

Plasmodium – Short Notes (High Yield)

Classification

- **Kingdom:** Protista
 - **Phylum:** Apicomplexa (Sporozoa)/ Protozoa
 - **Genus:** *Plasmodium*
 - **Disease:** Malaria
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Species Infecting Humans

- **P. vivax** – Benign tertian (48 h), relapse common
- **P. falciparum** – Malignant tertian (36 h to 48 h, irregular), most severe
- **P. malariae** – Quartan (72 h)
- **P. ovale** – Mild tertian

Most common (India/Nepal): *P. vivax*

Most dangerous: *P. falciparum*

Host & Vector

- **Definitive (primary) host:** Human
 - **Intermediate (secondary) host:** Female *Anopheles*, Mosquito
 - **Infective stage to human:** Sporozoite
 - **Infective stage to mosquito:** Gametocyte
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Life Cycle (MCQ Favorite)

In Human – Asexual (Schizogony):

1. Sporozoites → **Liver** (pre-erythrocytic schizogony)
2. Merozoites released → **RBCs** (erythrocytic schizogony)
 - Ring → Trophozoite → Schizont → RBC rupture (fever)
3. Some merozoites → **Gametocytes**

In Mosquito – Sexual (Sporogony):

- Gametocytes → Gametes → Fertilization → Zygote → Ookinete → Oocyst → Sporoblast - **Sporozoites** (salivary glands)

Hypnozoites (cause relapse): *P. vivax*, *P. ovale*

Fever Pattern

- **Cold stage:** Chills (15 to 60 min)

- **Hot stage:** High fever (2 to 6 Hours)
 - **Sweating stage:** Profuse sweating (2 to 4 Hours)
 - Periodicity species-specific (48 h or 72 h)
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Pathogenesis

- RBC destruction → **Anemia**
 - Toxins at schizont rupture → fever
 - *P. falciparum*: cerebral malaria, renal failure, severe anemia, **blackwater fever**
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Diagnosis

- **Peripheral blood smear (Gold standard)**
 - Thick smear: detection
 - Thin smear: species identification
 - Rapid diagnostic tests (RDTs)
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Prevention & Control

- Vector control (nets, repellents, larval control)
 - Antimalarial therapy
 - Elimination of breeding sites
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One-Line MCQ Facts

- Sexual reproduction occurs in **mosquito**
 - Asexual reproduction occurs in **human liver & RBCs**
 - Liver stage is **asymptomatic**
 - Relapse due to **hypnozoites**
 - Only **female Anopheles** transmits malaria
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PYQ Focus Areas

- Life-cycle sequence
 - Infective stages
 - Fever periodicity
 - Species-specific features (*falciparum* severity; *vivax* relapse)
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Species	Type of Malaria	Frequency of fever	Pre – patent period	Incubation period	Granules
<i>P. vivax</i>	Benign tertian Malaria	After every 48 Hours	8 days	14 days	Schuffner's granule
<i>P. falciparum</i>	Malignant tertian Malaria/ Cerebral Malaria/Black water fever/Aestivo autumnal Malaria	Irregular (After 36 to 48 Hours)	6 days	12 days	Maurer's Dots
<i>P. malariae</i>	Benign quartan Malaria	After 72 Hours	20 days	28 days	Ziemann's dot
<i>P. ovale</i>	Benign sub – tertian Malaria	After 48 hours	8 days	14 days	James dot

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