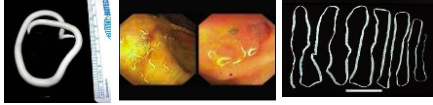
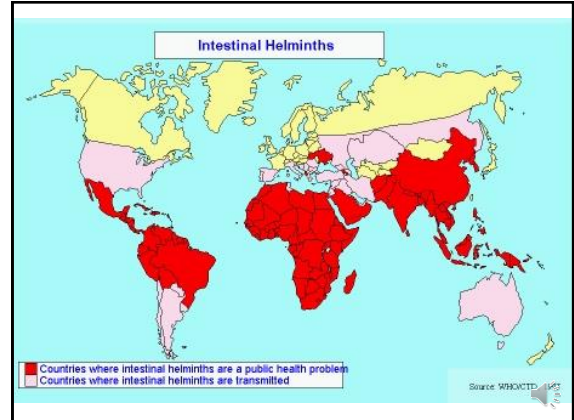


HELMINTHS

- Warm – like parasites, invertebrates with elongated, flat or round bodies
- Mostly **MACROPARASITES** – seen by naked eye



- Many groups, subdivided
- Developed through egg, larval and adult stages
- Mostly worldwide parasited – hygienic and sanitary measures



EOSINOPHILIA

= Increased level of eosinophils

- **Helminthic infections x Allergy - Never in infections caused by protozoa!!!**

- Level of eosinophils

Very high (30-80% WBC)

Trichinella, Toxocara, Fasciola

Medium high (10-30% WBC)

Strongyloides, Ancylostoma, Necator

Low, non-existing (0-10% WBC)

Enterobius, Ascaris, Trichuris



ANTHELMINTHIC Tx I

group of antiparasitic drugs that expel parasitic worms by either stunning (vermifuges) or killing them (vermicides) without causing significant damage to the host-interaction with tubulin of parasites - disruption of parasitic metabolism, consumption of supplies of energy, immobilisation/death of sensitive parasites

- **BENZIMIDAZOLES**

Mebendazol – absorbed less than 10% of the drug, active in intestine

Albendazol (Zente) – contraindicated in pregnancy, low absorption (increased by fatty food)

Tiabendazol

Triclabendazol

Flubendazole

Fenbendazole



ANTHELMINTHIC Tx II

- **Praziquantel** (Biltricid, Cesol) – good absorption, high concentration in bile, low concentration in CSF, metabolite excreted by kidney
- **Ivermektin** - product of *Streptomyces ivermectilis* – semi-synthetic; good absorption form GIT, excreted to bile, long biological life (16–35 hours)
- **Levamisol**-derivate of imidazotiazolu, good absorption form GIT, excreted by kidney into urine and to stool
- **Niklosamid** – low absorption form intestine, safe after 1st trimester of gravidity
- **Pyrantel pamoat** – safe in gravidity



CLASSIFICATION

- **FLUKES** (trematodes)- i.e. *Schistosoma, Paragonimus, Fasciola hepatica*

- leaf-shaped, hermaphroditic (excluding Schist.), go through several larval stages before reaching adulthood

- **TAPEWORMS** (cestodes) - i.e. *Taenia saginata, T. solium, Hymenolepis nana, Echinococcus sp.*

- flat hermaphroditic parasites colonising human GIT, some primarily human, some animal pathogens

- **ROUNDWORMS** (nematodes) – i.e. – *Enterobius vermicularis, Trichuris trichuria, Ascaris lumbricoides, Trichinella spiralis, Ancylostoma duodenale*

- cylindrical in structure, usually bisexual, mostly parasitic in humans

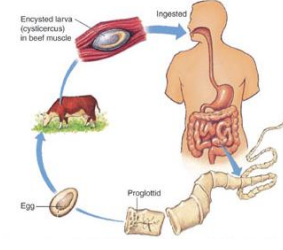




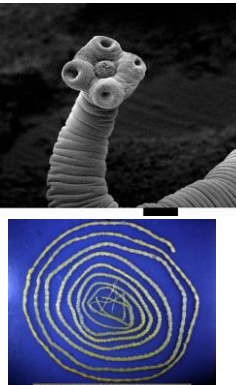
Taenia saginata

Cestoda
Distribution: geopolit, typical **food habits**
Source of the infection: raw or uncooked **beef**
 Final host: **human**
 Intermediate host: **cattle**

Life cycle



In the muscles of cattle:
cysticercus bovis
 (5-10 mm)
 Final host is discharging **proglottids** containing **eggs**
Small intestine




Adult measures 3-10 m
Prepatent period:
6-12 months
 Female releases: 1,000-2,000 proglottids (80-100 th. eggs per day)
Life expectancy: 20 years

Symptomatology


Usually **asymptomatic**
Malnutrition in heavier infection

Atypic migration of proglottids - **apendicitis**
Cysticercus bovis **only in ruminants:** muscles, myocardium, diaphragma, oesophagus



Therapy

- Praziquantel 10mg /kg single dose
- Albendazol 2x200mg 3 days
- Check up in 1 or 3 months




Taenia solium

Cestoda
 Distribution: **cosmopolite**
Transmission - alimentary:
 undercooked **pork meat (larvae)** – human as **final host (adult tape worm)**
food contaminated by eggs – human as **intermediate host (cysticercosis)**

Taeniosis

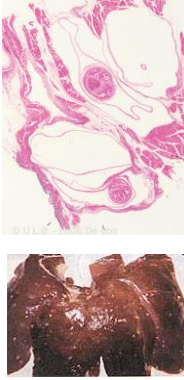
Inhabitates **the small intestine**
 Adults measure **2-3 m**
 Scolex with suckers and hooks
 Prepatent period: 11-12 months
Symptoms: usually asymptomatic / irritating movement of parasite, toxins-unspecific GIT problems



Cysticercosis

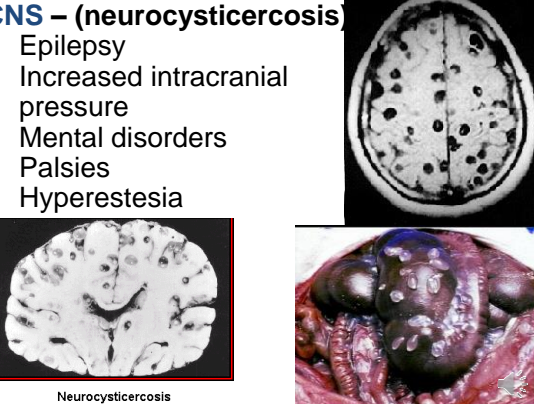
Cysticercus cellulosae:
 swine, human
 Localisation in host:
muscles, brain, subcutaneous infection

Symptoms are dependent on:
 lasting of infection
 number of cysticerci
 their localisation
 immune response of host



CNS – (neurocysticercosis)

- Epilepsy
- Increased intracranial pressure
- Mental disorders
- Palsies
- Hyperesthesia




Neurocysticercosis

Ocular – (ophthalmocysticercosis)

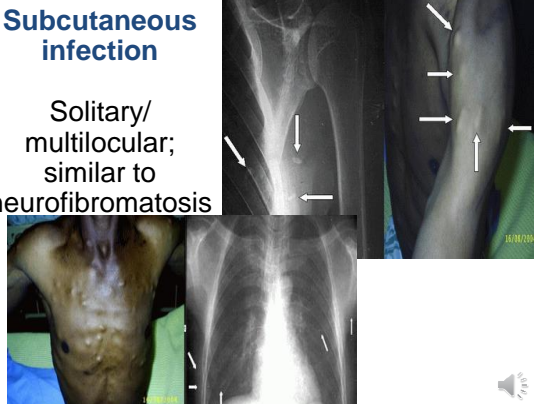
Corpus vitreum, subretinally:

- Inflammatory changes
- Retinal atrophy
- Chorioretinitis
- Iridocyclitis
- Cataract



Subcutaneous infection

Solitary/
 multilocular;
 similar to
 neurofibromatosis



Final host therapy

Praziquantel (CESOL 150 mg; BILTRICIDE 600 mg)
 doses:
 – 5-10 mg/kg in a single dose, after meal

Niklosamid (YOMESAN- Merck, tbl. 500 mg):
 Side effects: mild; headache, abdominal pain, fever
 Doses: 2 g p.o. in a single dose, after fasting

children:
 < 11 kg = 0,5 g
 11 – 34 kg = 1,0 g
 > 34 kg = 1,5 g

Intermediate host therapy:

- **CHEMOTHERAPEUTICS:**
 - Praziquantel 10 – 25 mg/kg 3x per day, 2-3 weeks
 - Albendazol um 7,5 - 15 mg/kg/day (max. 800 mg) in 2 doses., 2-4 weeks
 - Corticosteroid therapy for suppression of oedema and intracranial hypertension
- Chemotherapy is **not indicated** in severe active neurocysticercosis, (could lead to life threatening inflammatory reaction), symptomatic therapy
- Solitary cyst with symptoms of epilepsy – anticonvulsive therapy
- Surgery in subarachnoideal and intraventricular cysts, causing compression or hydrocephalus
- Ocular cysts are treated **surgically** with no chemotherapy