الجامعة الليبية الدولية للعلوم الطبية

Libyan International Medical University

# MALARIA

- Year: one
- Block: Blood & Lymphatic
- Problem: 5
- Week :5

# Presented by:

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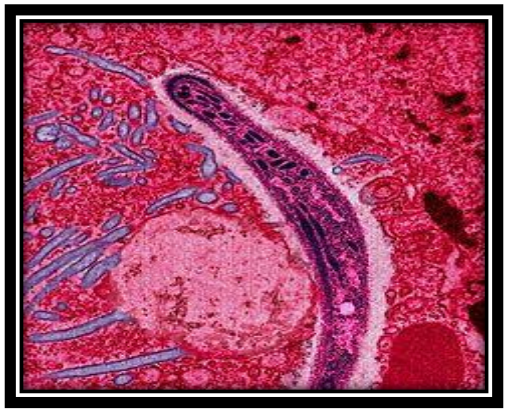
# INTRODUCTION:



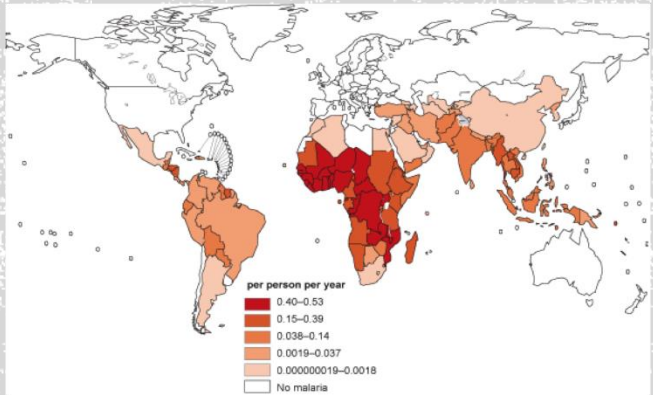
- Malaria is caused by the intracellular parasite, plasmodium. It's a worldwide infection that affects 300 million and kills 1 million

- is a mosquito-borne infectious disease.

It is most commonly transmitted by the anopheles mosquito

- It occurs primarily in tropical and subtropical areas, especially in Asia, Africa, and Central and South America.

**It is the most common lethal infectious disease.**



# Learning objectives

1) Describe the histological structure of the spleen

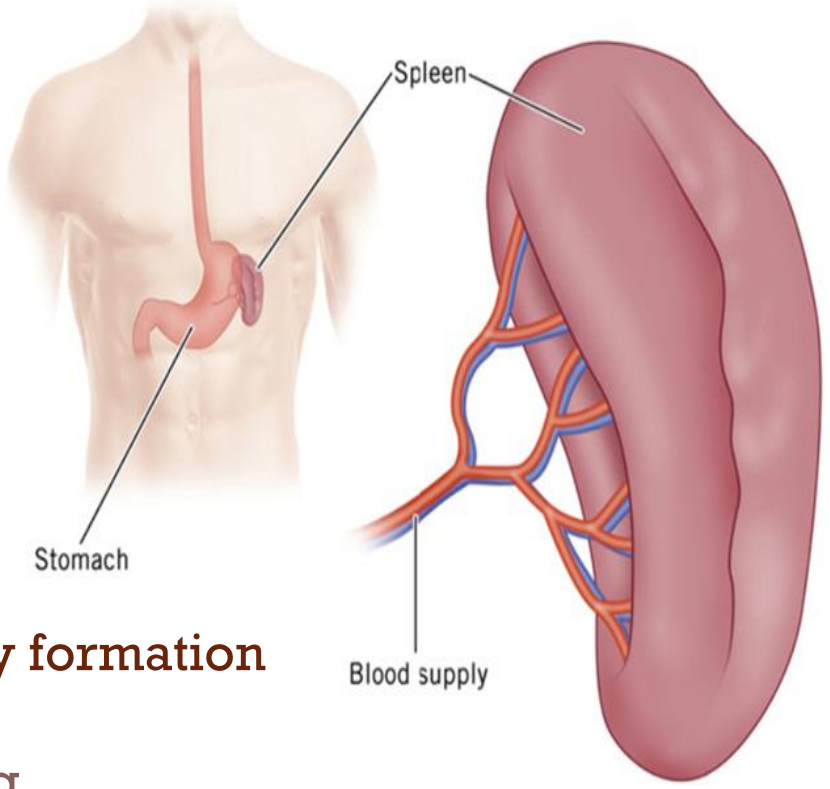
2) Describe the pathogenesis and morphology of malaria

3) Discuss the preventions and control of malaria

# HISTOLOGY OF THE SPLEEN

# The spleen

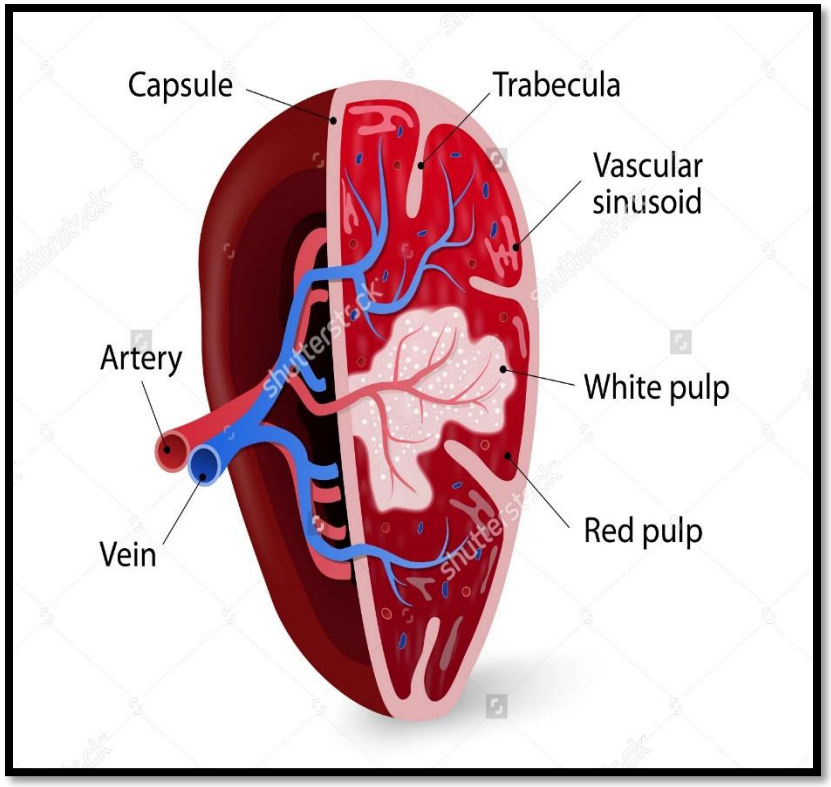
- The largest lymphoid organ in the body
- located in the peritoneum in the upper left quadrant of the abdominal wall




## ➢ Function as:

1) Immunoglobin capacity for antibody formation
2) T-cell and B-cell proliferation
3) As a filter for the blood in destroying erythrocytes
4) As a hemopoietic organ during fetal life

# THE SPLEEN CONSIST OF:




stroma

- capsule
- trabecula
- Reticular stroma

parenchyma

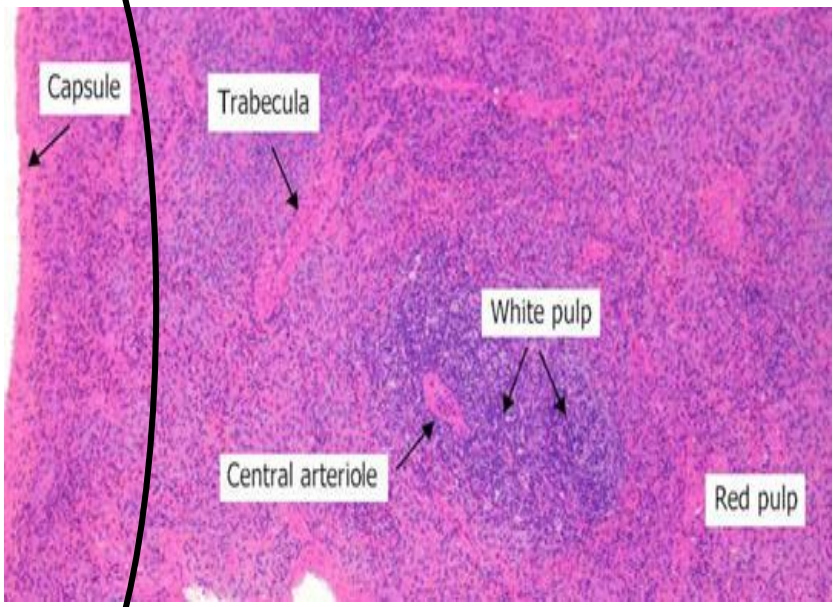
- White pulp
- Red pulp

# THE CAPSULE

- Dense irregular fibroblastic connective tissue

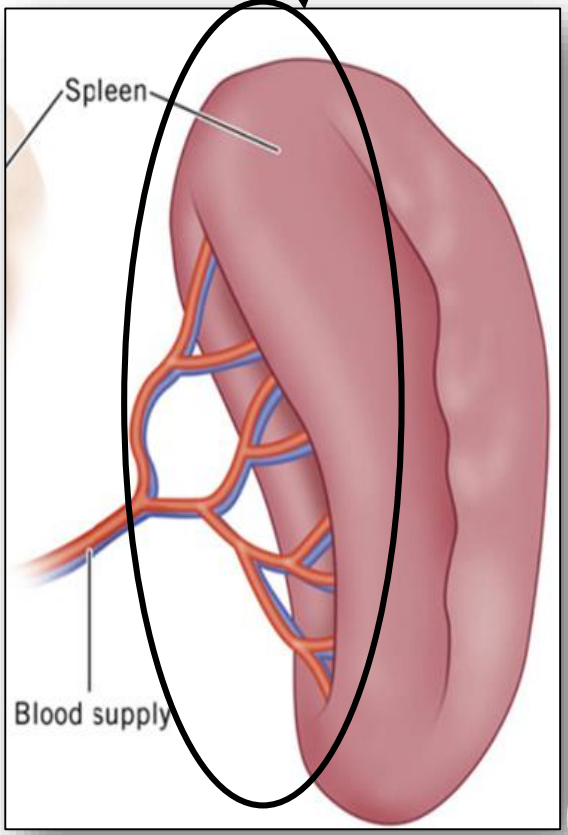
(house smooth muscle cells)

- Surrounded by visceral peritoneum
- The capsule thicken in the hilum

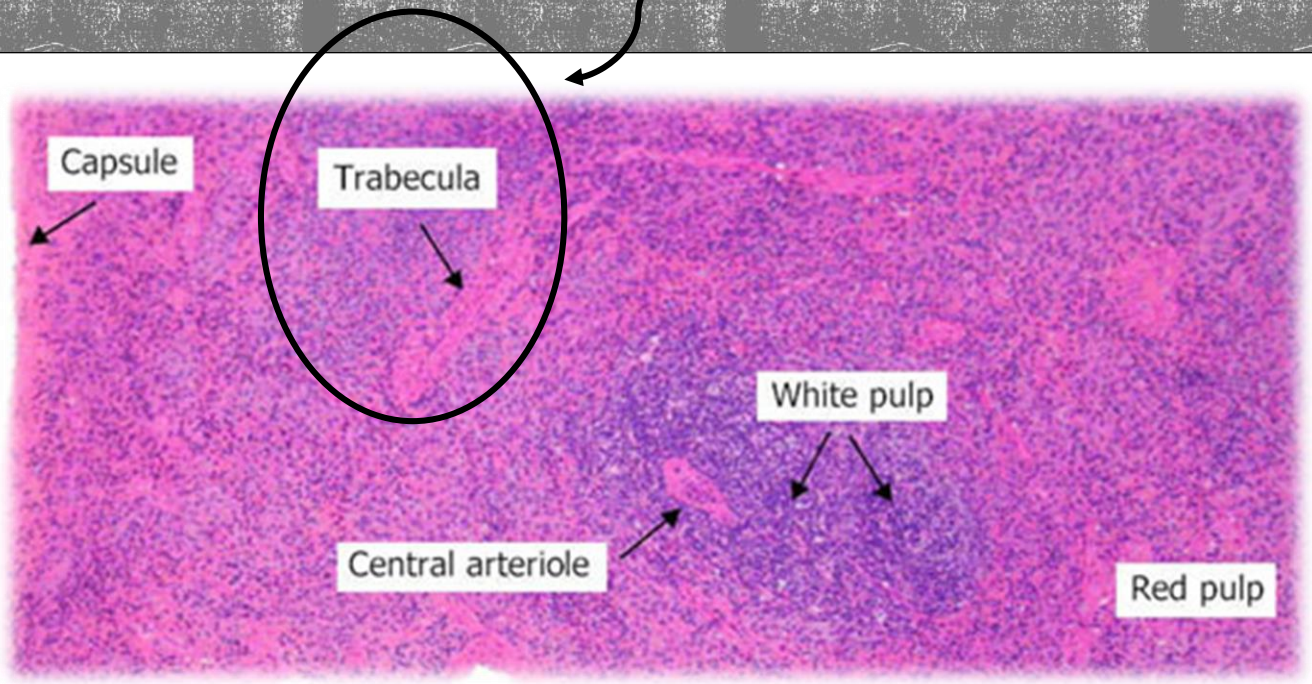


# THE HILUM:

- Where the arteries and there accompanying nerve fiber enter
- veins and lymph vessels leave the spleen



# TRABECULAR:




Arises from the capsule carry blood vessels into and out of the parenchyma of the spleen

# BLOOD SUPPLY OF THE SPLEEN

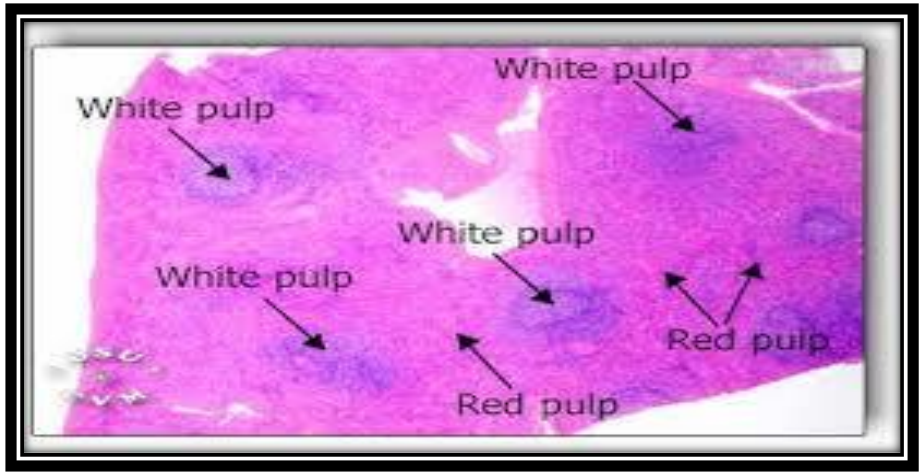
## Splenic artery

Splenic artery → Trabecular artery → Central artery → Penicillar arteries → 1)Pulp arteriole 2)sheeted arteriole 3)Terminal arteriole

## Splenic vein

Small veins of the pulp → Splenic vein → Portal vein

# WHITE PULP & MARGINAL ZONE




- White pulp consist of:

Periarterial lymphatic sheet (houses T cells)
Lymphatic nodules (houses B cells)

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- Marginal zone contain:

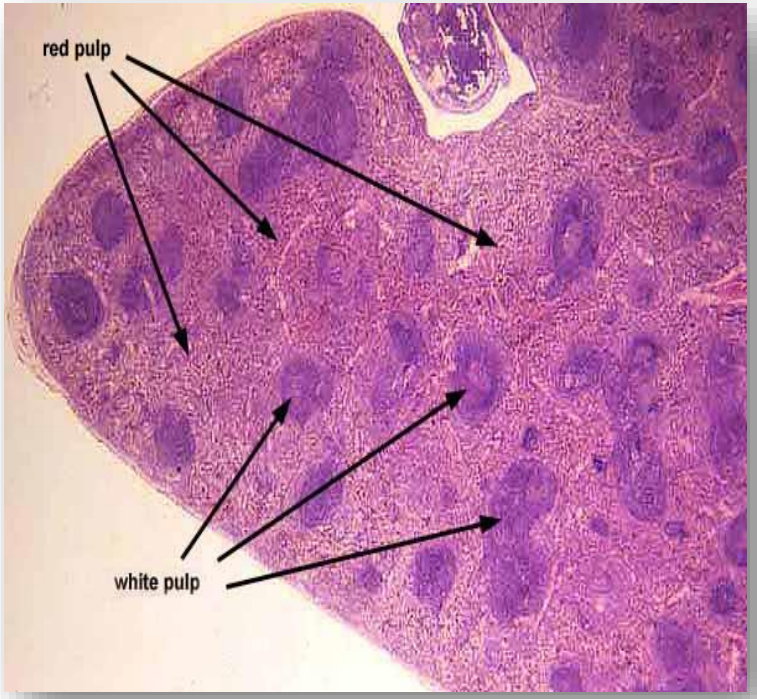
(they separate the white pulp from the red pulp )

# RED PULP

It is composed of:

-Splenic sinuses
(have a discontinuous basal lamia)

-Splenic cord (of billroth)
(composed of loose network of reticular cells)



# PATHOGENESIS AND MORPHOLOGY OF MALARIA

# ❖ LIFE CYCLE

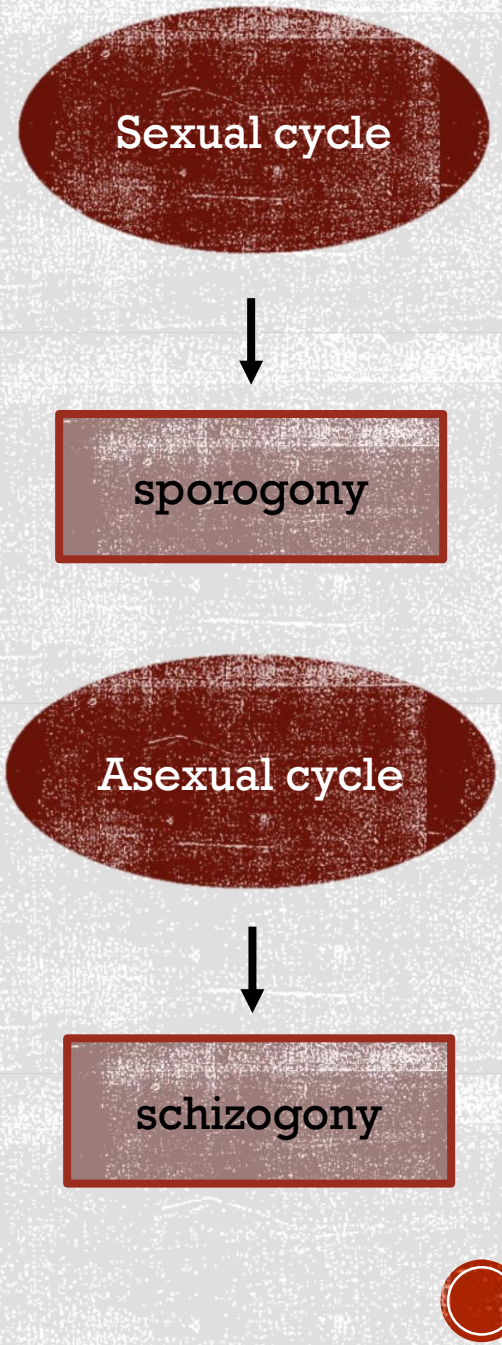
Malaria is caused by a plasmodium,
The plasmodium is divided into 4 types:

- ❖ Plasmodium vivax
- ❖ Plasmodium ovale
- ❖ Plasmodium malaria
- ❖ Plasmodium falciparum → The most common

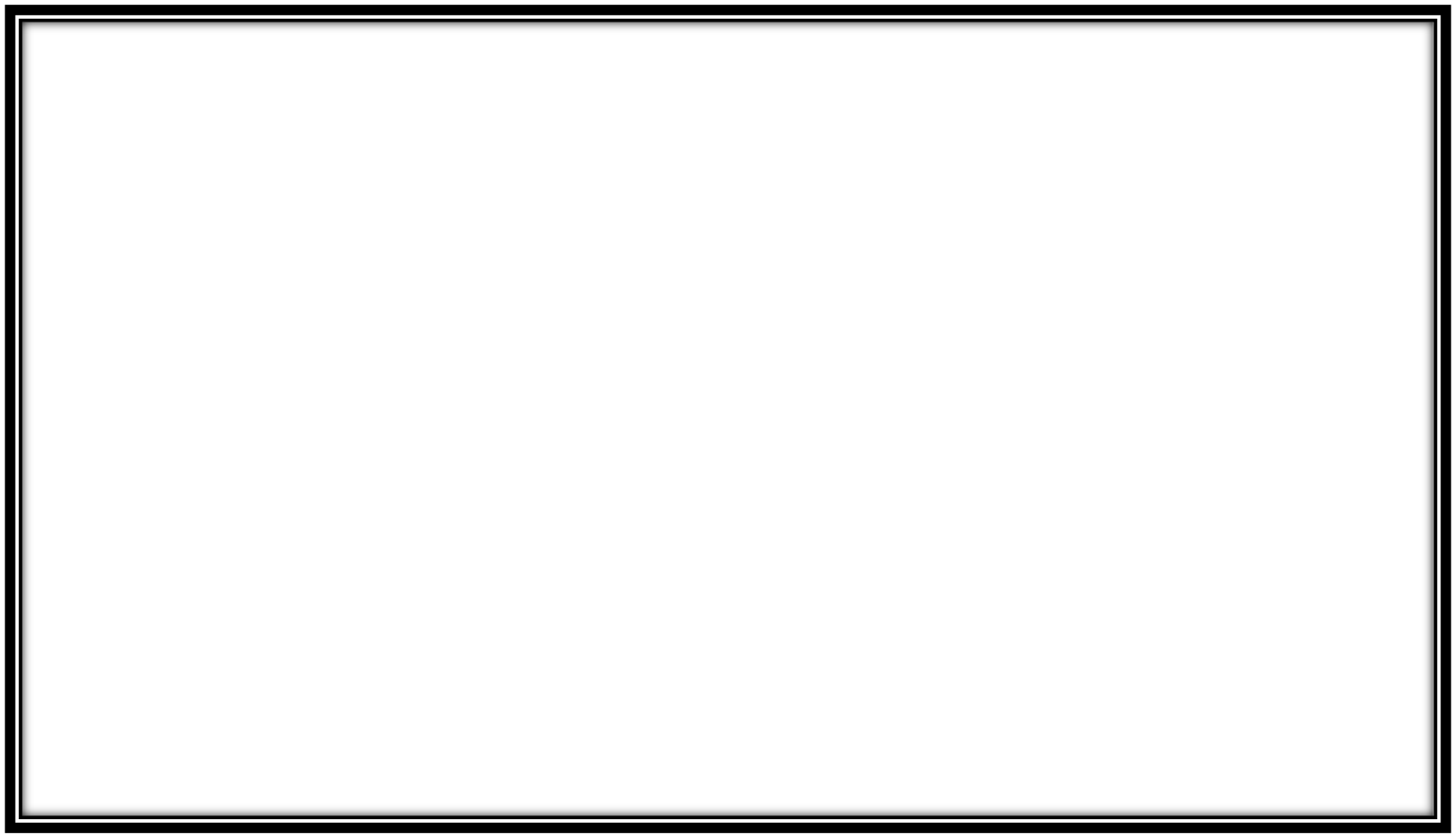
There are two phases in the life cycle:

The sexual cycle: occurs in the mosquito

The Asexual cycle: occurs in the human



# LIFE CYCLE OF THE PLASMODIUM



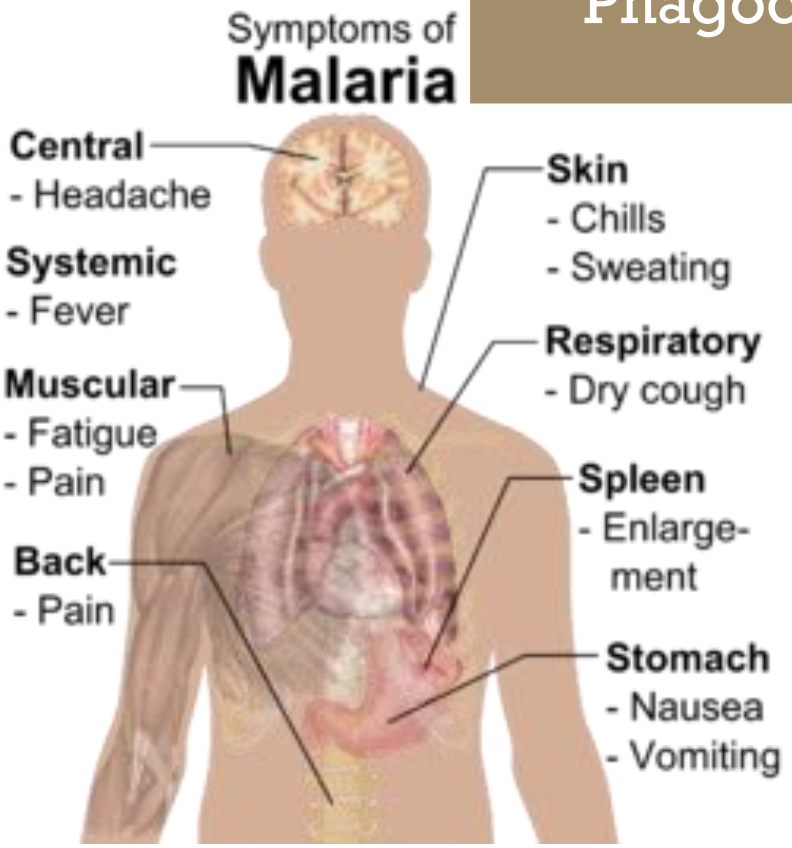
# ❖ PATHOGENESIS:

macrophage

Phagocyte the infected RBC

proInflammatory cytokines

(Responsible for the clinical manifestations)



# (PATHOGENESIS)

- **brain** → Cerebral malaria •
- **spleen** → splenomegaly •
- **kidney** → Metabolic acidosis •
  Acute renal failure(black water) •
- **lungs** → Acute respiratory distress •

# ❖ EPIDEMIOLOGY

## P. Malaria:

- timing of the fever cycle is 72 hours
- quartan malaria because it recurs every fourth day

malignant malaria

- *P. falciparum*

## other plasmodia:

- timing of the fever cycle is 48 hours
- called tertian malaria because it recurs every third day

benign malaria

- *P. vivax*
- *P. ovale.*

Sickle cell anemia

↓

Are protected against malaria

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Duffy blood group antigen deficiency

↓

Are resistant against p. vivax

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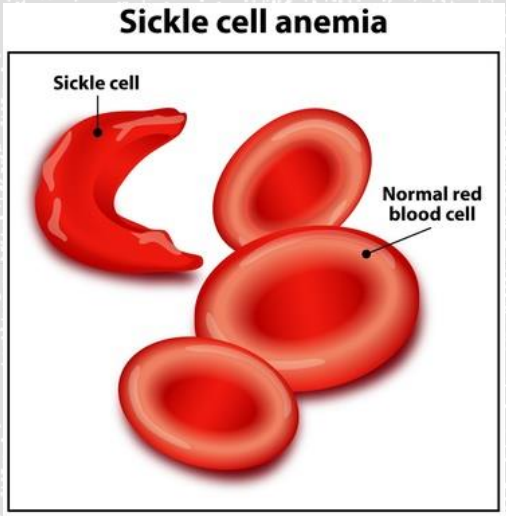
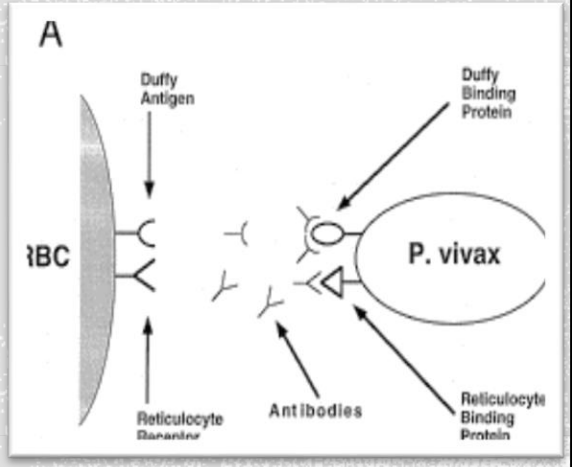
Glucose 6- phosphate dehydrogenase
G6PD deficiency

↓

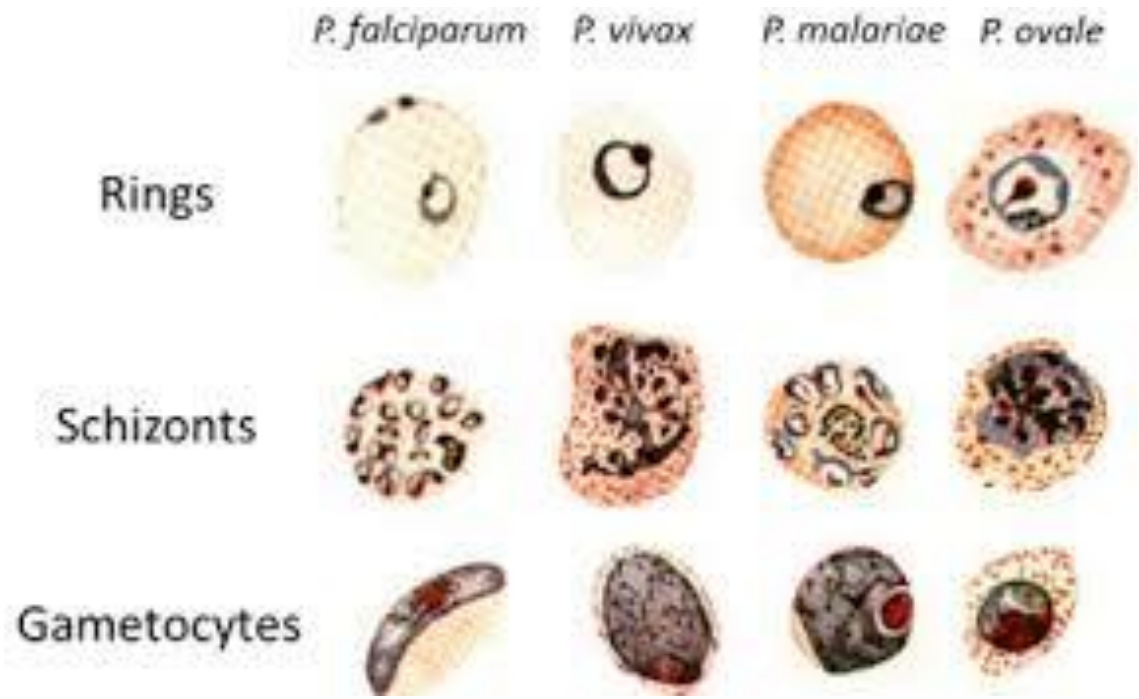
Protected against p. falciparum

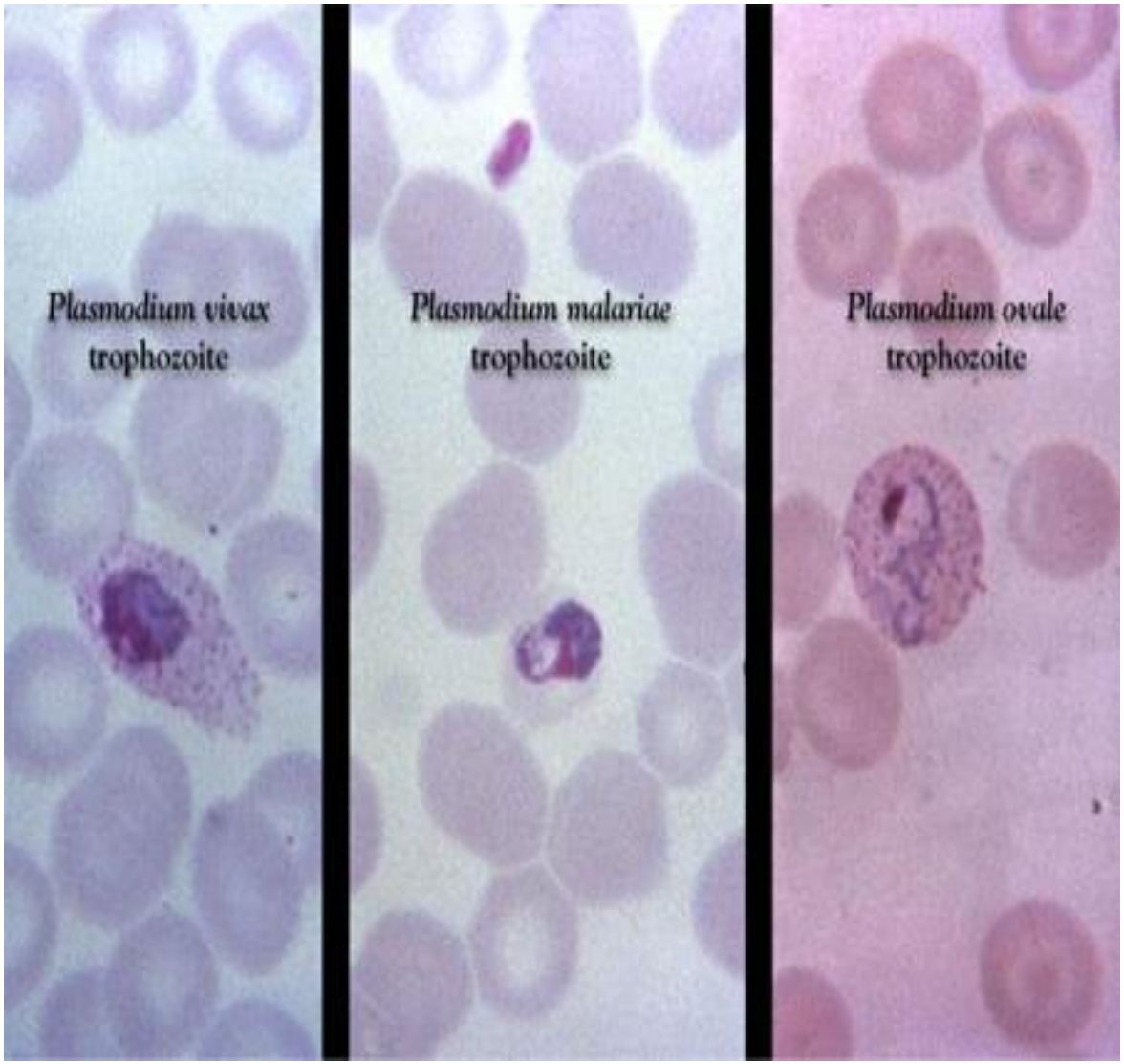

# ❖ MORPHOLOGY

When taking a blood smear, malaria can be defined on the bases of the shape of the plasmodium on each stage through its life cycle.



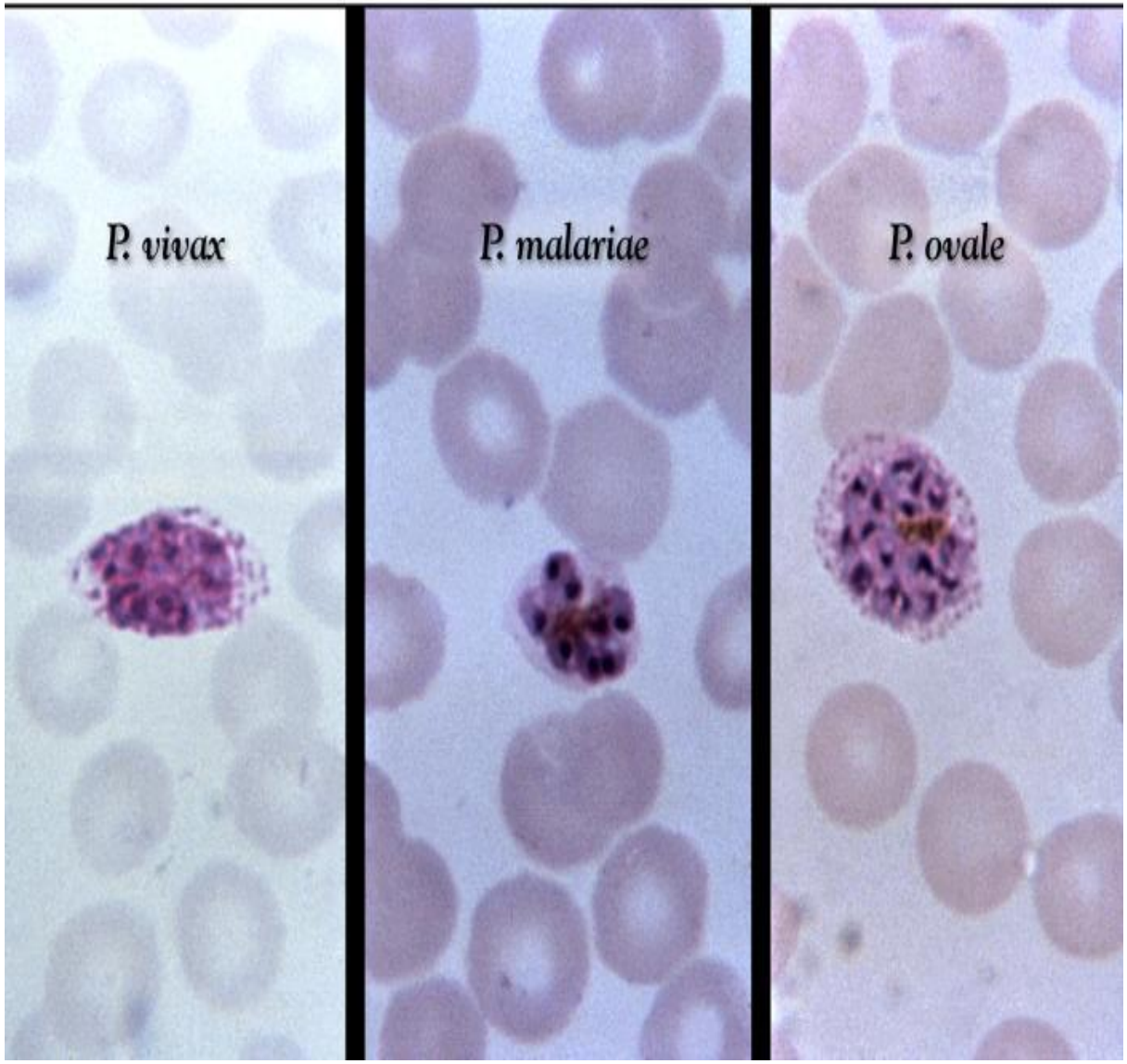

- ✓ Trophozoite
- ✓ Schizoid
- ✓ Gametocyte

# TROPHOZOIDE




- Ring shaped
- **Two stages: Early and Late The late stage is median in size**
- Compact and round

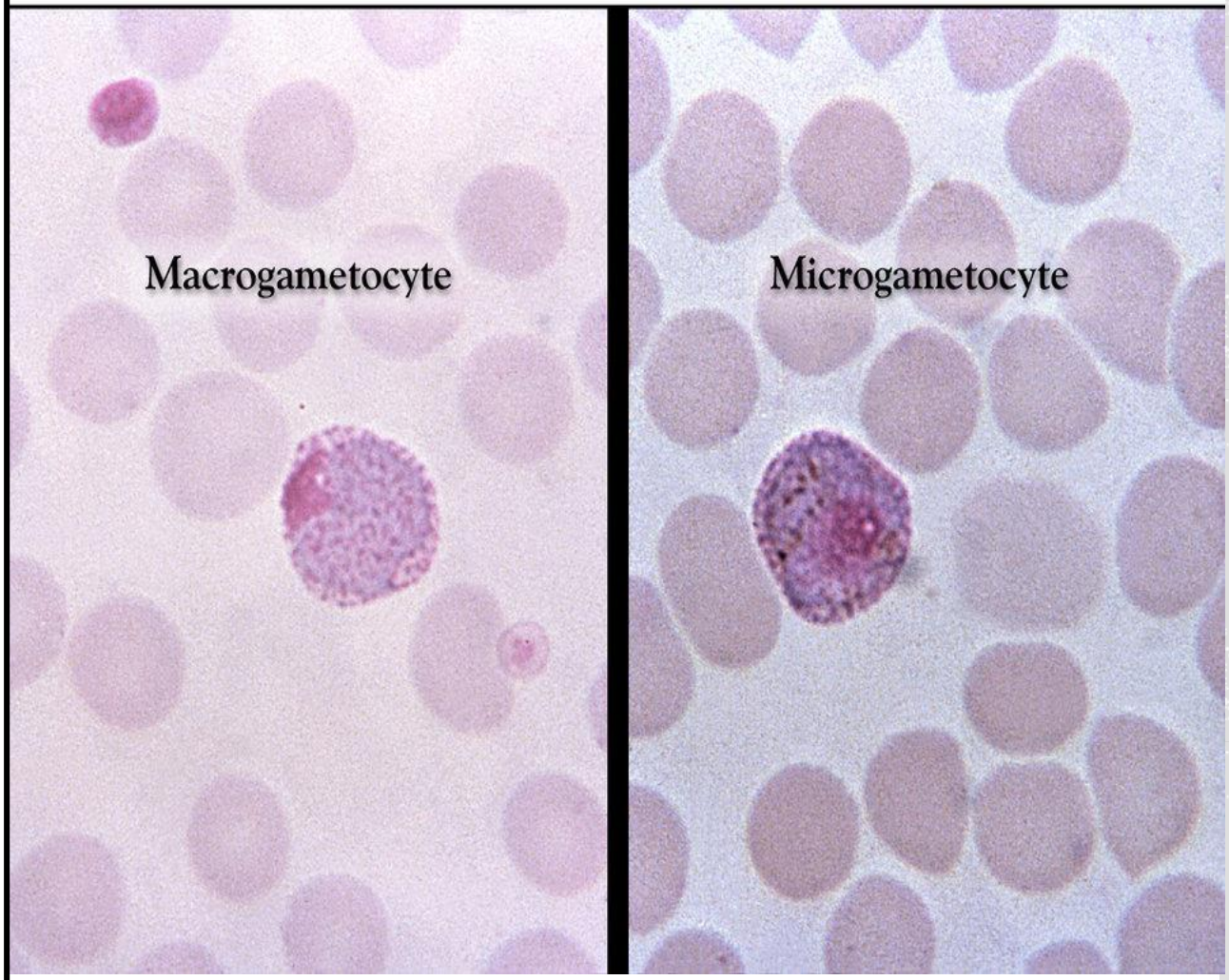
## Schizonts




- Spherical in shape
- Contain 14-33 merozoite

# GAMETOCYTES

*Plasmodium vivax*




## Banana in shape

Microgametocytes:

- Diffuse chromatin
- Scattered pigment

Macrogametocyres:

- Longer
- Compact chromatin
- Cytoplasm: dark brown

# PREVENTION AND CONTROL OF MALARIA


- Chemoprophylaxis
- mosquito netting
- window screens
- insect repellents
- protective clothing

# ❖ CHEMOPROPHYLAXIS

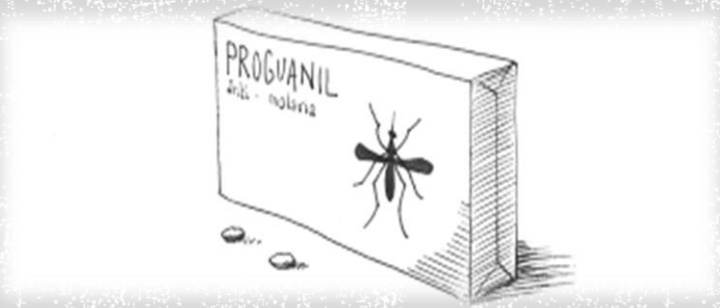
- Chloroquine

  (Used in areas where P. falciparum is sensitive to drug)

- 2 weeks → before arrival
- 6 weeks → after departure

"followed by primaquine if exposer is high"


- mefloquine or doxycycline
- atovaquone and proguanil (Malarone)





- Apply to exposed skin only

- If outdoors wear a long-sleeved shirt, long pants, and a hat.

# Insect repellents


# mosquito netting & protective clothing

# DDT

## A WEAPON OF MASS SURVIVAL

No longer effective because the mosquitoes have developed resistance

# REFERENCES


1) Kumar, abbas,fausto,pathologic basis of disease, seventh edition, saunders 2006.

2) vinay Kumar, Abul K.Abbas, Nelson Fausto, Richard N.Mitchell,Robbins Basic Pathology, 8th edition,Philadelphia,PA, joan sinclair.2007

3) REVIEW OF MEDICAL MICROBIOLOGEY AND IMMUNOLOGY, Warren Levinson, Eleventh edition

“Safety is more important than convenience”

*THANK YOU*

*& Stay safe*