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Assist .Lecture .Katherine Bnader

Babesia sp

-Final host: domestic animals, including cattle, sheep, goats, horses, swine, dogs, and cats, as well as numerous wild animals and man.

Intermediate host: Ixodes tick.

-Site of infection: inside the R.B. Cs, reproduce by binary fission inside the R.B. Cs, after transmission.

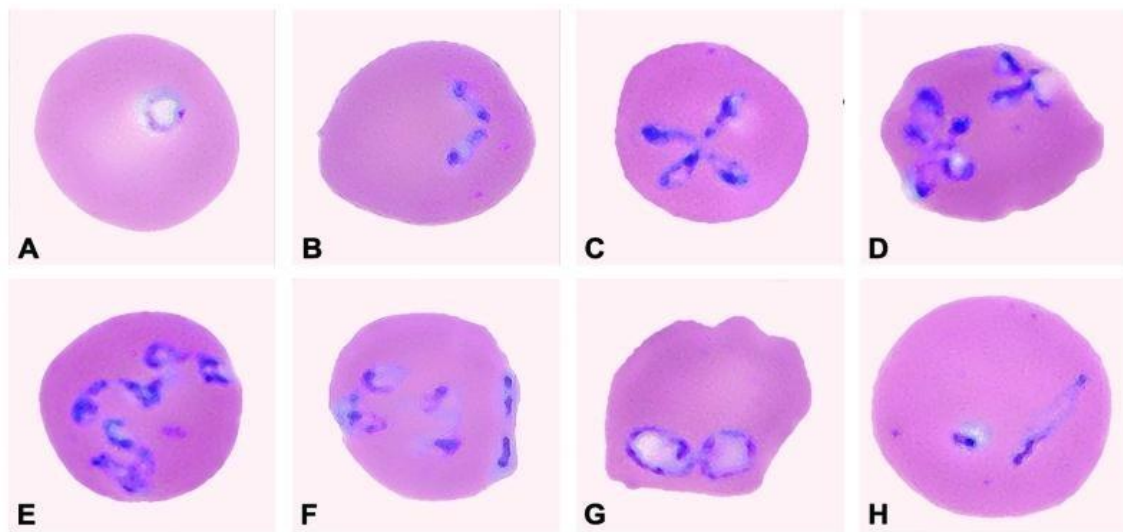
Diagnostic Technique: Blood examination.

B. bigemina Cattel

B. motasi Sheep

B. equi Horses

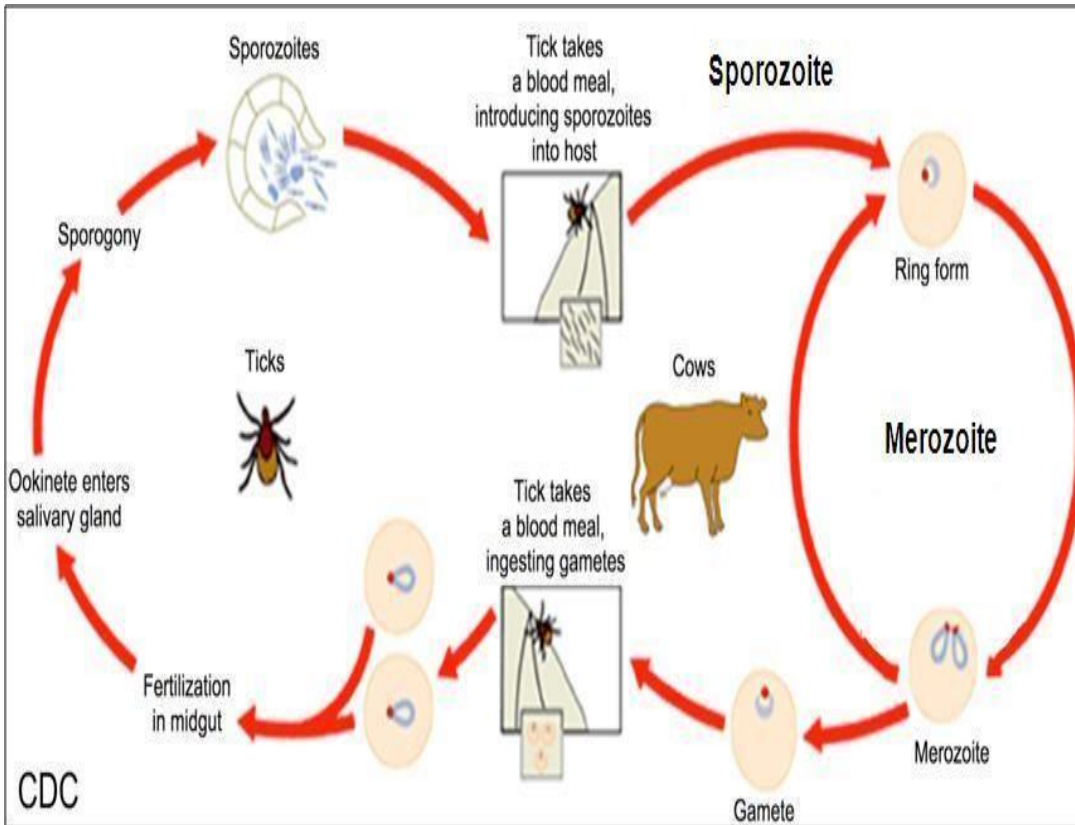
B. Caballi Horses



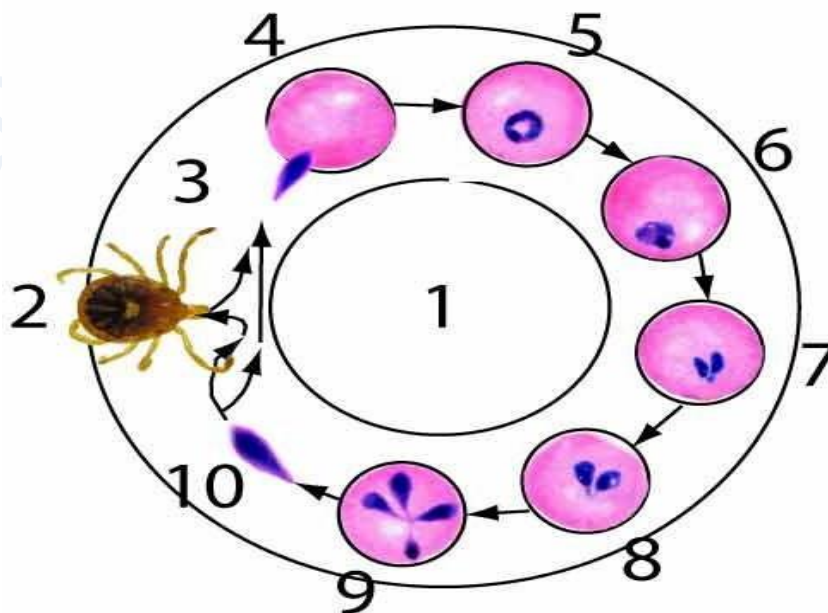
B. divergens Babesia

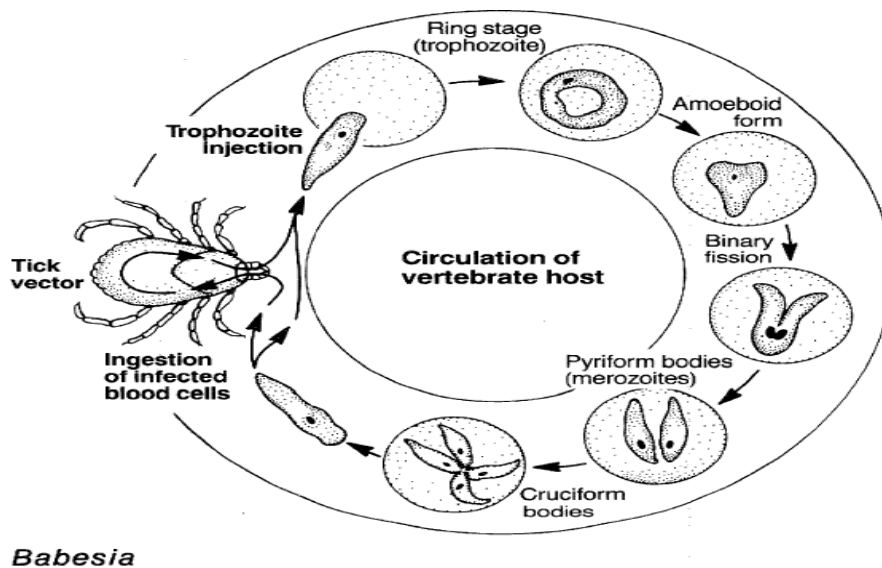
A/ enters erythrocytes at the sporozoite stage. Within the red blood cell, the protozoa become cyclical and develop into a trophozoite ring. The trophozoites develop into merozoites, which have a tetrad structure coined (a Maltese-cross) form. The tetrad

morphology, which can be seen with Giemsa staining of a thin blood smear, is unique to Babesia. Trophozoite and merozoite growth ruptures the host erythrocyte, leading to the release of vermicules, the infectious parasitic bodies, which rapidly spread the protozoa throughout the blood.



Life cycle of *Babesia*





Theileria

-**Final host:** infect both wild and domestic animal, some species also infect small ruminants.

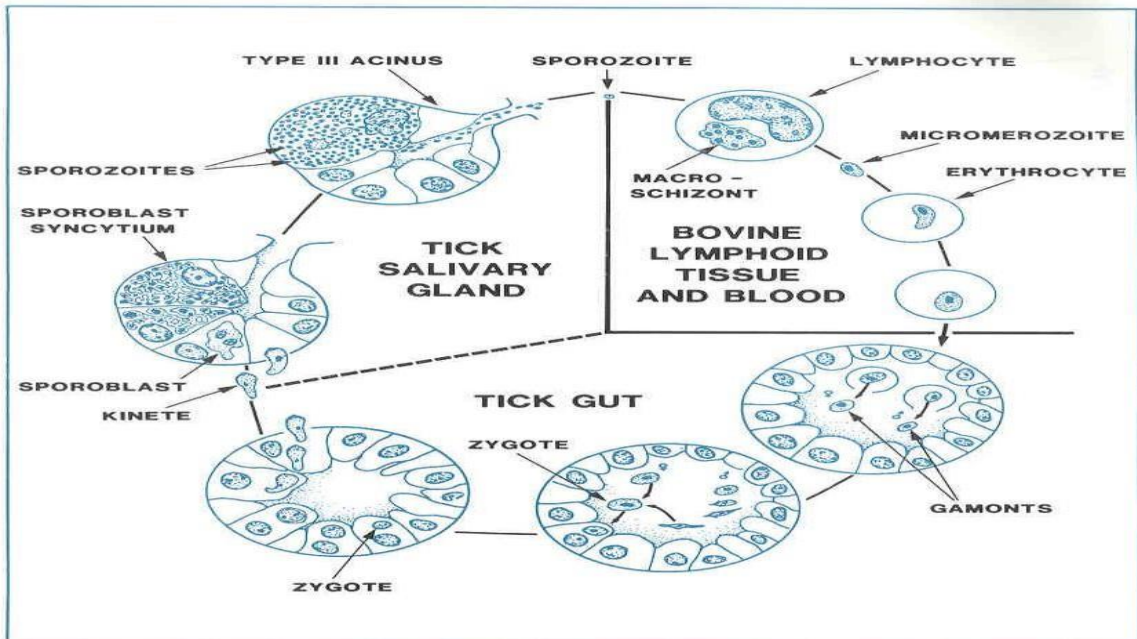
Intermediate host: hard ticks. -

-**Site of infection:** obligate intracellular.

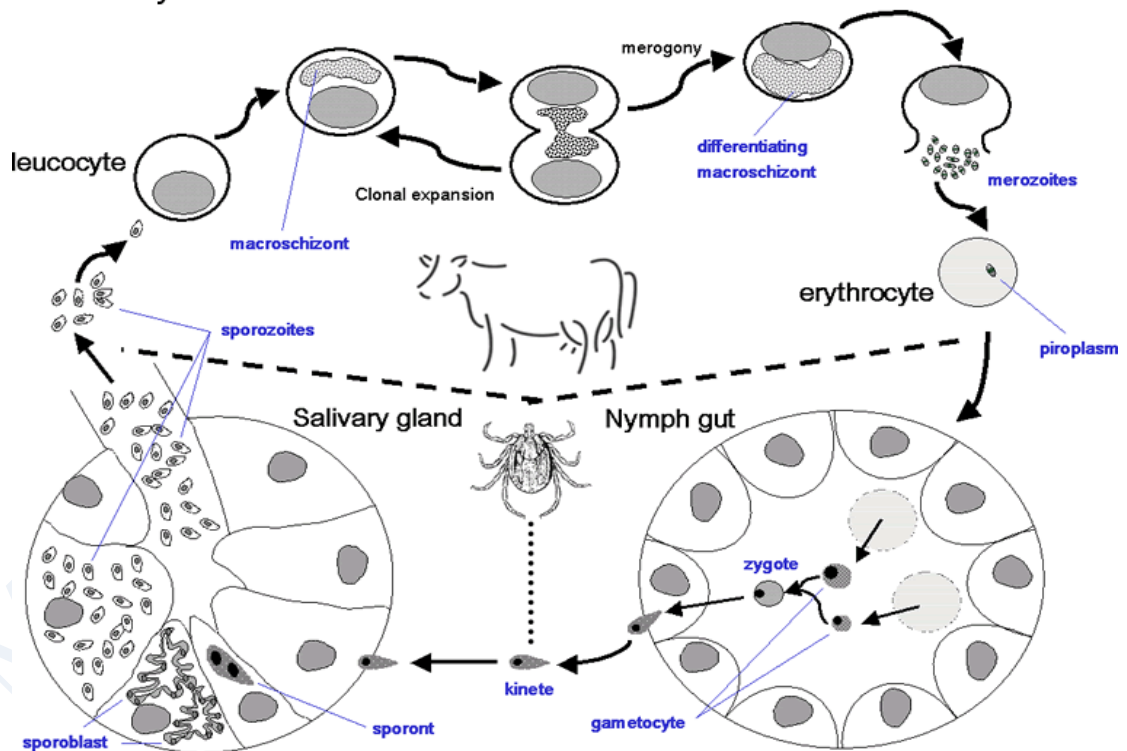
Diagnostic Technique: *Theileria* spp. are diagnosed in mammalian tissues as schizonts in leukocytes, macrophages, and other cells and as trophozoites in erythrocytes.

Theileria have complex life cycles in both vertebrate and invertebrate hosts. There are six identified *Theileria* spp. that infects cattle; the two most pathogenic and economically important are *T. parva* and *T. annulata*.

- *T. parva* infects cattle, African buffalo, Indian water buffalo and waterbuck.
- *T. annulata* infects cattle and yak, with milder infections usually seen in water buffalo.

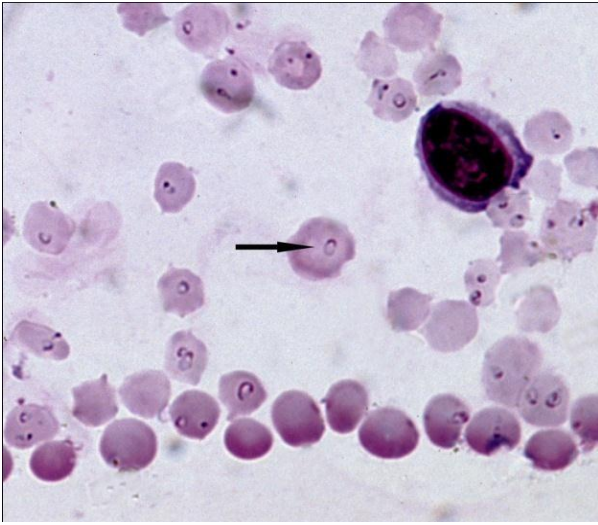


The life-cycle of *T. annulata*

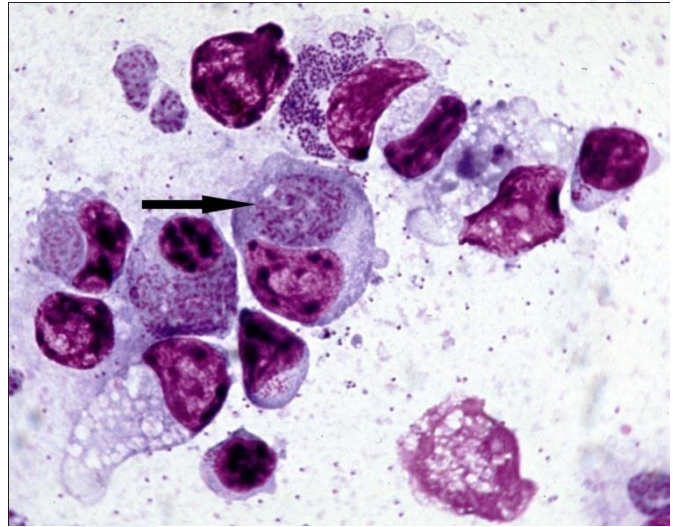


***Theileria* spp. Morphology:**

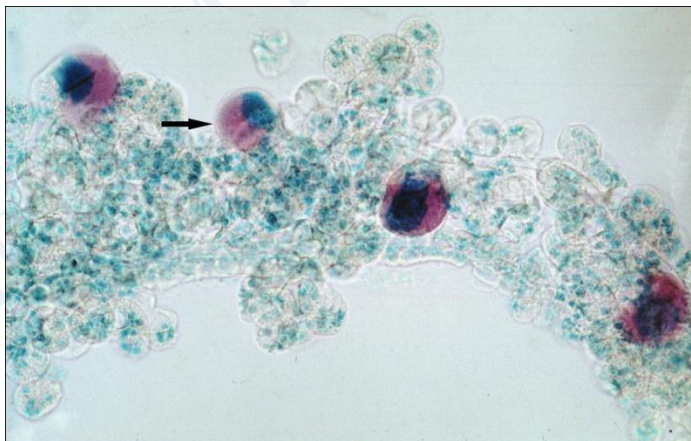
- 1- Blood-phase: present in RBCs and have multiform like ring shape, oval shape, coma shape and rod shape.
- 2- Lymphatic phase: capsule shape macroschizont (8 merozoites) or microschant (50-120 merozoites).



T. annulata schizonts



T. annulata piroplasms in erythrocytes



T. annulata

Plasmodium sp.

-**Final host:** not host-specific , domestic animals , invertebrate that infect a wide variety of domestic and wild birds, and it is transmitted to the human.

-**Intermediate host:** mosquitoes, usually *Culex*, *Anopheles*, *Aedes spp.*

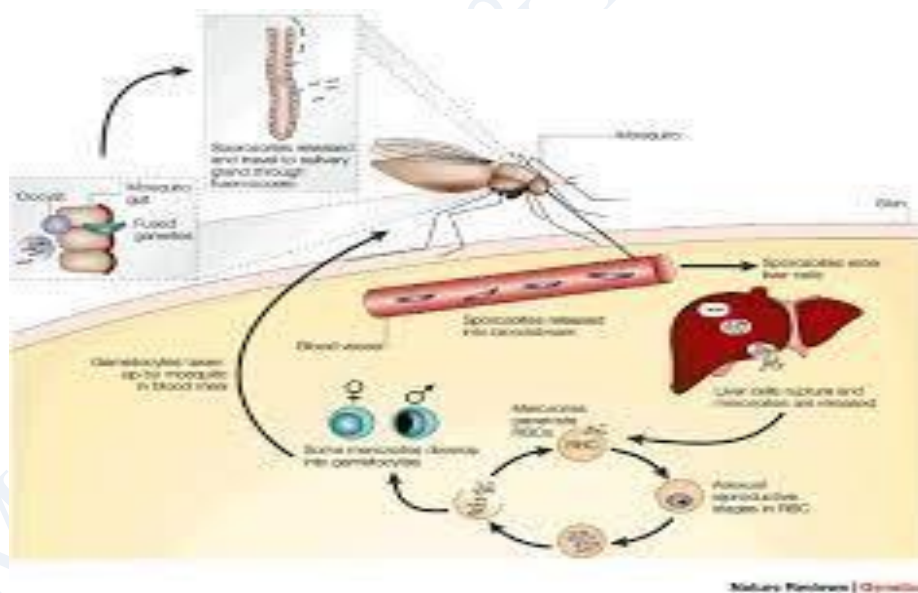
-**Site of infection:** inside the R.B.Cs, liver.

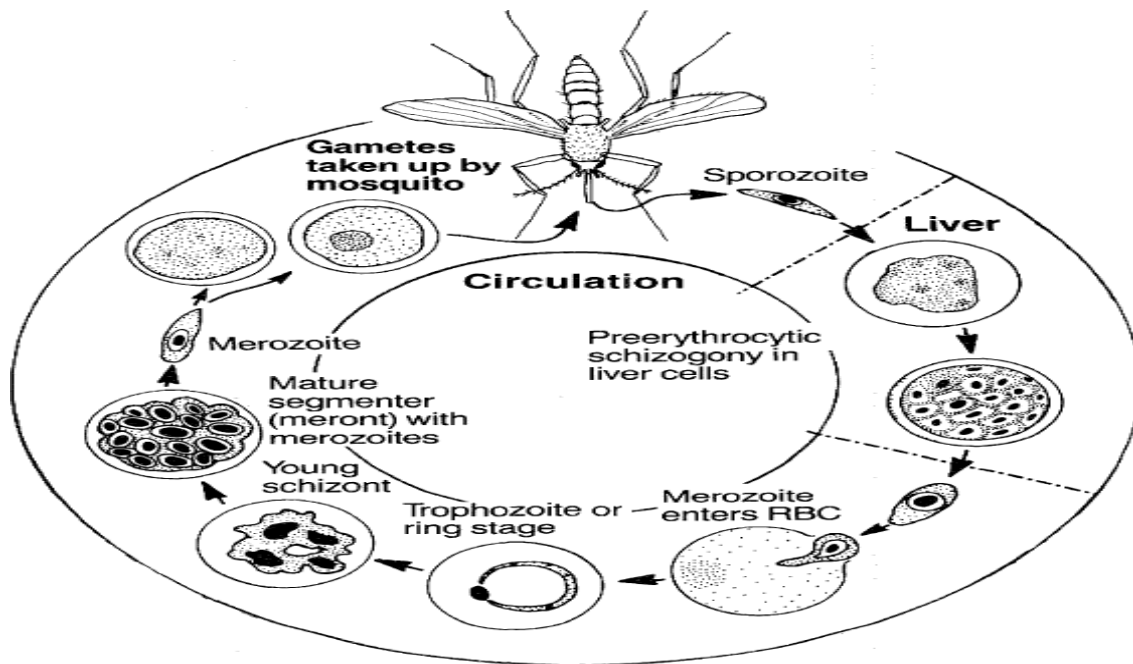
Diagnostic Technique: Blood examination.-

- There are four types of *plasmodium*:

Plasmodium vivax, *Plasmodium ovale*, *Plasmodium malaria*, *Plasmodium falciparum*

Life cycle of *Plasmodium sp* :





Plasmodium

Morphology of *Plasmodium* spp

Early trophozoite (ring form)

One red nucleus on the ring-like light blue cytoplasm; single infection in a cell.

Infected RBC like normal RBCs.

Late trophozoite

It is irregular shape like amoeboid form with pseudopodia; within cytoplasm, brown pigment granules (malarial pigment-haemozoin) appear.

Infected RBCs are pale in color, and have schuffner's dots in it (fine red granules).



Early trophozoite (ring form)



Late trophozoite

Immature schizont

Oval in shape, nucleus divided into 2-4 or more, malarial pigment begins to concentrate in a mass.

Mature schizont

Nucleus divided into 12-24; and cytoplasm also divided, each nucleus surrounded by a portion of cytoplasm to form merozoites, malarial pigment clumped.



Mature schizont

Immature schizont

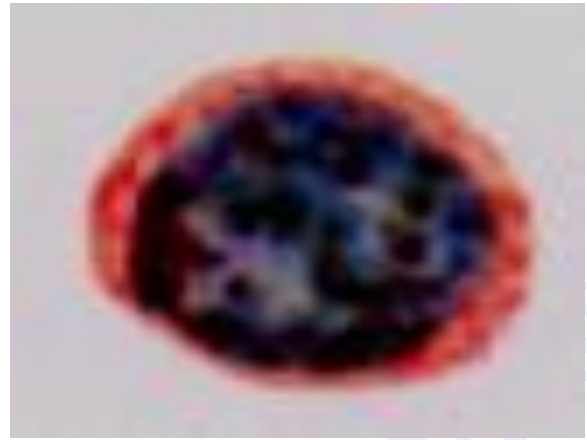


Male gametocyte (microgametocyte) Oval in shape; 1 loose nucleus in centre of it; malarial pigments diffuse.

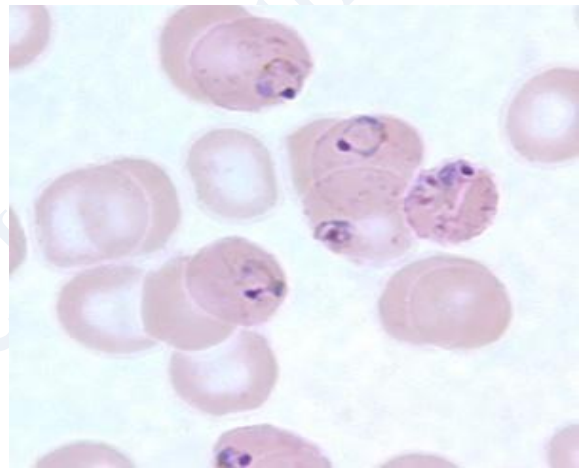
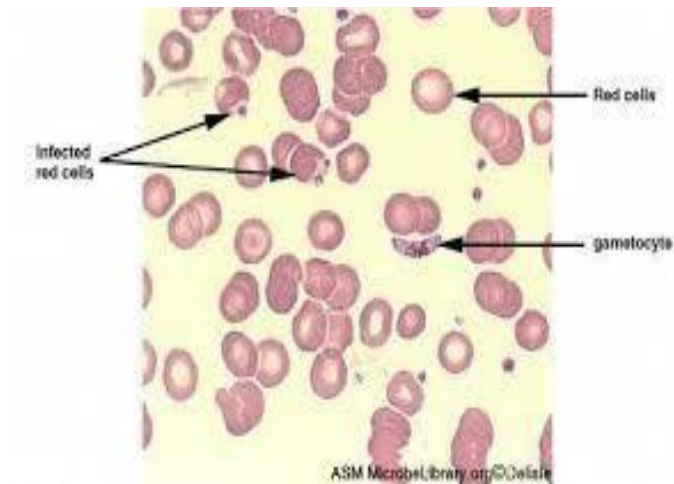
Female gametocyte (macrogametocytes) Oval in shape; 1 compact nucleus not in centre of it.



Male gametocyte



Female gametocyte



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