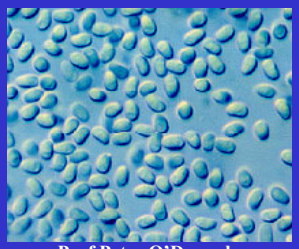
BioMedical Parasitology

Protozoology

Myxozoa



Prof Peter O'Donoghue

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PROTOZOA

65,000 species

(31,250 extant + 33,750 extinct)

flagellates	amoebae	sporozoa	ciliates
6,900 species	**11,550 species**	**5,600 species**	**7,200 species**
5,100 free-living 1,800 parasitic	11,300 free-living 250 parasitic	all parasitic	4,700 free-living 2,500 parasitic

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SPOROZOA

Apicomplexa	Microspora	Myxozoa
(apical complex)	(unicellular)	(multicellular)
(oocysts)	(spores)	(spores)

All parasitic

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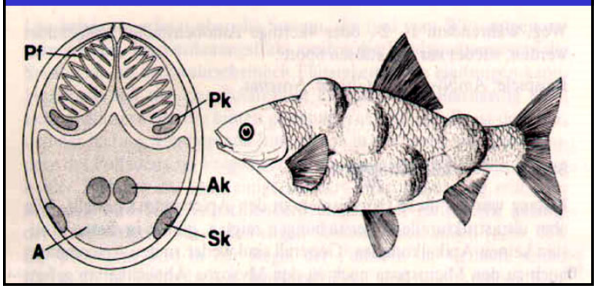
Parasite assemblage

MYXOZOA

multicellular spores (therefore not a protozoan!)
common in fish and aquatic annelids



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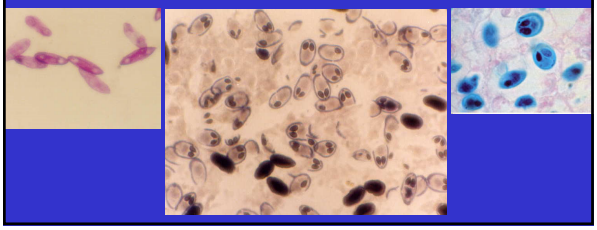
Parasite morphology

Multicellular spores

- capsulogenic cells (polar capsules)
- sporoplasmic cells (infective sporoplasm)
- valvogenic cells (encapsulating valves)



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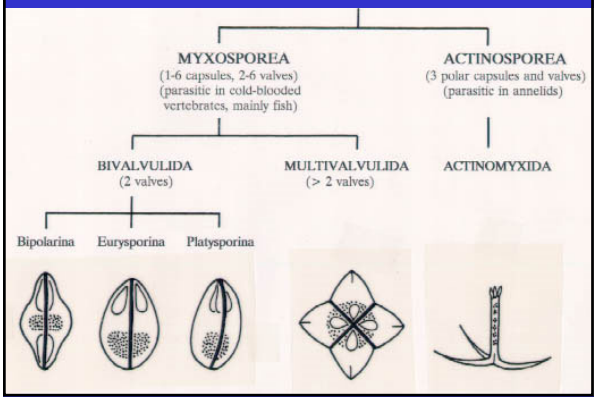
MYXOZOA



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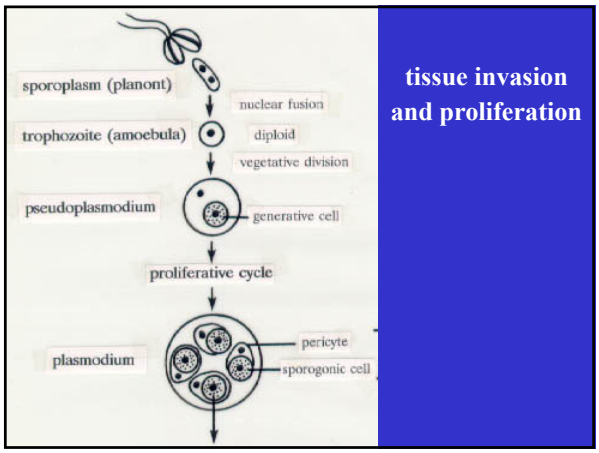
sporoplasm (planont)
nuclear fusion
trophozoite (amoebula)
diploid
vegetative division
pseudoplasmodium
generative cell
proliferative cycle
plasmodium
pericyte
sporogonic cell
tissue invasion and proliferation

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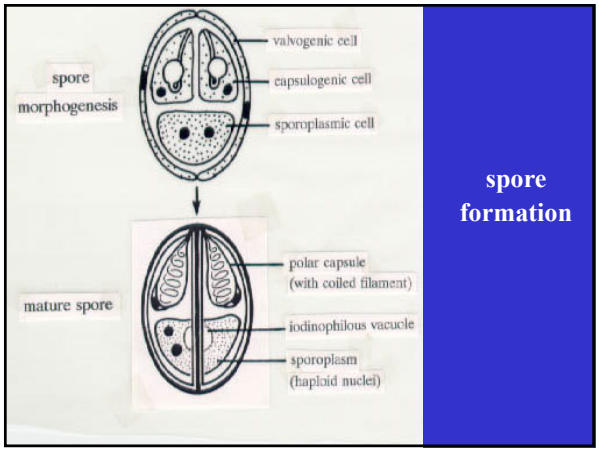
spore morphogenesis
valvogenic cell
capsulogenic cell
sporoplasmic cell
mature spore
polar capsule (with coiled filament)
iodinophilous vacuole
sporoplasm (haploid nuclei)
spore formation

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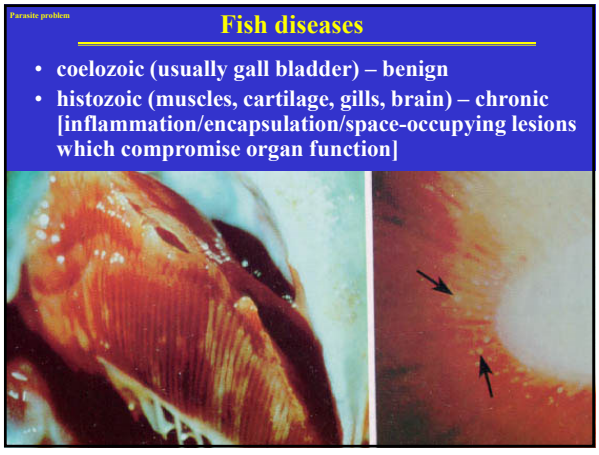
Parasite problem
Fish diseases
• coelozoic (usually gall bladder) – benign
• histozoic (muscles, cartilage, gills, brain) – chronic [inflammation/encapsulation/space-occupying lesions which compromise organ function]

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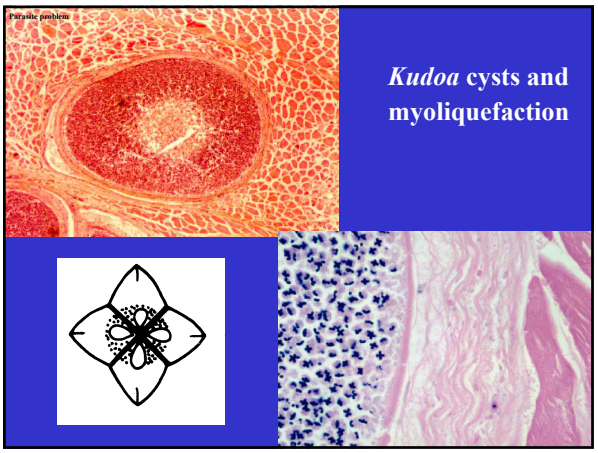
Parasite problem
Kudoa cysts and myoliquefaction

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Parasite problem
Southern bluefin tuna - sea cage culture

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Parasite problem

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Parasite life-cycle

Transmission?

- Endogenous development known but fish-fish transmission unclear
- Resistant spores formed → exogenous phase
- Spores may be freed ante-mortem (eruptive lesions) or post-mortem (histolysis)
- Alternatively, infected flesh may by ingested by predator/scavenger (carnivory)
- Freshwater myxozoan studies (need mud)

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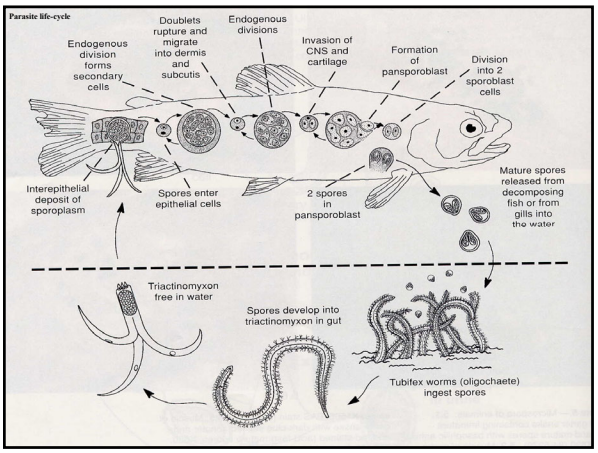

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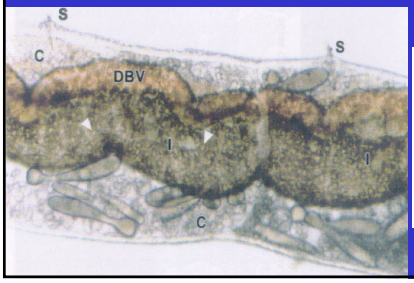
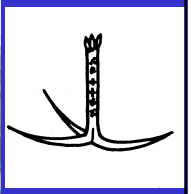
Parasite life-cycle

Annelid stages

endogenous development

external actinospores





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Parasite problem

Problem with marine species

- Tuna do not eat worms and do not frequent shallow inshore wormy waters
- Possible accession through food chain via carnivory of paratenic? hosts
- Pilchard (trash fish) diet

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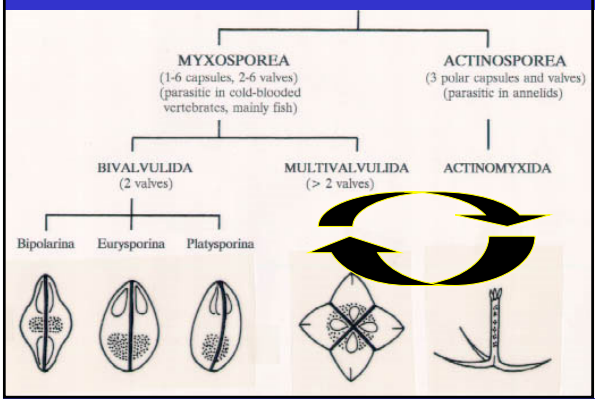
Parasite life-cycle

Alternation of life cycle



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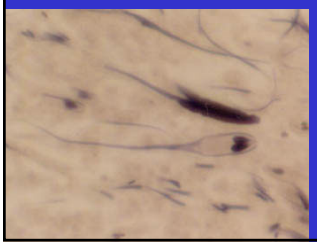
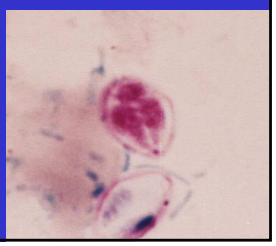
Parasite biodiversity

Human infections?

spores found in faeces ("pseudo-parasites")

- spores sperm-like
- suspect sexual abuse
- *Henneguya* from salmon
- diarrhoea patients
- suspect pathogen
- *Myxobolus* from callop





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SUMMARY

Spore-forming parasites other than Apicomplexa

MYXOZOA

- **multicellular spores with polar capsules used for attachment**
- **common coelozoic or histozoic parasites of fish and annelids**
- **pseudo-parasites of humans (in transit after ingestion)**

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