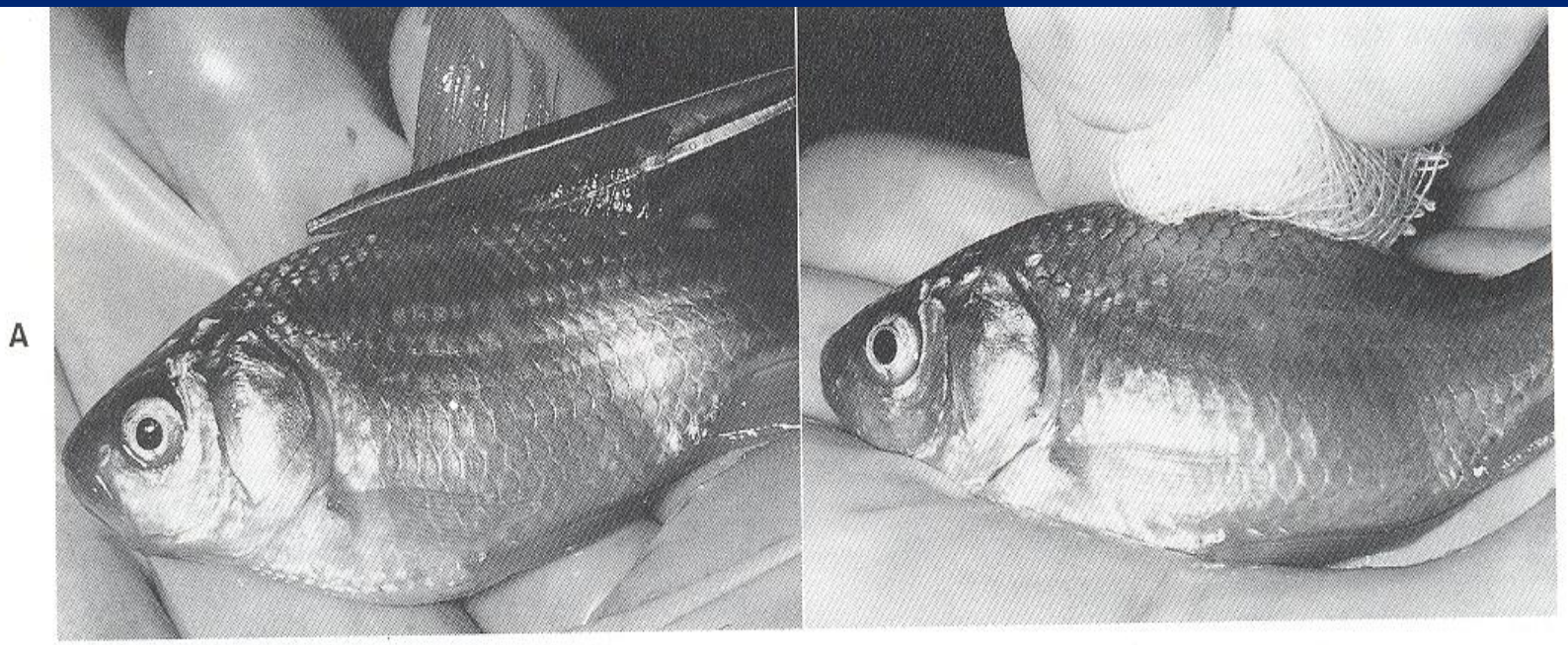


Fig. 1-18 Culturing for bacteria, using the dorsal approach. **A,** After anesthetization the dorsal fin is clipped to reduce possible contamination. **B,** The surface of the back is decontaminated with antiseptic and then dried with a dry, sterile gauze pad.

Continued.

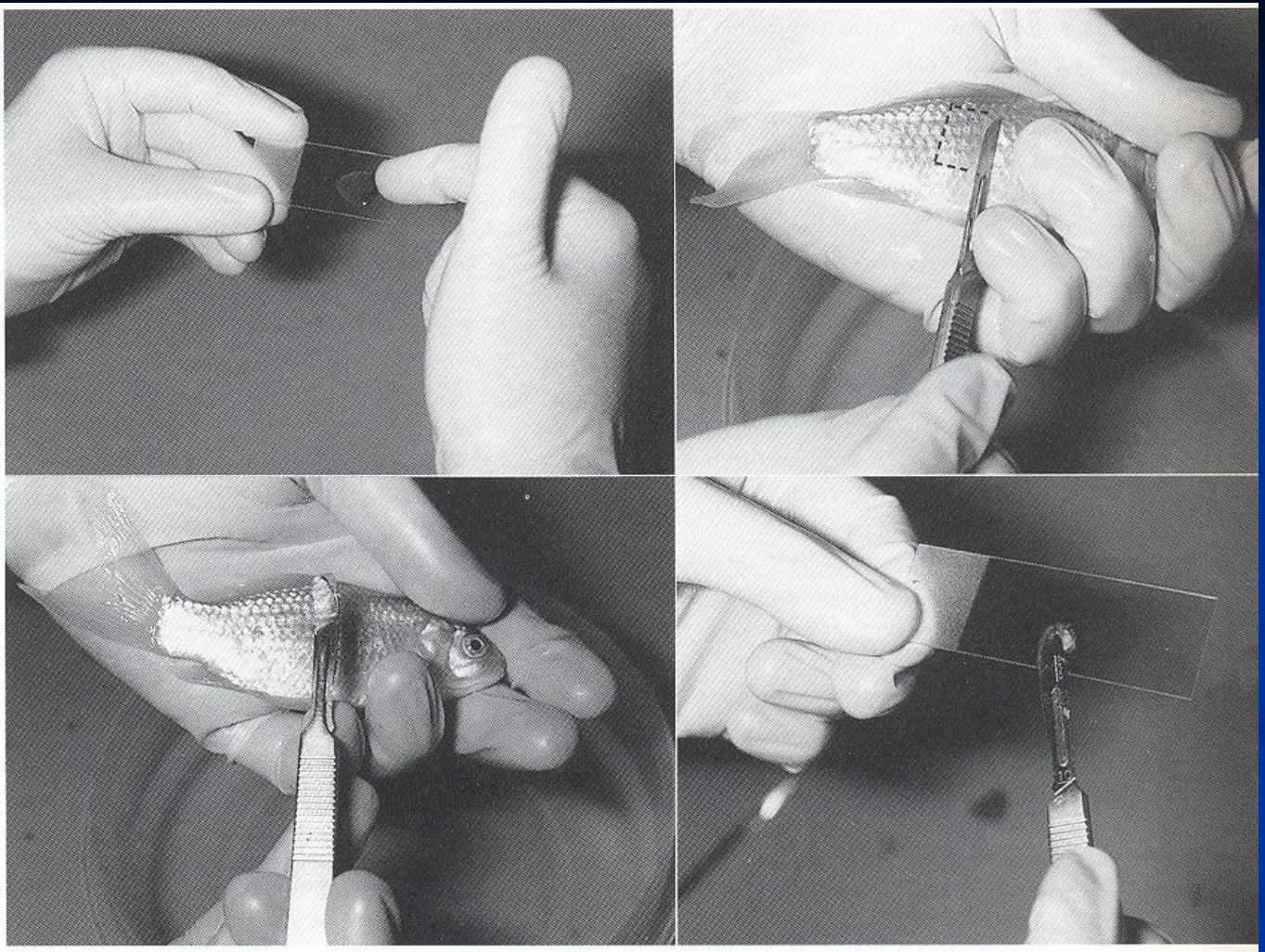


Fig. I-5 The skin scraping. **A,** Adding a drop of water to a slide before performing the biopsy. Dip a finger in water, and then touch the finger to the slide. **B,** Scraping the skin with a scalpel to obtain a biopsy sample. Note that the back side of the blade is used for scraping. Only a relatively small area (*dotted line*) should be scraped. **C,** Biopsy material on the scalpel blade. Note that scales (flat, refractile) have been included in the biopsy, indicating that the entire epithelial layer has been removed. **D,** Scraping the biopsy material onto the slide.

Continued.

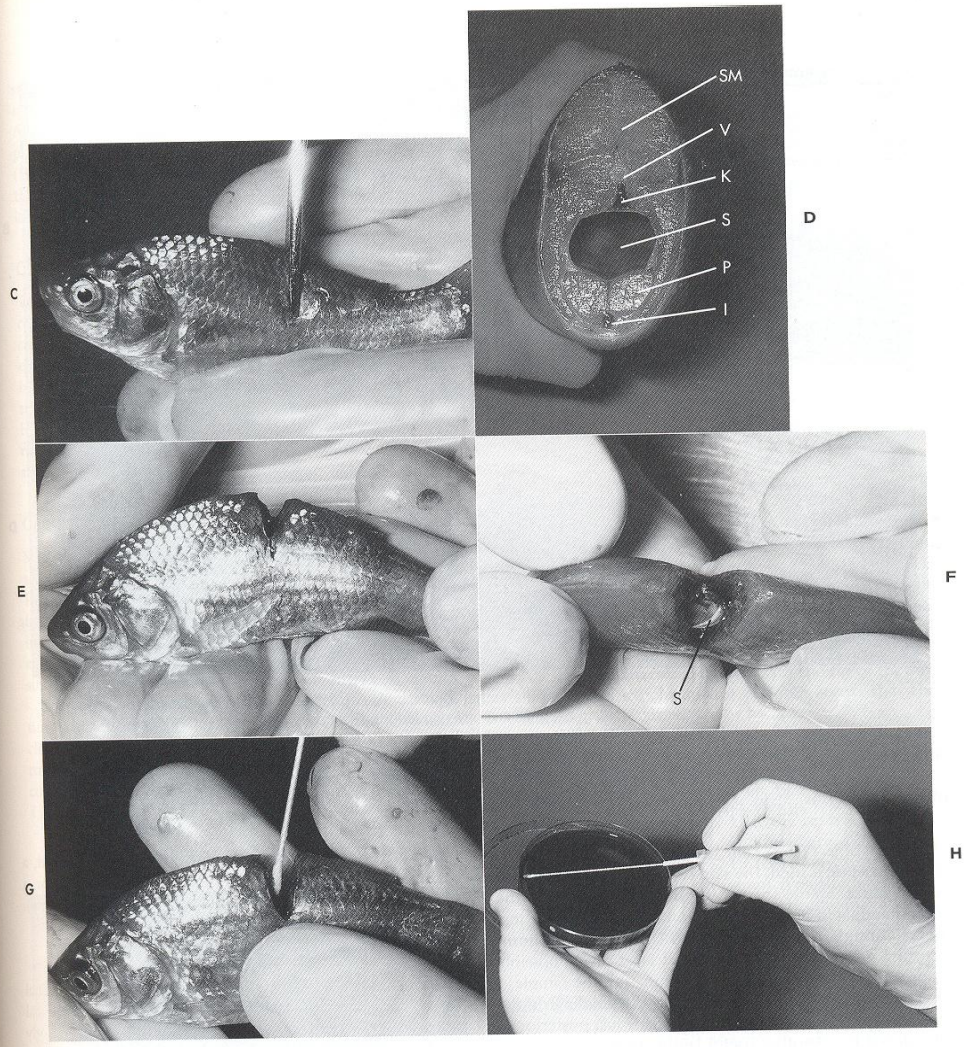


Fig. I-18—cont'd. **C,** The back is cut with sterile scissors. Care is taken not to cut so far as to enter the peritoneal cavity. This step is the most likely time for contamination to occur. **D,** Whole-body cross-section through a fish. Note that the kidney (*K*) is ventral to the vertebral column (*V*), which must be severed before reaching the kidney. The swim bladder (*S*) is ventral to the kidney. *P* = viscera in the peritoneal cavity, including intestine (*I*). *SM* = skeletal muscle. **E,** Reflecting the body ventrally (fish in Fig. I-18, *C*) to expose the kidney for culture. **F,** Entrance into the kidney is indicated by the appearance of a large amount of hemorrhage because of the highly vascular nature of the kidney. The collapsed, white swim bladder (*S*) lies ventral to the kidney; it is not clearly visible on all fish. **G,** Touching a sterile Culturette to the kidney and being careful not to touch other areas, which would cause sample contamination. **H,** Inoculating a Columbia blood agar plate with the sample, using a Mini-tip Culturette (Becton-Dickinson) and spreading the inoculum.

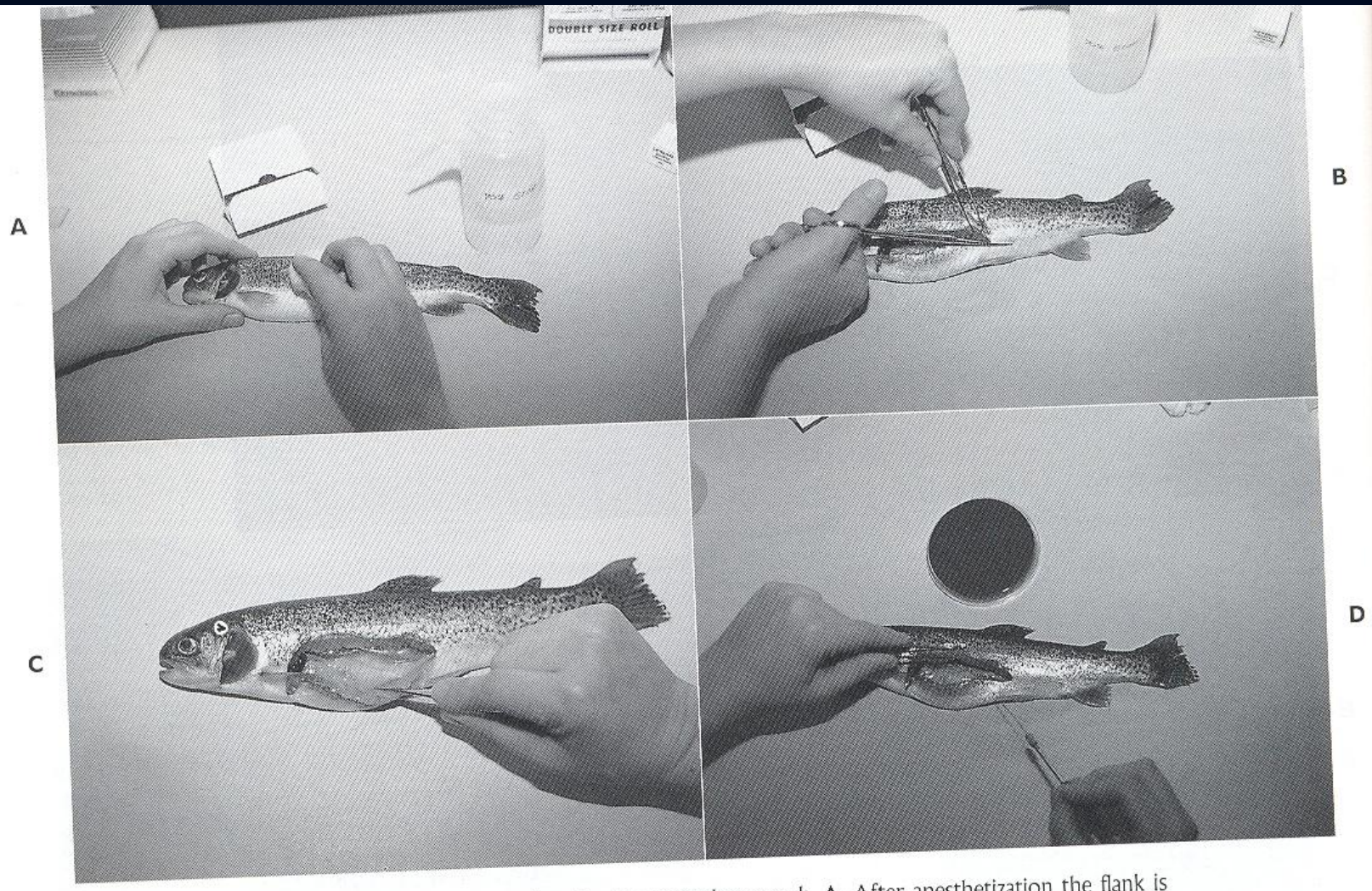
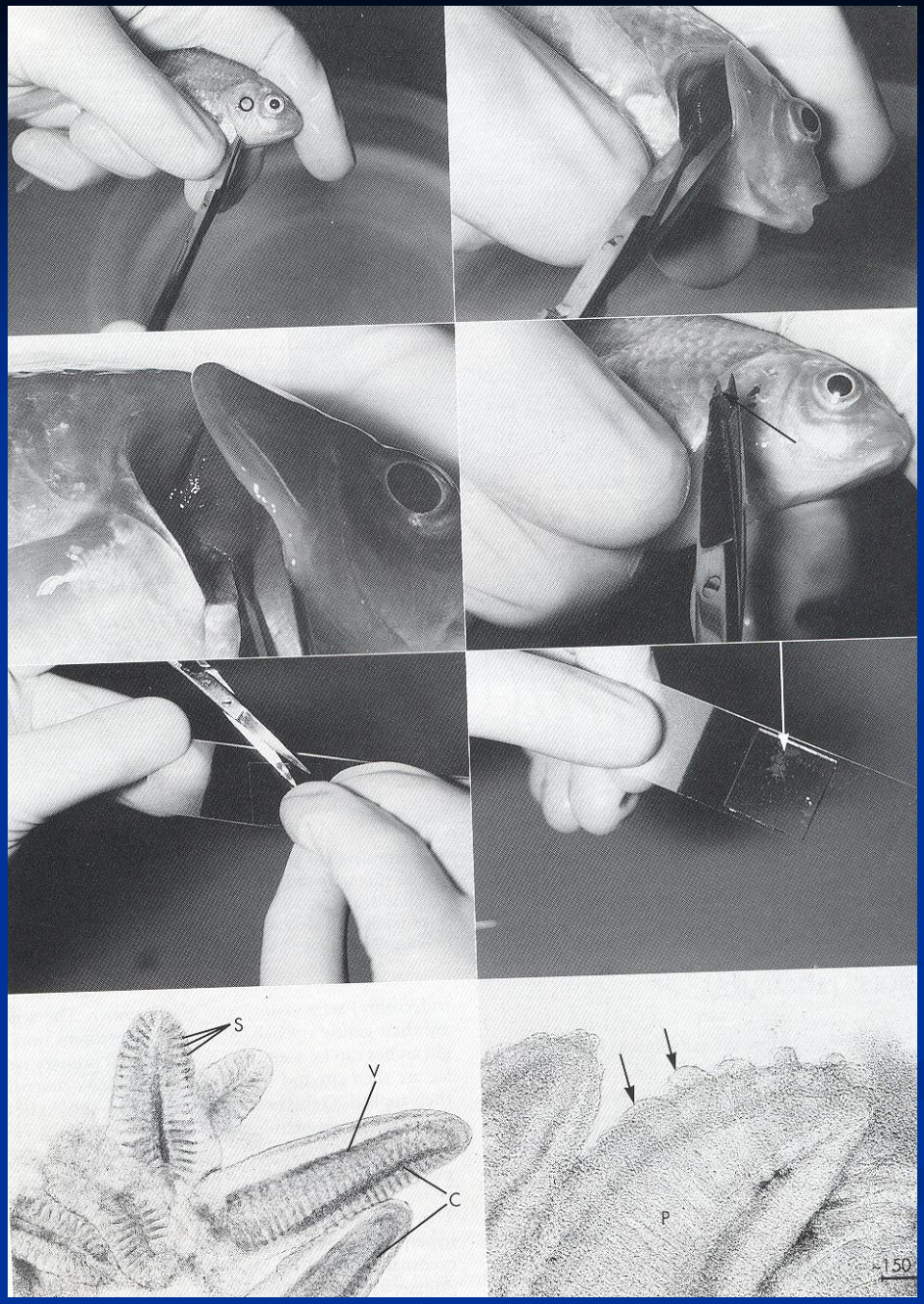
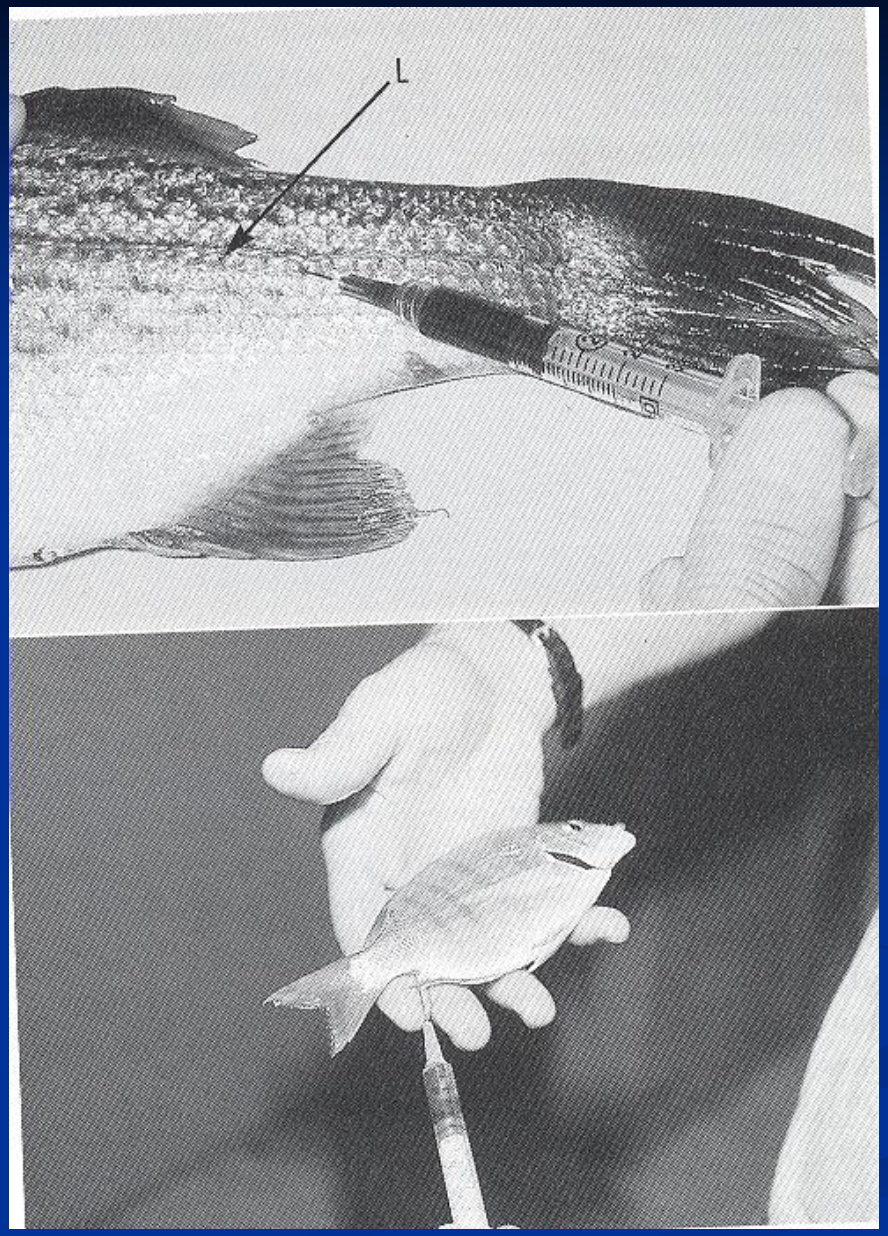


Fig. I-19 Culturing for bacteria, using the ventral approach. **A,** After anesthetization the flank is swabbed with antiseptic, avoiding the anus and any skin lesions. The area is then dried with a dry sterile gauze pad. **B,** The body wall is cut with sterile scissors. Care is taken to avoid the anus and to cut close to the body wall to prevent severing the intestine. **C,** Viscera are aseptically reflected, exposing the swim bladder (also see Fig. I-18, *E*). The swim bladder must be cut or reflected to reach the kidney. **D,** The kidney is often covered by a tough fibrous capsule, which must be severed to enter the parenchyma.

Once the kidney is exposed, a

Fig. 1-20 A blood agar plate from a skin lesion of a fish hav
ing well-isolated bacterial colonies.


S
V
C
P
~150


L

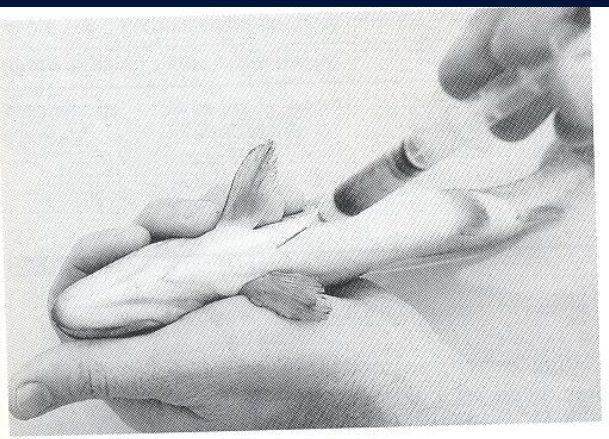


Fig. I-15 Bleeding a rainbow trout from the heart.

Fig. I-16 Bleeding from the caudal vein by severing the tail. After anesthetization, a sharp scalpel is used to cut off the base of the tail. A heparinized capillary tube is immediately applied to the vessel until sufficient blood is obtained.

A

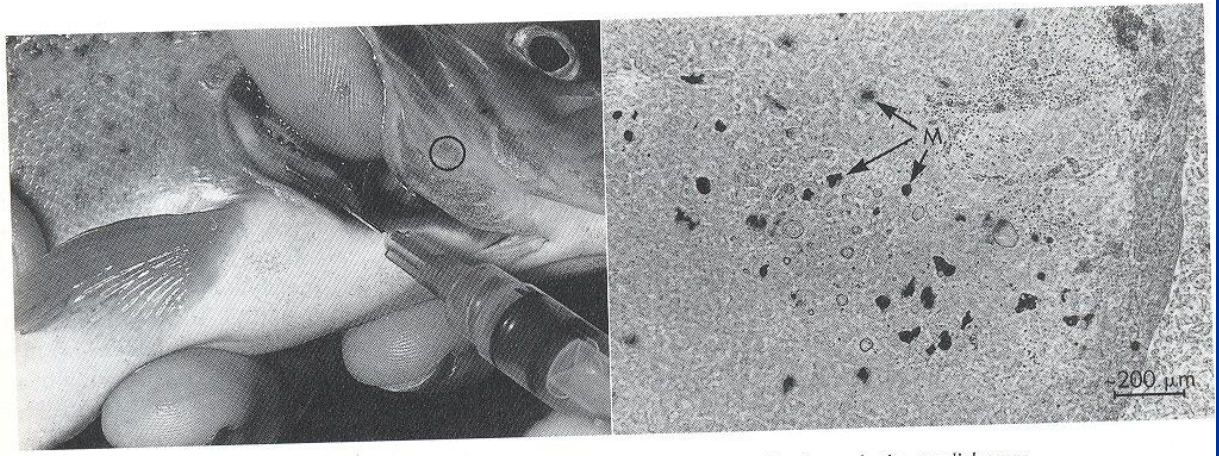


Fig. I-17 Anterior kidney biopsy technique. **A,** Inserting a needle through the medial membrane of the gill chamber and into the kidney. *O* = operculum. **B,** Confirmation that kidney material has been obtained as indicated by the presence of melanocytes (*M*) in a wet mount of biopsy material.

(From Noga et al., 1988.)

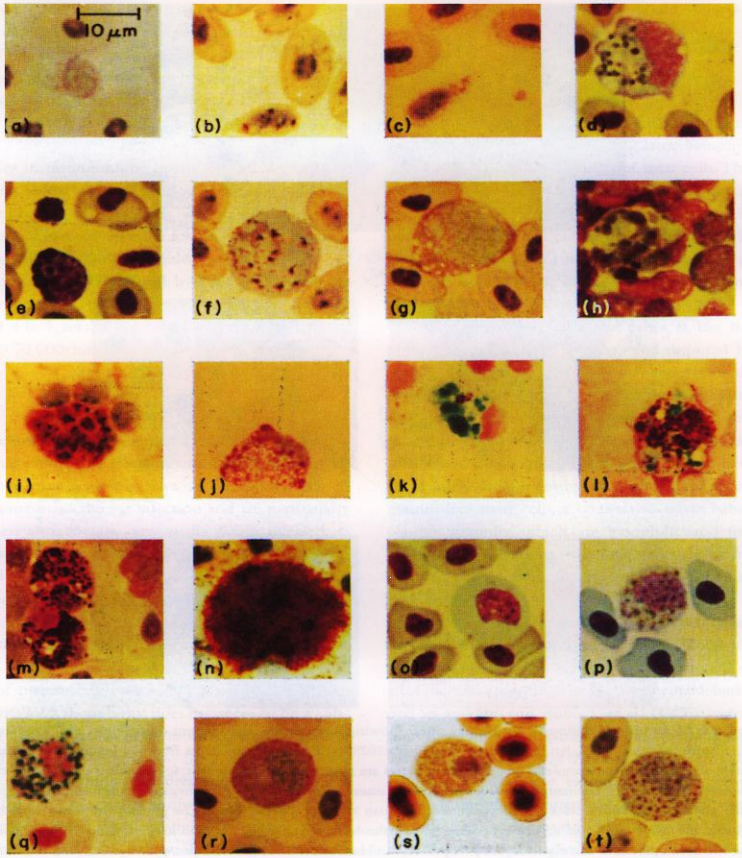
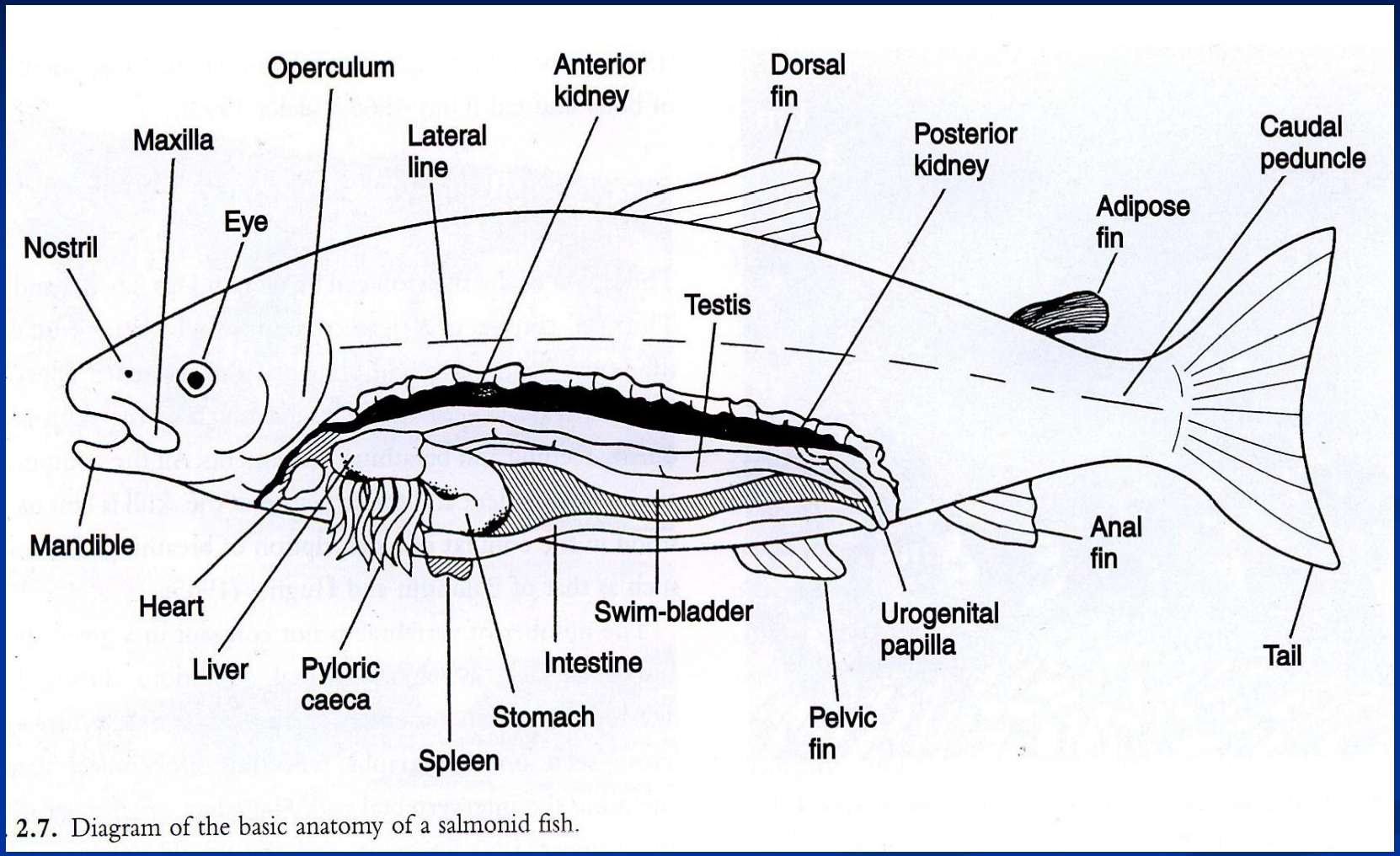
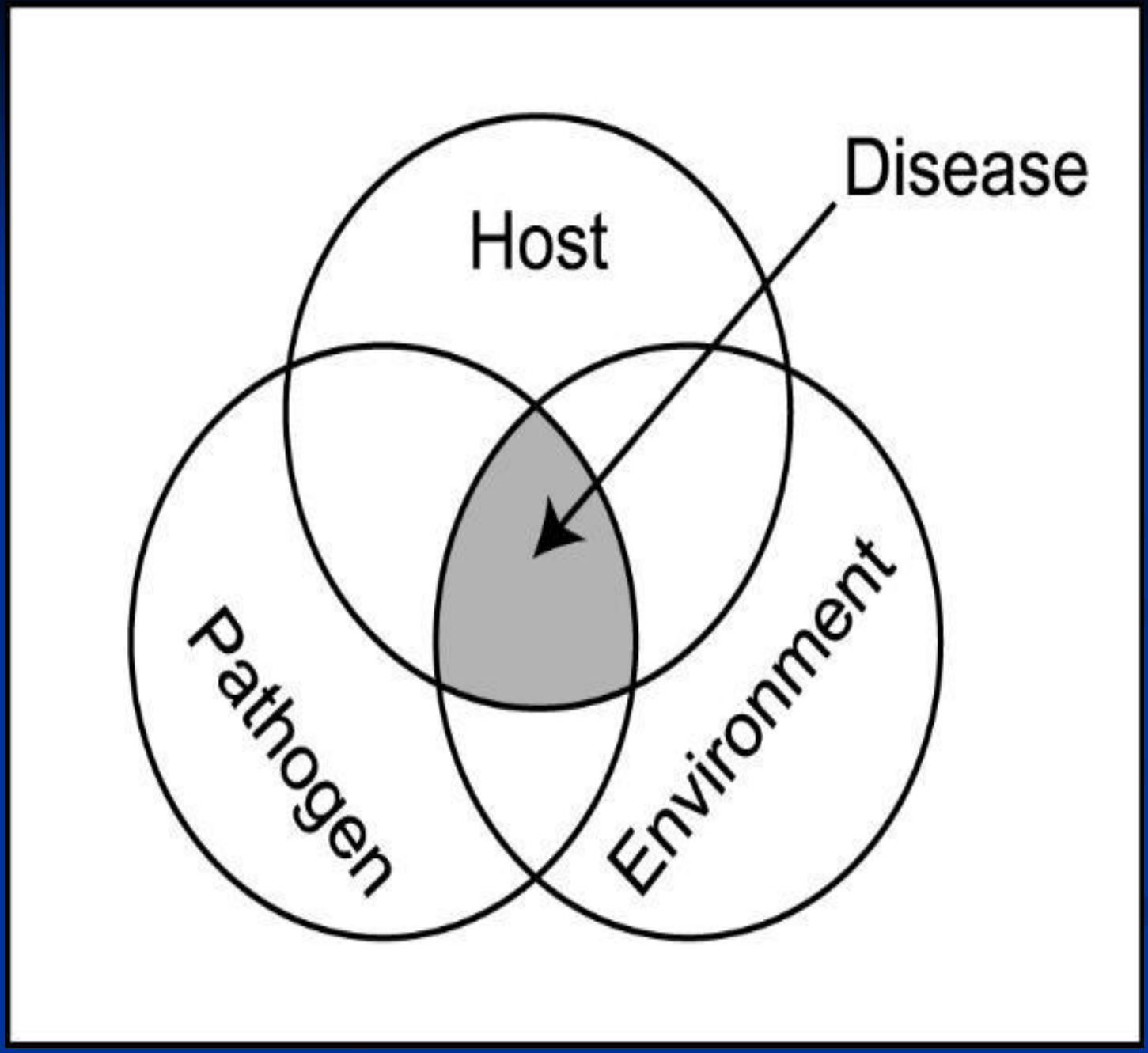
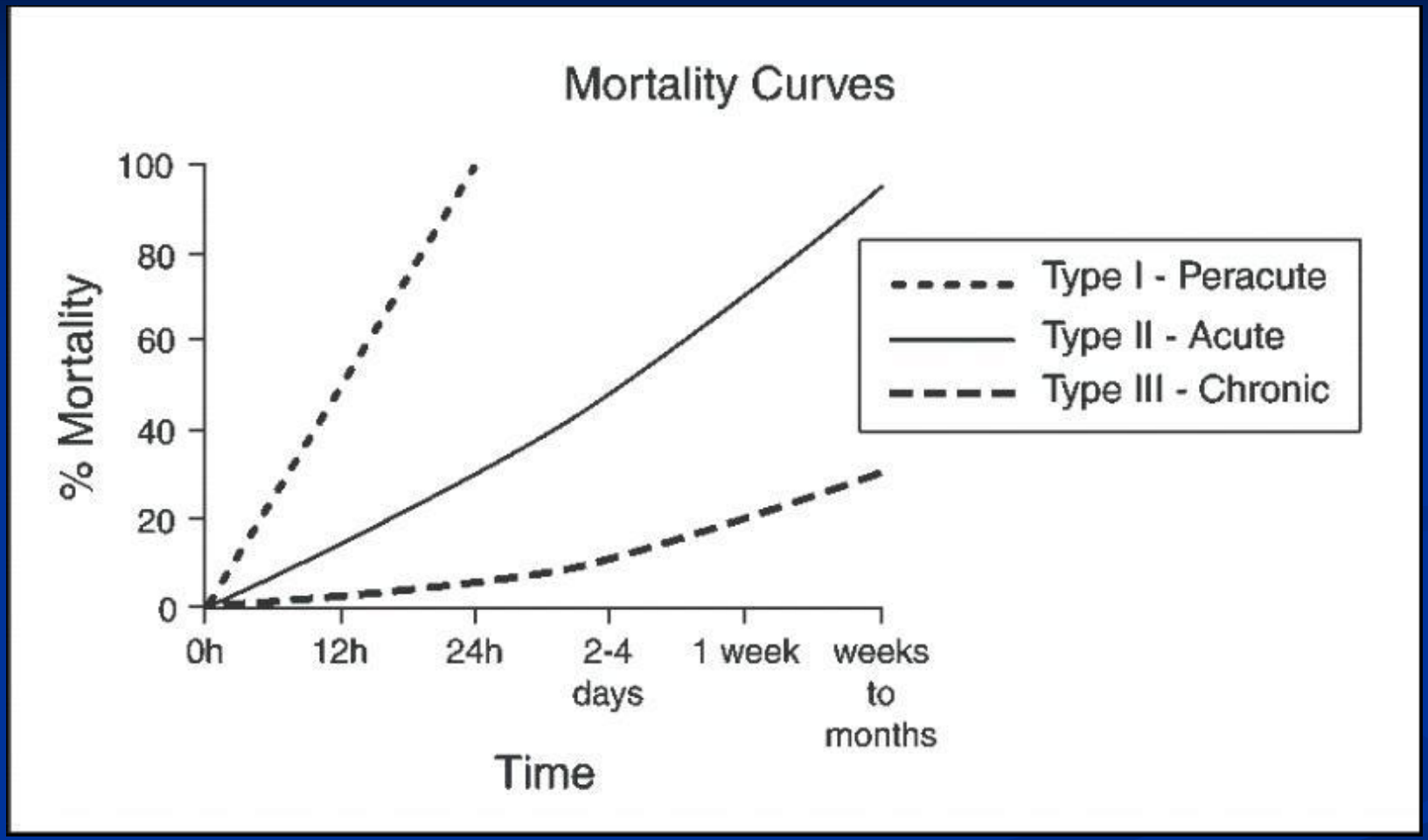


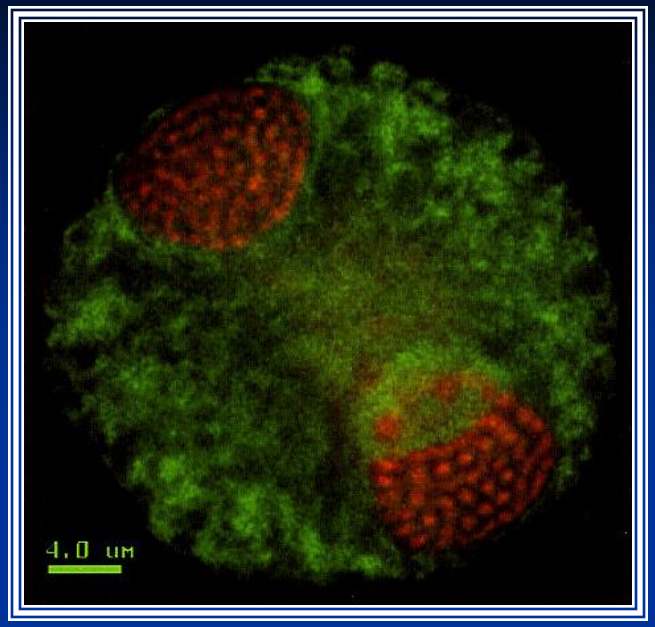
Fig. 2.22. Blood cells of the plaice. (a) Blood lymphocyte with slight PAS positivity of the cytoplasm. PAS ×900. (b) Thrombocyte with several acid phosphatase-positive granules. ×900. (c) Thrombocyte with characteristic PAS-positive granules at the base of the 'spike'. ×900. (d) Blood monocyte containing several carbon particles. Leishman ×900. (e) Blood monocyte in an area of smear disallowing proper spreading of the leucocytes which consequently appear smaller. ×900. (f) Blood monocyte with acid phosphatase-positive granules. ×900. (g) Blood monocyte showing characteristic tinge of PAS-positivity of the cytoplasm. ×900. (h) Macrophage (from thymus smear) containing cellular debris. Leishman ×900. (i) Tissue macrophage containing large granules with acid phosphatase activity. ×900. (j) Peritoneal macrophage with a granular PAS-positivity. ×900. (k) Splenic macrophage filled with free iron compounds. Perl's potassium ferrocyanide ×900. (l) Splenic melanomacrophage containing Perl's-positive material. ×900. (m) Splenic melanomacrophage. PAS ×900. (n) Kidney melanomacrophage with acid phosphatase-positive cytoplasm. ×900. (o) Blood neutrophil. Leishman ×900. (p) Blood neutrophil. Sudan black B and Leishman ×900. (q) Blood neutrophil. Benzidine peroxidase test of Sato & Sekiya and safronin ×900. (r) Blood neutrophil. PAS ×900. (s) Blood neurophil. Alkaline phosphatase ×900. (t) Blood neutrophil. Acid phosphatase ×900.

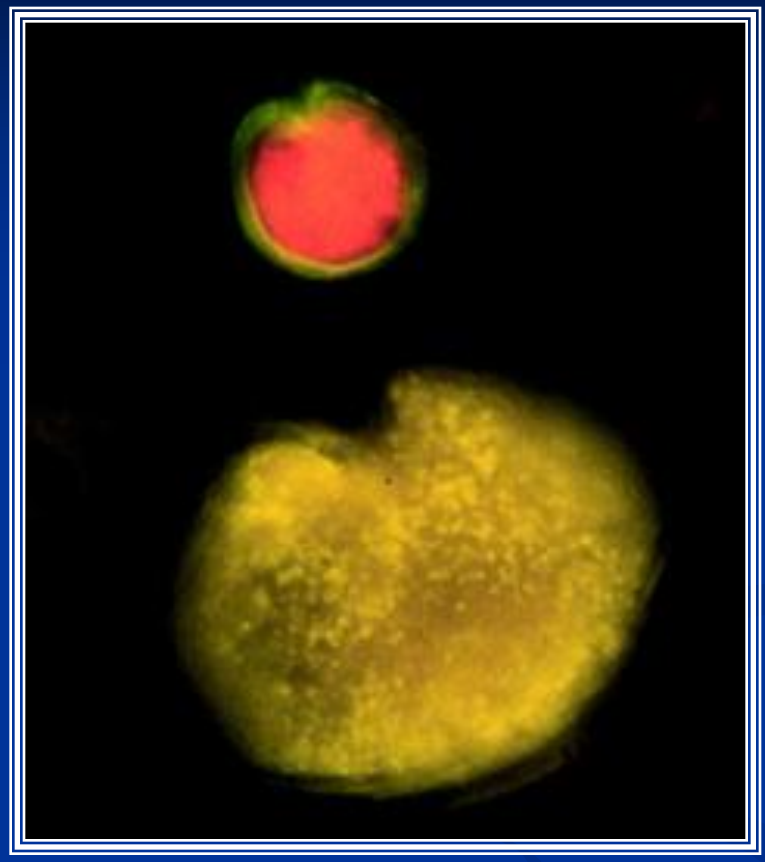


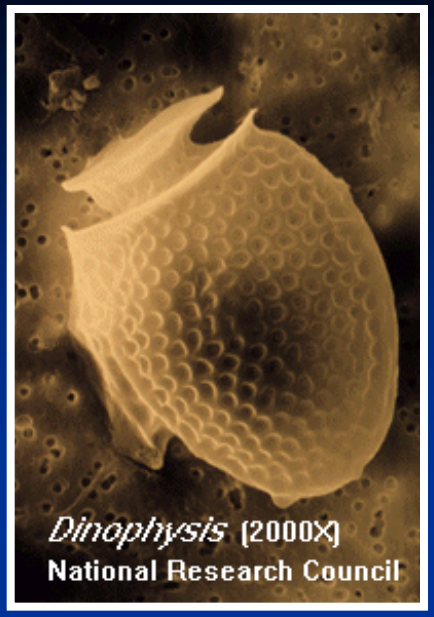
2.7. Diagram of the basic anatomy of a salmonid fish.


Disease
Host
Pathogen
Environment


Mortality Curves
% Mortality
100
80
60
40
20
0
0h
12h
24h
2-4 days
1 week
weeks to months
Time
Type I - Peracute
Type II - Acute
Type III - Chronic


4.0 um

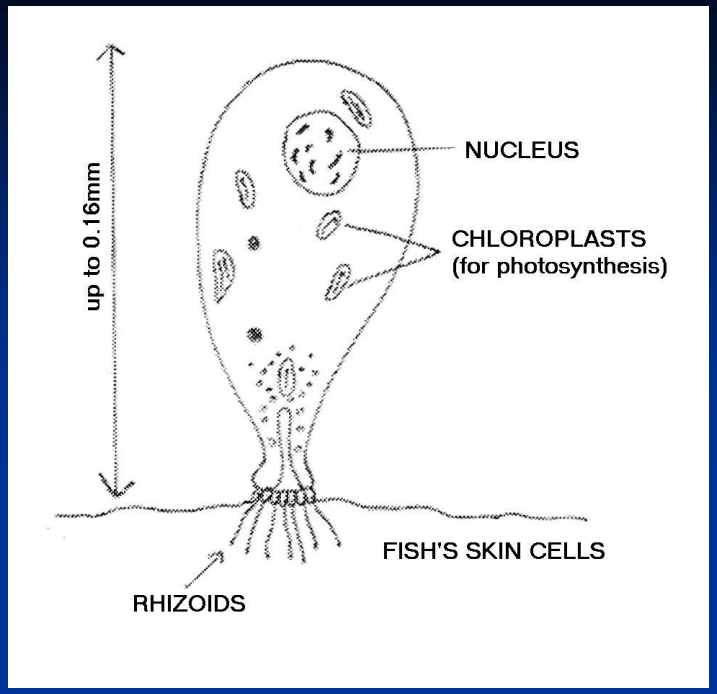


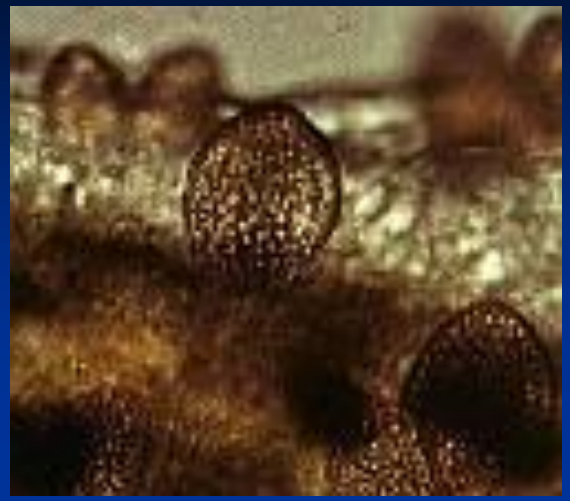

Dinophysis (2000X)
National Research Council

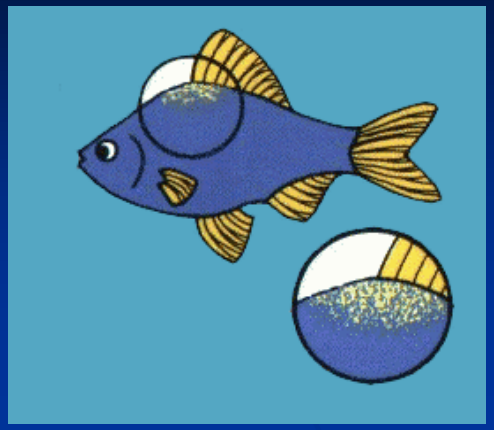

Alexandrium (100X)
National Research Council

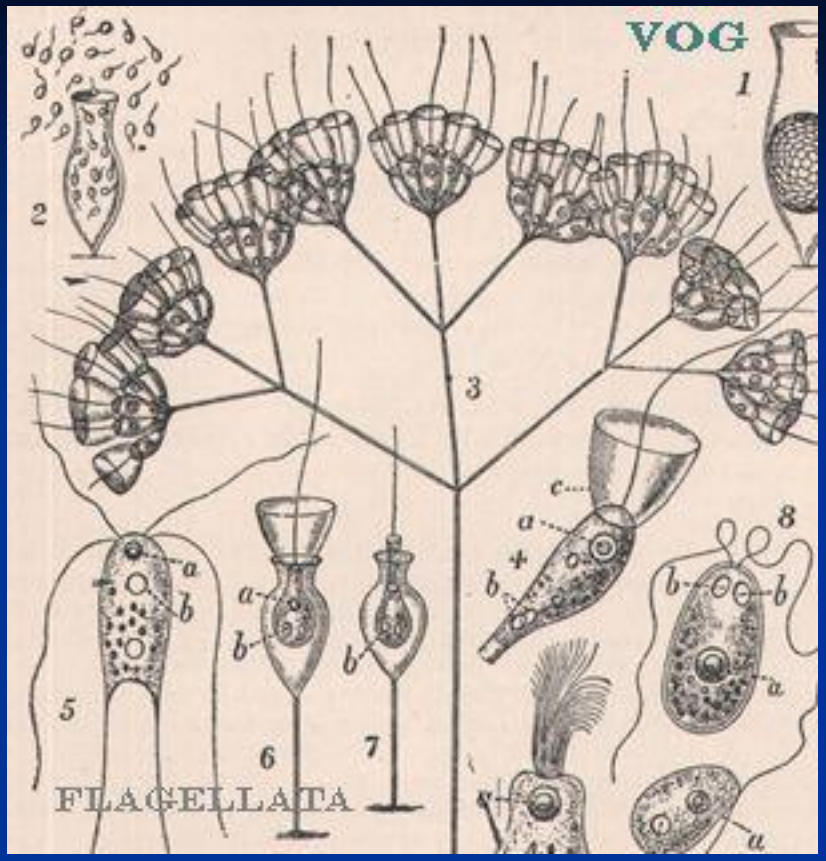

Pseudo-nitzschia multiseries (250X)
National Research Council

Velvet disease









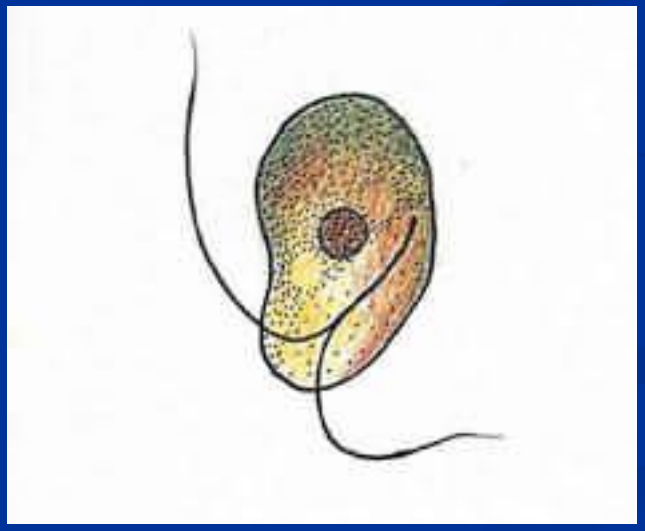
تاژک داران

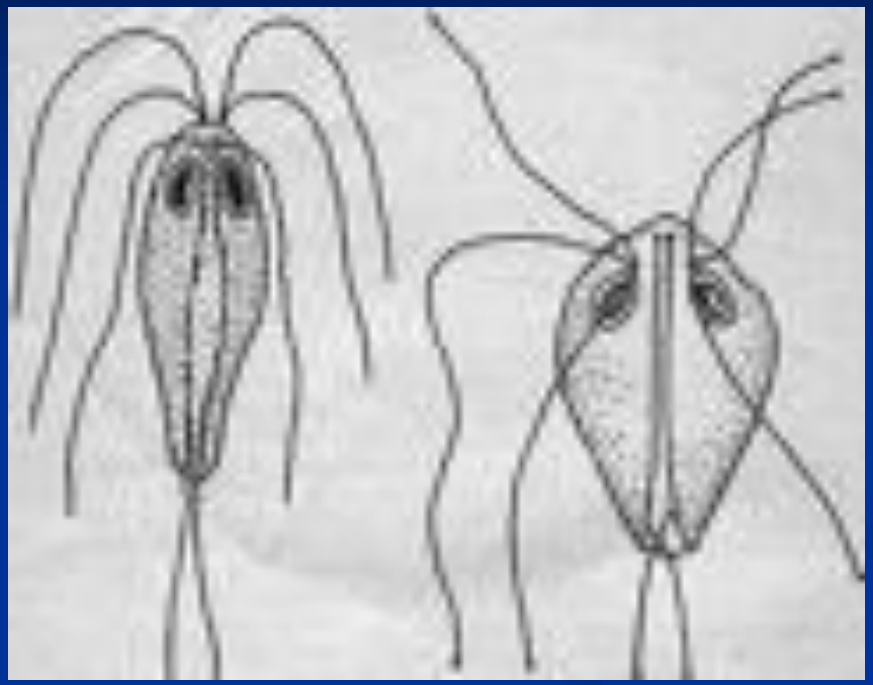
تریپانوزوم

کریپتوبیا

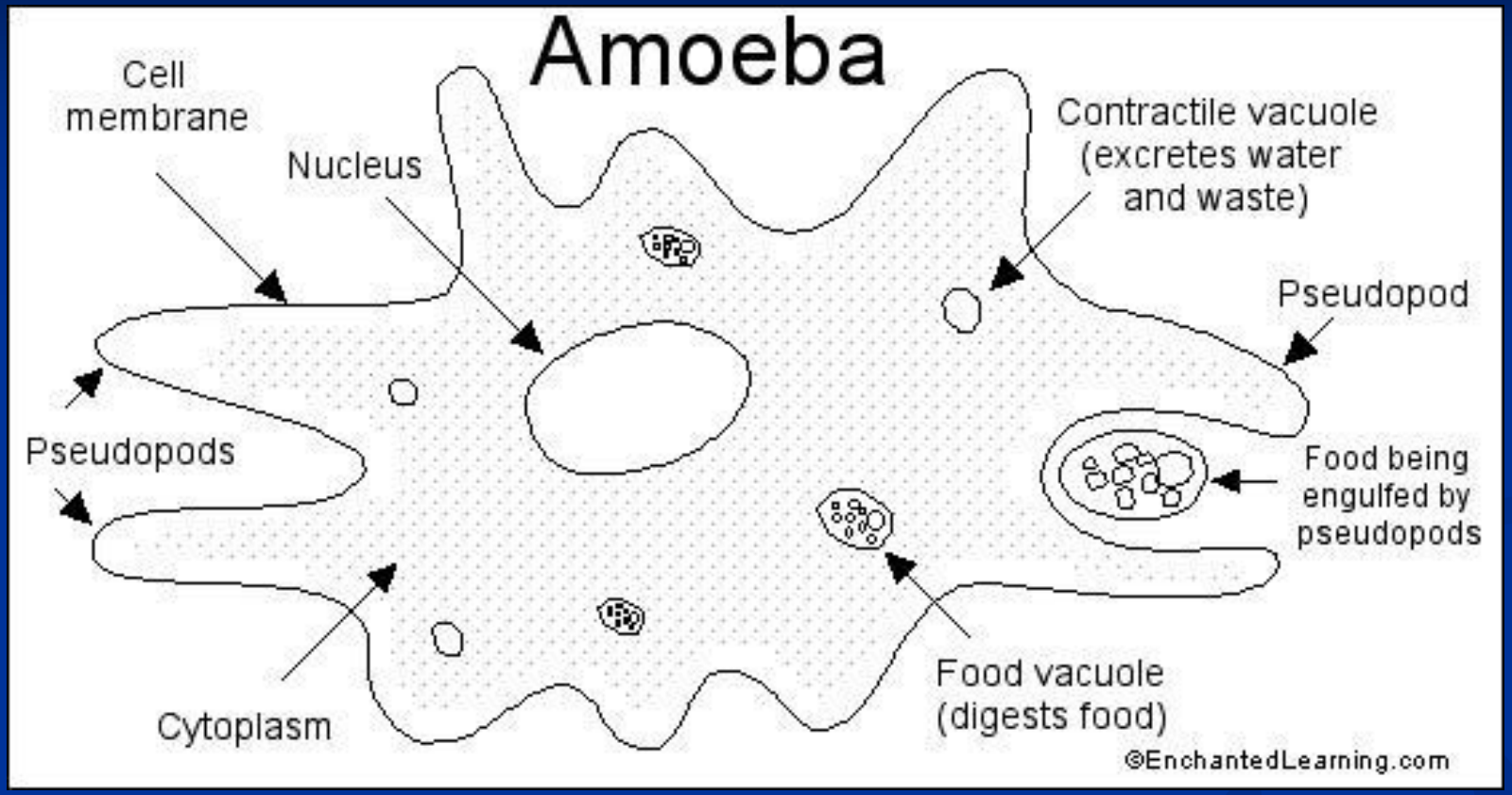
Pscicola geometra

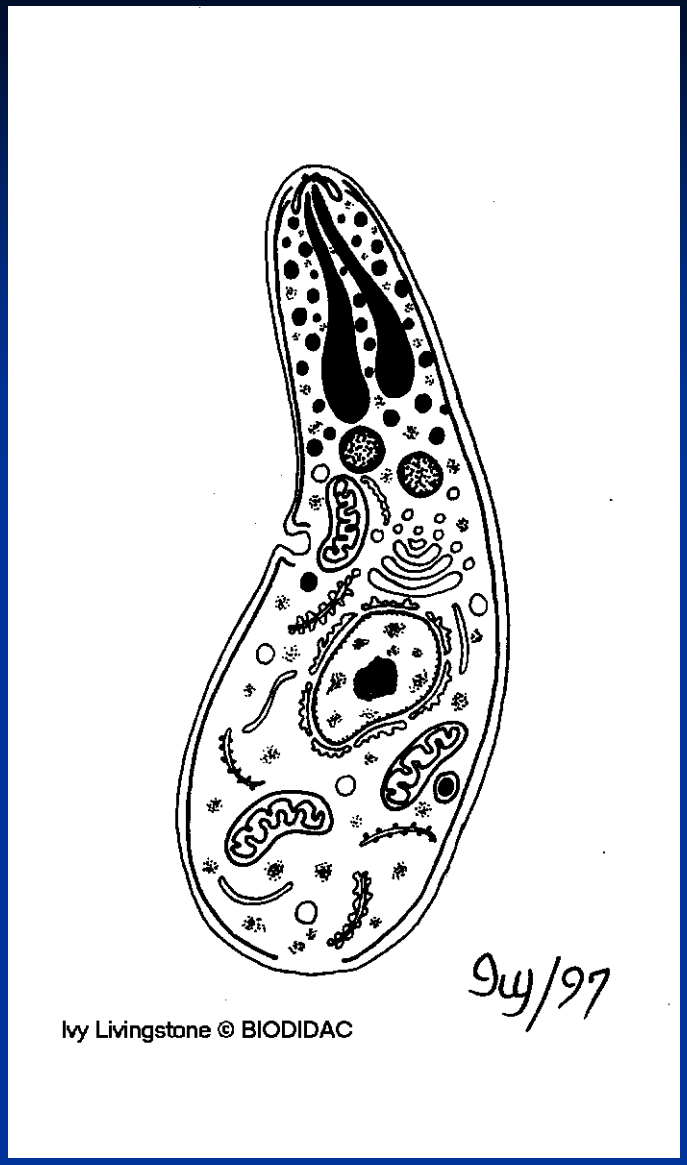

Costia



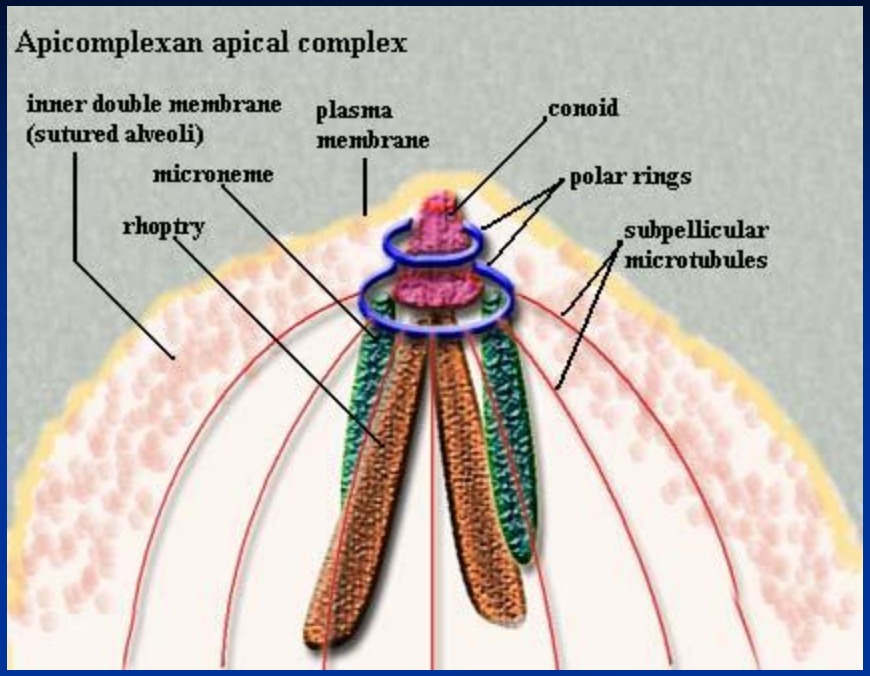


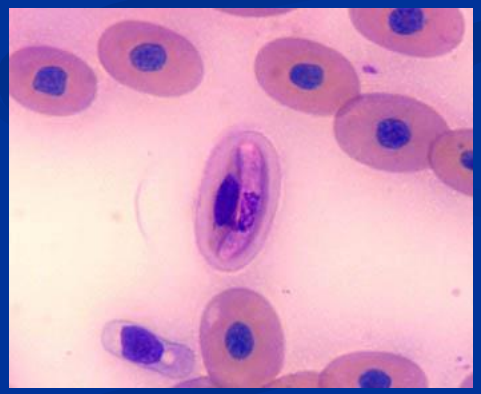
هگزامیتا


Amoeba
Cell membrane
Nucleus
Contractile vacuole (excretes water and waste)
Pseudopod
Pseudopods
Food being engulfed by pseudopods
Cytoplasm
Food vacuole (digests food)
©EnchantedLearning.com

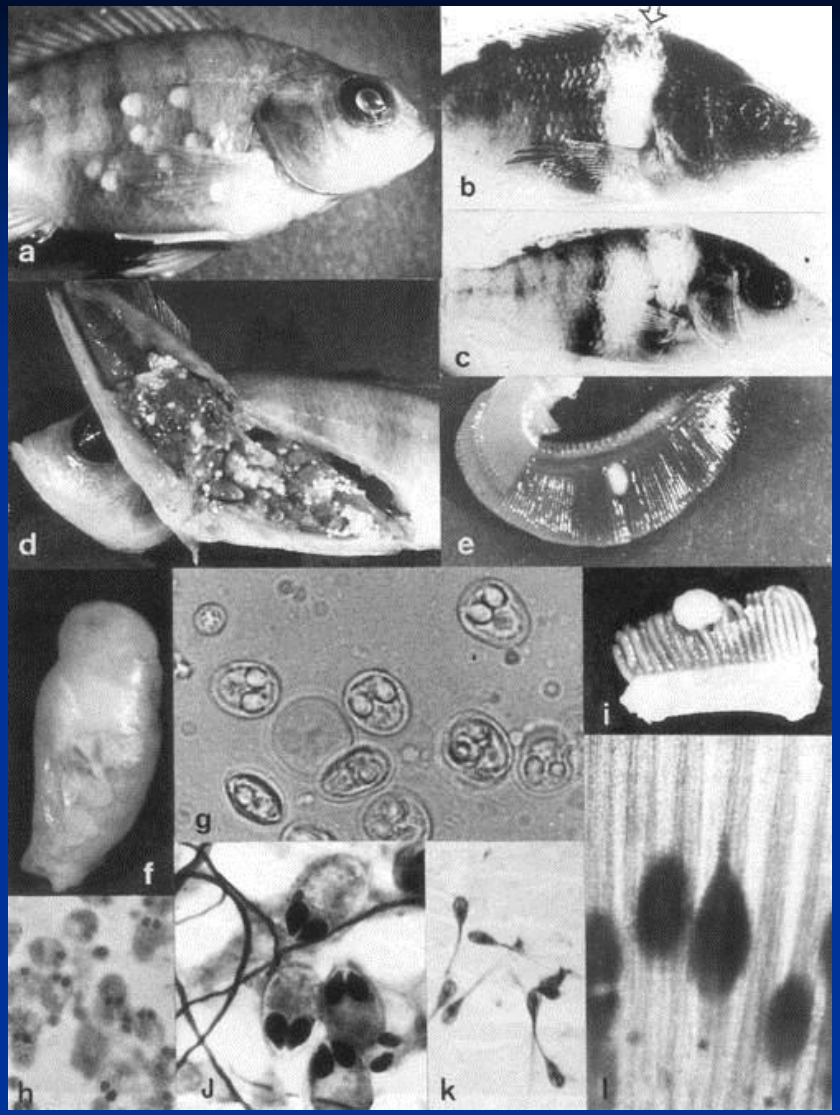


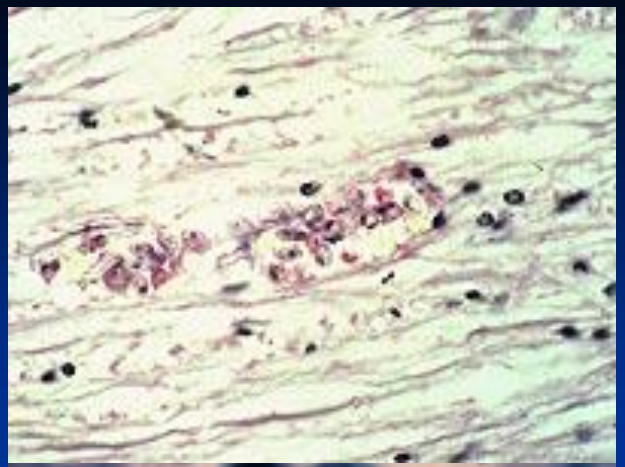
Apicomplexa sp.

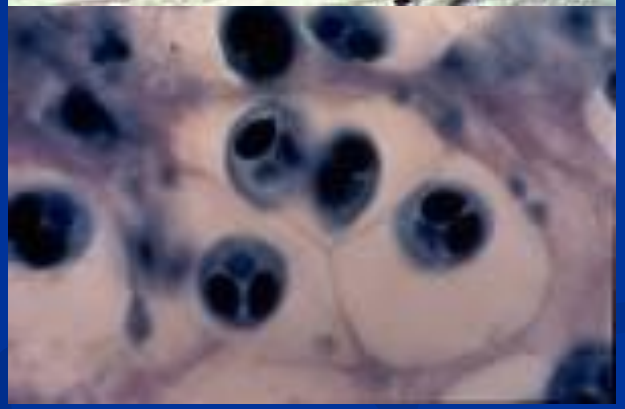


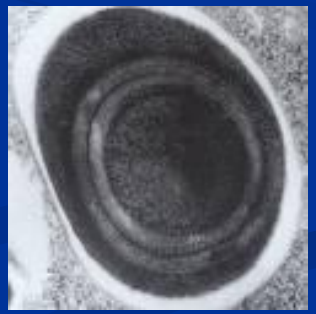


هموگریگارینا



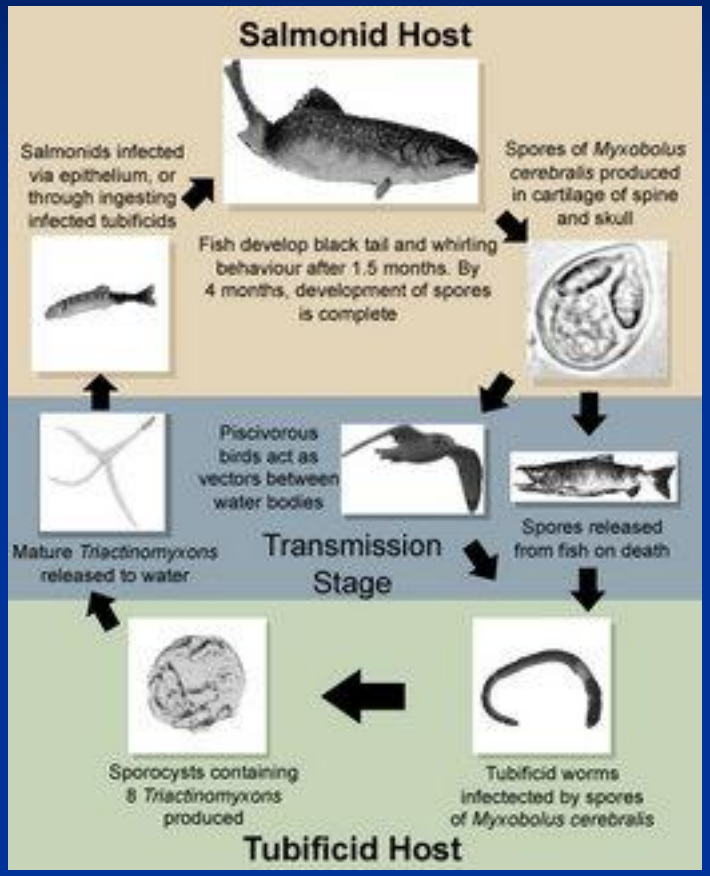


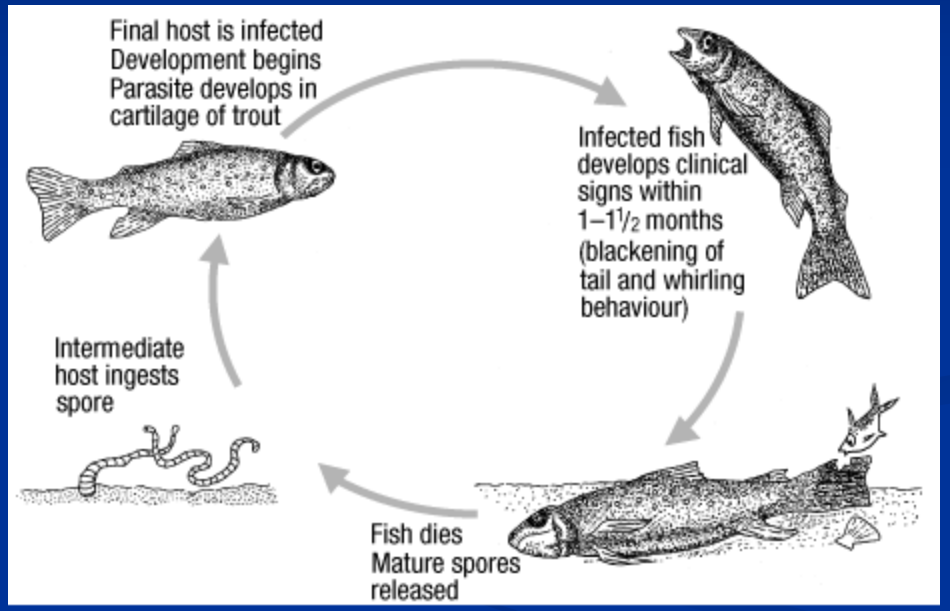




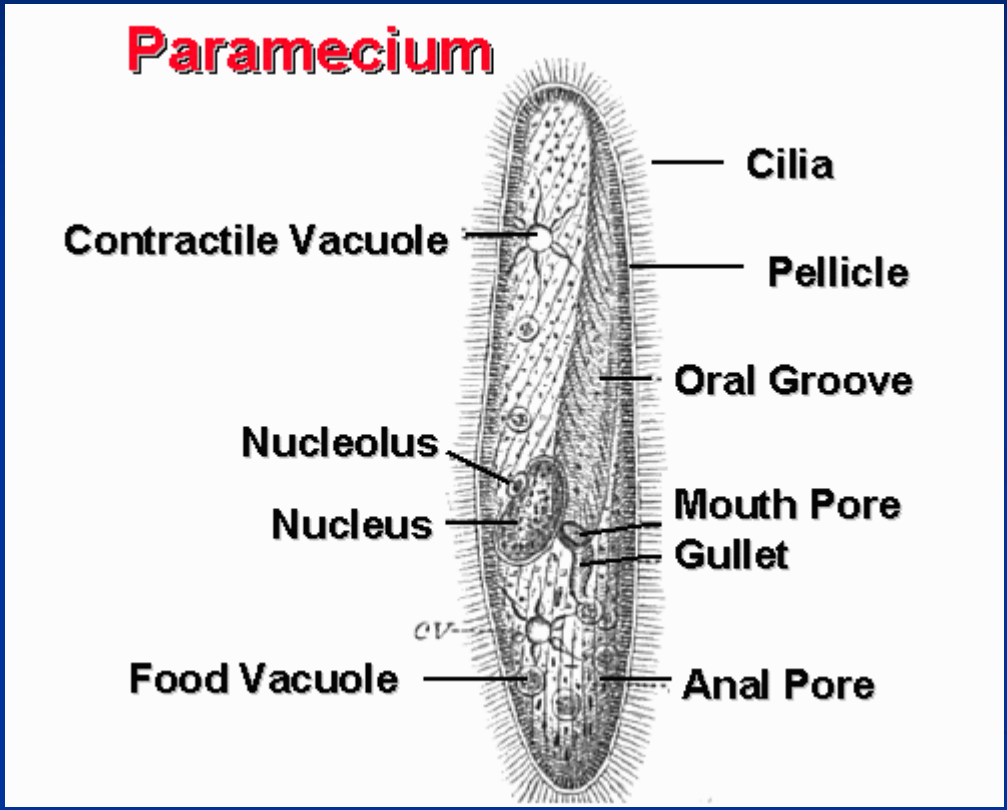
هاگ داران

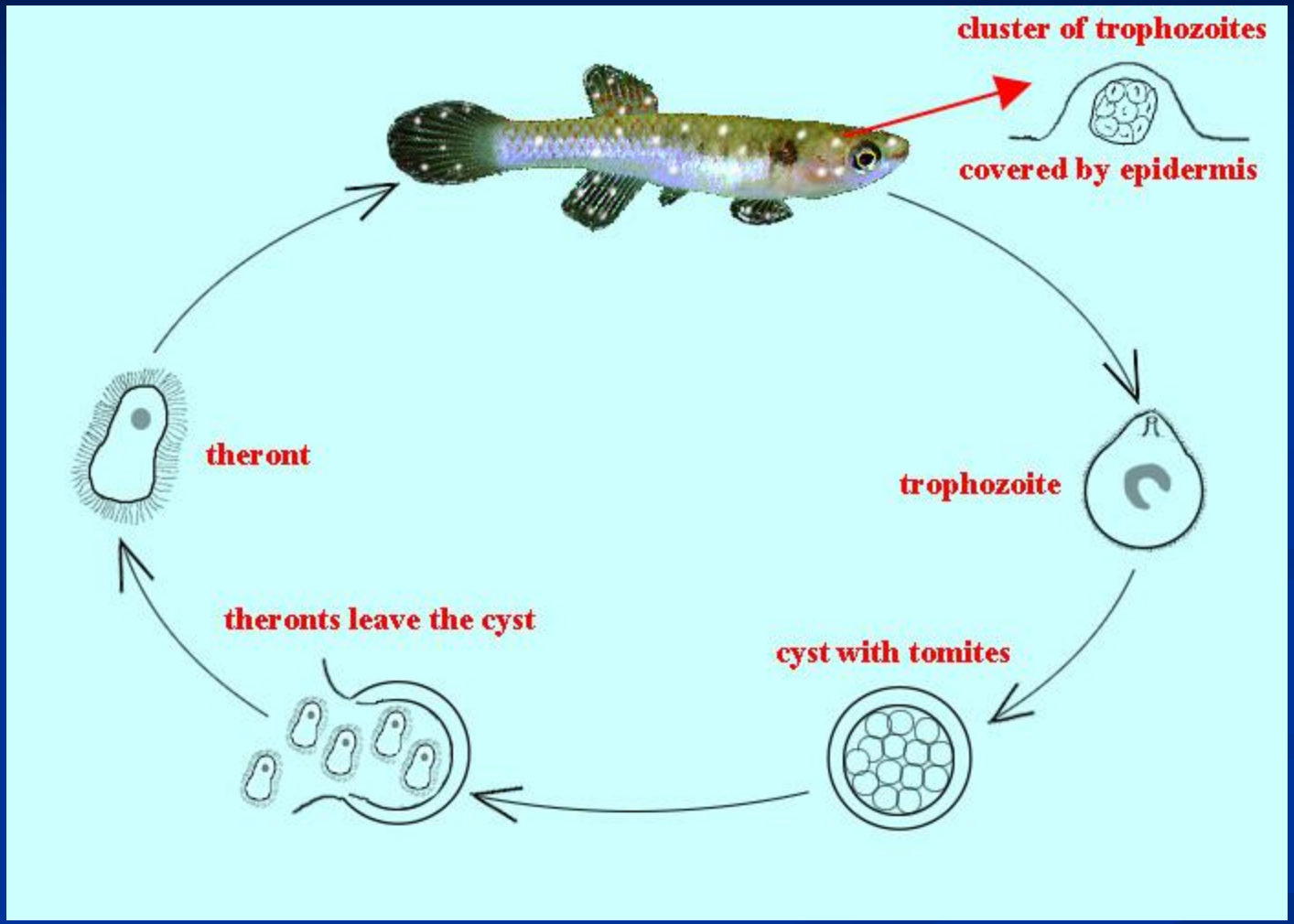
Myxosomiasis or whirling disease



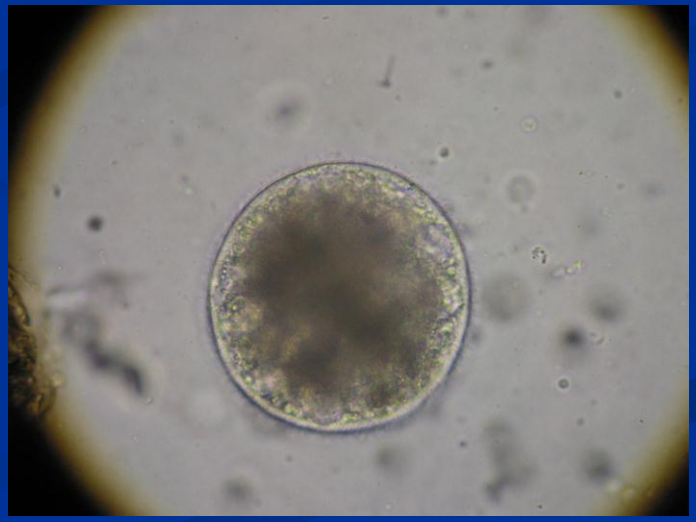


مژه داران

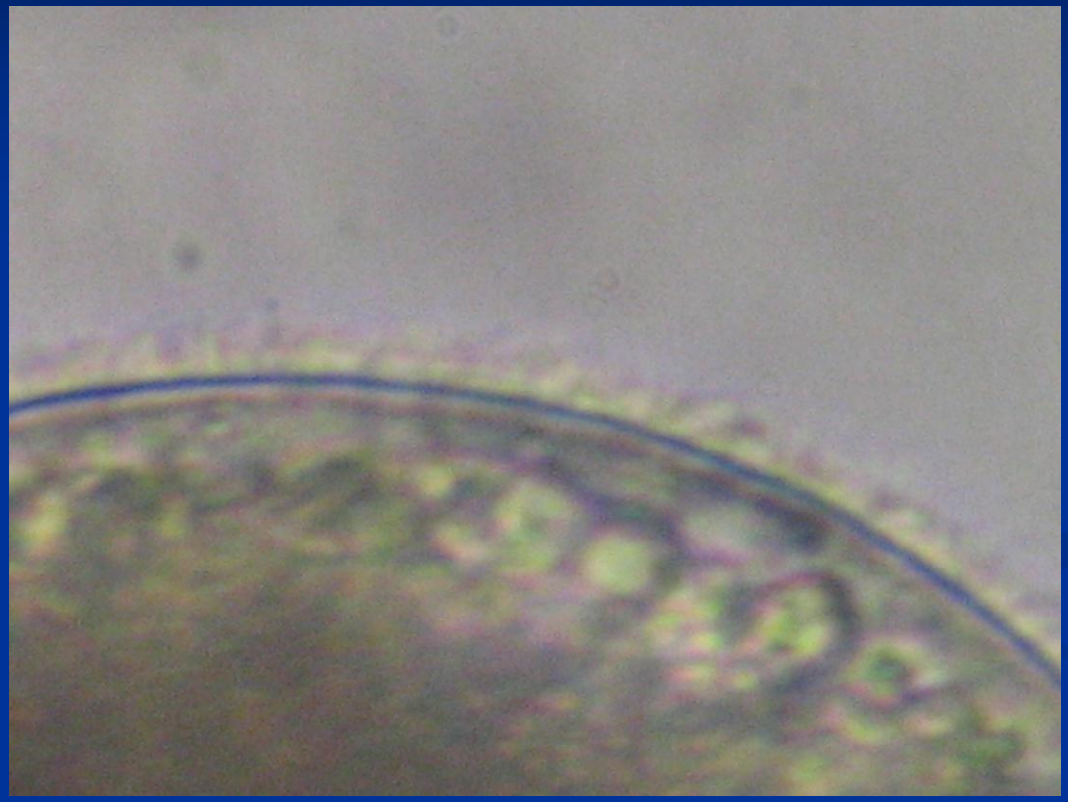

Paramecium
Cilia
Contractile Vacuole
Pellicle
Oral Groove
Nucleolus
Mouth Pore
Nucleus
Gullet
Food Vacuole
Anal Pore

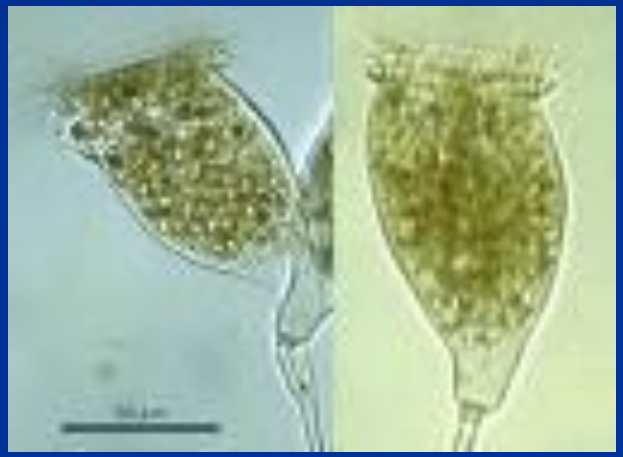

cluster of trophozoites
covered by epidermis
trophozoite
cyst with tomites
theronts leave the cyst
theront

Ich

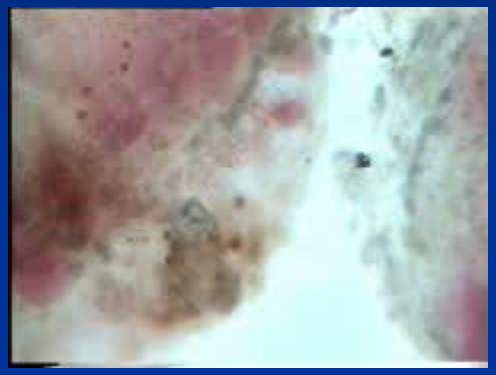


Ich

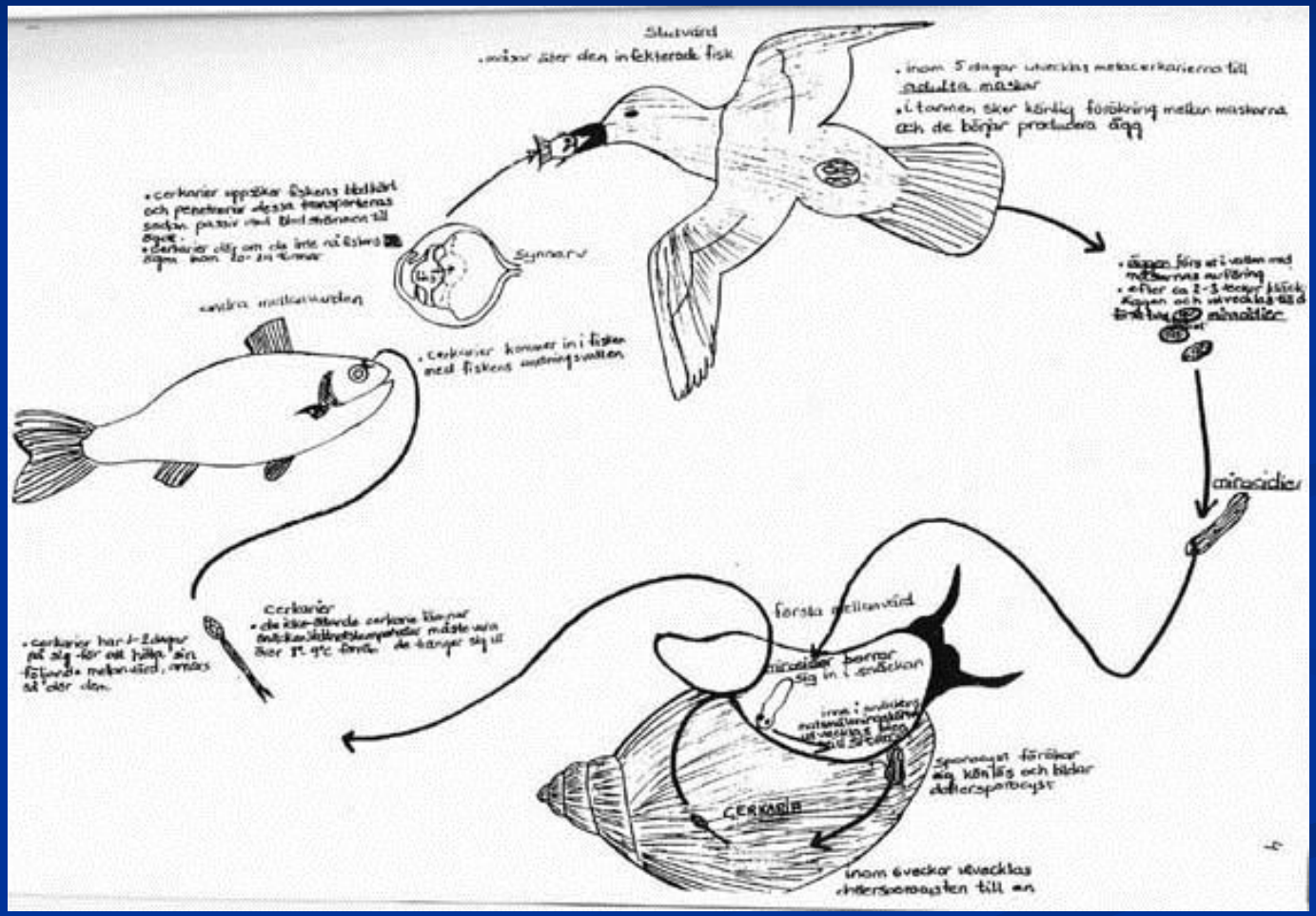




Dactylugyrus and Gyrodactylus



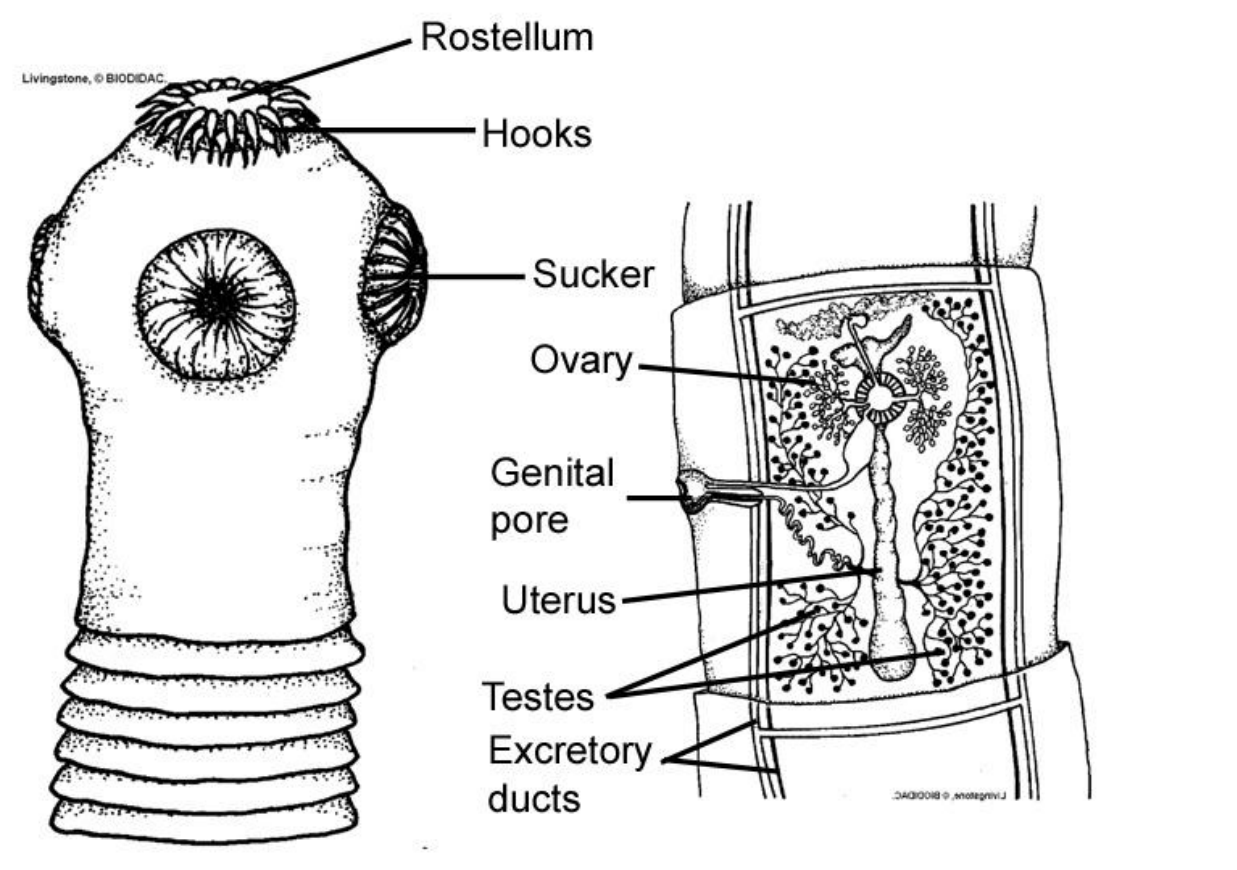
Diplostomum spathaceum



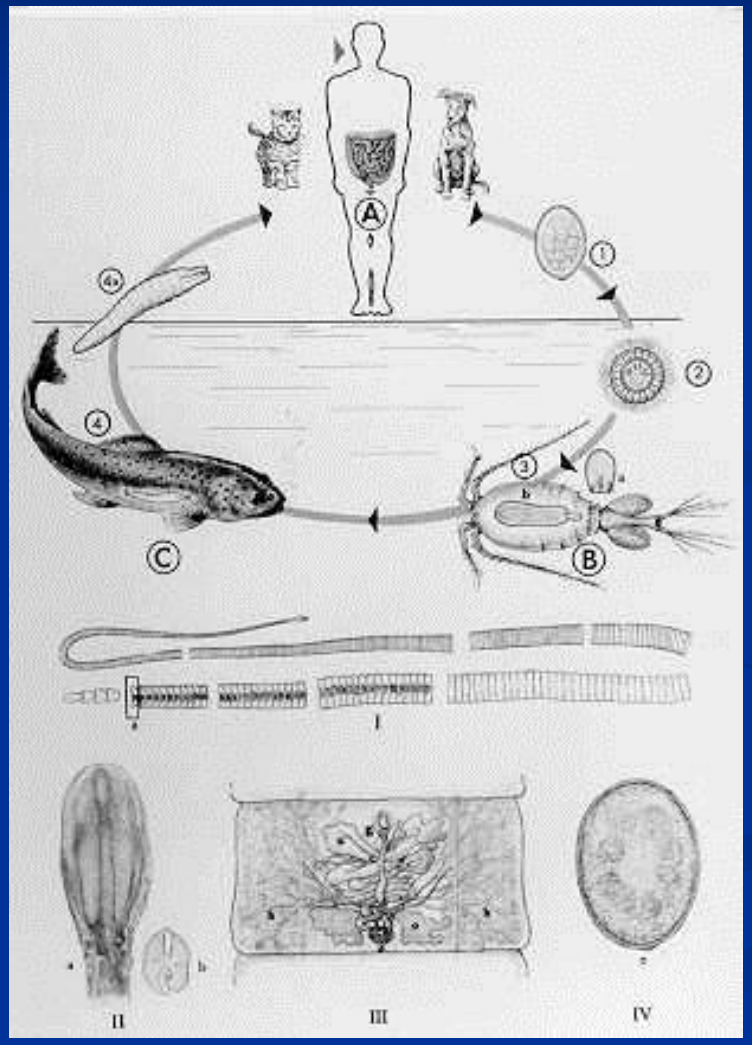
Diplostomum spathaceum

Amphilina foliacea

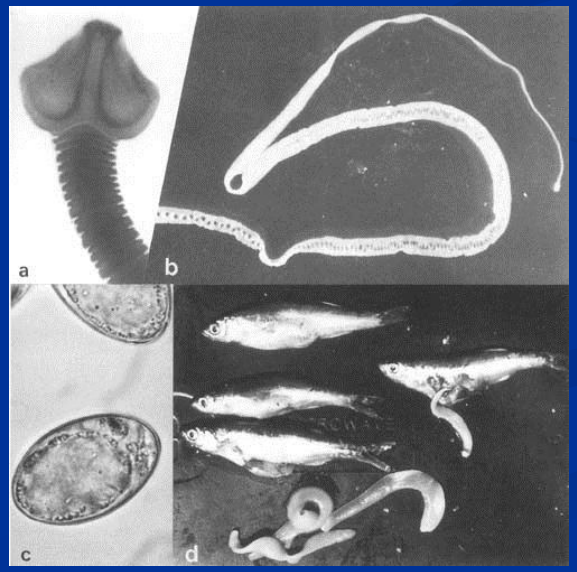
Cestoda


Rostellum
Hooks
Sucker
Ovary
Genital pore
Uterus
Testes
Excretory ducts

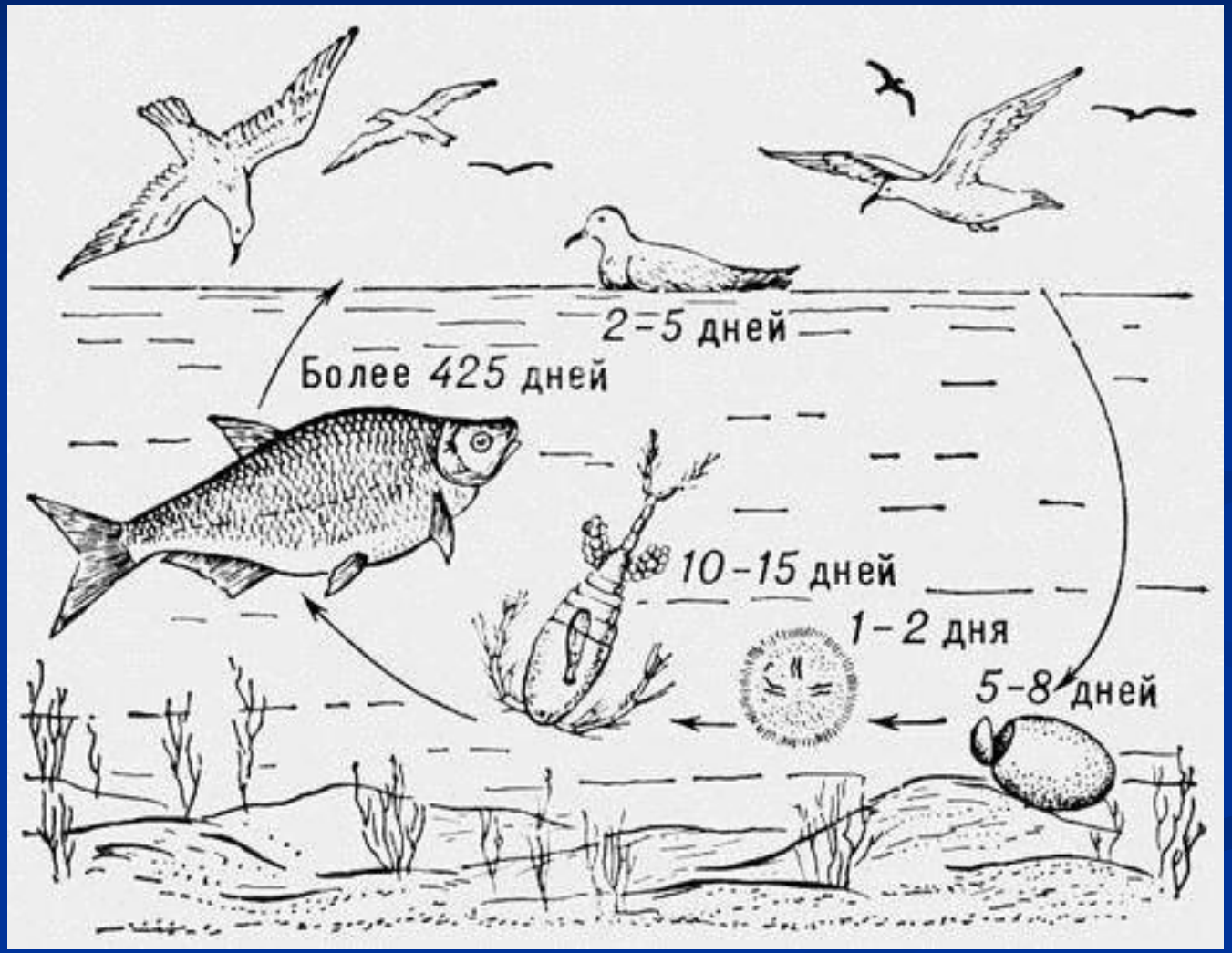
Diphylobutrium latum

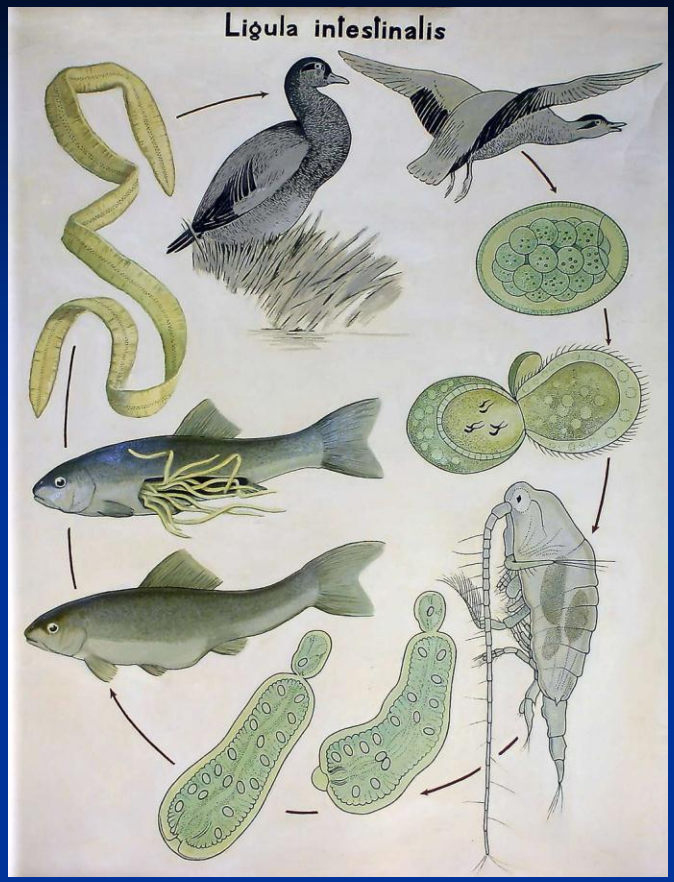


Diphylobutrium latum



Ligula intestinalis





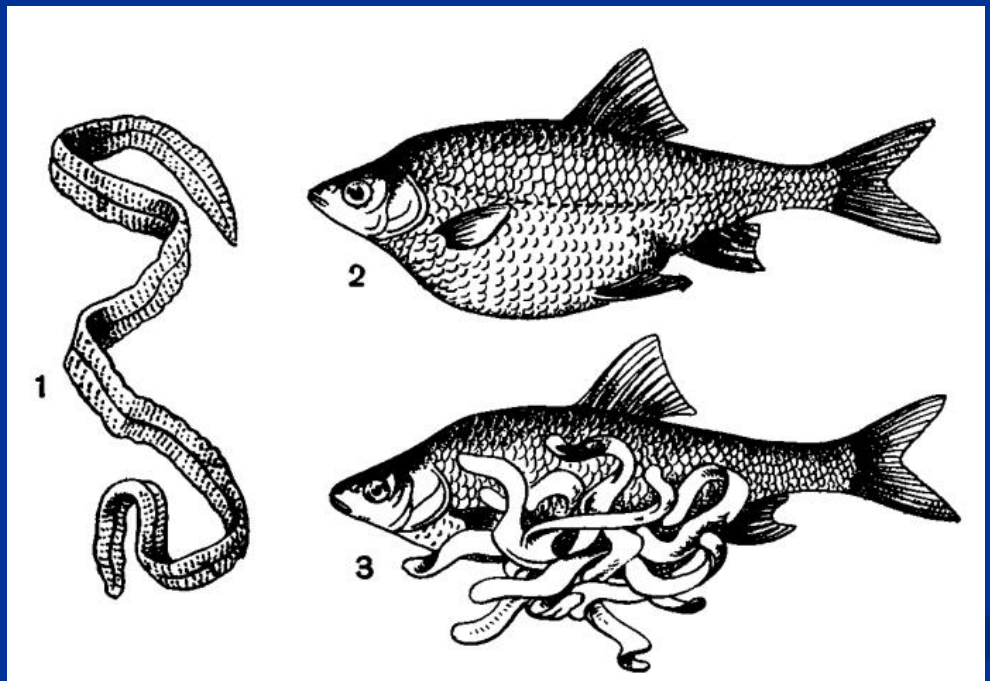
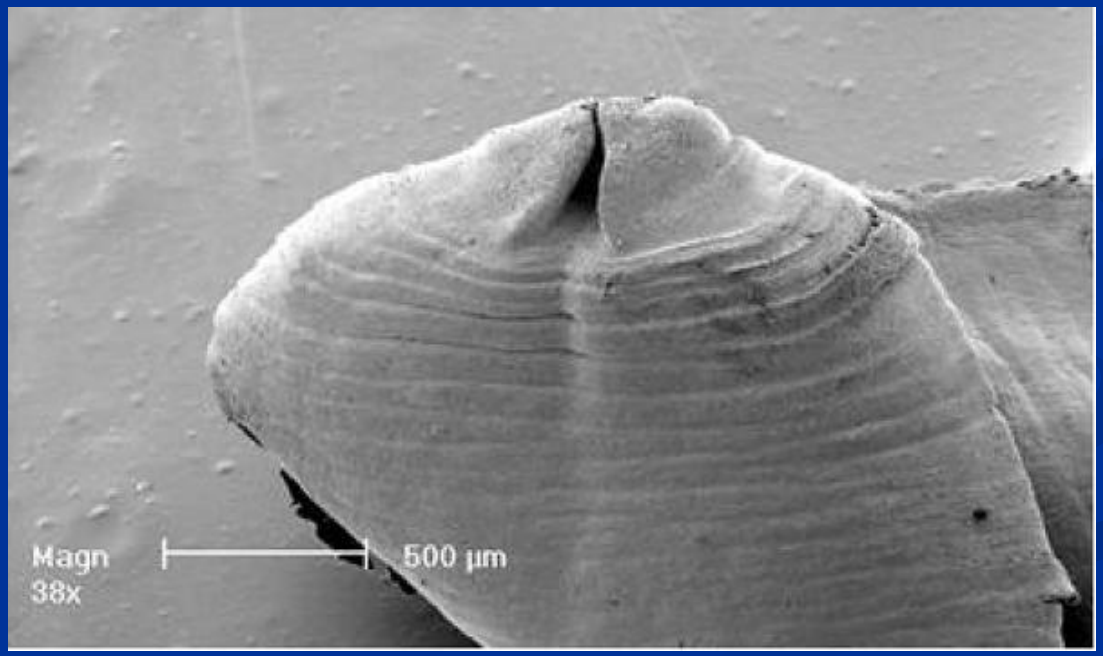


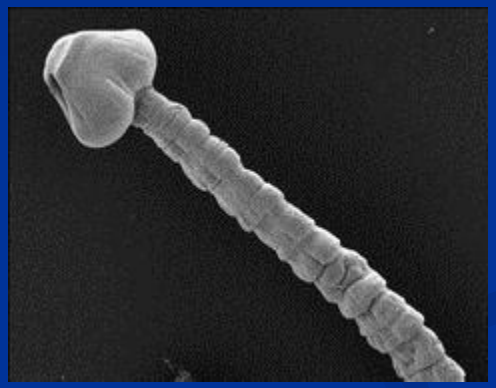
Рис. 215. Ремнец (Ligula intestinalis):

1 — личинка-плероцеркоид, извлеченная из полости тела рыбы; *2* — рыба, зараженная личинкой ремнеца; *3* — личинки ремнеца, вышедшие из тела рыбы через разрыв.

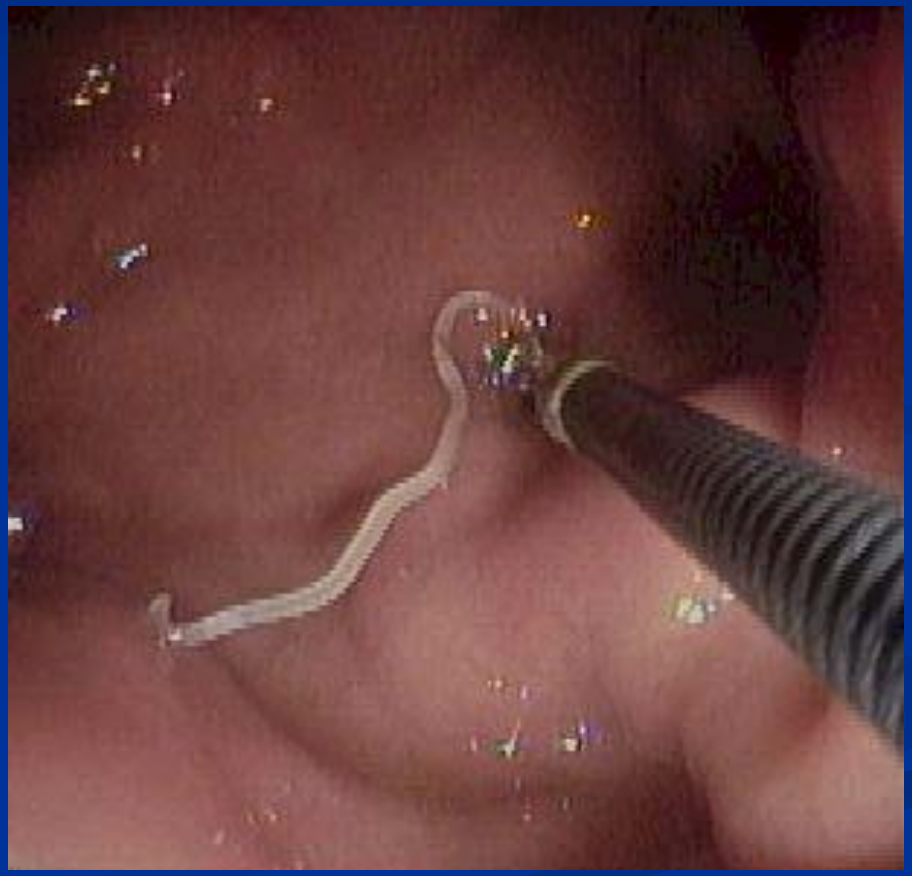
Ligula intestinalis



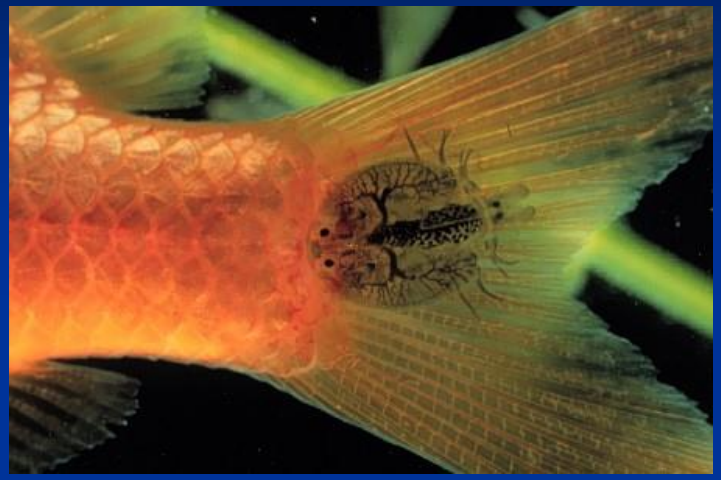
Bothriocephalous



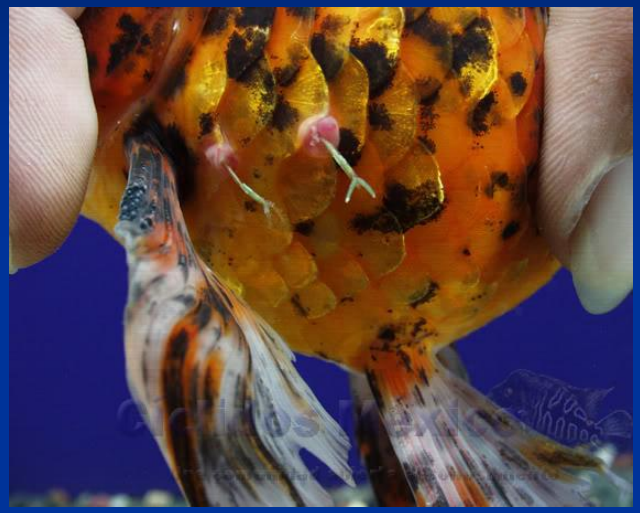
Anisakis sp.

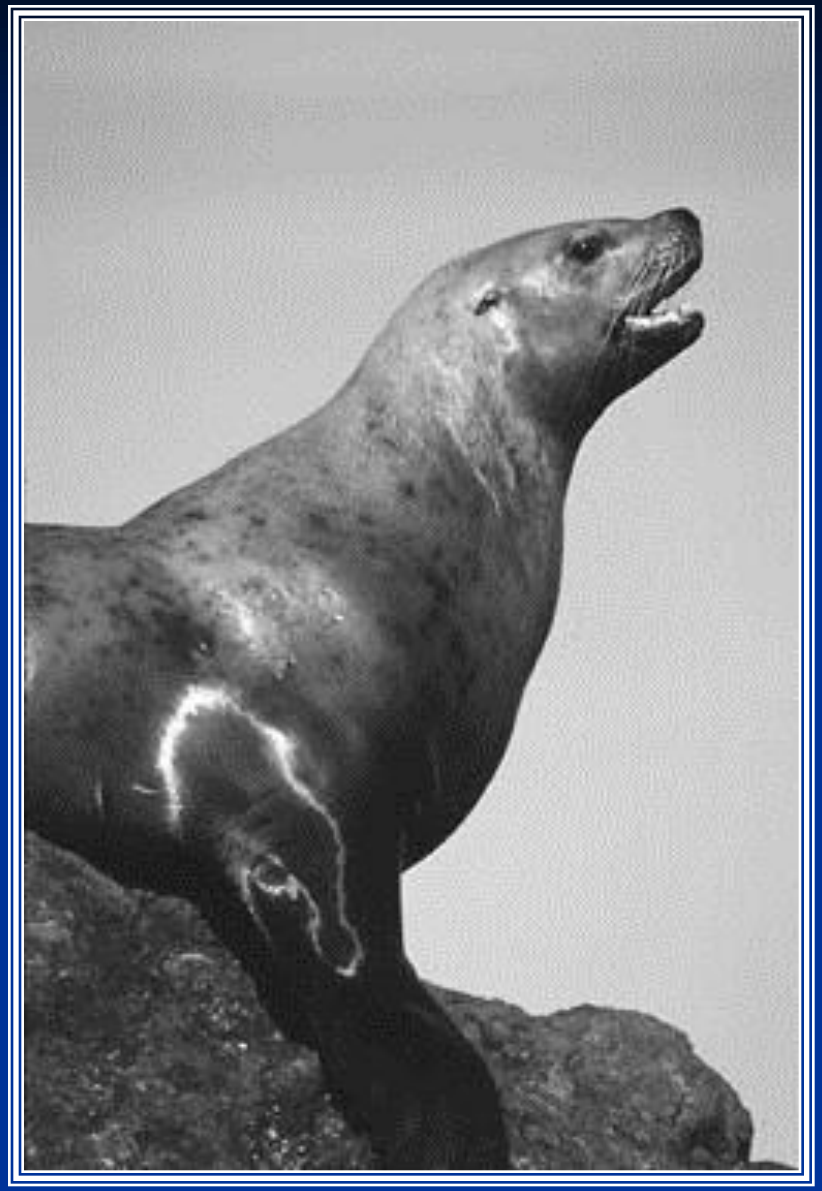


Argulus



Lernea



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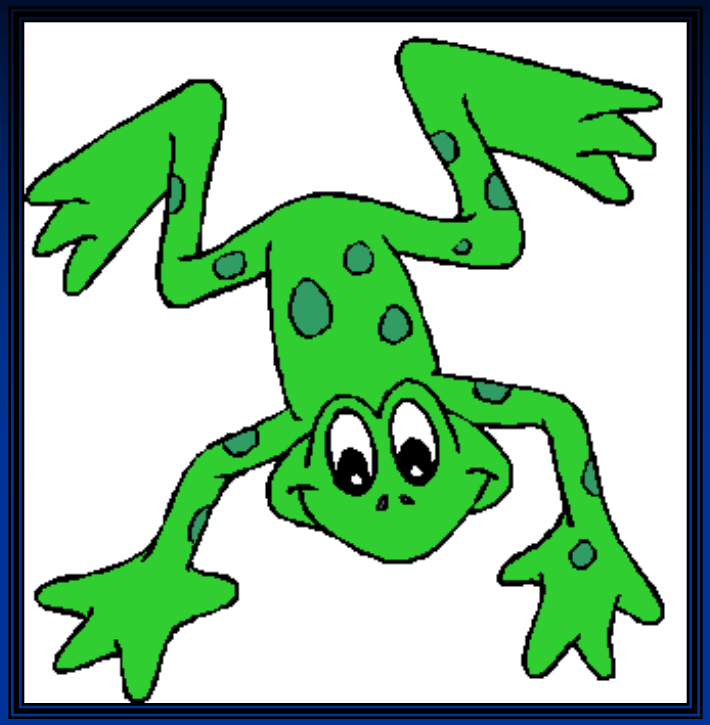

Very very dangerous peredator