

s.o: Piroplasmorina

F.: Babesiidae

G.: Babesia

- ▶ They are pyriform, round, ameboid
- ▶ It is haemoparasites (occure in RBCs) = intracellular blood parasites
- ▶ Heteroxenous= wide host range
- ▶ Locomotion by gliding
- ▶ Reproduction in vertebrate host is asexual by merogony or binary fission
- ▶ Sexual reproduction occur in vectore (hard tick)



life cycle:

Mode of infection:

BY inoculation of sporozoites when infected female hard tick suck blood from animals ← sporozoites reach blood and attack RBCs directly in large Babesia, while in small Babesia invade lymphocytes and reproduce by schizogony → rupture ← infect RBCs

*IN RBCs:

Sporozoites reproduce by budding to produce 2 merozoites, in some time 4 merozoites are formed (tetrad) ← rupture infected cells and merozoites released and reattack another RBCs and through on until treatment or death of the animals



▶ IN TICK:

When female hard tick suck blood from infected animal
take merozoites → all forms of merozoites are digested
except round form

Sexual reproduction to produce gametes → fertilization
in mid gut of tick to produce motile zygote (ookinete) →
attack epithelial cells of mid gut and its nucleus divided
several times to form vermiforms → rupture, releasing 1000
sporozoites → invade epith. Cells and attack all
organs of tick especially ovary and invade eggs



- ▶ Infected female harg tick lay 18000 infected eggs → hatched to produce infected larvae
- ▶ Sporokinet invade salivary gland of larva and metamorphose to comma shape sporozoites
- ▶ Larva moult to nymph that cary sporozoites in their salivary gland and infect new animal during blood suckling and inoculate sporozoites
- ▶ Infected nymph and adult able to infect animals for several generation
- ▶ This type is transovarian transmission that occur in large babesia



Bovine Babesia

- ▶ 1- *B. bigemina*
- ▶ Merozoites in RBCs are round, oval, pyriform or irregular shape Pyriform occur in pairs, the angle between them is acute
- ▶ Size: 4-5 μm (large babesia)
- ▶ Vector: *Boophilus*
- ▶ N.B.: size of large babesia is 3 μm or more, while size of small babesia less than 2.5 μm



2. Babesia bovis

- ▶ Size of merozoites 3-4 μm
- ▶ Occur in center of RBCS
- ▶ Angle between 2 merozoites is acute
- ▶ Vectore: Ixodes, Boophilus and Rhipicephalus



3-Babesia divergens

- ▶ Small Babesia 1.5um
- ▶ Occur on margine of RBCs
- ▶ Angle between the two merozoites is obtuse= merozoites diverge from each other



4-Babesia major

- ▶ Occur in center of RBCs
- ▶ 2.5 μm
- ▶ Less pathogenic than *B. bovis*



Small ruminants Babesia

- ▶ 1-B. motasi:
 - ▶ occur in sheep, goat. large, 2.5 um
- ▶ 2-B. ovis:
 - ▶ occur in sheep, goat . small type, 1.5 um
 - ▶ Lie in the margine of RBcs, the angle between the pairs is obtuse
- ▶ 3- B. taylori:
 - ▶ Occur in goat. Small type 2 um
- ▶ 4-B. foliate: in sheep



Equine Babesia

- ▶ 1- *B. caballi*:
 - ▶ large species,
 - ▶ Infect horse, donkey and mule
- ▶ 2- *B. equi*:
 - ▶ Infect horse, donkey and mule
 - ▶ More widely distributed than *B. caballi*
 - ▶ It is small type 2 um
 - ▶ 4 daughter merozoites are formed at one time in the cell (tetrad)



Canine babesia

1-Babesia canis

Large type 4-5 um

Cause canine babesiosis= malignant jaundice= biliary fever

2-Babesia gibsoni: smaller than B. canis

3-B.vogeli: in dog, less pathogenic than canis

4-B. cati: in cats, large type

5-B. felis: in cats, small type



- ▶ *B.perroncitoi*: in pig, small type 0.7 μm



pathogenesis

- ▶ Incubation period: 8-15 day
- ▶ Disease: bovine babesiosis, piroplasmosis, red water, Taxes fever, tick fever
- ▶ It is arthropode borne disease
- ▶ Highly pathogenic for adult animals

First sign of the disease is rise body temperature

Affected animals are dull, fail to eat, stop rumination, thin , emaciated

Sever anemia due to destruction of erythrocytes



Hemoglobinuria

Death due to organic failure that caused by sever destruction of Rbcs and the resulted anemia, also due to blocking capillaries of various



P.M. examination

- ▶ Spleen is greatly enlarged
- ▶ Liver enlarged and yellowish brown
- ▶ Lung is edematous



- ▶ In chronic infection temperature is not very high, no haemogloninuria
- ▶ Immunity:
- ▶ Recovered animals remain infected for the life, immune to reinfection
- ▶ No cross immunity between different species



Diagnosis

- ▶ 1- clinical signs
- ▶ 2- P.M. examination
- ▶ Microscopic examination of stained thin blood film



Treatment

- ▶ Acriflavine, acaprine
- ▶ Supportive treatment
- ▶ Prevention :
- ▶ Tick elimination
- ▶ Artificial premunization



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