

Microbiology Practical Session-1

Hematologic and Lymphatic System

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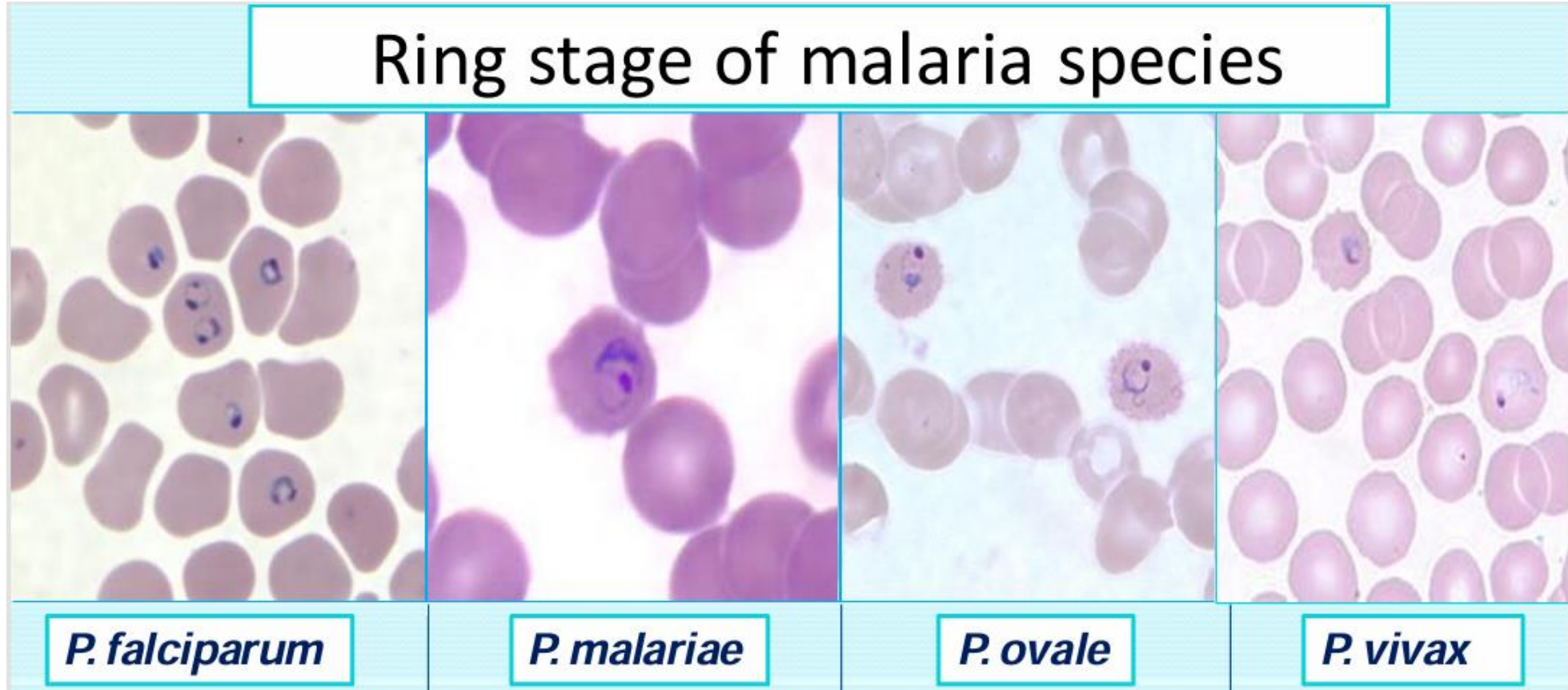


Malaria

Ring Stage of Malaria Species

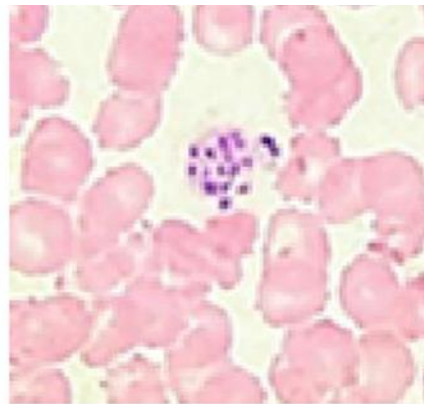
Feature	<i>P. falciparum</i>	<i>P. malariae</i>	<i>P. ovale</i>	<i>P. vivax</i>
RBC size	Normal	Normal	Oval, larger, irregular surface	Larger than non-infected
Ring size	Scanty cytoplasm; fills 1/6 RBC; surrounds small vacuole	Fills 1/3 RBC	Dense cytoplasm; fills 1/3 RBC	Delicate ring; fills 1/3 RBC
Chromatin dots	1–2 dots (headphone sign)	1 dot inside ring	1 chromatin mass	1 chromatin dot
Other	Multiple rings common	—	—	—

Ring Stage of Malaria Species

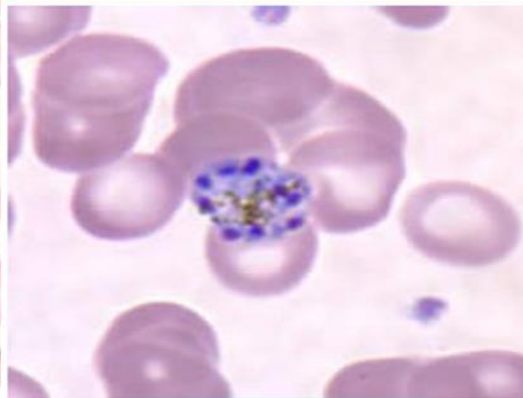


Schizont Stage of Malaria Species

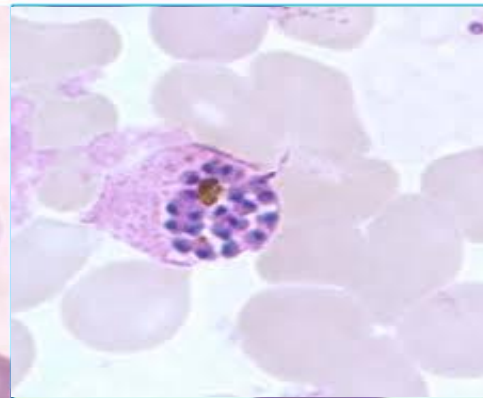
Feature	<i>P. falciparum</i>	<i>P. malariae</i>	<i>P. ovale</i>	<i>P. vivax</i>
RBC	-	Fills RBC	Fills $\frac{3}{4}$ of RBC; fimbrial end	Fills RBC
Merozoite count	8 - up to 32	6–12 (typically 8)	6–12 (typically 8)	12–24 (typically 18)
Arrangement	—	Symmetrically around central malarial pigment (rosette-shaped ★)	Irregularly around central malarial pigment	Irregularly around central malarial pigment



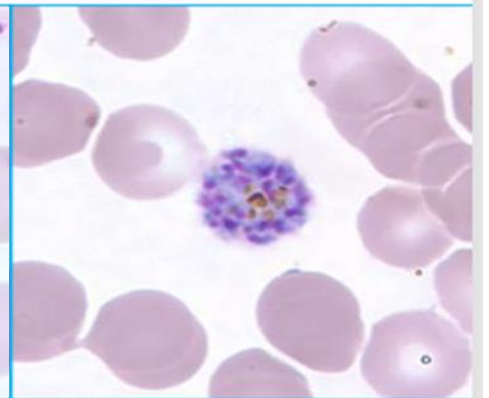
P. falciparum



P. malariae



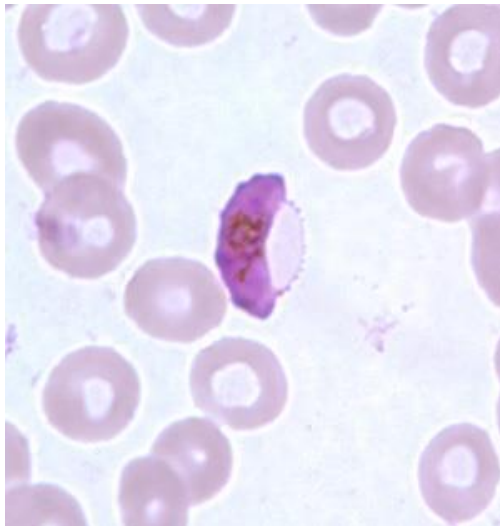
P. ovale



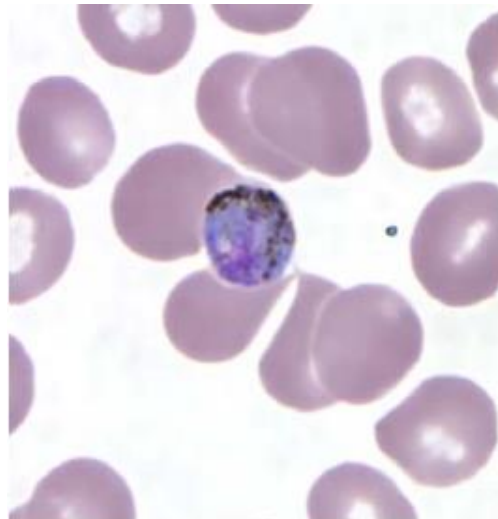
P. vivax

Gametocytes of Malaria Species

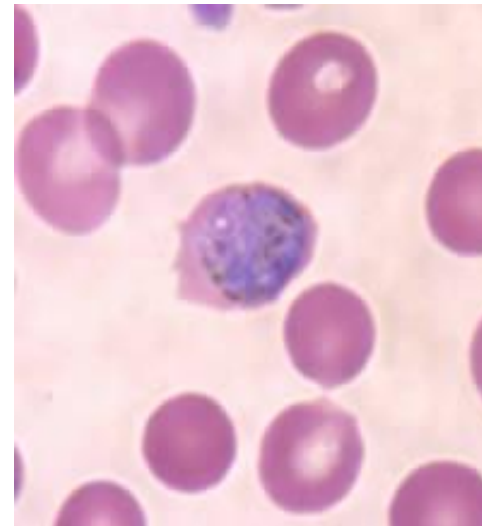
Feature	<i>P. falciparum</i>	<i>P. malariae</i>	<i>P. ovale</i>	<i>P. vivax</i>
Shape	Crescent / banana-shaped ★	Spherical & compact	Spherical & compact; smaller than <i>P. vivax</i>	Spherical & compact
RBC fill	Distorts RBC	Fills RBC	Fills $\frac{3}{4}$ of RBC	Fills RBC



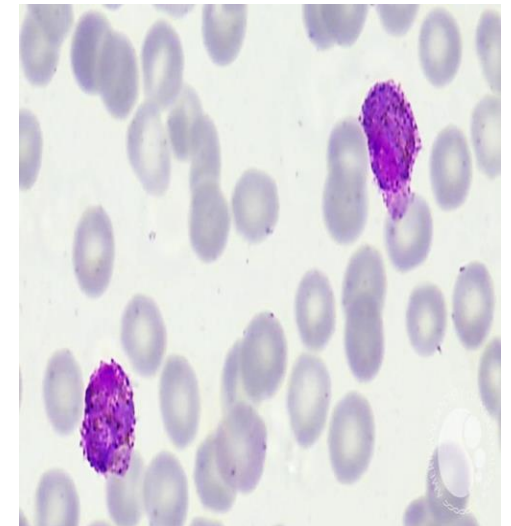
P. falciparum



P. malariae

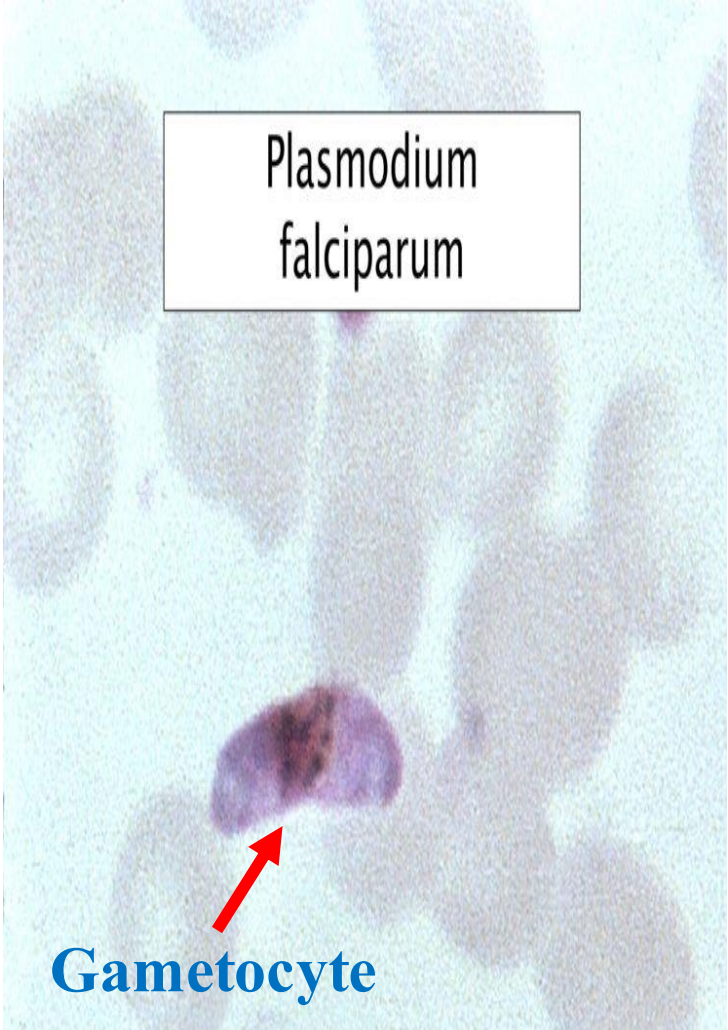
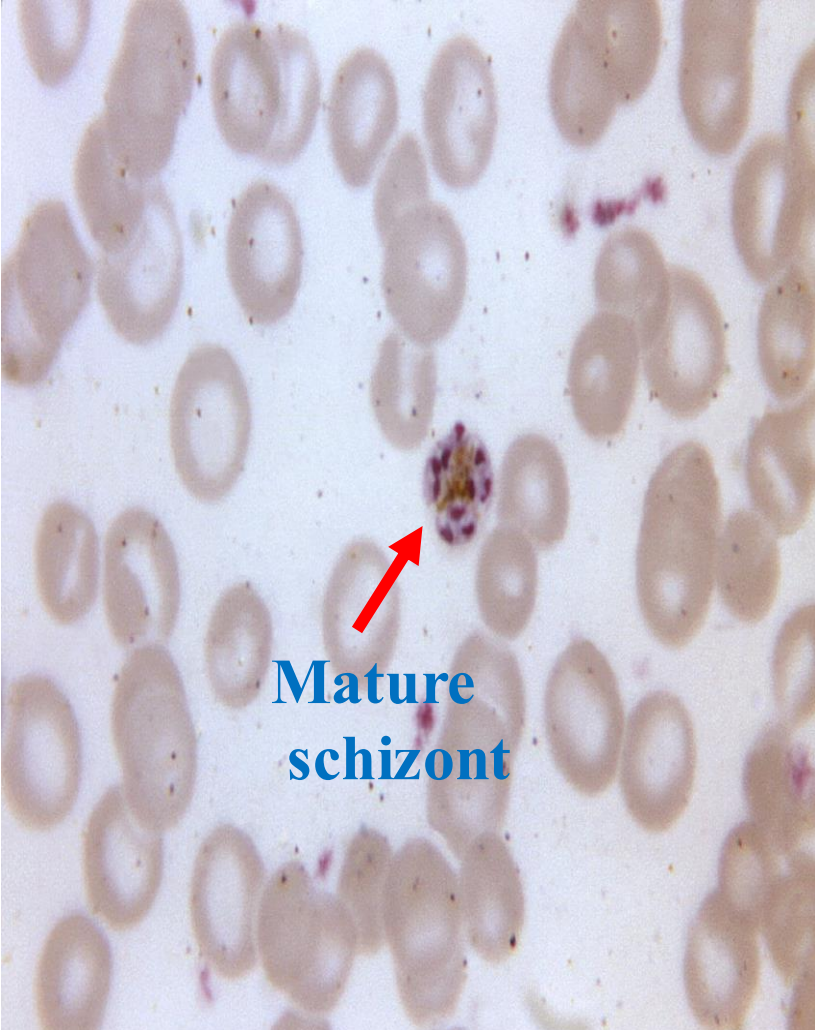
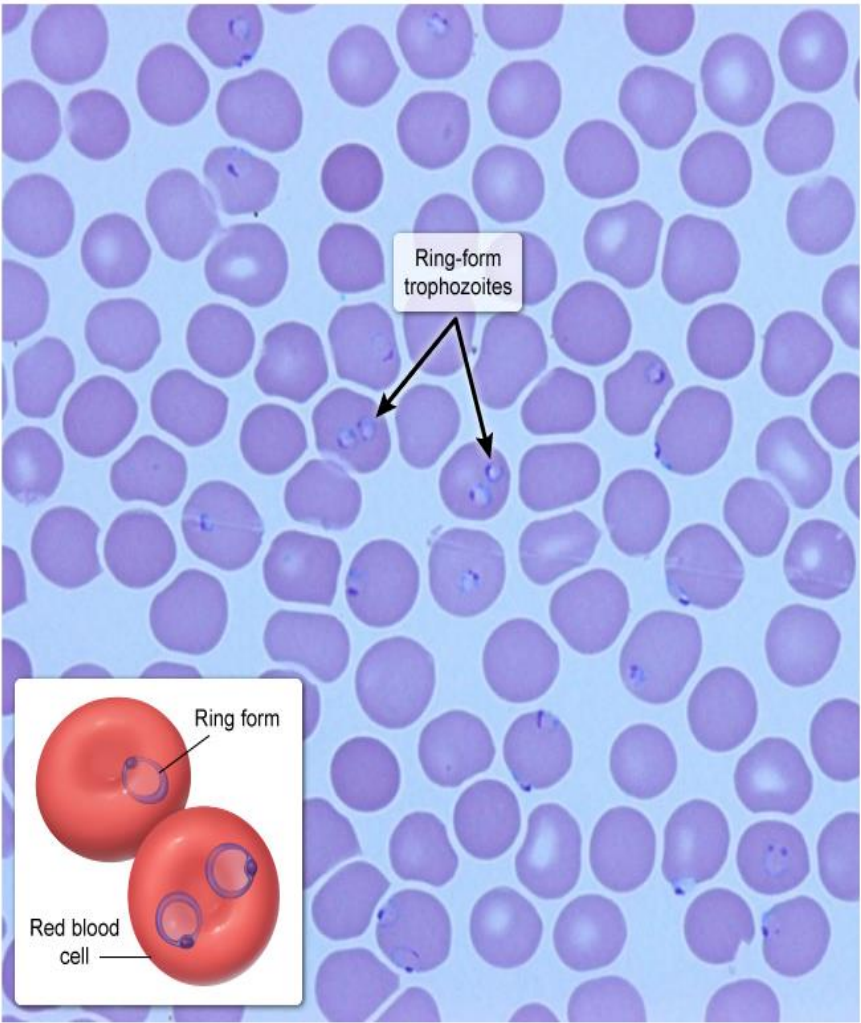


P. ovale



P. vivax

Malaria: **Diagnosis**

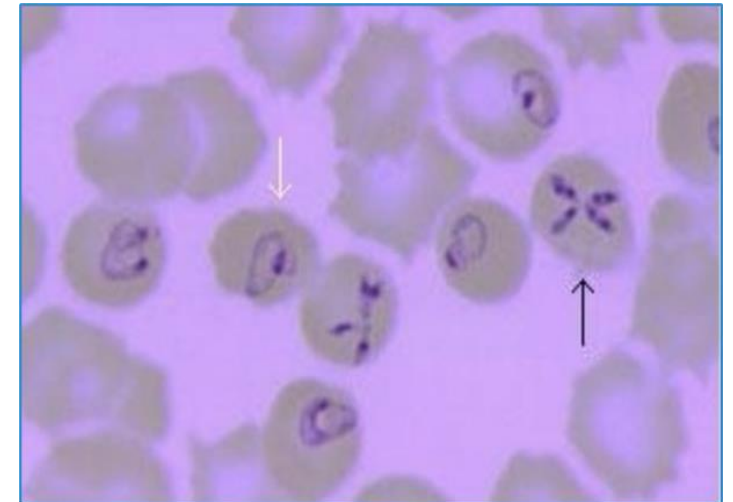


Babesiosis

Babesiosis

- Infection caused by *Babesia* spp. — a protozoa that replicates within host erythrocytes
- Peripheral blood smear showing *Babesia* as **intraerythrocytic rings** and/or **Maltese cross**
- The Maltese Cross (Tetrad Form)- This is the hallmark finding of Babesiosis — when 4 merozoites remain attached at their tips after division inside a single RBC- no other organism produces this

Pathogen	<i>Babesia</i> species
Vector	Deer tick (<i>Ixodes scapularis</i>)
Transmission	Tick bite



Lymphatic Filariasis

Etiology- Filarial nematodes

- Nematodes (roundworms) are long, thin, unsegmented, tube-like worms. Adult worms form separate sexes, with the males usually being smaller than the females.
- **Causative species:**
 - *Wuchereria bancrofti* (responsible for most cases of lymphatic filariasis worldwide)
 - *Brugia malayi*



Etiology- Filarial nematodes- Stages of Life

- **Microfilariae:**

- Produced by adult nematodes
- Found in the peripheral blood of the human host
- Microfilariae have nocturnal periodicity (10 p.m. to 2 a.m.).



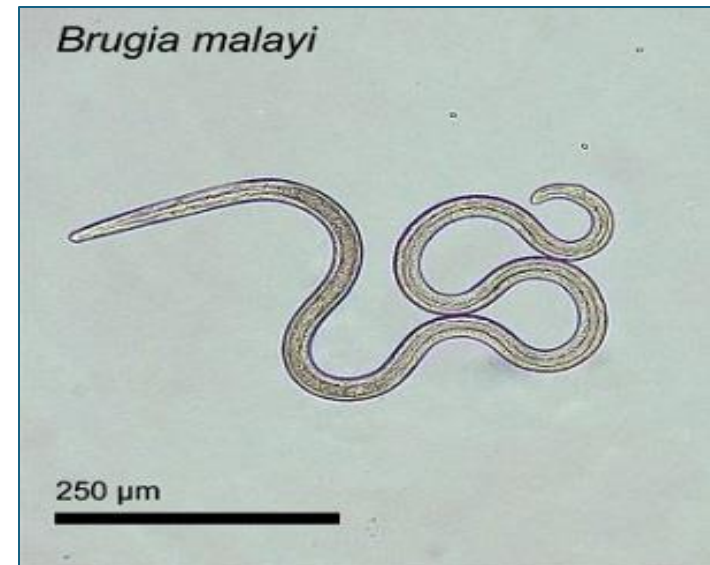
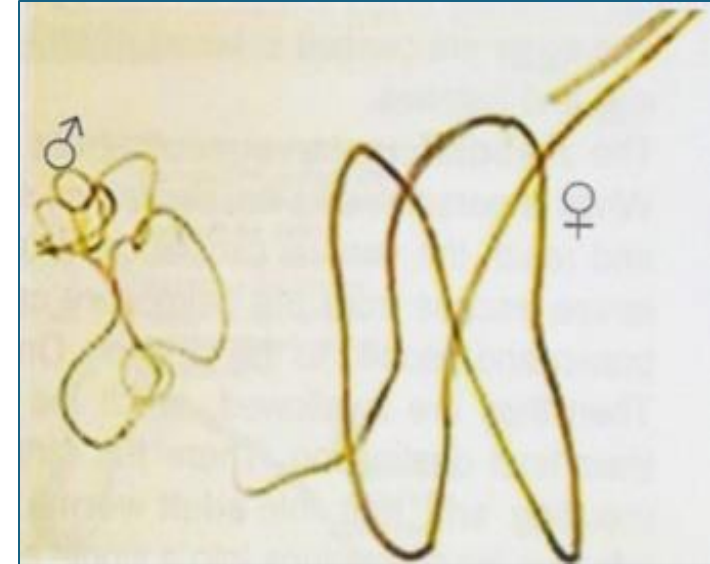
- **Larvae:**

- Microfilariae that lose their sheaths
- Microfilariae mature into larvae inside the mosquito: L1 (1st stage) larvae to L3 (3rd stage) larvae
- Maturity reached in 6–9 months

Etiology- Nematodes Stages of Life

- **Adults:**

- Mature from L3 larvae in the regional lymphatics
- Wuchereria worms:
 - Adult female: 80–100 mm in length
 - Adult male: about 40 mm
- Brugia worms:
 - Adult female: 43–55 mm in length
 - Adult male: 13–23 mm in length



Epstein–Barr virus

Acute infectious mononucleosis



Exudative tonsillopharyngitis

Pharynx and tonsils in a patient with infectious mononucleosis. The tonsils are massively hypertrophied, touching at the midline (known as "kissing tonsils"), and covered with gray-white exudate. The visible parts of the pharynx are erythematous.



Infectious mononucleosis:

pharyngitis demonstrating exudative tonsillitis and an enlarged uvula in a 19-year-old undergraduate university student 5 days after onset of infectious mononucleosis

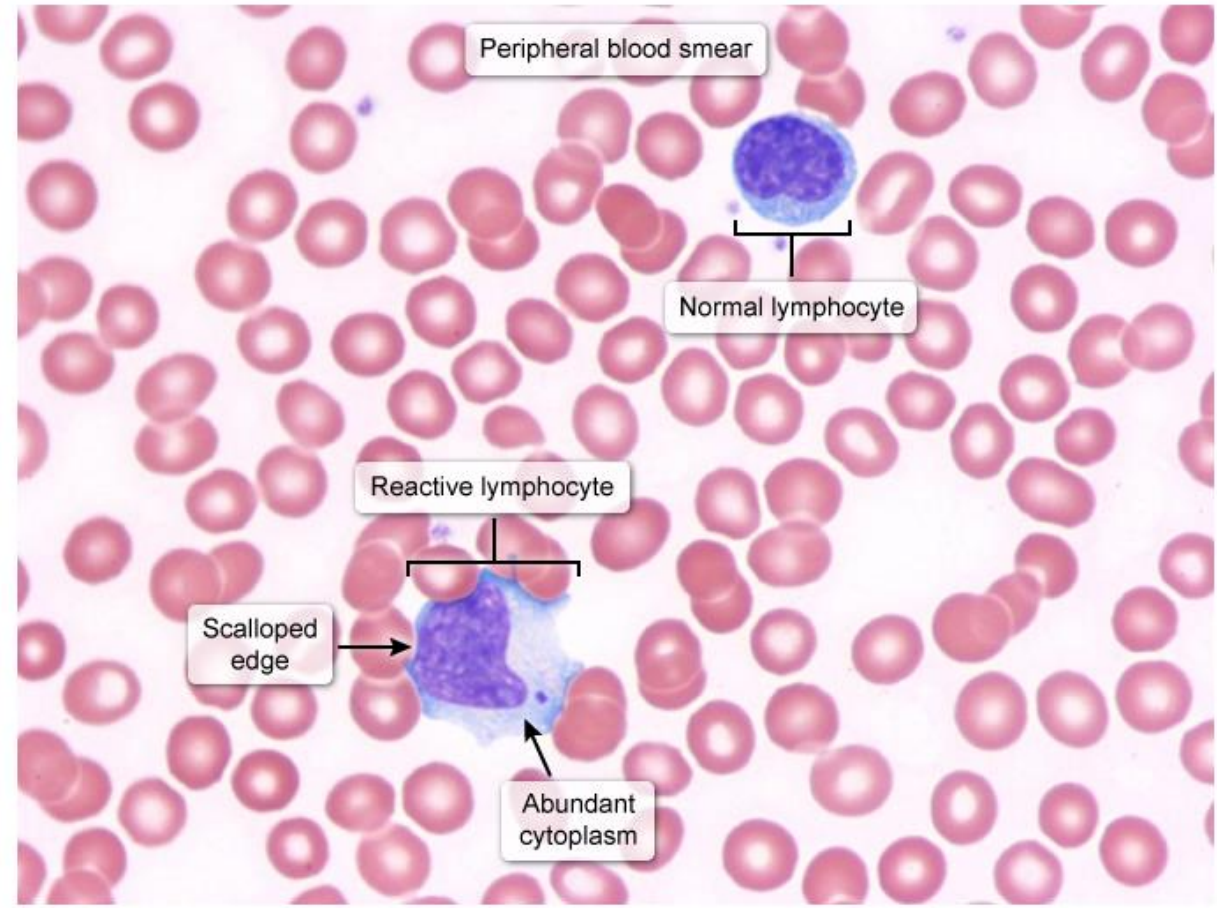


Lymphadenopathy in a patient with mononucleosis

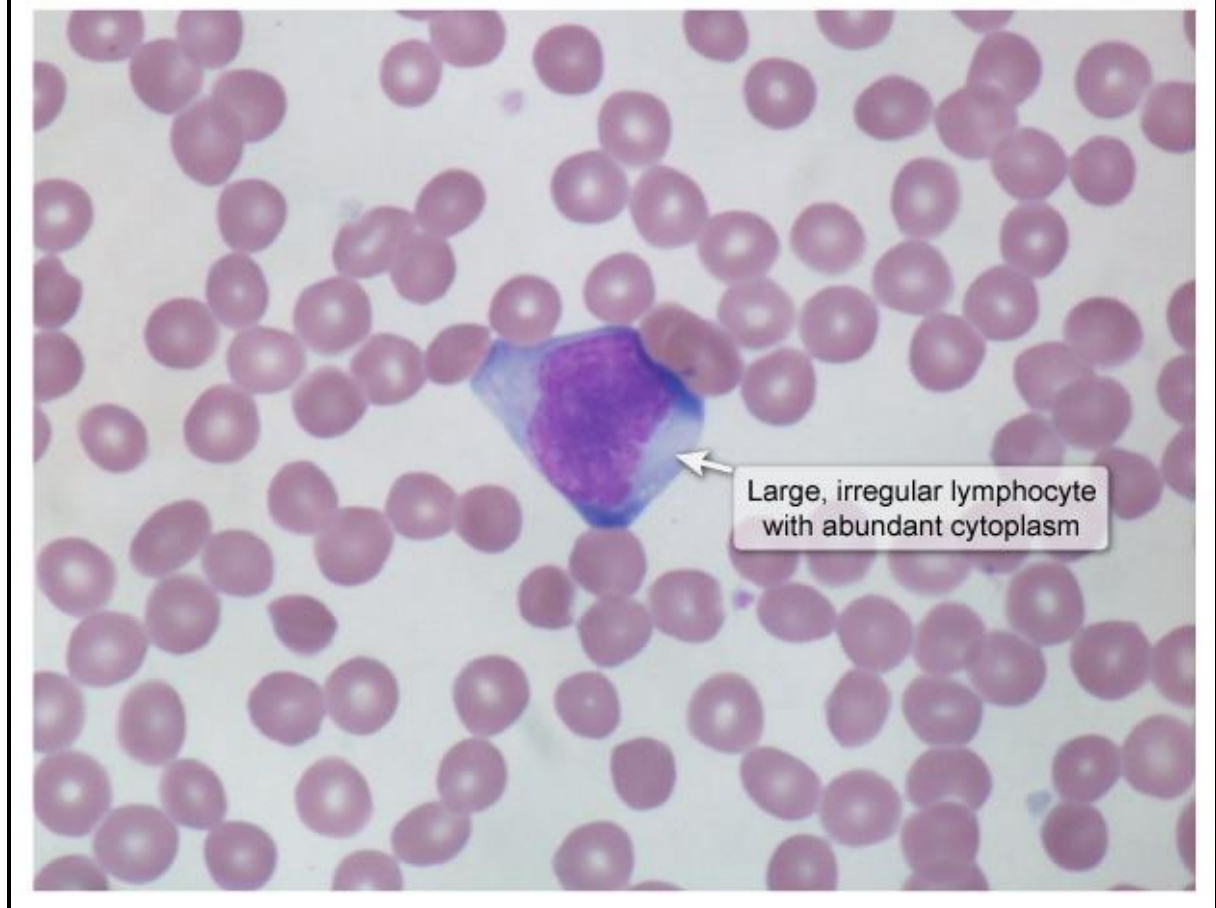
Bilaterally enlarged cervical lymph nodes (black arrows) and submandibular lymph nodes are seen in the neck region of a patient with infectious mononucleosis.

Additionally, there is a pale, macular rash on the neck and upper chest. A rash seen in infectious mononucleosis may be caused by the infection itself but is more commonly due to antibiotic use.

Reactive lymphocytes



Atypical CD8+ T lymphocyte



Thank you