

Parasitic diseases acquired from fish

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Zoonotic parasites

- Worldwide problem, mainly trematodes and nematodes. Occasional reports of microsporidians and myxozoans in immunocompromised patients.
- Most of zoonotic concern usually have mammalian host
- Transmission to humans usually via ingestion of raw or undercooked food
- Chance of infections dramatically reduced by freezing (pickling or smoking has variable impact)
- Screening of fish products may require specialist equipment
- Discrimination of non-problematic parasites from zoonotics requires specialist taxonomic knowledge

Trematodes - Clonorchiasis



- *Clonorchis sinensis*
- Complex lifecycle involving snail, fish, mammals
- Metacercaria found in musculature (plus subcutaneous tissues, scales, fins, gills) of cyprinids (71 species), clupeids (>13 spp). 43 species of fish susceptible in China.
- Transmission via consumption of raw fish
- Bile duct of humans, may cause pancreatitis and lead to liver carcinoma
- Also found in rats, cats, dogs, pigs
- Occurs in Hong Kong, China, Taiwan, South Korea
- Treatment in humans using praziquantel

Trematodes - Opisthorciasis



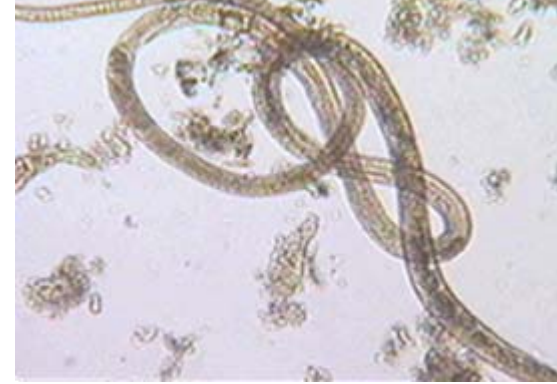
- *Opisthorchis viverrini* and *O. felineus*
- Complex lifecycle involving snail, fish, mammals
- Metacercaria found in musculature of cyprinids
- Transmission via consumption of raw fish
- Bile duct of humans, heavy infections may cause cirrhosis and liver carcinoma
- Also found in cats, dogs, foxes, pigs (*O. viverrini*) and cats (*O. felineus*)
- *O. viverrini* occurs in south east Asia (particularly Thailand), *O. felineus* occurs in Poland, central Eastern Europe and Siberia.
- Treatment in humans using praziquantel

Cestodes - Diphyllobothriasis



- *Diphyllobothrium* spp.
- Complex lifecycle involving copepods, fish, mammals
- Plerocercoid found in musculature and viscera of a variety of fish species (marine and freshwater)
- Transmission via consumption of raw fish
- Mucosa of ileum and jejunum of humans, limited pathology. Infections are rare.
- Also found in birds, bears, seals, walruses, dogs...
- *Diphyllobothrium* infections have been reported in North and South America, Europe, Greenland, Iceland, Japan
- Treatment in humans using niclosamide, bithionol and paramomycin sulphate.

Nematodes - Capillariasis



- *Capillaria philippinensis*
- Complex lifecycle involving fish and humans (experimentally transmitted to gerbils, monkeys and some birds). Autoinfection in humans possible.
- Larvae found in intestine of fish. Transmitted through the practise of eating small fish raw (6-7cm in length).
- Parasites found in intestine. Leads to death if untreated
- Mainly Philippines, found in Thailand, Japan, Taiwan, Indonesia, Korea, Iran, Egypt, India.
- Treatment in humans using mebendazole or albendazole.

Nematodes - Gnathostomiasis



- *Gnathostoma* spp.
- Complex lifecycle involving copepods, fish (or frogs), and mammals. Very wide host range including snakes, chickens, tree shrews, pigs, etc...
- Parasites found in muscle of fish host
- Definitive hosts are pigs, cats, boars, weasels
- Mainly South East Asia, China, Japan, Korea, Indian subcontinent, middle East, Mexico
- Treatment in humans via surgery or using thiabendazole, albendazole or ivermectin.

Nematodes - Anisakiasis

- Larvae of *Anisakis* spp., *Pseudoterranova* spp., *Contracaecum* spp.
- Complex lifecycle involving euphausiid crustaceans, fish, squid and mammals
- Larvae found in viscera and muscle
- Parasites found in intestine.
- Definitive hosts are marine mammals including seals, whales and dolphins
- Worldwide distribution, predominates in areas where raw, pickled fish eaten
- Increasing evidence of hypersensitivity
- Treatment in humans by surgery

Future directions

- Consumer choice may lead to increase in zoonotics – increase in sushi and in exotic foods
- General increasing trend in % in hosts? CC? Better diagnostics? Wider surveys?
- Identification methods – morphology vs. molecular
- Hypersensitivity / anaphylaxis?
- Treatment in humans?
- Treatment / eradication / killing in other hosts?
- Need for networks and / or links with medical field? Better advertising of our skills!