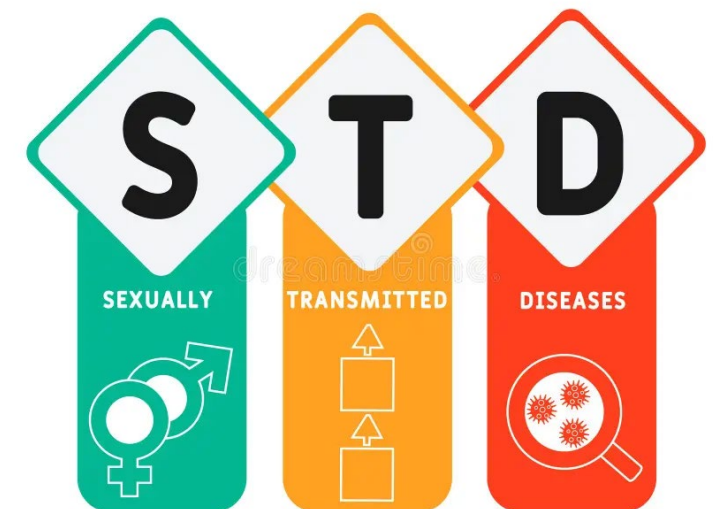
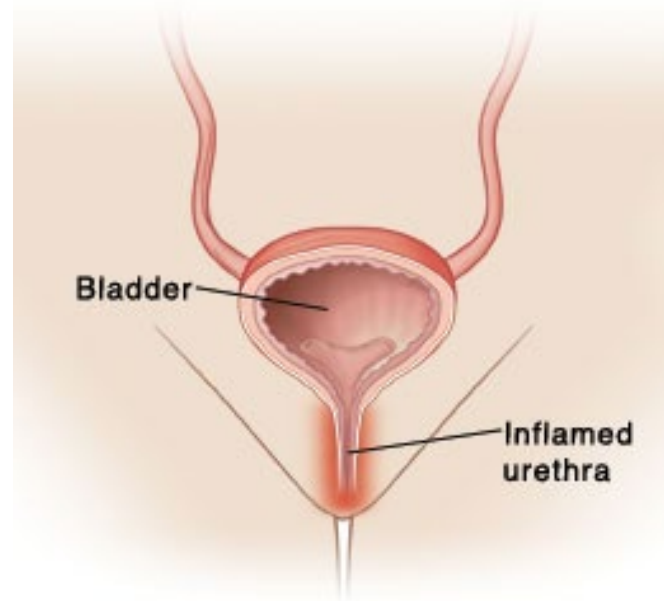
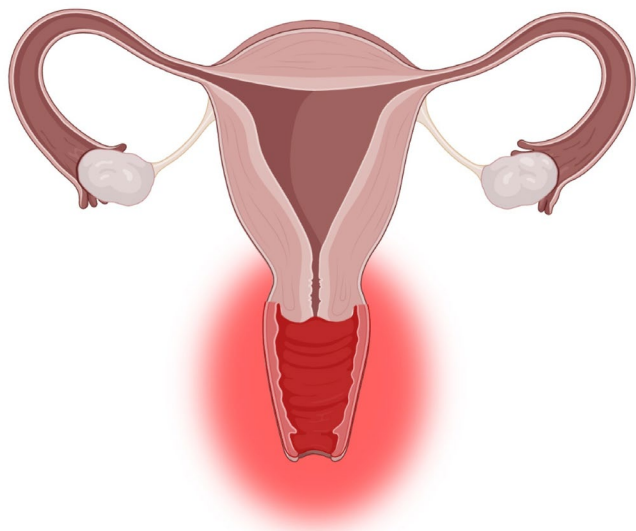
Deoxyribonucleic acid hybridization and PCR are also highly sensitive (97%) and specific (98%) tests for the diagnosis of trichomoniasis.



Genital Examination

Introduction

Parasitic infections of the genital tract are among the major causes of vaginitis, urethritis, and sexually transmitted diseases.



Examples of Sexually transmitted disease

What Parasites we can detect?

- The most common protozoan parasite responsible for genital infection is **Trichomonas vaginalis**, which infects both males and females through sexual contact.
- Other parasites such as ***Enterobius vermicularis*** (occasionally found in the vagina)
- ***Sarcoptes scabiei*** (scabies), and ***Phthirus pubis*** (pubic lice) may also be detected from genital areas.

Specimen Types

Specimen Type	Source	Purpose
Vaginal or urethral swab	Discharge from genital tract	Detection of <i>Trichomonas vaginalis</i>
Skin scraping	Genital or pubic area	Detection of mites or lice
Pubic hair sample	Hair shafts	Identification of <i>Phthirus pubis</i> nits or adults

Specimen Collection and Handling

- Use a **sterile cotton swab or loop** to collect vaginal or urethral discharge.
- Avoid contamination with urine or menstrual blood.
- Transport the specimen **immediately** to the laboratory Maintain aseptic technique and proper labeling of all samples.

Macroscopic Examination

- Observe color, consistency, and odor of discharge.
- A **frothy, yellow-green discharge** suggests *Trichomonas vaginalis* infection.

Microscopic Examination

1. Saline Wet Mount

- Place a drop of saline on a slide.
- Add a small portion of the discharge.
- Cover with a coverslip and examine under 10× and 40×.
- Look for **motile trophozoites** of *Trichomonas vaginalis* (rapid, jerky movement).

2. Stained Smear (Giemsa or Pap stain)

- Useful if motility is lost.
- Trophozoites appear oval or pear-shaped with a nucleus and four anterior flagella.

3. For Ectoparasites

- Examine hair shafts or skin scraping under low power for mites, eggs, or lice.

Why is *T. vaginalis* examined in fresh wet mount rather than after fixation?



Chemical Examination (Dipstick)

Chemical Examination (Dipstick)

Using urine reagent strips:

- **pH:** 4.5–8.0; alkaline in UTI.
- **Protein:** Normally absent; present in nephrotic syndrome and infection.
- **Glucose:** Abnormal in diabetes mellitus.
- **Ketones:** Diabetes, starvation, vomiting.
- **Bilirubin & Urobilinogen:** Liver or biliary disease.
- **Blood/Hemoglobin:** Trauma, stones, infection, hemolysis.
- **Nitrite & Leukocyte esterase:** Suggestive of UTI.



pH

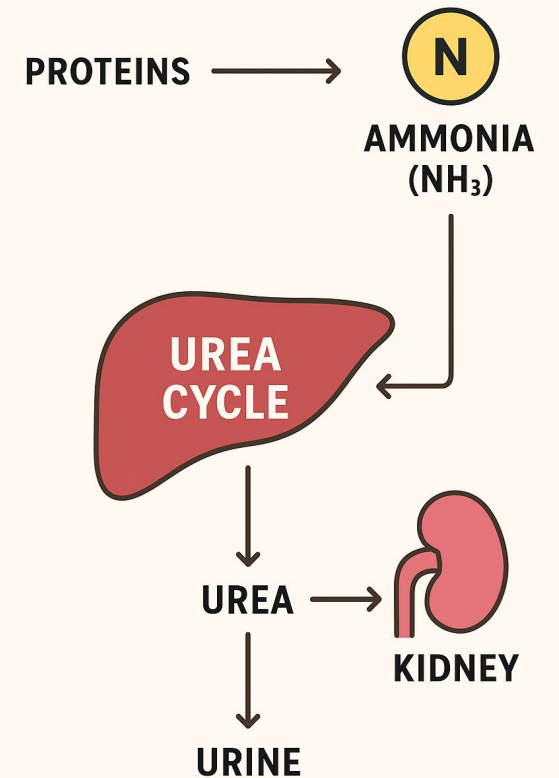
Indications:

Acidic urine:

- Metabolic or respiratory acidosis
- Diabetes mellitus (ketone formation)
- Starvation, dehydration, diarrhea

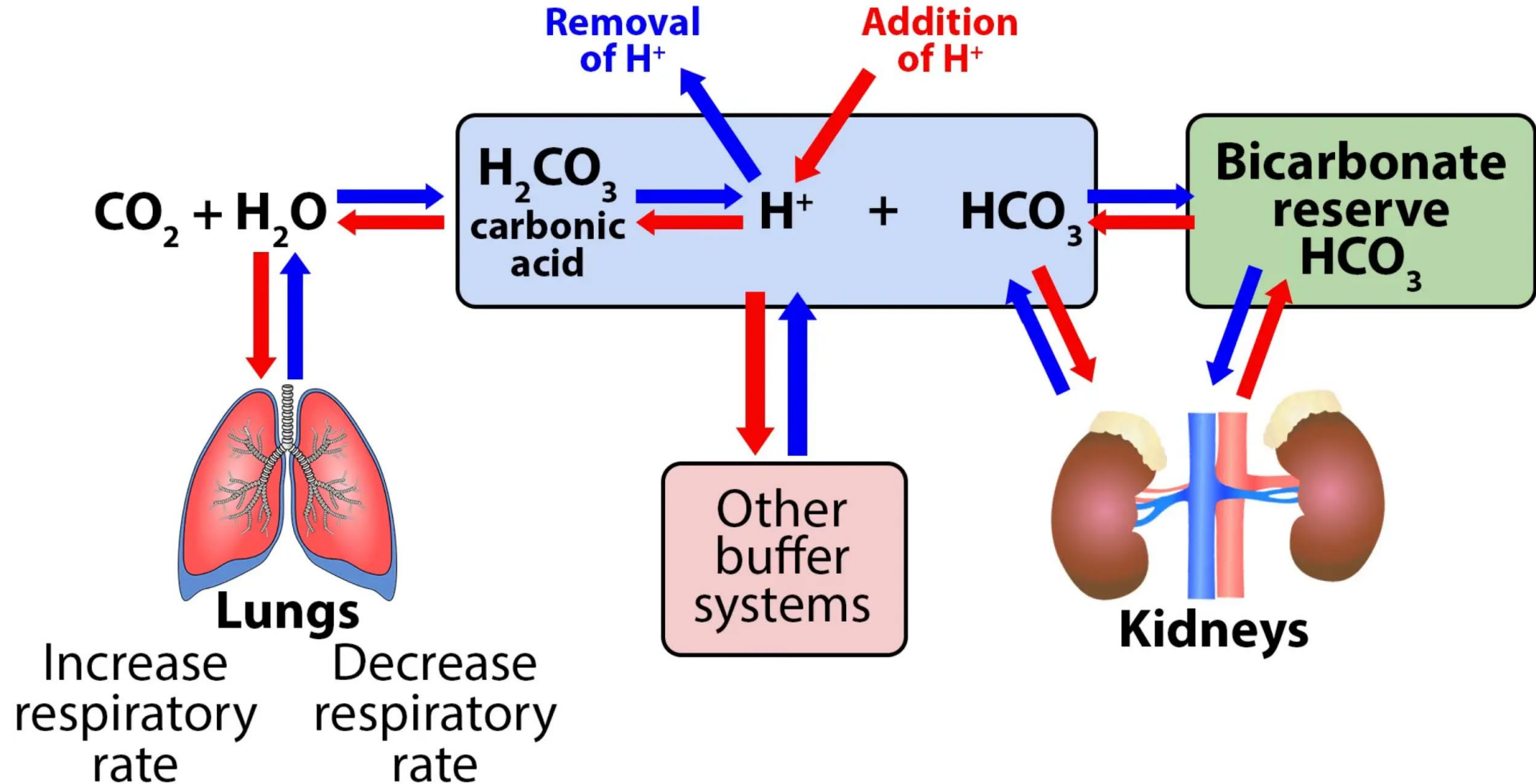
Alkaline urine:

- Urinary tract infection (with urea-splitting bacteria)
- Renal tubular acidosis



pH

Maintaining proper pH of blood and body tissues



5. Specific Gravity

We measure the specific gravity (SG) of urine to check how well the kidneys can concentrate and dilute urine.

Definition: Specific gravity = ratio of the density of urine to the density of pure water.

Measure by urinometer or dipstick.

- Normal: 1.015–1.025

Specific Gravity

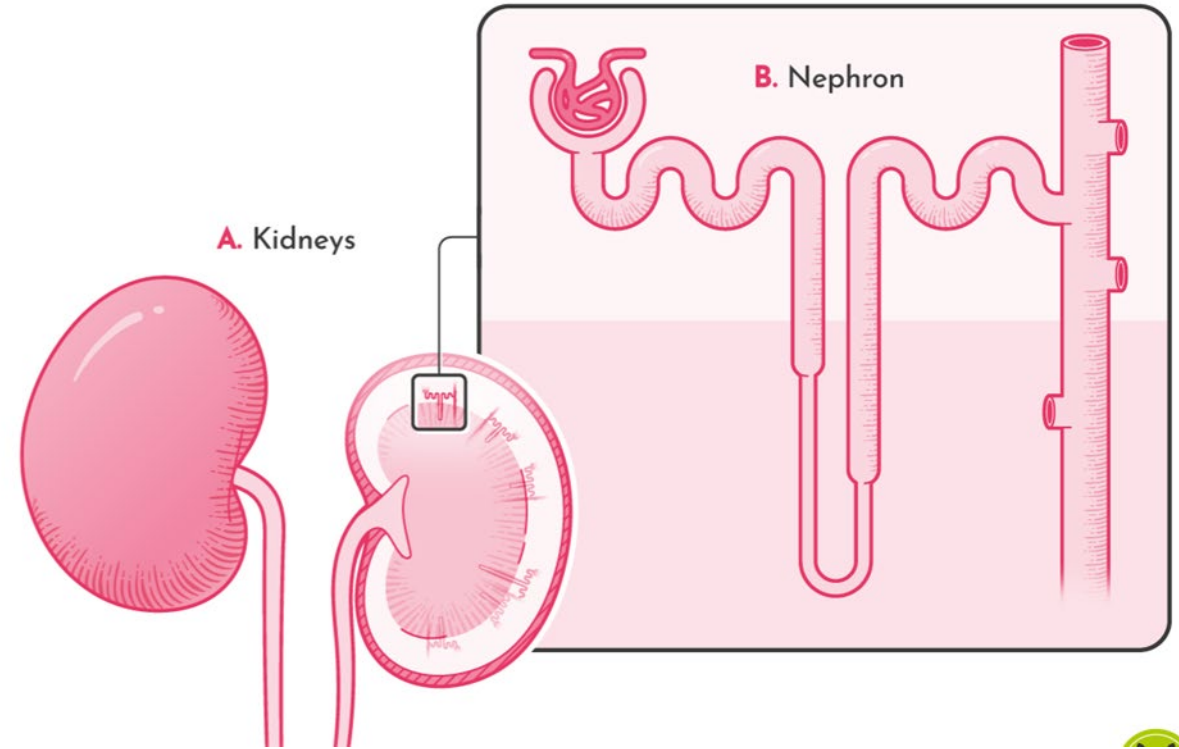
Indications:

High SG:

- Dehydration
- Glycosuria (diabetes mellitus)
- Proteinuria

Low SG:

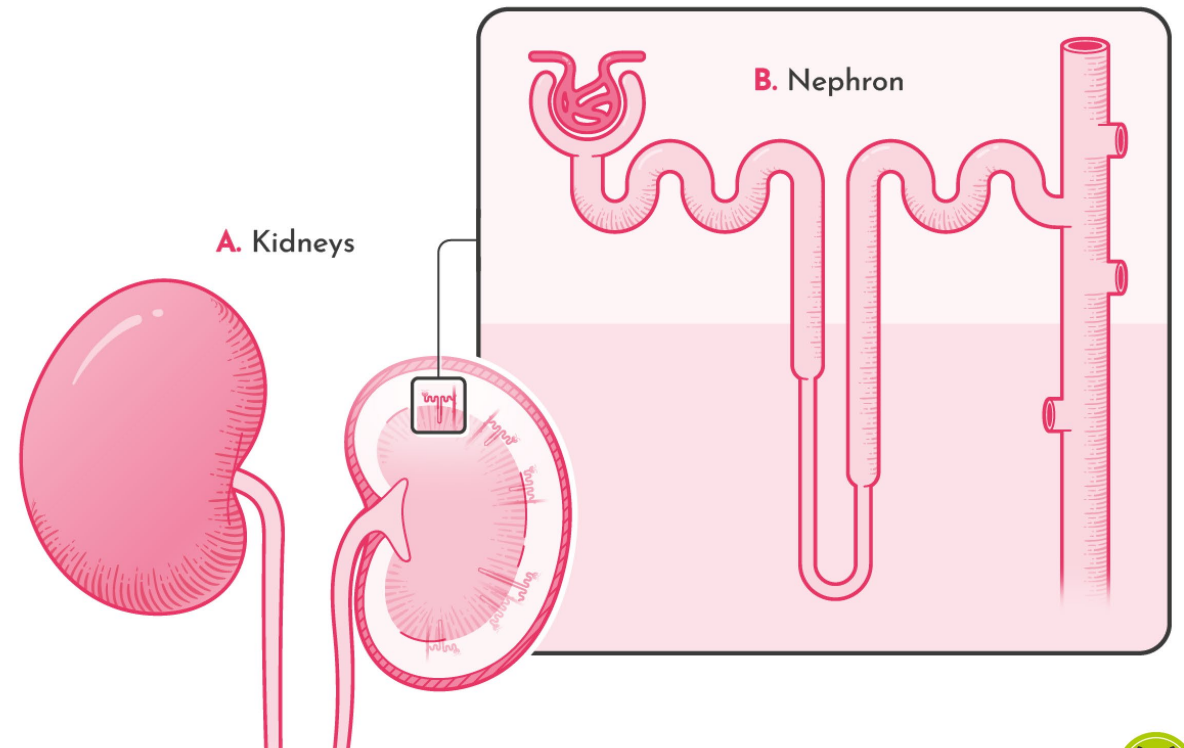
- Overhydration
- Diabetes insipidus
- Chronic renal failure (loss of concentrating ability)



Protein

Proteinuria indicates:

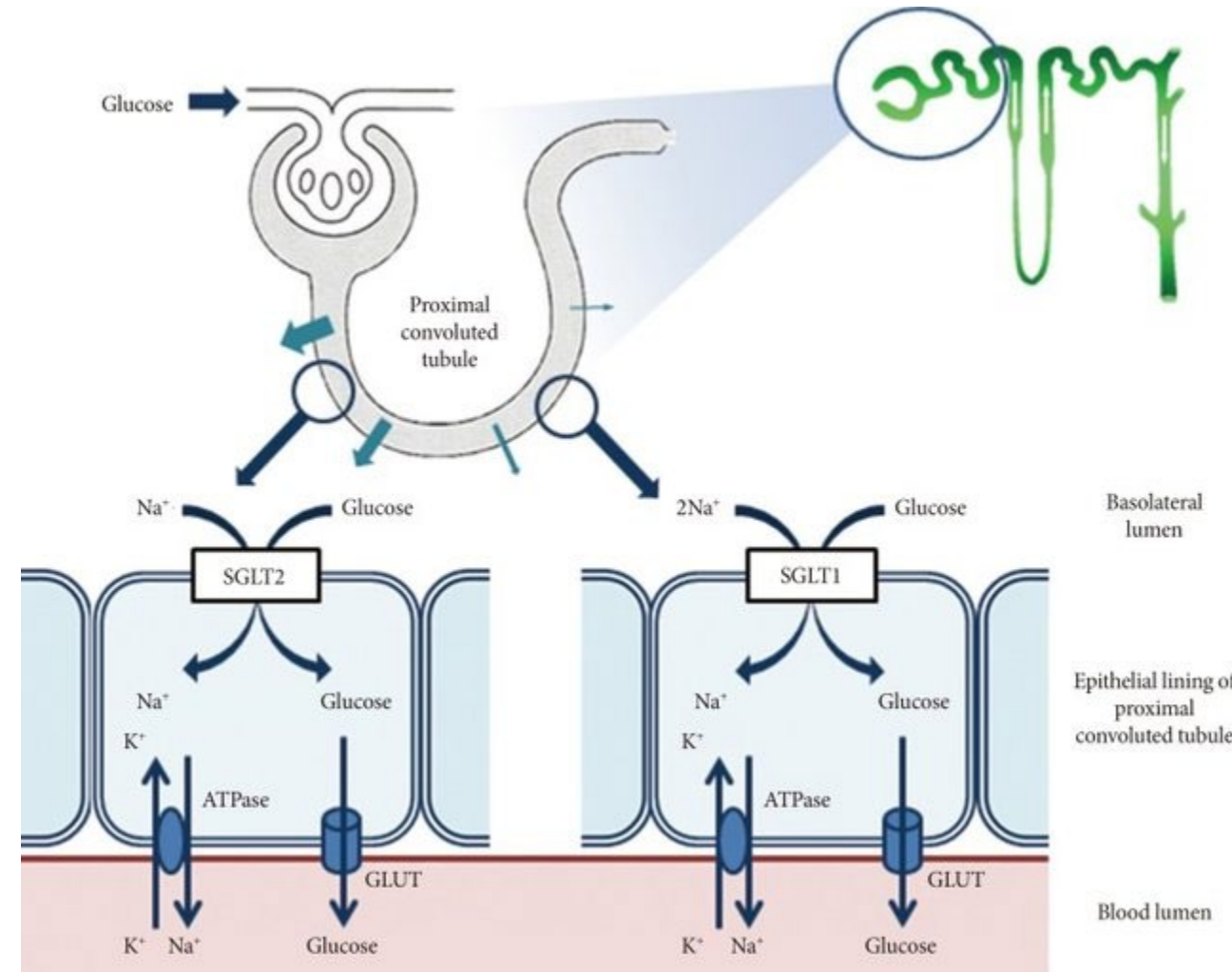
- Glomerular diseases (e.g., glomerulonephritis, nephrotic syndrome)
- Hypertension, diabetes mellitus
- Infections or inflammation of the urinary tract
- Fever, exercise, or stress (temporary/physiological)

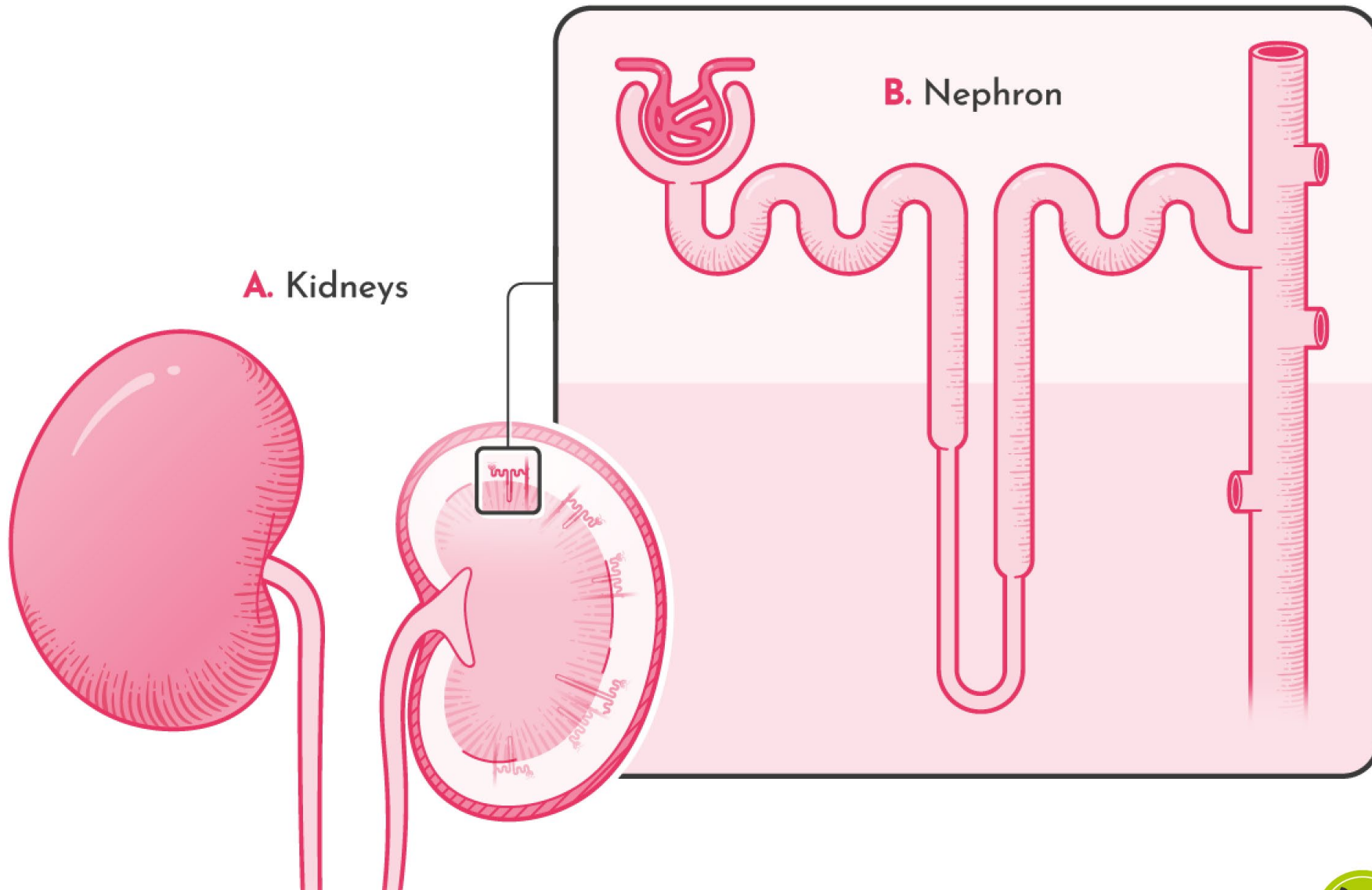


Glucose

Glycosuria indicates:

- Diabetes mellitus (the most common cause)
- Renal glycosuria (tubular reabsorption defect)
- Cushing's syndrome, hyperthyroidism, or after a high-carbohydrate meal

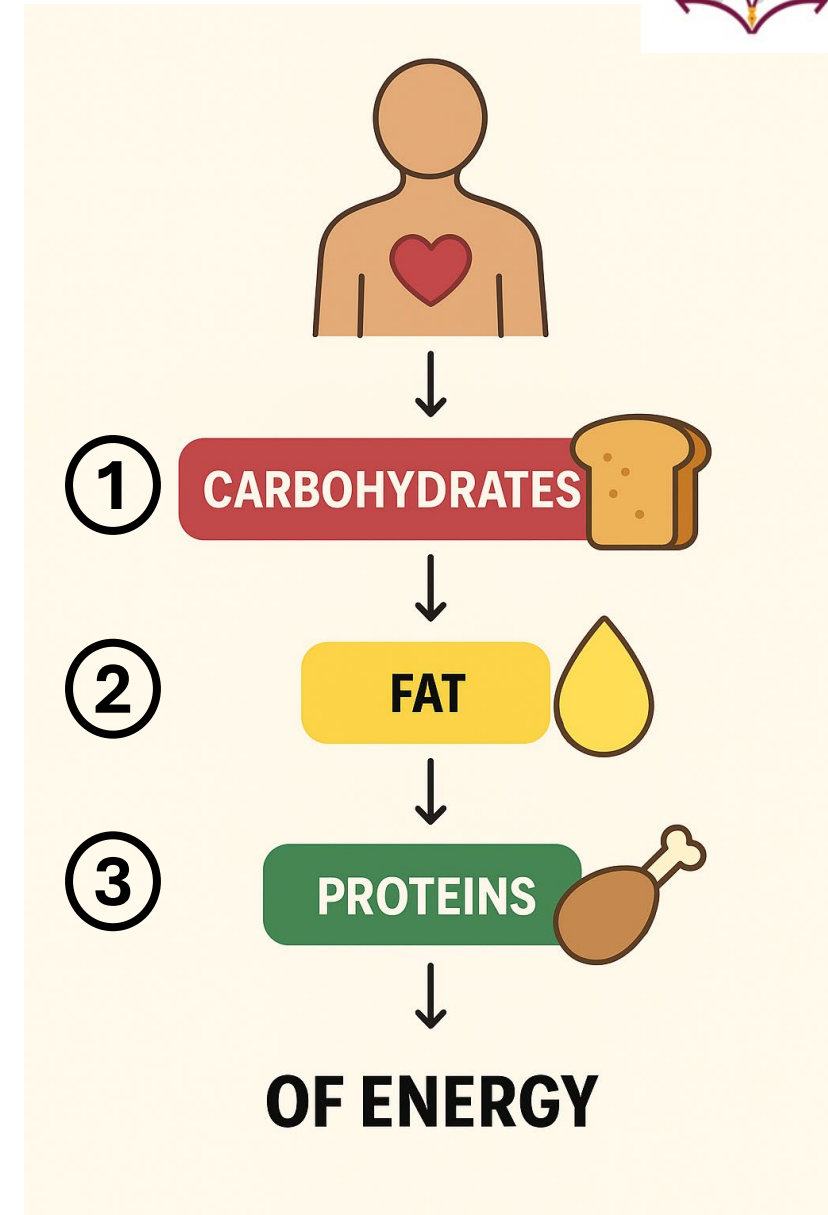
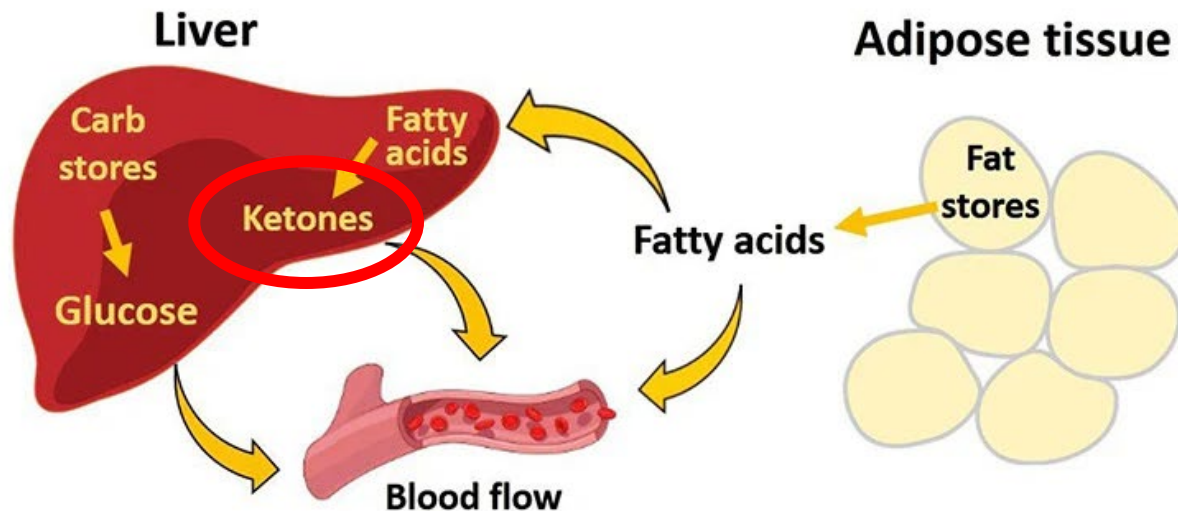




Ketone Bodies

Ketonuria indicates:

- Diabetic ketoacidosis
- Starvation, fasting, or prolonged vomiting
- Low-carbohydrate diet



Bilirubin

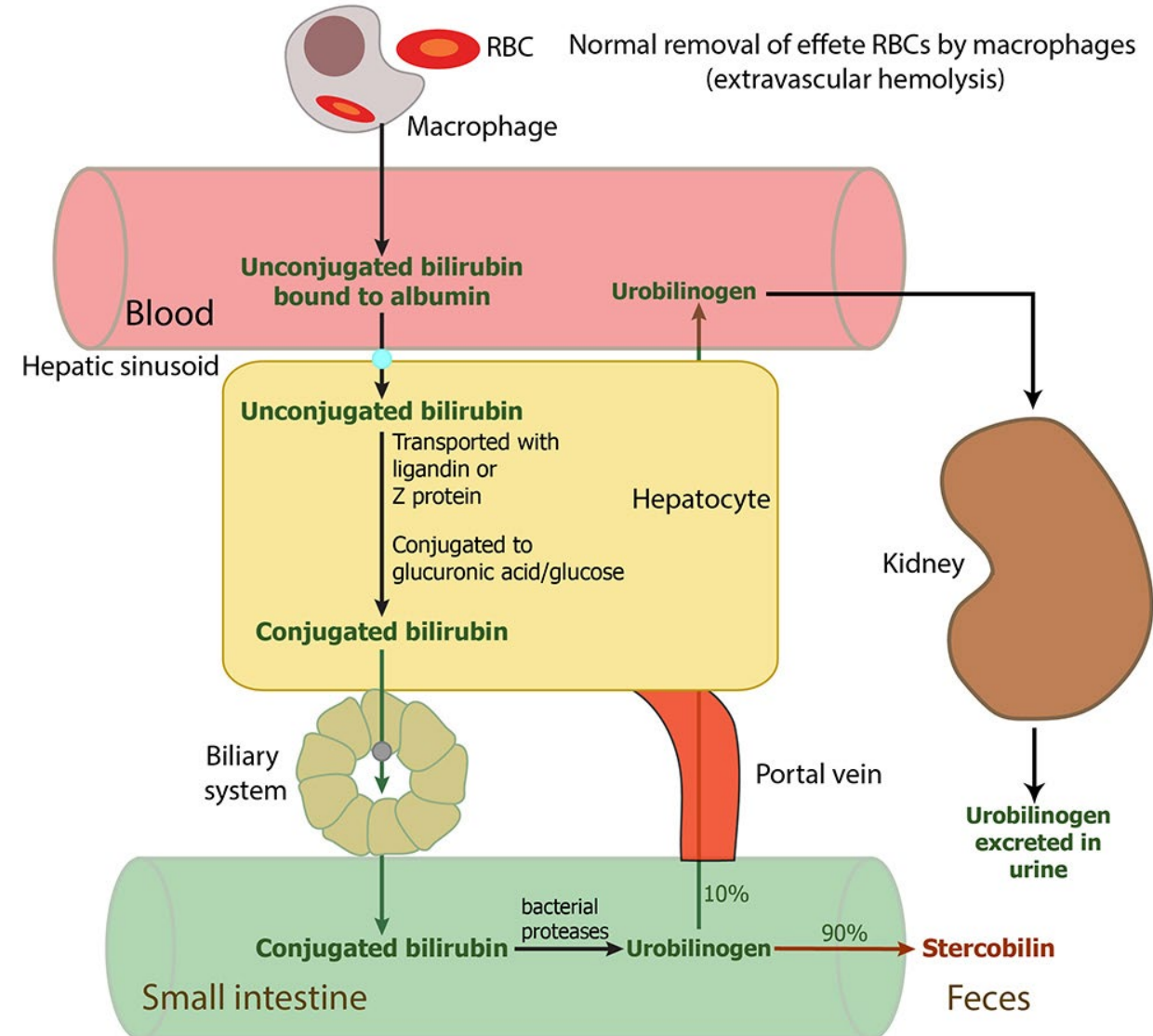
Indications:

Presence indicates:

- Hepatocellular disease (e.g., hepatitis, cirrhosis)
- Obstructive jaundice (bile duct obstruction)

Absent in:

- Hemolytic anemia (since unconjugated bilirubin is not excreted in urine)



Urobilinogen

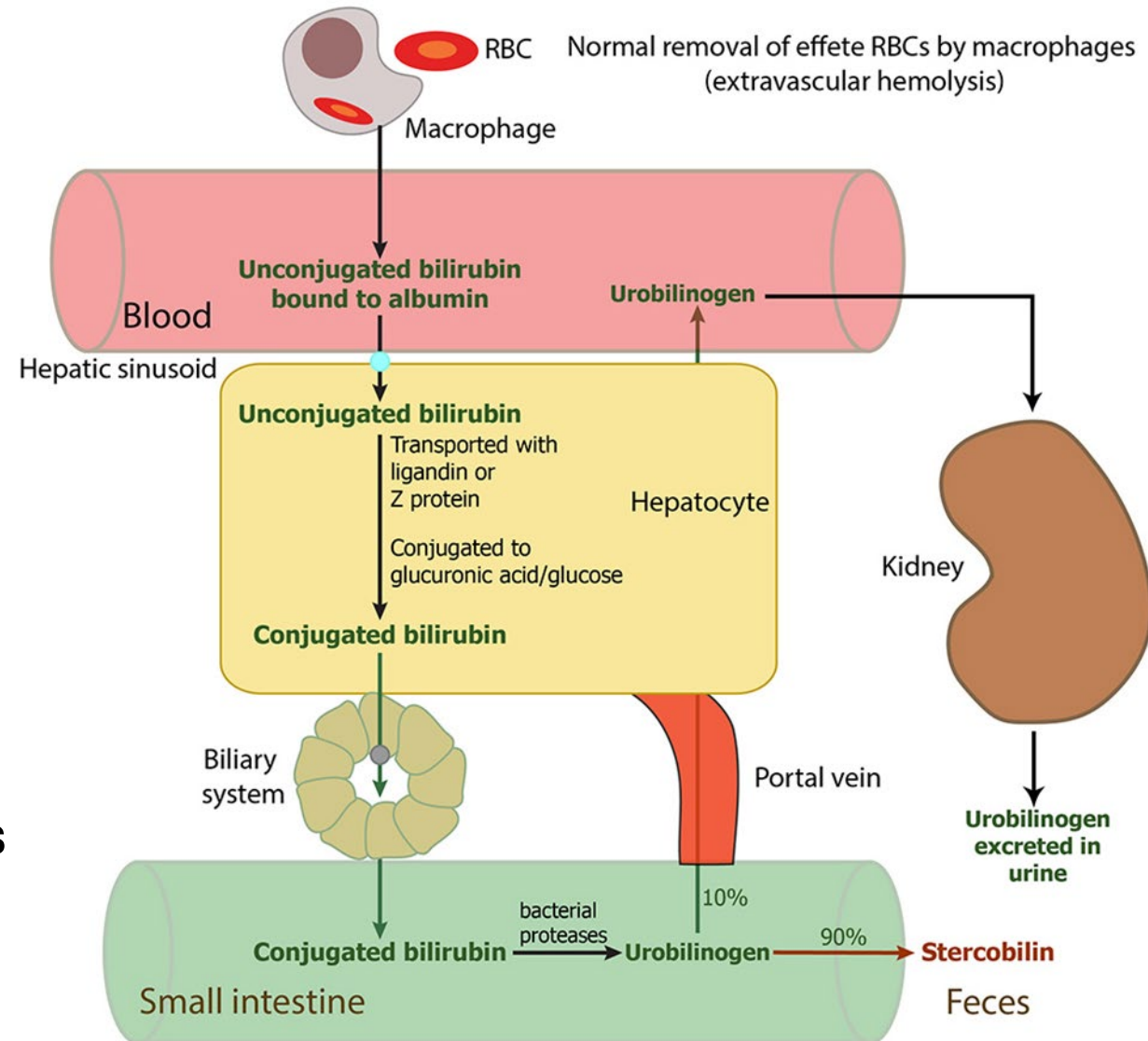
Indications:

Increased:

- Hemolytic anemia (excess RBC breakdown)
- Liver disease (hepatitis, cirrhosis)

Decreased/Absent:

- Use of broad-spectrum antibiotics (reduces gut flora that forms urobilinogen)



Blood (Hemoglobin/Myoglobin)

Indications:

Positive test suggests:

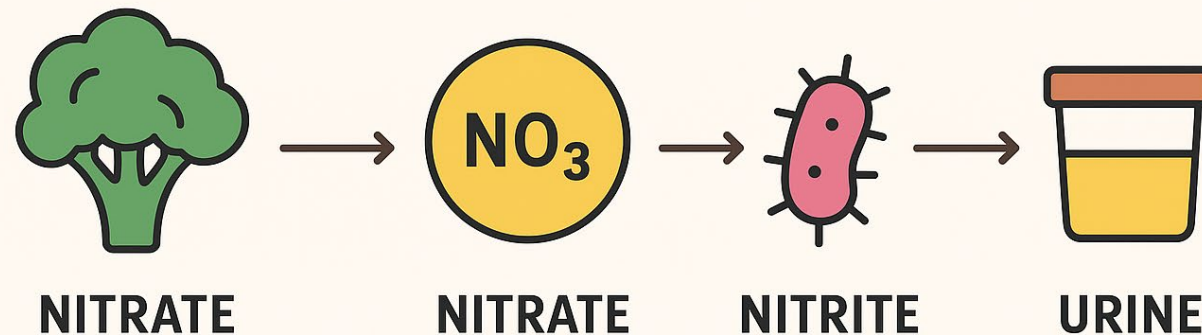
- Hematuria: Kidney stones, trauma, infection, or tumor
- Hemoglobinuria: Hemolytic anemia, transfusion reaction, severe burns
- Myoglobinuria: Muscle injury, rhabdomyolysis, myocardial infarction

Nitrite

Indications:

Positive result indicates:

- Bacterial urinary tract infection (especially with Gram-negative bacteria like E. coli, Klebsiella, Proteus)
- Confirms presence of nitrate-reducing bacteria



Leukocyte Esterase

Indications:

Positive result indicates:

- Urinary tract infection (presence of WBCs)
- Cystitis, or urethritis
- Inflammation anywhere in the urinary tract

References

- Paniker, C. K. J. & Ghosh, S. 2021. *Paniker's textbook of medical parasitology*, New Delhi, Jaypee Brothers Medical Publishers.

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