

Anti-protozoal Drugs



Prof. Dr Khaled Abo EL-Sooud
Prof. of Veterinary Pharmacology
Faculty of Vet. Med.
Cairo University

Anti-protozoal Drugs

Definition: These are drugs that combating the parasitic protozoa responsible for different diseases in animals.

Most of parasitic protozoal disease are transmitted by vector insect as Ticks, flies, mosquitoes and others.

So for control of these diseases the use of ectoparasiticides as **IVOMEC** and other insecticides is very important besides the hygienic measures and finally the use of drugs for treatment of infected animals.

Protozoal Diseases

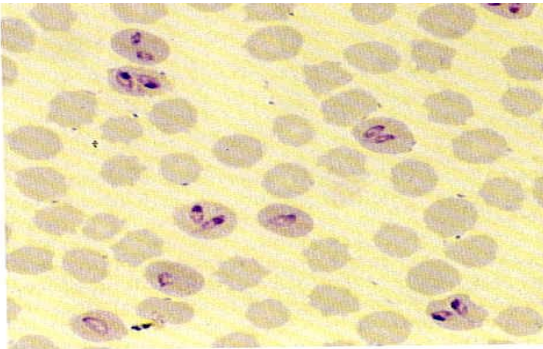
```
graph TD; A[Protozoal Diseases] --> B[Blood Protozoal Diseases Transmitted by Vector as Ticks, Flies]; A --> C[Tissue Protozoal Diseases]
```

**Blood Protozoal
Diseases
Transmitted by
Vector as Ticks,
Flies**

**Tissue Protozoal
Diseases**

Blood Protozoal Diseases

RBCs or WBCs



Babesia
Theileria
Anaplasma

Plasma



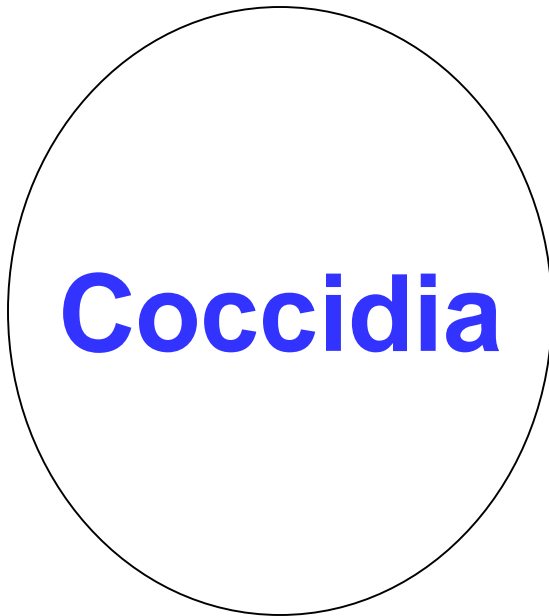
Trypanosoma

Histomonas

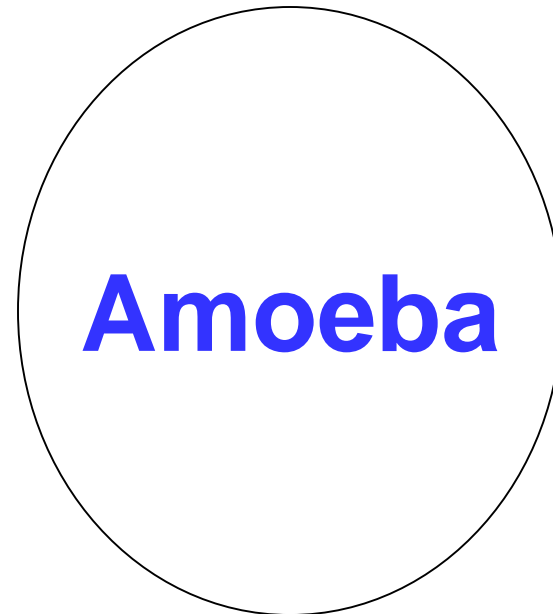
Tissue Protozoal Diseases

Liver

Intestines



Intestines

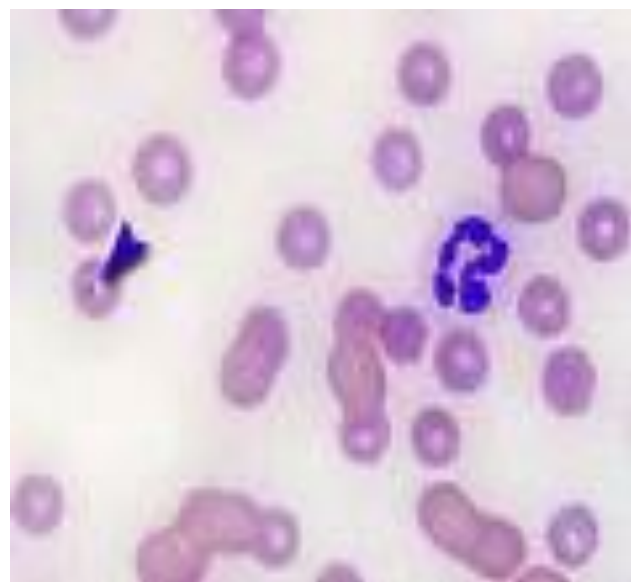
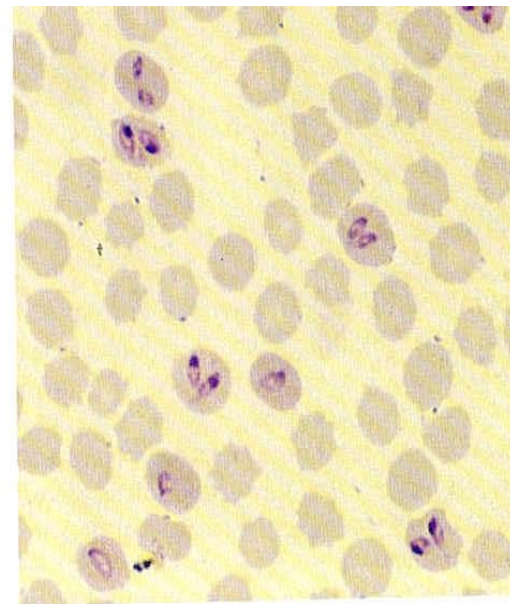


Blood Protozoal Diseases

Babesiasis
Tick Fever Red
water Fever (Texas Fever)
Piroplasmosis

Clinical symptoms

Fever, depression, anorexia, weakness, and cessation of rumination. In the late stage there is severe jaundice, and the urine is dark red to brown in colour (hemoglobinuria) and produce a very stable froth.



Chemotherapy of Babesiasis

1- Quinuronium derivatives

(Acaprin[®], Babesan[®], Pirevan[®]),

0.25-0.5 mg/kg S/C 5% solution

Horse *Babesia caballi*, Dog *Babesia canis*

Cattle *Babesia bovis* Sheep *Babesia ovis*

Local swelling Salivation, sweating,
diarrhea; → adrenaline is the
antidote.

Cure → 24 - 48 hr If used at fever and
repeat second injection

Chemotherapy of Babesiasis

2- Amicarbalide diisethionate Diampron[®]

Babesia divergens Babesia caballi, Bab. bigemina, Bab. argentina

Dosage 5-10 mg/kg, S/C or I/M or Slow IV at fever and repeat 24 h second dos

Its LD₅₀ is 15 times that of Quinuronium.

Local swelling at the site of injection may occurs due to the release of histamine.

Chemotherapy of Babesiasis

3- Imidocarb dipropionate (Imizol[®])

Imidocarb is effective against *Babesia* spp. infection. It is a cholinesterase inhibitor.

For treatment of babesiosis: in cattle 1.2 mg/kg IM and the prophylactic dose is 3 mg/kg, Horse 2.4 mg/kg, Dog 6 mg/kg S/C or I/M.

The drug is effective against *babesia* and *anaplasma* infections.

It bind to plasma proteins, so act for a long time (4 weeks).

Toxicity in cattle 10 mg/kg death.

Withdrawal time in meat 28 days

Chemotherapy of Babesiosis

4- Diminazene diacetate (Berenil[®])

3.5 mg/kg; S/C or I/M.

It also effective against **Trypanosomiasis**

Single doses are usually sufficient,

It cause an arterial dilatation, a lowering of blood pressure and a lowering of blood glucose level

Chemotherapy of Babesiasis

5- Trypan blue 1 % IV

Bab. Equi, Bab. Bovis,

Horse and cow 1-4 g

Sheep 0.5-1 g

Dogs 20-120 mg

Stain meat and milk for weeks

NOT USED NOW

Anaplasmosis

Anaplasma marginale

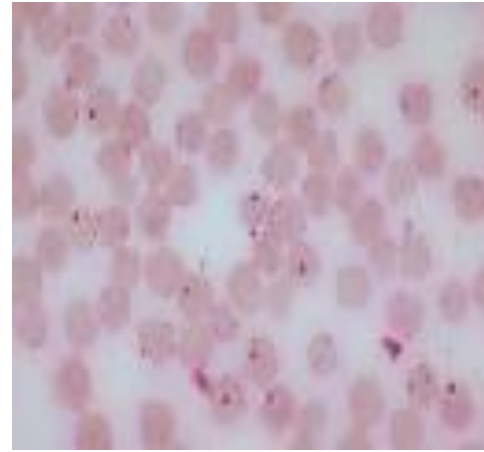
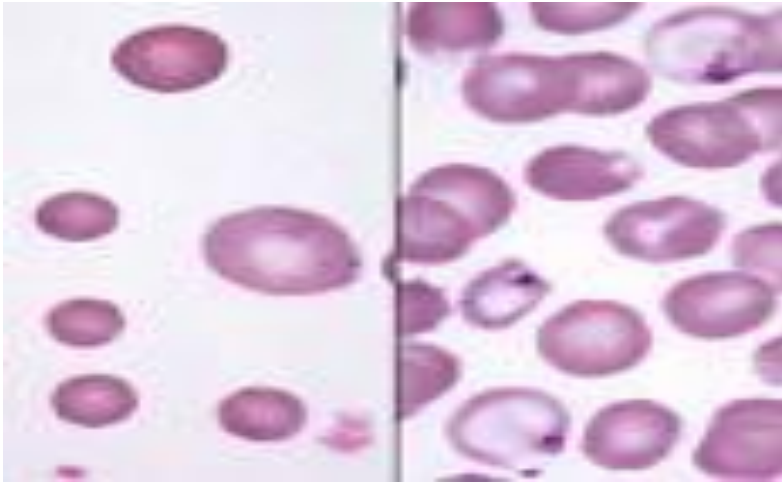
Anaplasmosis is most severe in mature cattle but it is mild in calves.

Disease is usually mild in calves up to 1 year of age, acute but rarely fatal in cattle up to 2 years of age, and acute and often fatal in cattle over 2 years of age.

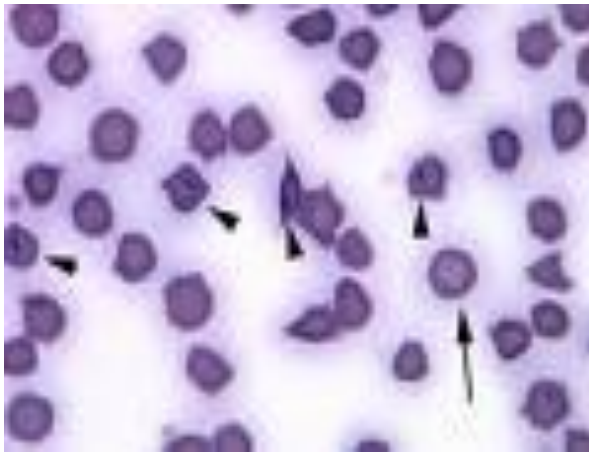
Clinical signs

Fever → normal → subnormal.

The urine is dark yellow but not red, since hemoglobinuria does not occur
suppression of rumination, constipation, and dryness of the muzzle



Anaplasmosis



Theleriaisis

Chemotherapy of Anaplasmosis

Imidocarb:

It is used for treatment of babesiosis and anaplasmosis

Administration and dosage:

Cattle: 3 mg/kg, in a single S/C dose.

Tetracyclines:

Early use (before Hb values fall below 4 mg%) → 100% survival

Long-acting oxytetracycline: 20 mg/kg, single I/M injection.

Injection into the neck muscle is preferred.

Chlortetracycline: 2.2 mg/kg, orally each day for 60 days.

Dithiosemicarbazones Gloxazone[®]

having an activity against *A. marginale*.

Administration and dosage:

10 mg/kg, single I/V injection for 10 days

Theileria

East Coast fever

A number of *Theileria* spp. occur within lymphocytic and erythrocytic cells and are transmitted by the bites of various species of ticks in cattle sheep. In cattle, *Theileria parva parva*, the cause of East Coast fever, and *T. annulata*, the cause of Mediterranean Coast fever, are the main pathogenic species.

Chemotherapy of Theileriosis

Buparvaquone (Butalex[®]) and **parvaquone** (Parvexon[®]) are hydroxynaphthoquinones used for the treatment of theileriosis in cattle. Naphthoquinones are thought to interfere with electron transport within mitochondria at the uboquinone level

chlortetracycline and **oxytetracycline**, are used for prophylaxis against *T. parva parva* and may reduce parasitaemia by arresting schizogony. Chlortetracycline is used at a dose of 1.5 mg/kg orally for 28 days and oxytetracycline is given at a dose of 20 mg/ kg intramuscularly once or twice, or 5 to 15 mg/kg intravenously.

Dithiosemicarbazones

Gloxazone is a member of dithiosemicarbazones having an activity against *A. marginale*.

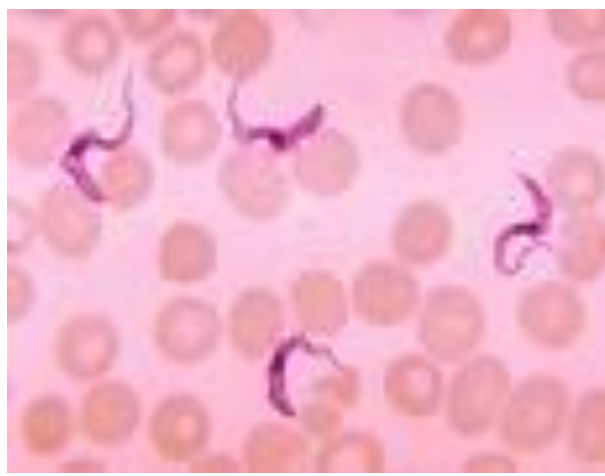
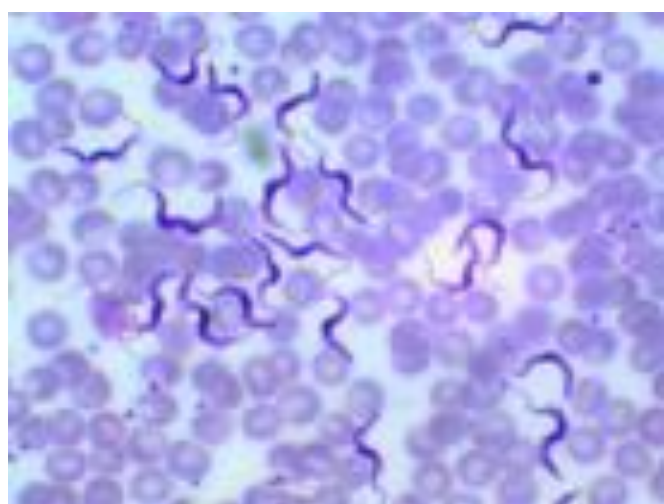
Administration and dosage:

5 mg/kg, single I/V injection.

Trypanosomiasis

Sleeping Fever

Nagana is a disease of cattle in Africa,
Surra, a disease of cattle in India,
Dourine, a disease of horses in Africa, Asia,
Europe, and the Americas.
It is responsible for sleeping sickness in
humans



Trypanosomiasis

Sleeping Fever

Causative organisms: *Trypanosoma congolense*, *T. vivax*, *T. siamiae* and *T. brucei*

Glossina spp. (tsetse fly)

Trypanosomes → subcutaneous site, → blood stream

Symptoms

Fever, dullness, anorexia, pale m m, enlarged lymph nodes. Infected animal become immunosuppressed, very emaciated and dies within 2- 4 months.

Clinical pathology

The classic method of confirming the diagnosis is to demonstrate the parasites in a wet blood film or in blood smear stained with Giemsa.

Chemotherapy of Trypanosomiasis

Diamidines group:

- Trypanocidal
- Babesicidal also
- MOA: Hypoglycemic activity
- Members

Diminazine,
phenamidine,
Pentamidine,
Stilbamidine,
Propamidine

Chemotherapy of Trypanosomiasis

Diminazene, (Berenil[®]): Trypanocide, Babesicide, bactericide

Dosage: 3.5 mg/kg IM SC therapeutically, but weak for prophylaxis,

Horse, cattle, sheep and dogs

T. vivax, *T. congolense*, *T. brucei*

Chemotherapy of Trypanosomiasis

Phenamidine isethionate, Horse, cattle and dogs

Trypanocide, Babesicide

Dosage: 0.03 mL of 40% solution/kg SC

Pentamidine, Stilbamidine

For Human Trypanosomiasis

Chemotherapy of Trypanosomiasis

Amino-Phenanthridinium derivatives :

- **Trypanocidal**

Homidium bromide Ethidium[®] Cattle

Homidium chloride Homidium[®] Horse

Dosage: 1 mg/kg BW

I/M Produce a rapid action with duration for about 1 month. Sever local reaction can result from S/C injection so, it is given by deep I/M injection.

Chemotherapy of Trypanosomiasis

Amino-Phenanthridinium derivatives :

Isometamidium chloride Metamidium[®] or Samorin[®]

Dosage: 0.5 mg/kg BW as curative 2 mg/kg BW as prophylactic protect 6 months I/M

•Trypanocidal *T.vivax, T.congolense T.evansi*

Cattle, Horse, camels

Chemotherapy of Trypanosomiasis

Quinapyramine compounds , (Antrycid®, Trypacide®, Tribexin®),

Quinapyramine sulfate: **water soluble rapidly absorbed low prophylactic**

Quinapyramine Chloride: **less water soluble slowly absorbed strong prophylactic**

2 parts of chloride + 3 parts of sulfate

Dosage: 0.025 mg/kg BW SC

MOA: inhibition of Trypanosomal cell growth and division

Toxic in young animals over dose Collapse

Chemotherapy of histomoniasis

***Histomonas meleagridis* (black-head Disease) (histomoniasis) was most commonly seen in turkeys but is now more likely to be seen in game birds after they have been released.**

- 1. Aminonitrothiazole 0.1% in feed for 14 days**
- 2. Nithiazide (Hepezide) 0.025% (prevention) or 0.04% treatment In feed or water**
- 3. Dimetridazole (Emtryl) 0.05% In feed (interfere with RNA synthesis)**

Chemotherapy of Trichomoniosis

Bovine trichomoniosis (trichomoniasis) is a venereal disease caused by *Tritrichomonas foetus*, and has been controlled in many countries by artificial insemination.

Avian trichomoniosis with *Trichomonas gallinae* (*T. columbae*) causes lesions in the mouth and upper respiratory tract (canker in pigeons).

**Metronidazole, ronidazole, and
carnidazole are thought to interact with
DNA destroying its ability to act as a
template for DNA and RNA synthesis**

carnidazole *Pigeons by mouth*, (adult birds) 10 mg; (young birds) 5 mg