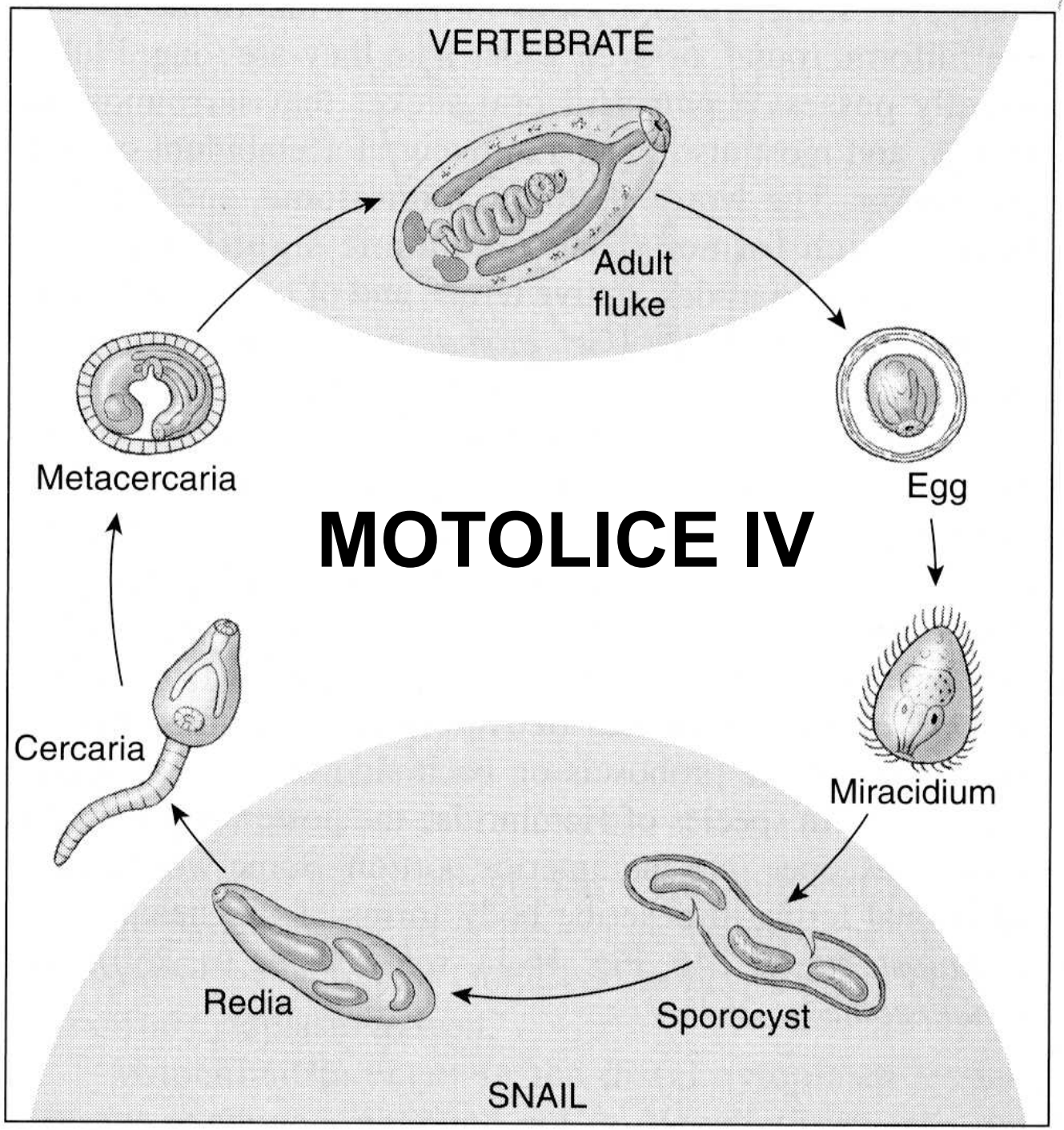
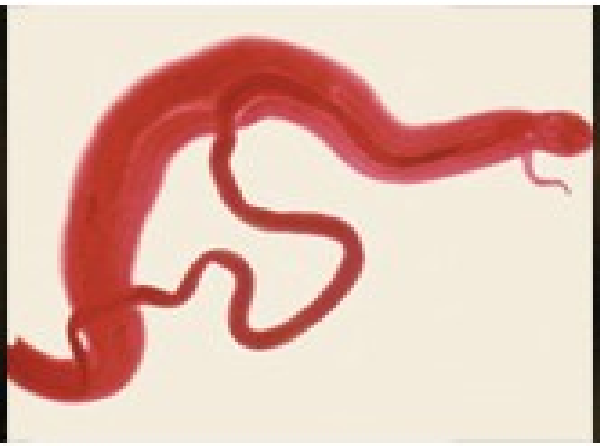

VERTEBRATE
Adult fluke
Egg
Miracidium
Sporocyst
Redia
Cercaria
Metacercaria
MOTOLICE IV
SNAIL

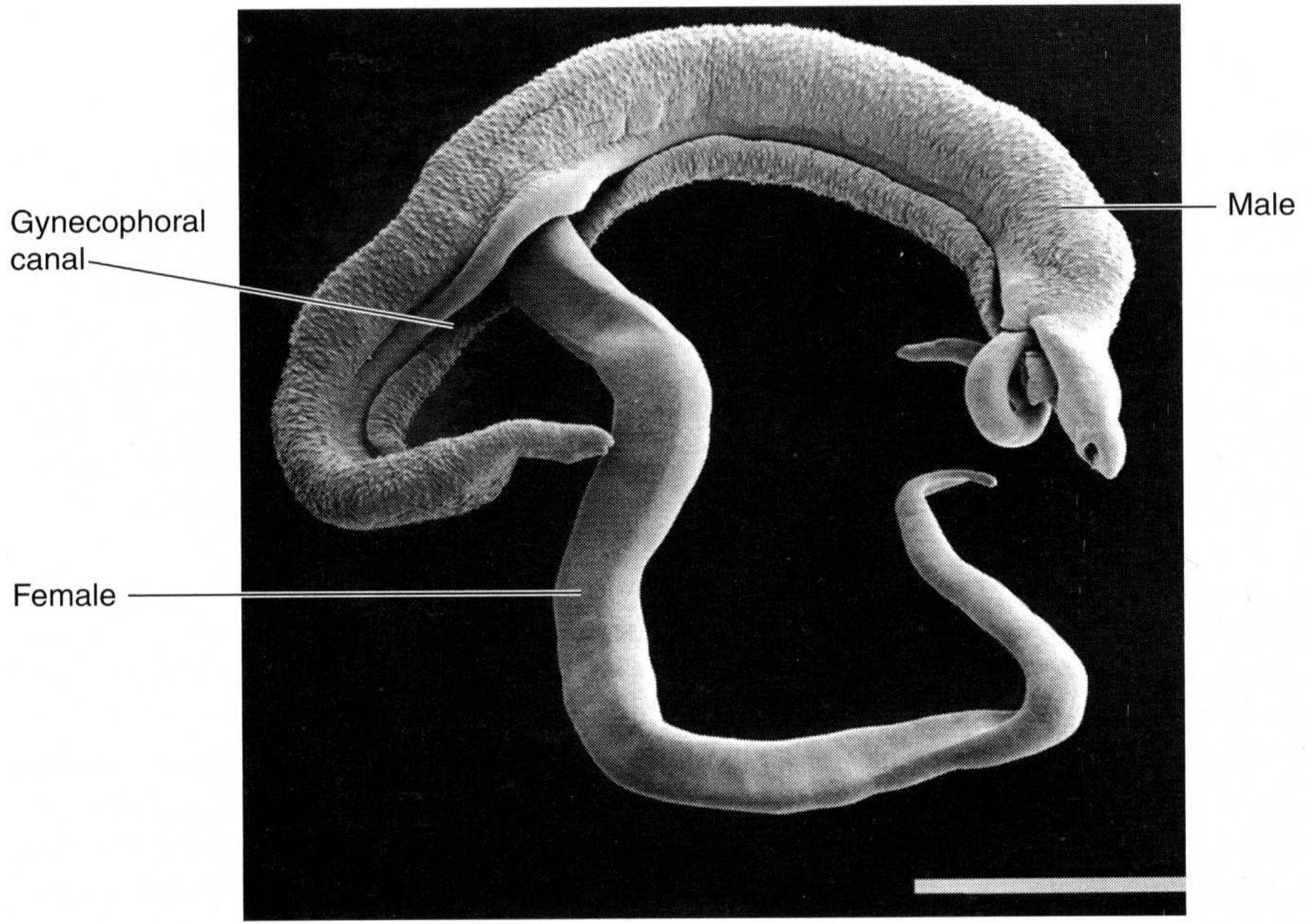

- **Schistosomiása je známa také jako bilharzióza. Napadá asi 200 mil lidí a je po malárii druhou nejvýznamnější parazitósou.**

- **Cizopasníci působící schistosomiásu se vyvíjejí v různých druzích sladkovodních plžů. Infekčním, stádiem jsou cerkárie, které aktivně penetrují lidskou pokožku. Nejčastěji jsou lidé napadeni těmito třemi druhy: Schistosoma mansoni, S. haematobium, or S. japonicum.**

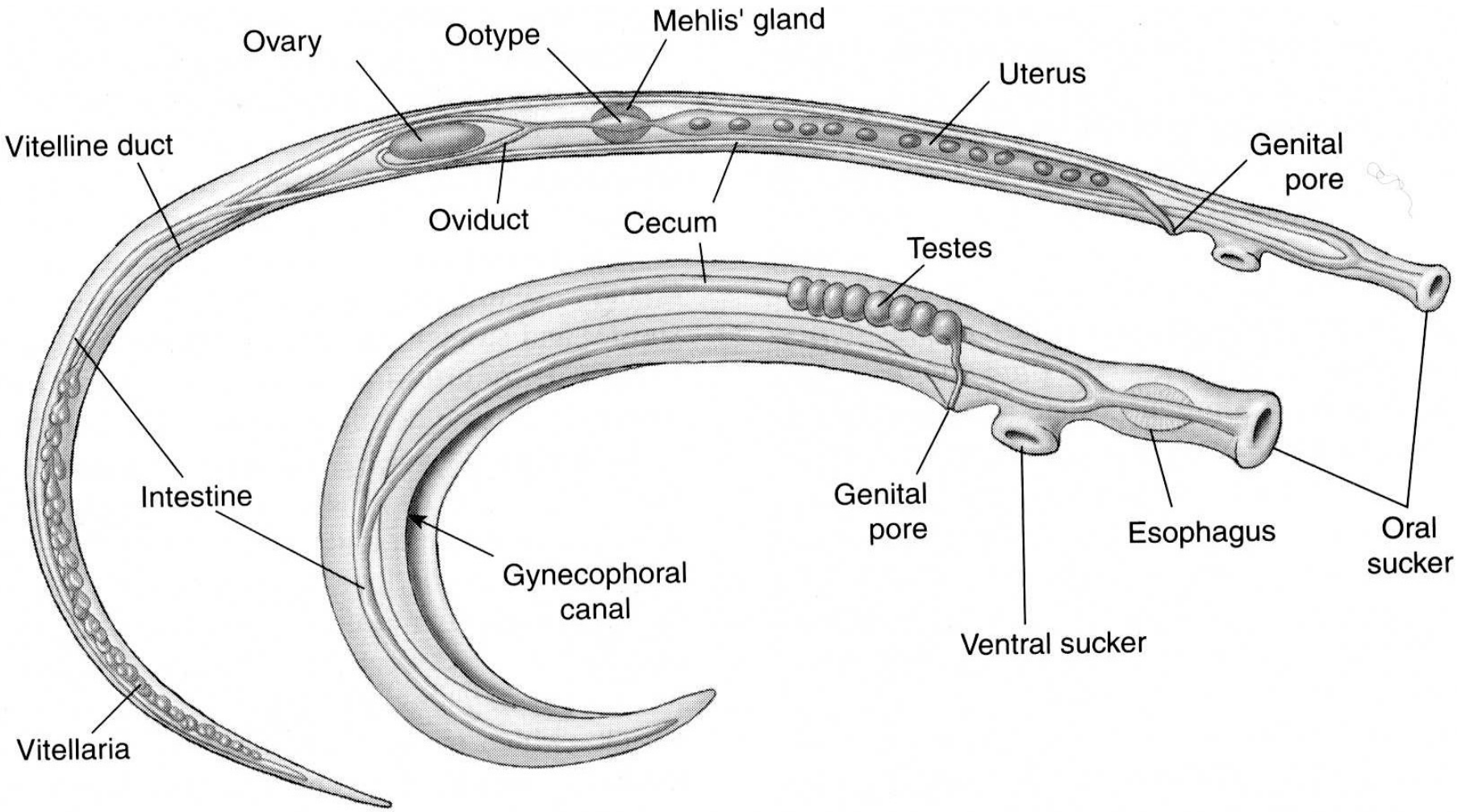
Schistosomatidae

Charakteristika:

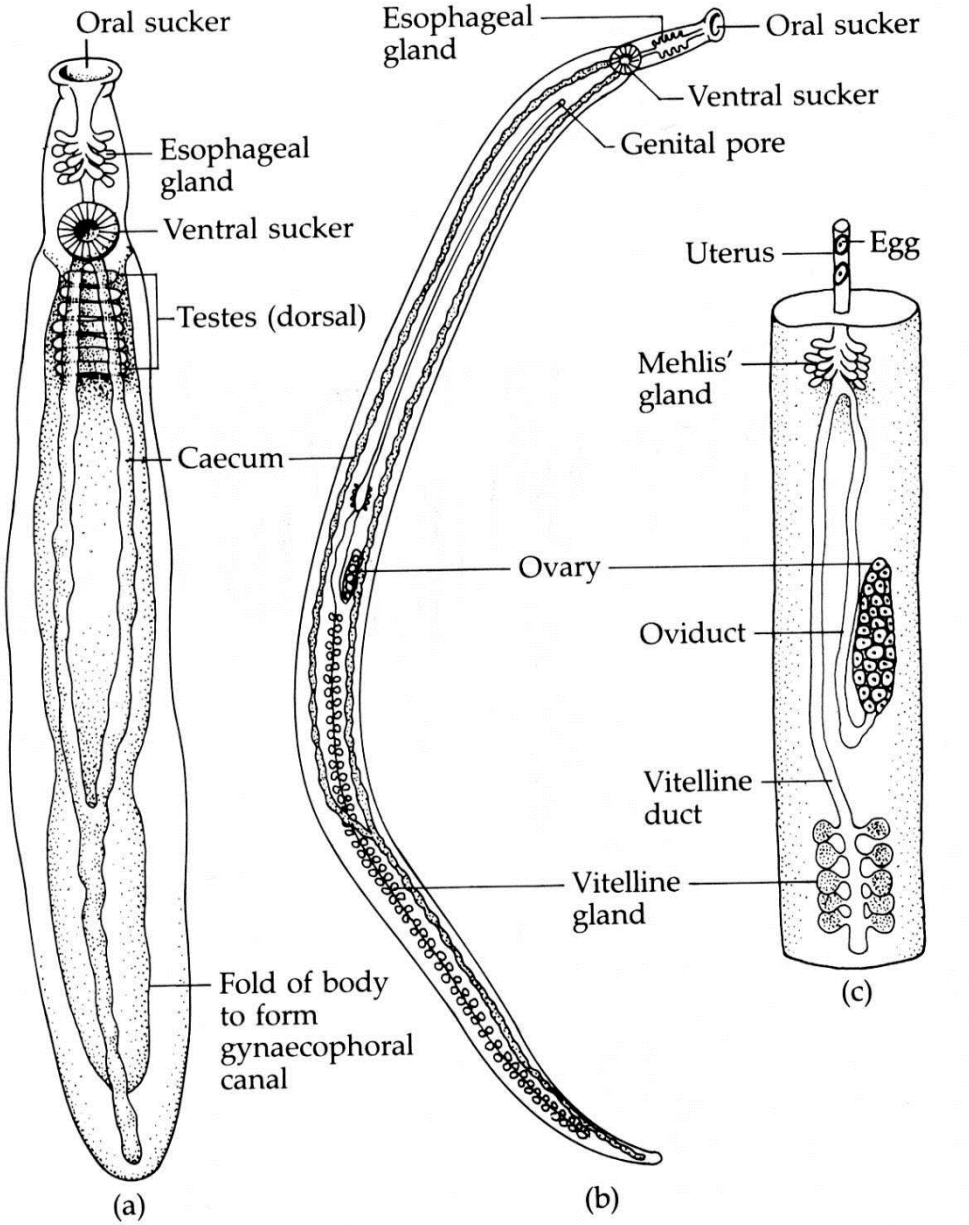
- Cizopasníci krevního systému
- Protáhlé tělo, až 20 mm dlouhé
- Gonochoristé
- Štíhlejší, delší samice v *canalis gynecophorus* kratšího, širšího samce


Gynecophoral canal
Male
Female

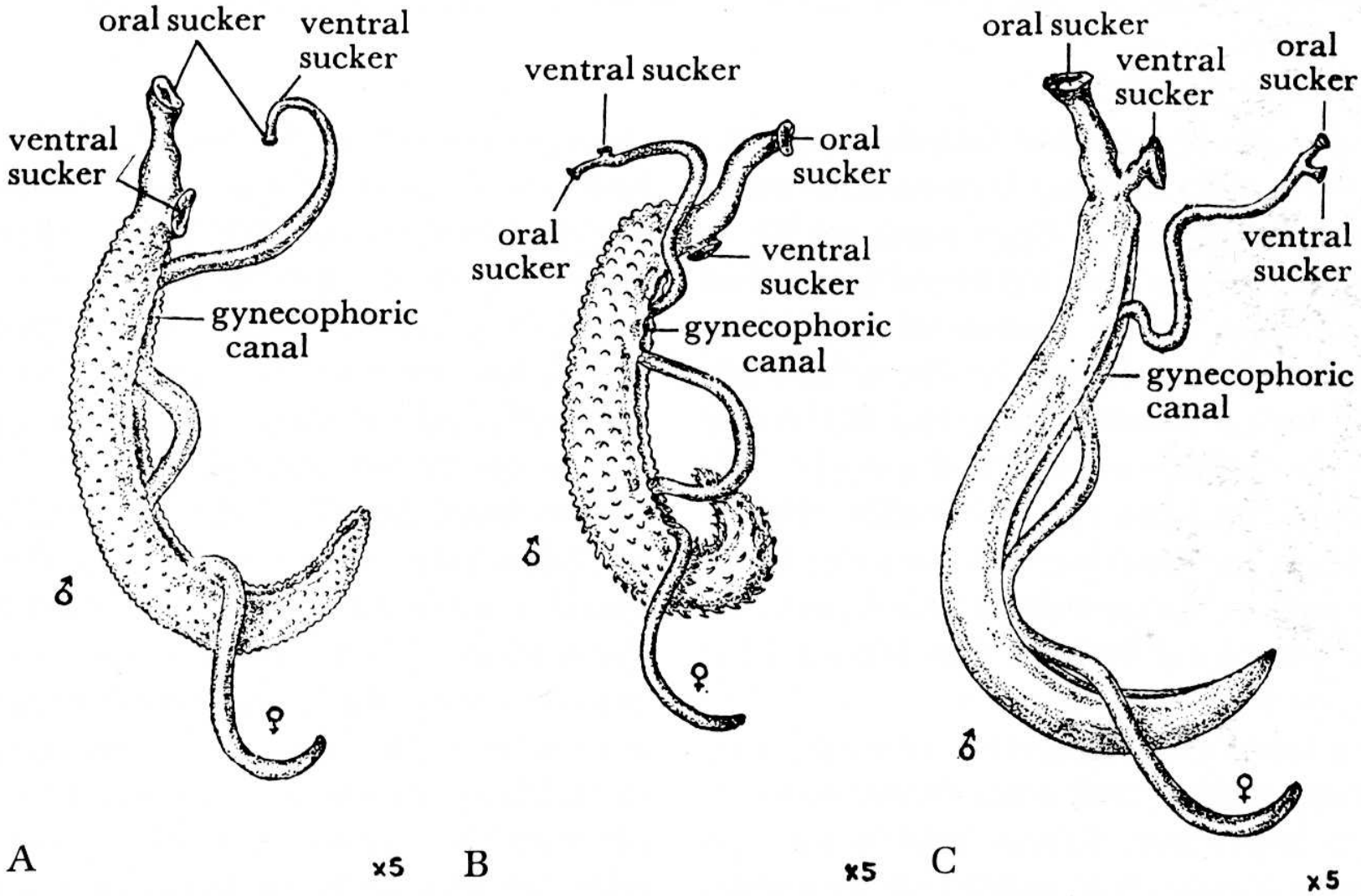
Morfologie - gonochoristi



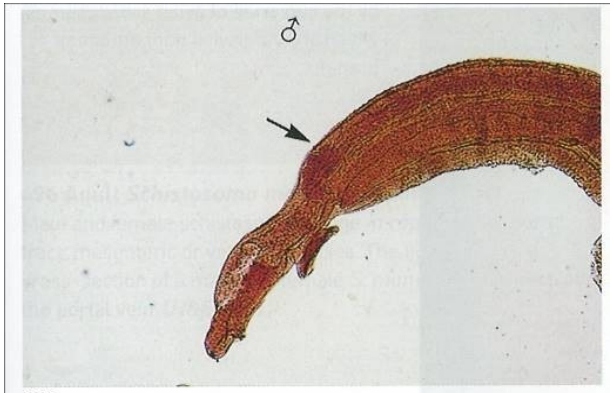
Pohlavní dimorfismus



Schistsoma haematobium (A) S. mansoni (B) a S.japonicum (C)

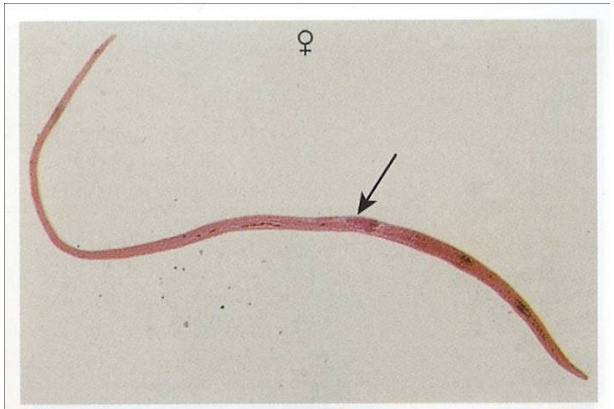


Schistosoma - gonochoristi



487

haematobium



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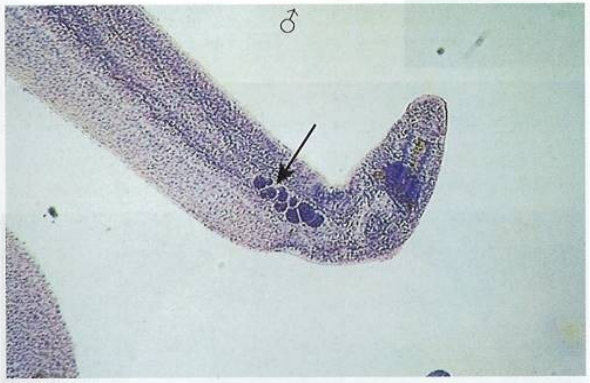
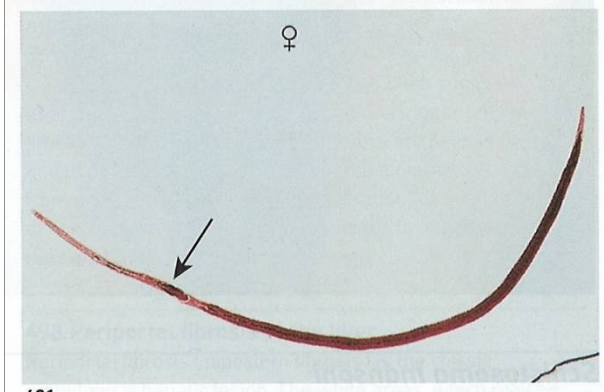


488

mansoni



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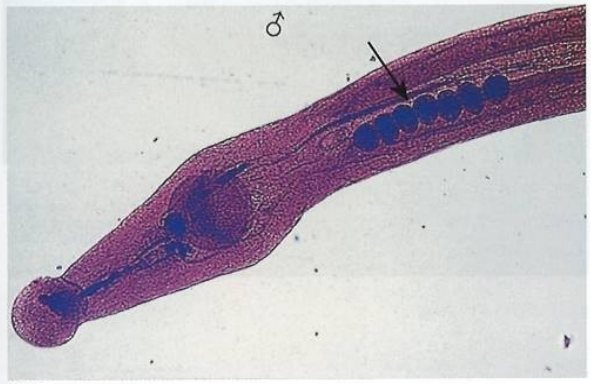
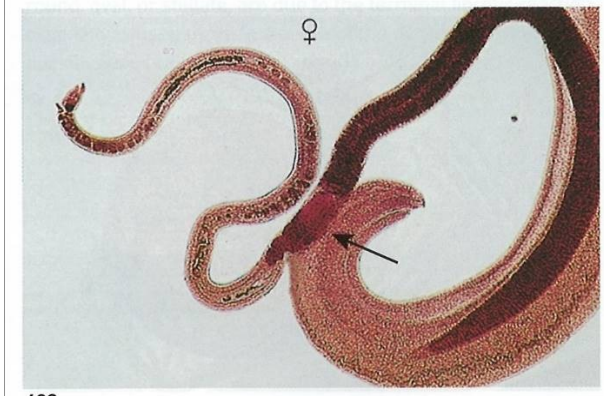


489

japonicum



492

Shistosoma - rozšíření

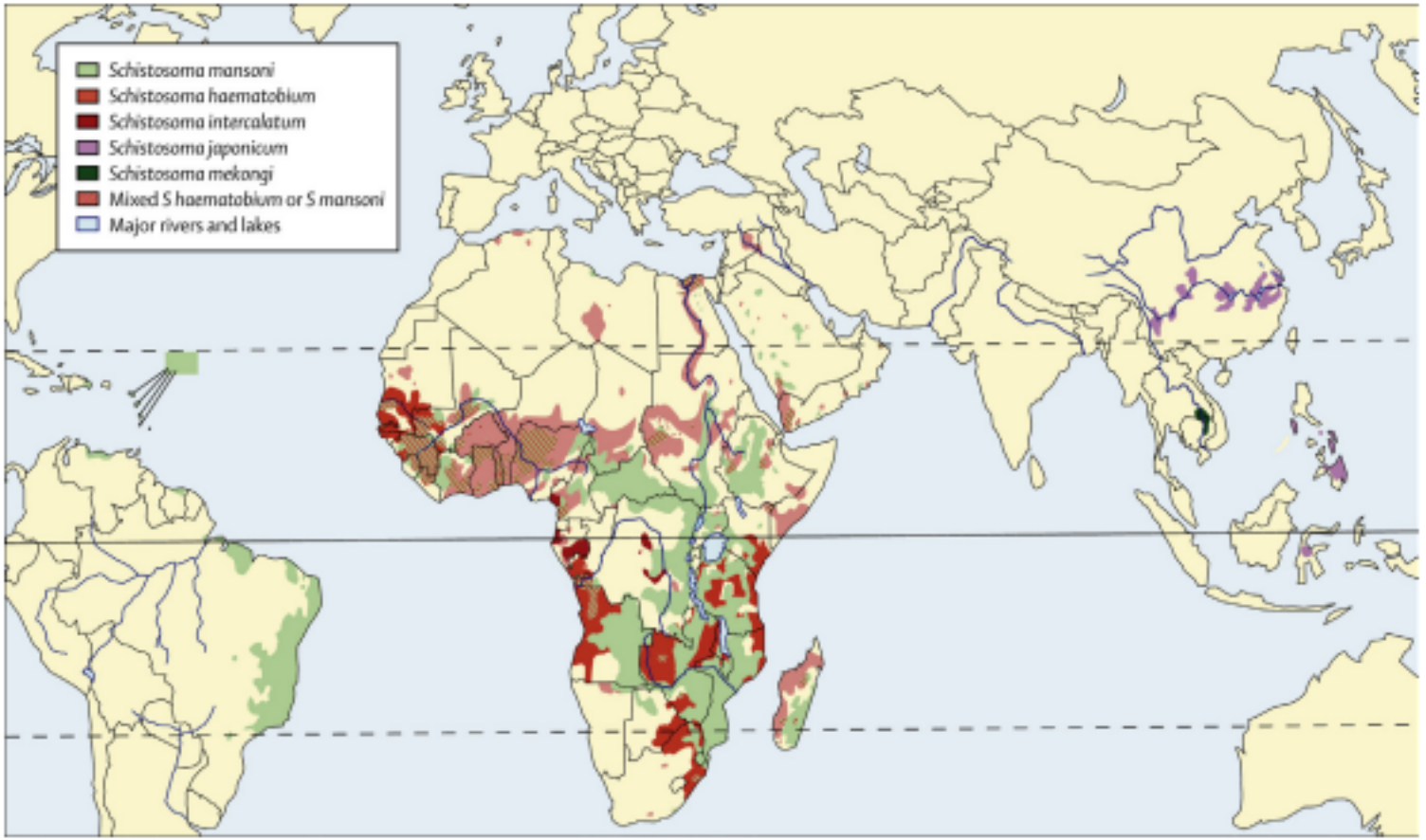


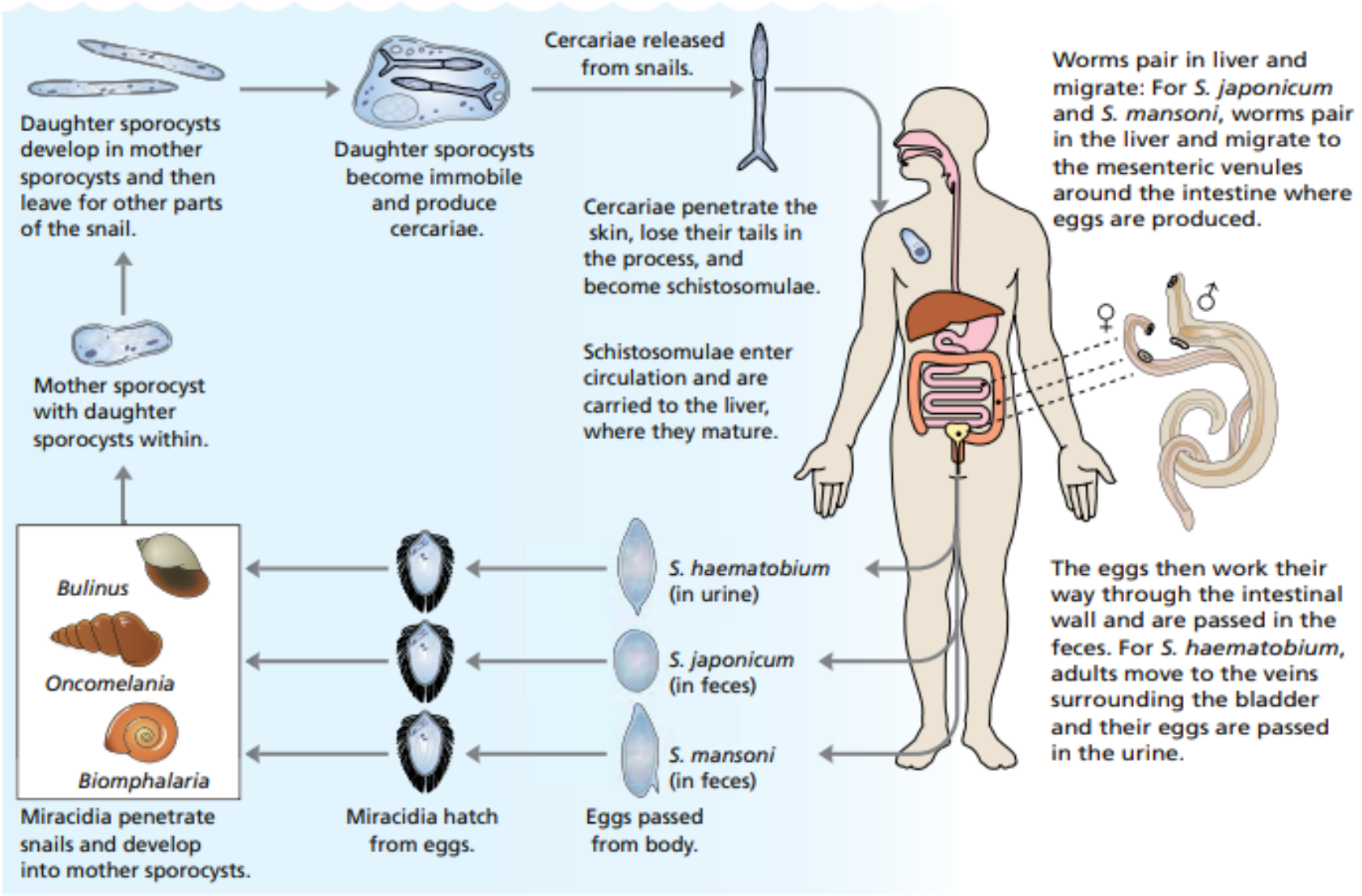
Fig. 2.52 Global distribution of countries where human schistosomiasis is transmitted.
Schistosome species have specific snail hosts whose habitat range defines the distribution of human disease. Thus only *Schistosoma mansoni* is found in the Americas and *Schistosoma japonicum* is only found in Asia, predominantly China and the Philippines. *Schistosoma haematobium* and *Schistosoma mansoni* are found throughout Africa and the Middle East. *Schistosoma mekongi* (Mekong River basin) and *Schistosoma intercalatum* (Central and West Africa) account for a minor portion of disease and have geographically more restricted distributions. (From Colley D.G., Bustinduy A.L., Secor W.E., King C.H. Human schistosomiasis. Lancet 2014, Volume 383, Number 9936, 2253–2264, Fig. 2. (adapted from Gryseels and colleagues). www.thelancet.com)

Schistosomatidae

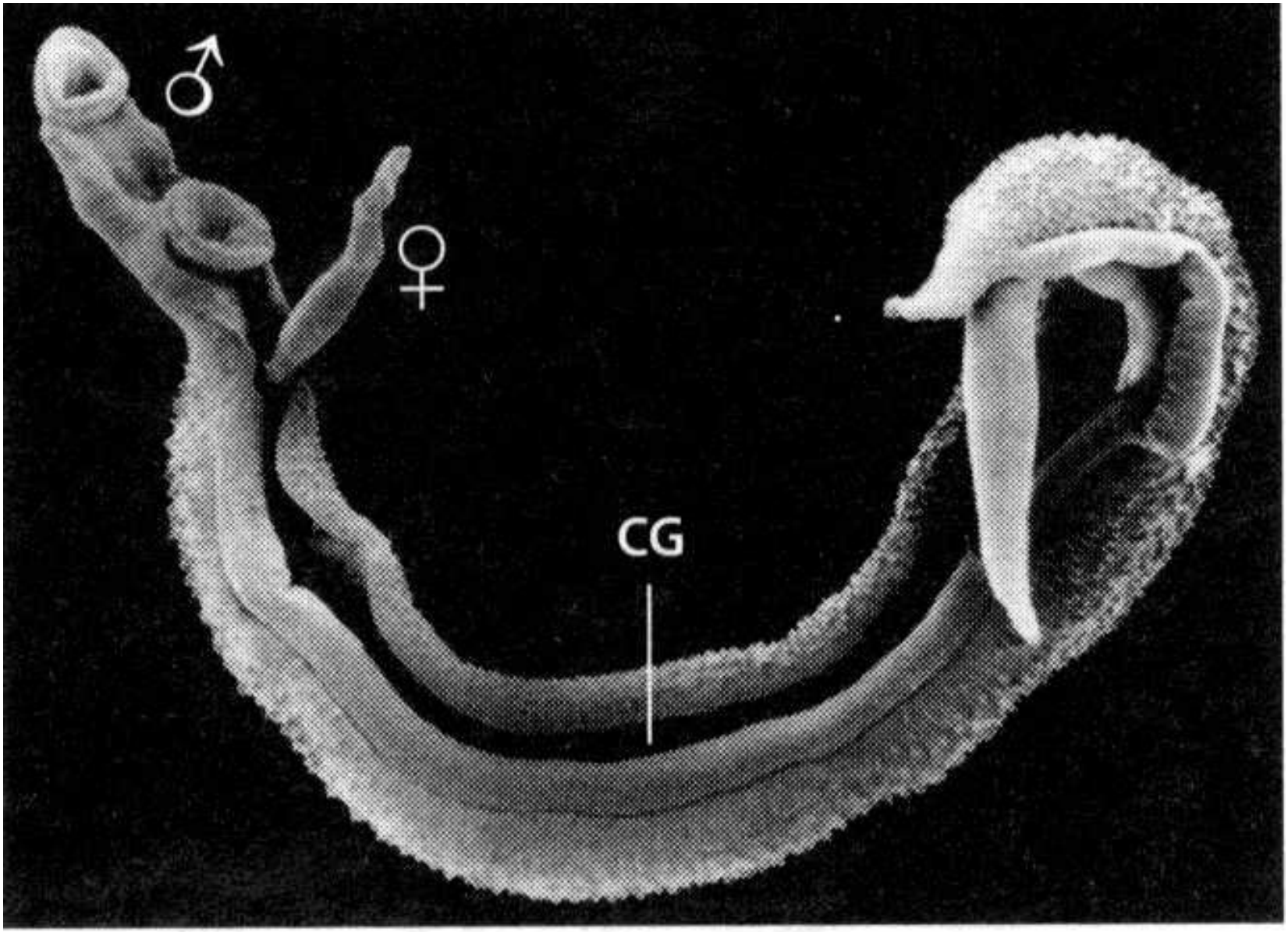
Vývoj:

- 1.Mz: plži se sporocystami 1. a 2. generace
- Přímá penetrace furkocerkarií do definitivního hostitele – odvržení ocásku – (schistosomulum)
- Prepatentní perioda 5 – 8 týdnů
- Doba života až 30 let
- Po kopulaci migrace do kapilár specifických orgánů
- Denně kolem 300-3000 velkých vajíček, bez víčka, s vyvinutým miracidiem
- Vajíčka hlavní patogenní agens(granulomy, protření kapilár – hematurie, hepatosplenomegalie

Schistosoma – životní cyklus



Schistosoma - kopulace



Samičí reprodukční soustava

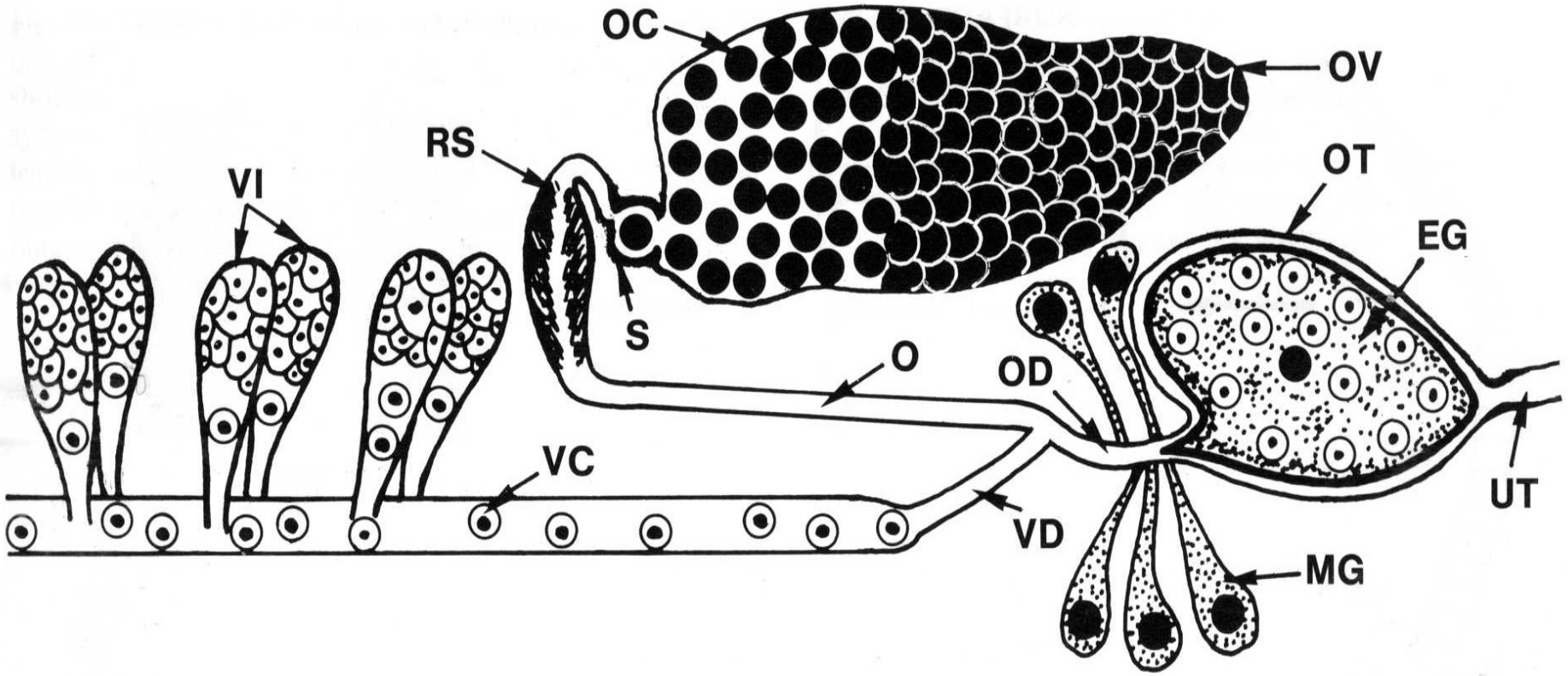
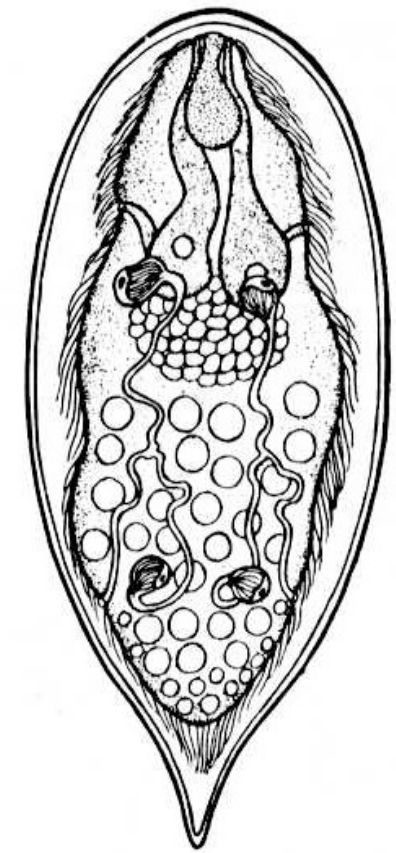
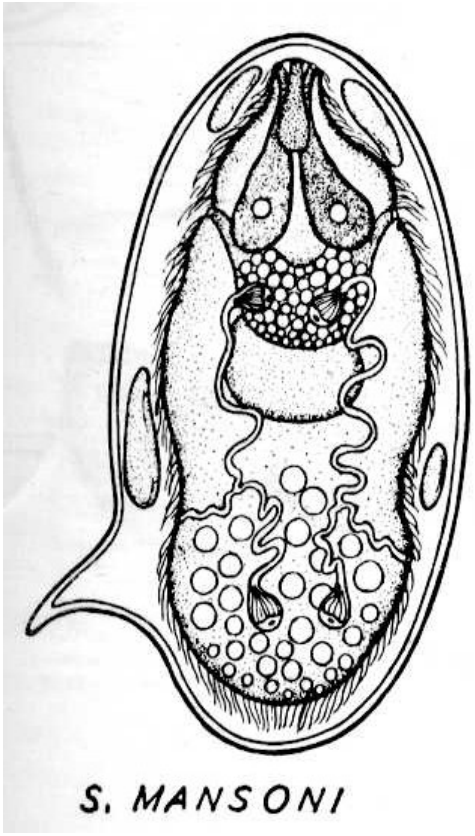


Fig. 3.97. Diagrammatic representation of the reproductive organs of a female of *Schistosoma mansoni* (after Gönnert 1955 and Mehlhorn and Piekarski 1981). *EG,* Egg (containing the zygote and vitellary cells); *MG,* Mehlis's glands; *O,* oviduct; *OC,* oocyte; *OD,* ovovitellary duct; *OT,* ootype; *OV,* ovary; *RS,* receptaculum seminis; *S,* sphincter; *UT,* uterus; *VC,* vitellary cell; *VD,* vitellary duct; *VI,* vitellarium

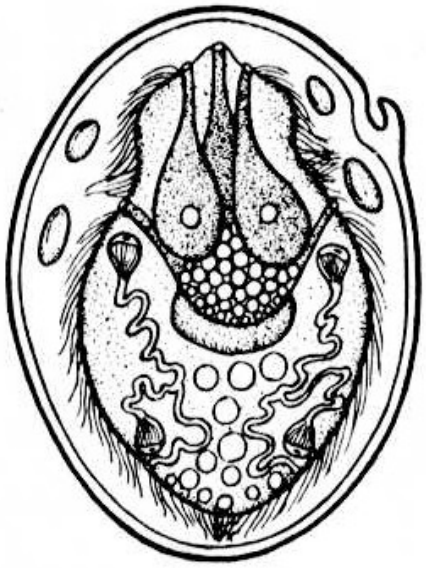
Schistosoma - vajíčka



S. HAEMATOBIUM

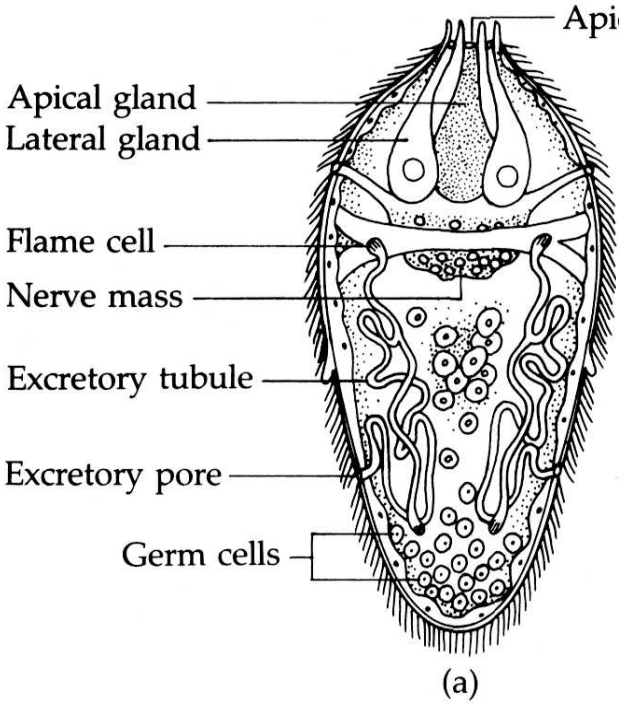


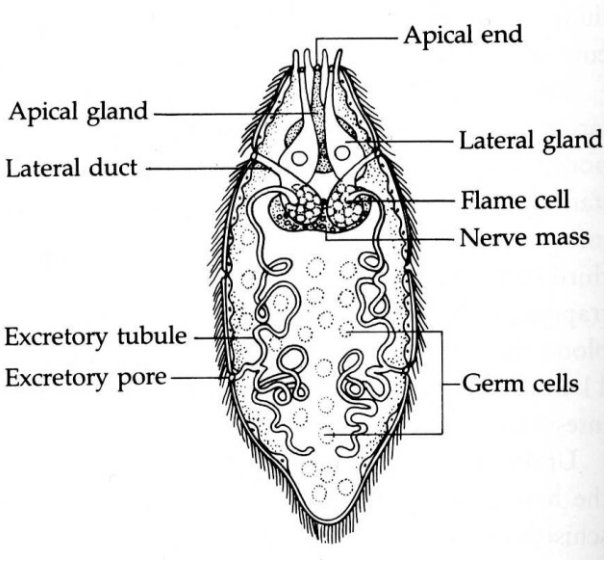
S. MANSONI

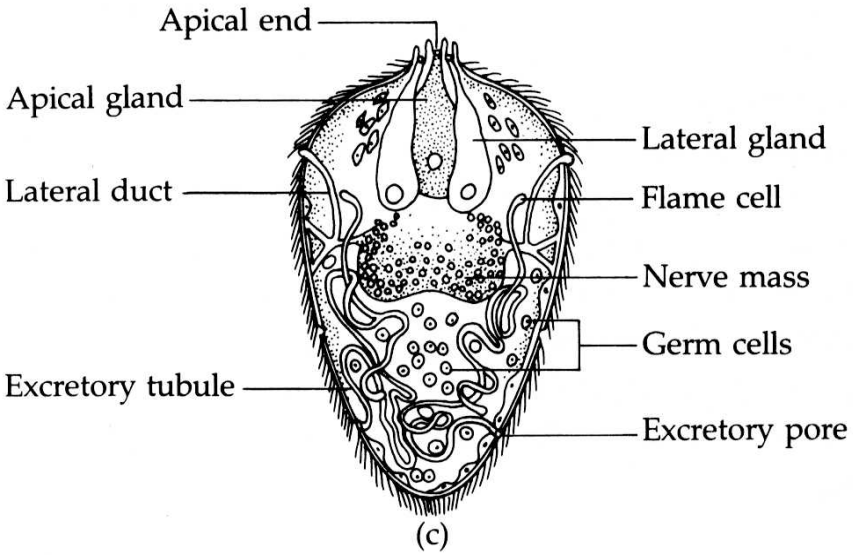


S. JAPONICUM

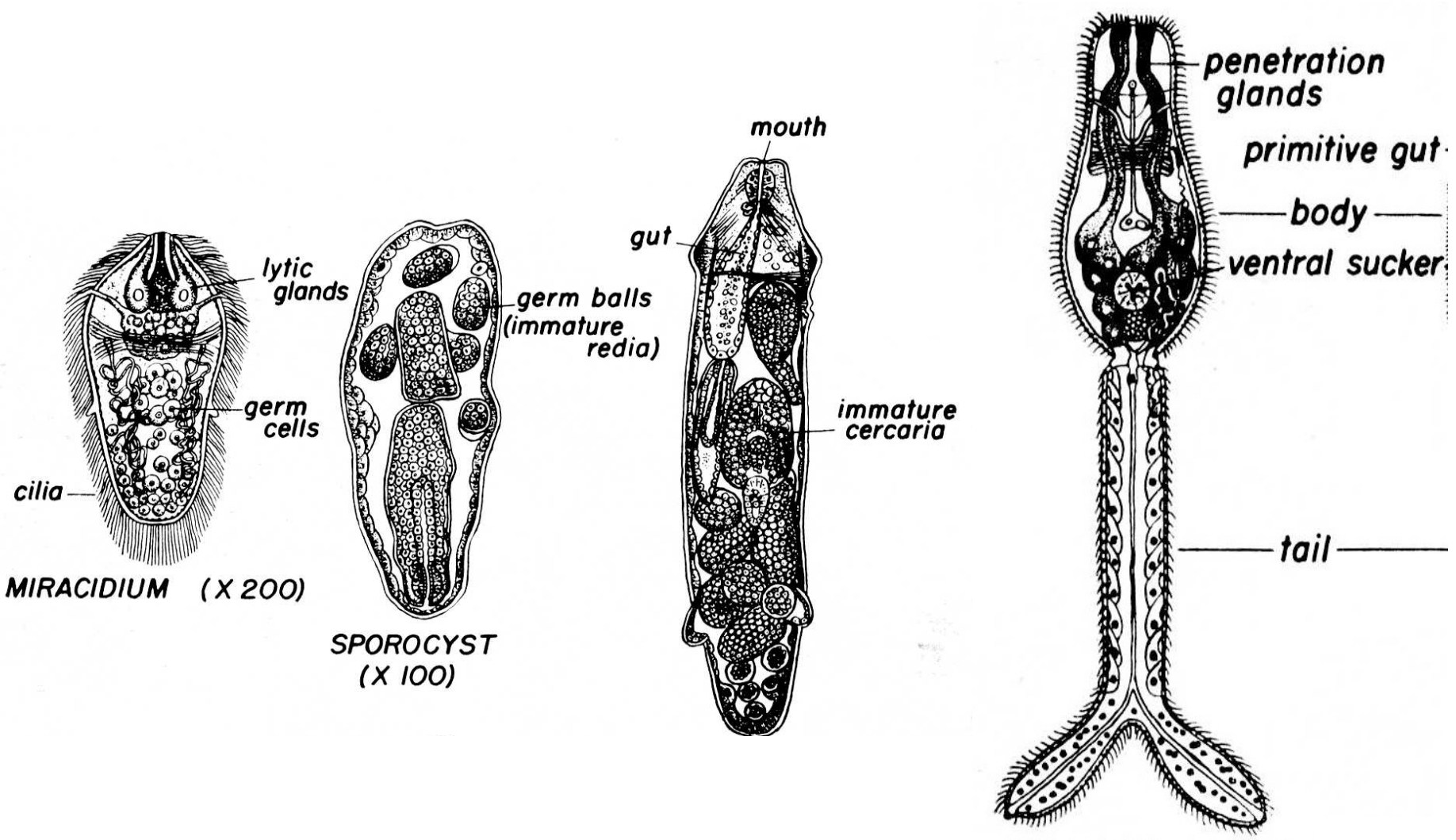
Schistosoma - miracidium



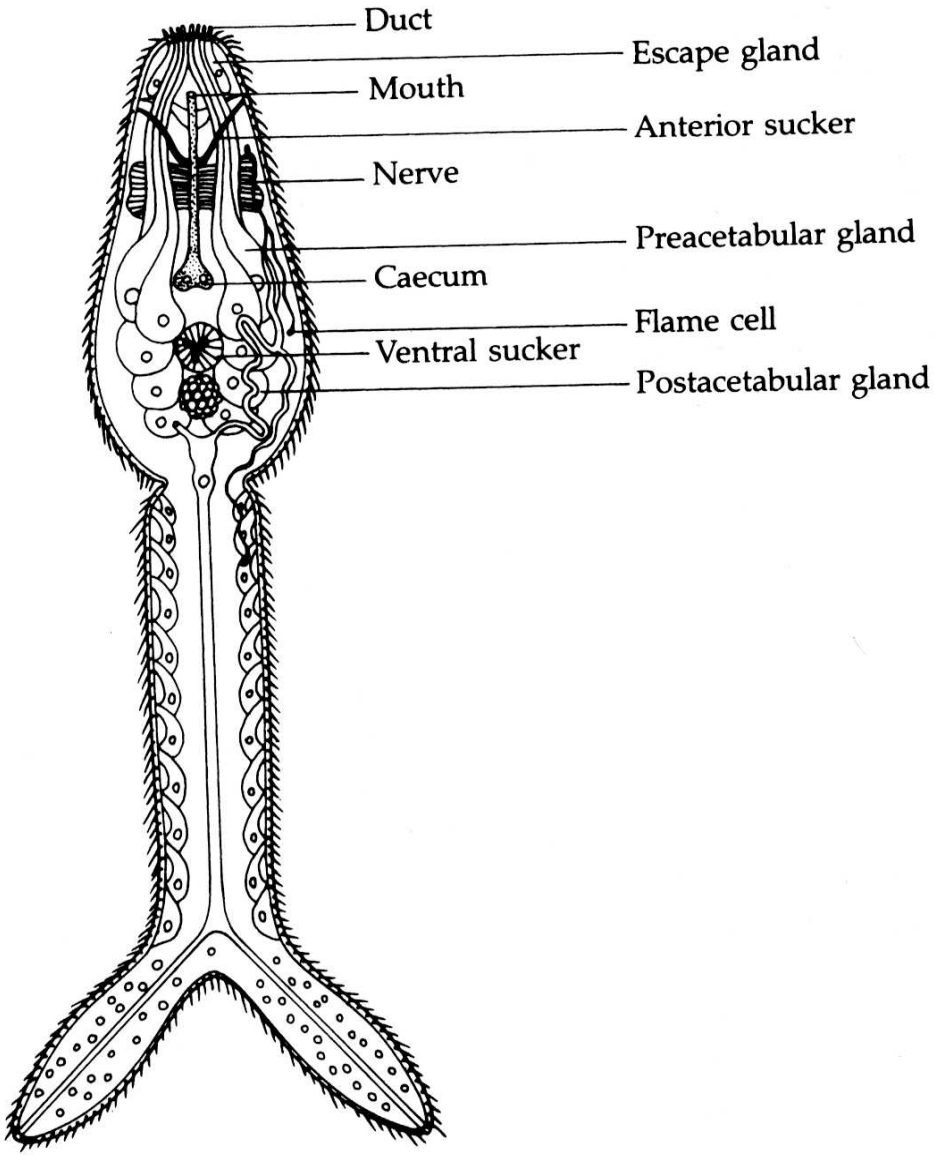


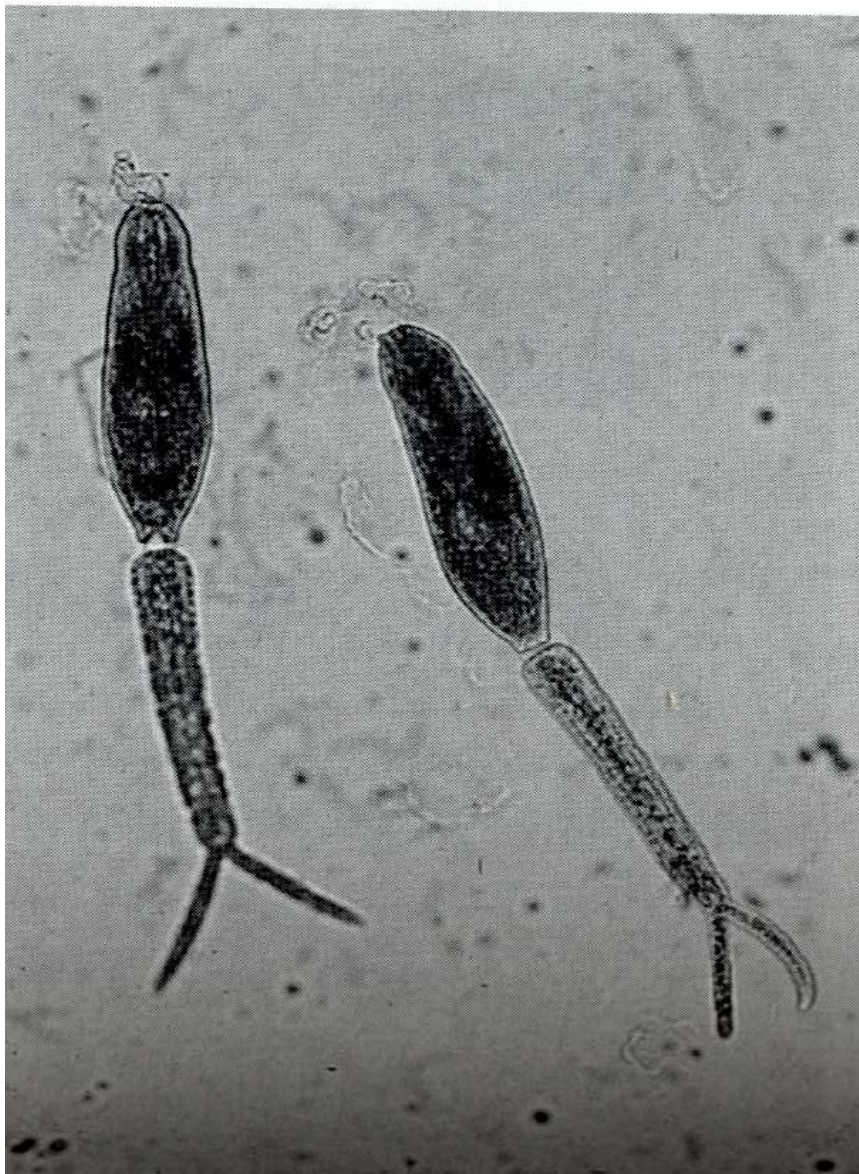


Vývojová stádia

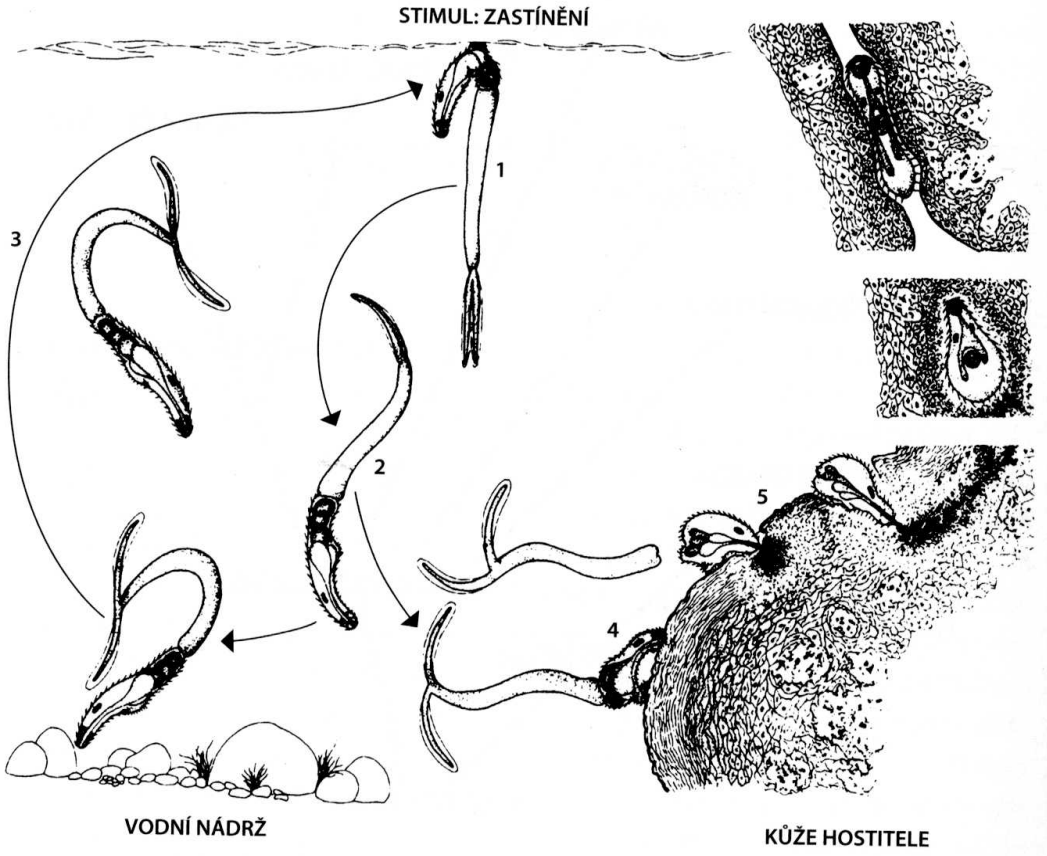


Furkocerkárie penetruje pokožku





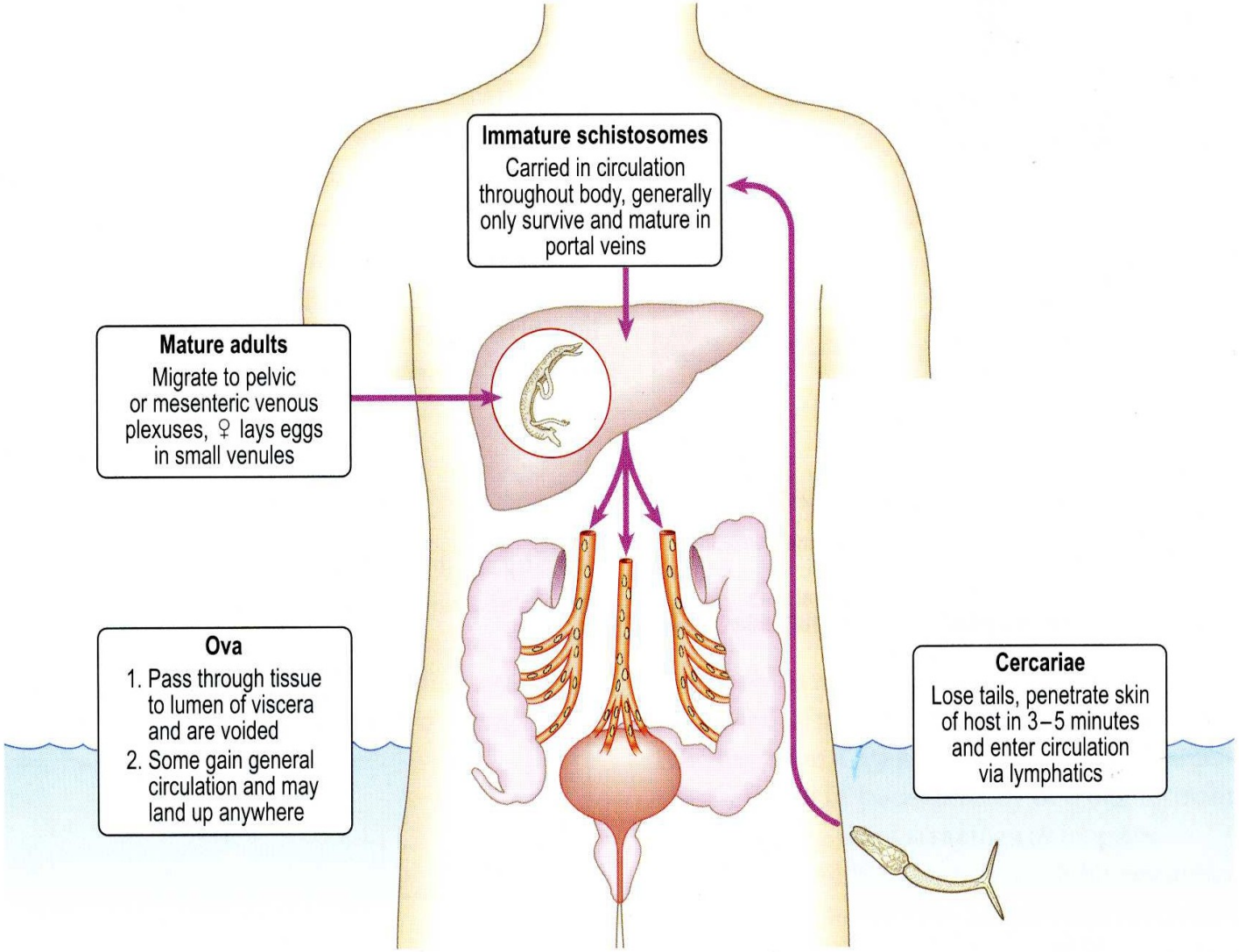
Penetrace pokožky



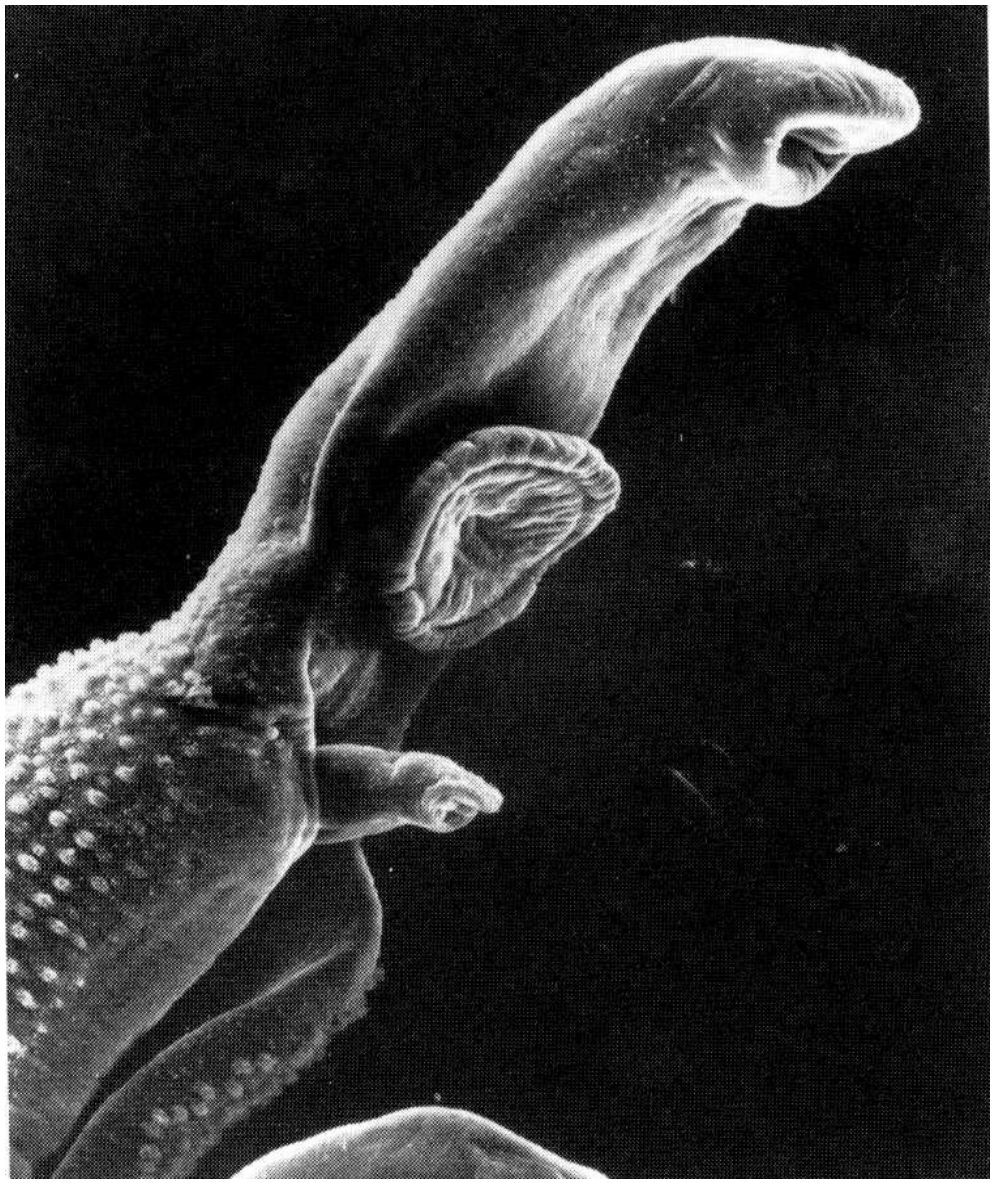
Obr. 3–2 Platyhelminthes, Trematoda, *Trichobilharzia szidati*. Chování cerkárií před

Life cycle in humans

Vývoj v člověku



Schistosomy - haematofagie



Shistosomulum

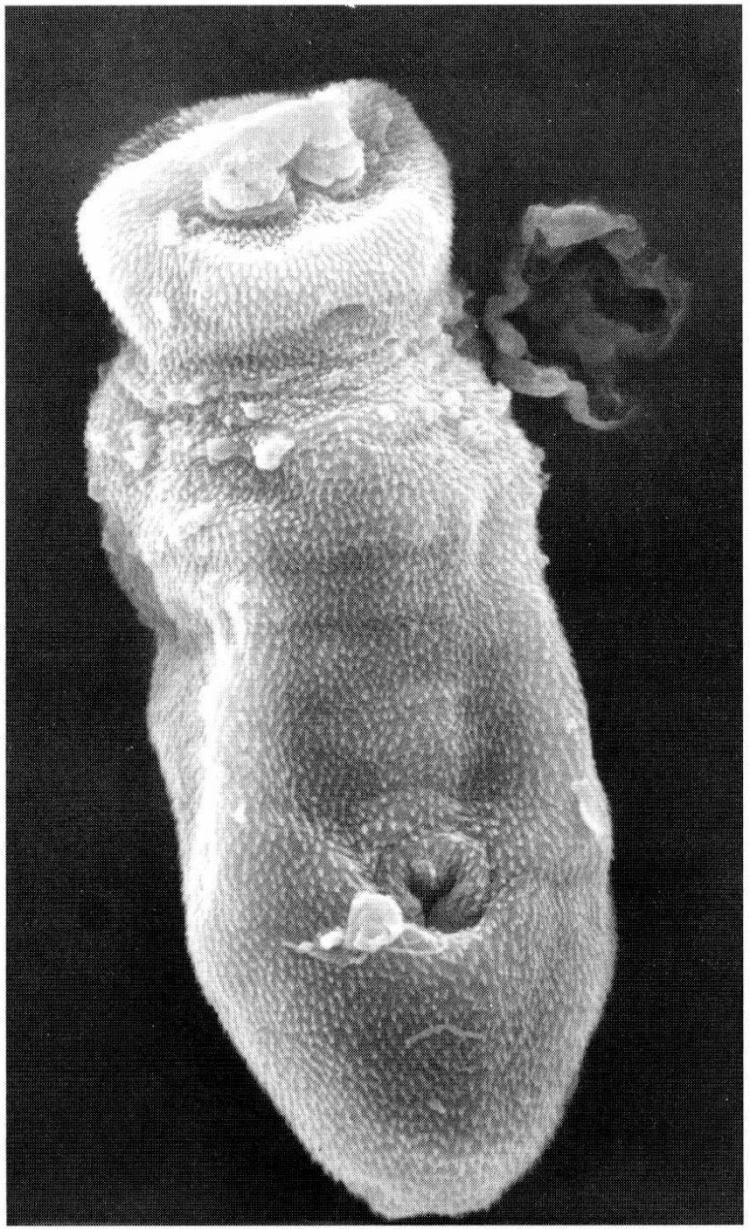
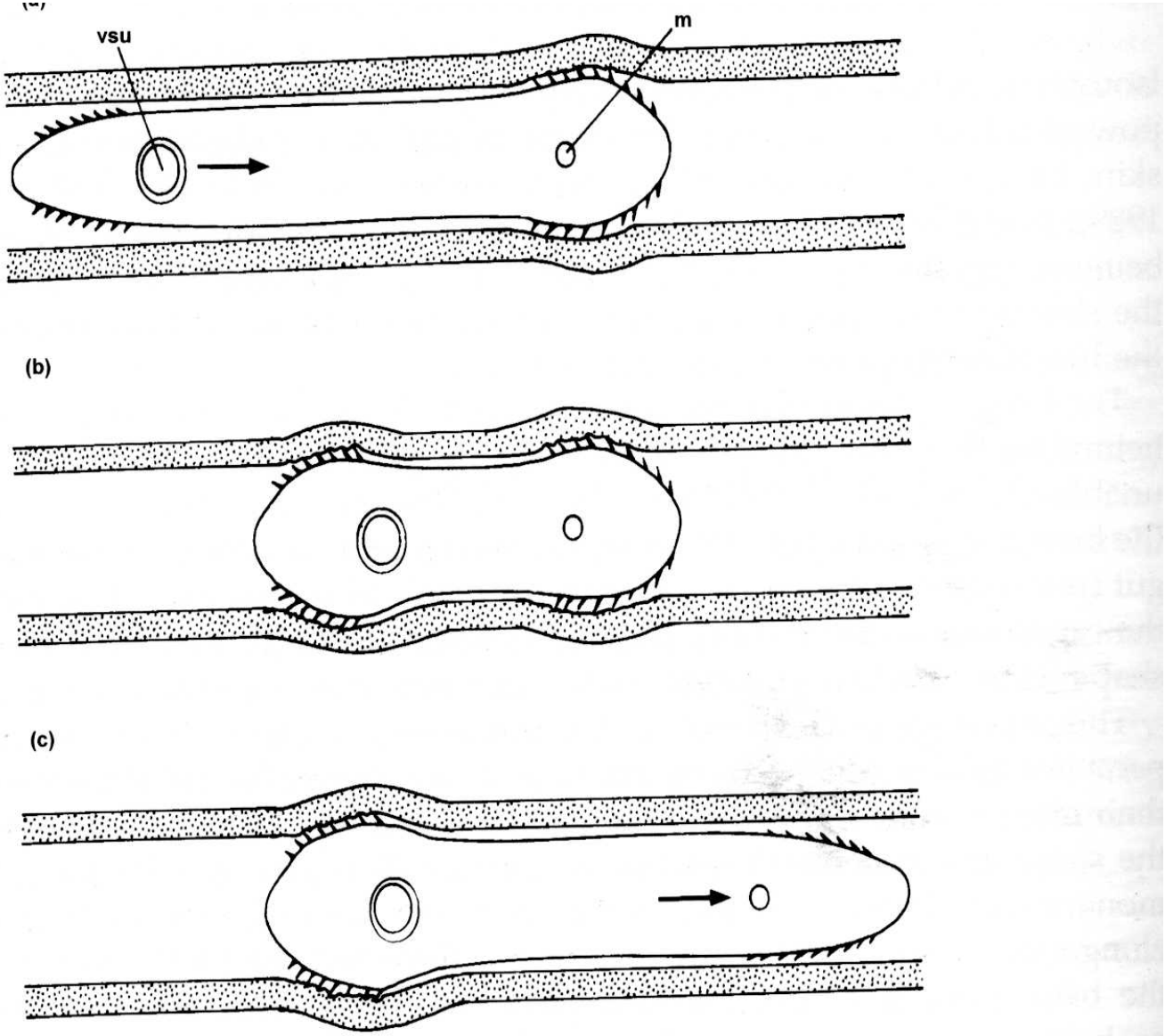


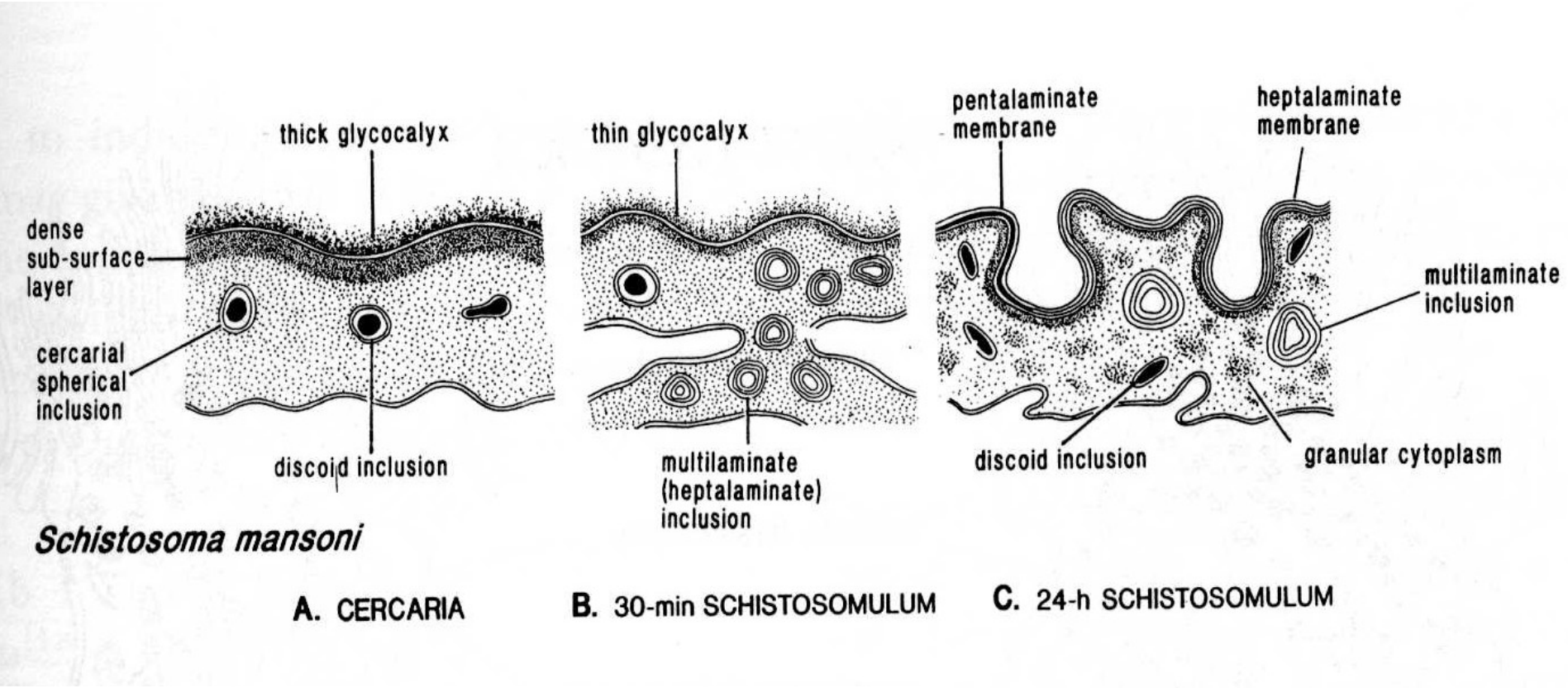
FIGURE 11-10
Scanning electron micrograph of *Schistosoma mansoni* schistosomule.

Pohyb schiostosomula v cévě



e 18.14 Diagrammatic representation of the movement of a schistosomulum along the lumen of

Transformace tegumentu



Vývoj tegumentu schistosom

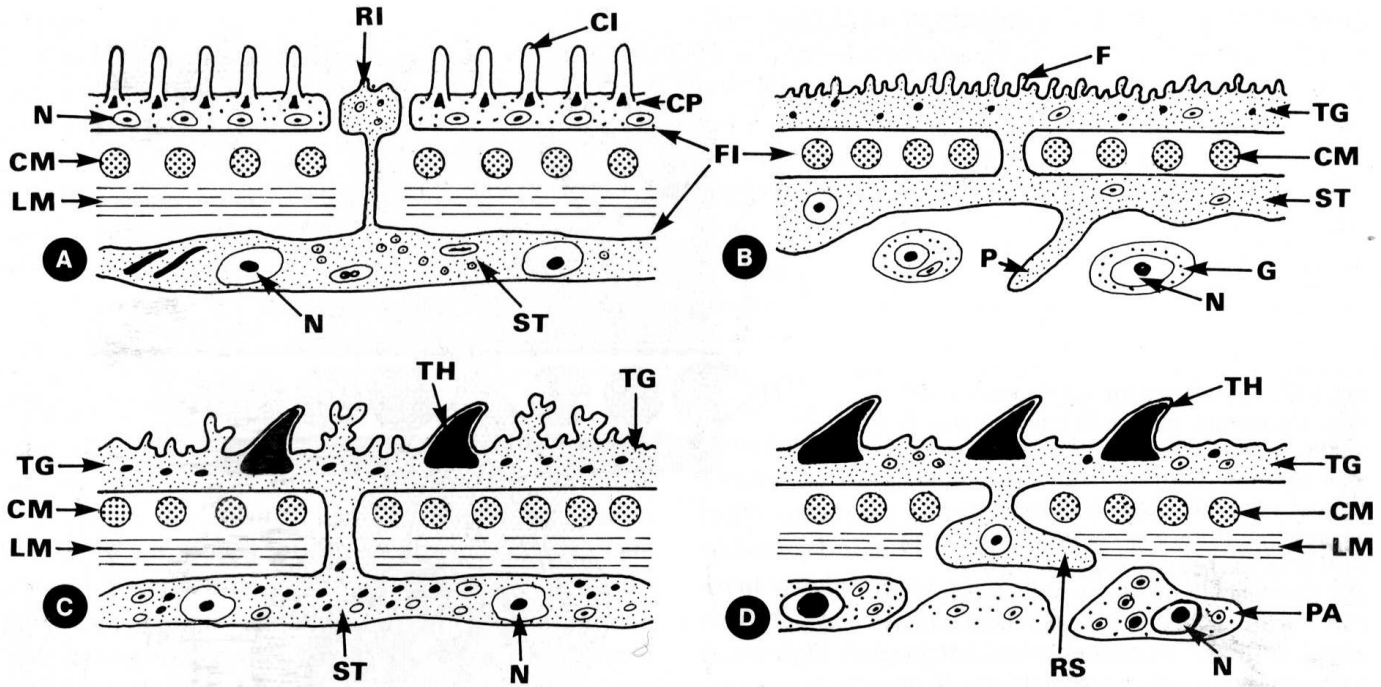


Fig. 3.58 A–D. Diagrammatic representation of the development of the syncytial tegument in digeneans *(Schistosoma mansoni)*. **A** Miracidium which is covered by ciliary plates and ridges formed by the subtegumental layer. **B** Mother sporocyst after detachment of ciliary plates. **C** Daughter sporocysts are covered by a syncytial tegument, which is connected by bridges with the subtegumental layer. **D** Cercariae: the subtegumental layer becomes reduced, and later parenchymal cells will contact the syncytial tegument. *CI,* Cilia; *CM,* circular muscles; *CP,* ciliary plate; *F,* foldings; *FI,* fibrous layer; *G,* germinal cells; *LM,* longitudinal muscles; *N,* nucleus; *P,* protruding subtegument; *PA,* parenchymal cell; *RI,* ridge; *RS,* remnants of the subtegument; *ST,* subtegumental layer; *TG,* tegument; *TH,* tegumental thorn (hook)

Vývoj cizopasníka v mezihostiteli

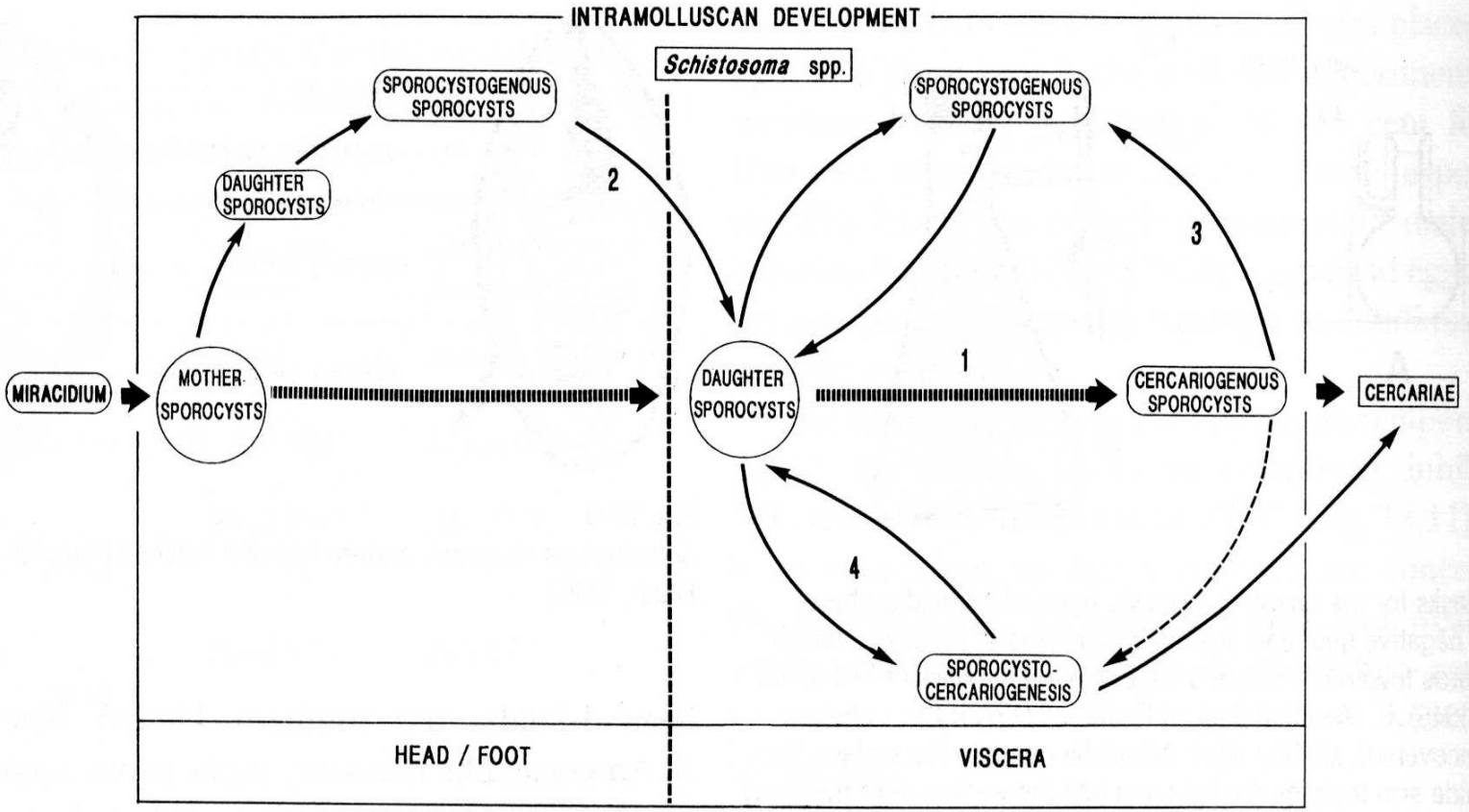


Fig. 16.7
A proposed new interpretation of the intracellular larval development of schistosomes for which several pathways are possible:
1. *Cercariogenous* sporocysts producing only cercariae;
2. *Sporocystogenous* sporocysts producing a new generation of daughter sporocysts by direct *sporocystogenesis*, or by
3. *Sporocystogenesis* taking place after *cercariogenesis*; or by
4. Simultaneous *sporocysto-cercariogenesis*. (Adapted from Jourdane & Therón, 1987; reprinted with permission from *Biology of Schistosomes* (ed. R. Rollinson & J. C. Simpson), p. 87. Academic Press, London, 1987.)

Schistosoma - ekologie

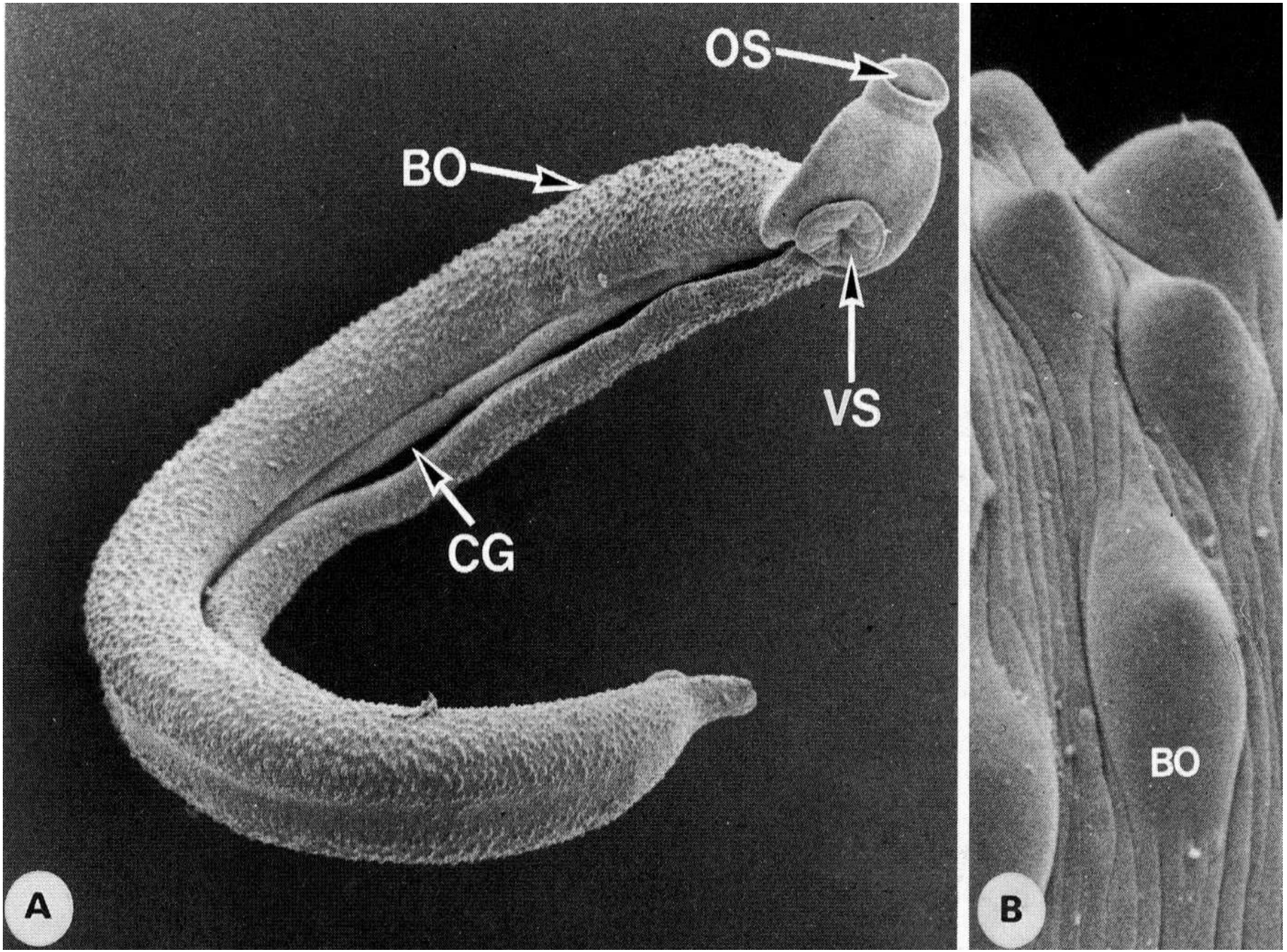
Schistosoma - ekologie

Fig. 2.63 Ecology of *Schistosoma japonicum*.
This zoonotic infection can be detected in cattle and domestic animals. Human infection occurs during exposure to contaminated water, for example when planting rice in paddy fields. (Courtesy, Dr. K. Woods.)

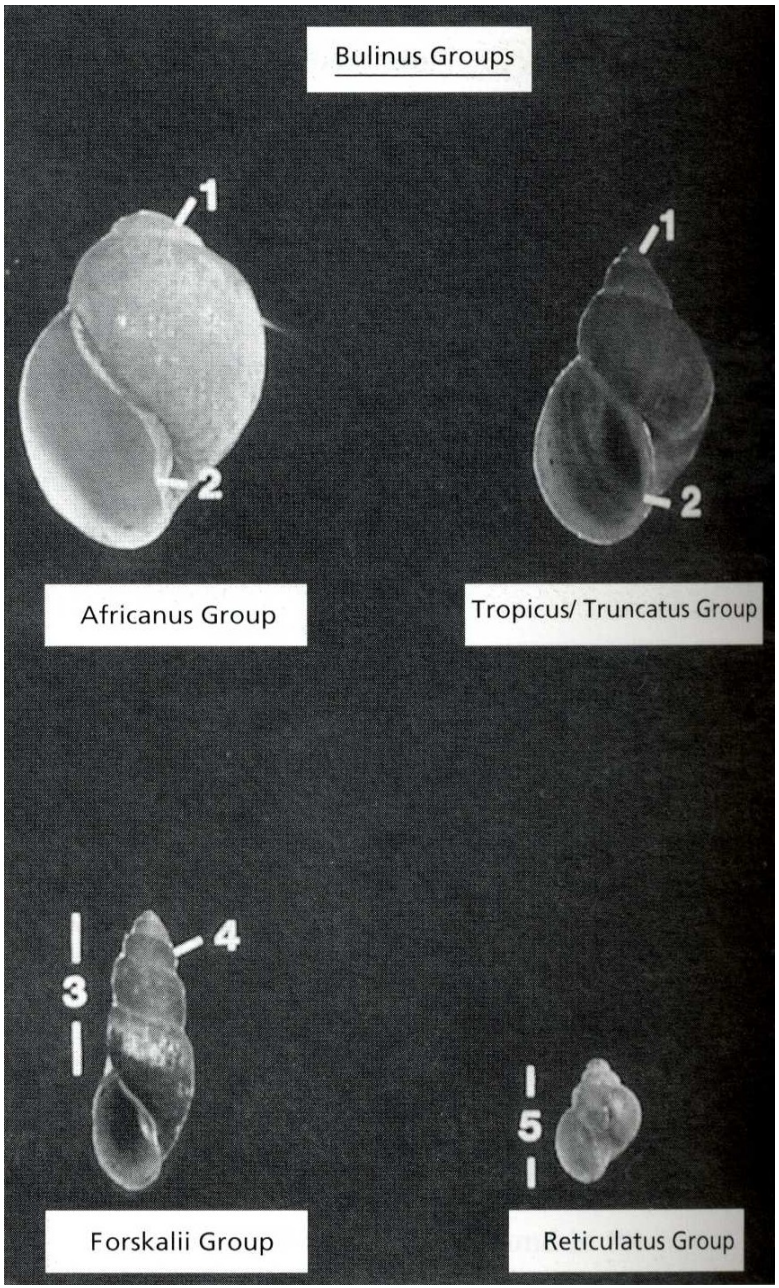
Fig. 2.64 Ecology of *Schistosoma mekongi*.
Removal of the intermediate snail host, *Neotricula aperta*, of this most recently identified human schistosome is challenging, so mass drug administration of affected populations has been the mainstay of human disease control. The tiny snails are found on the submerged underside of rocks just like those upon which these children are sitting (see also Fig. 2.50). (Courtesy, Dr A Stich.)

Schistosoma haematobium

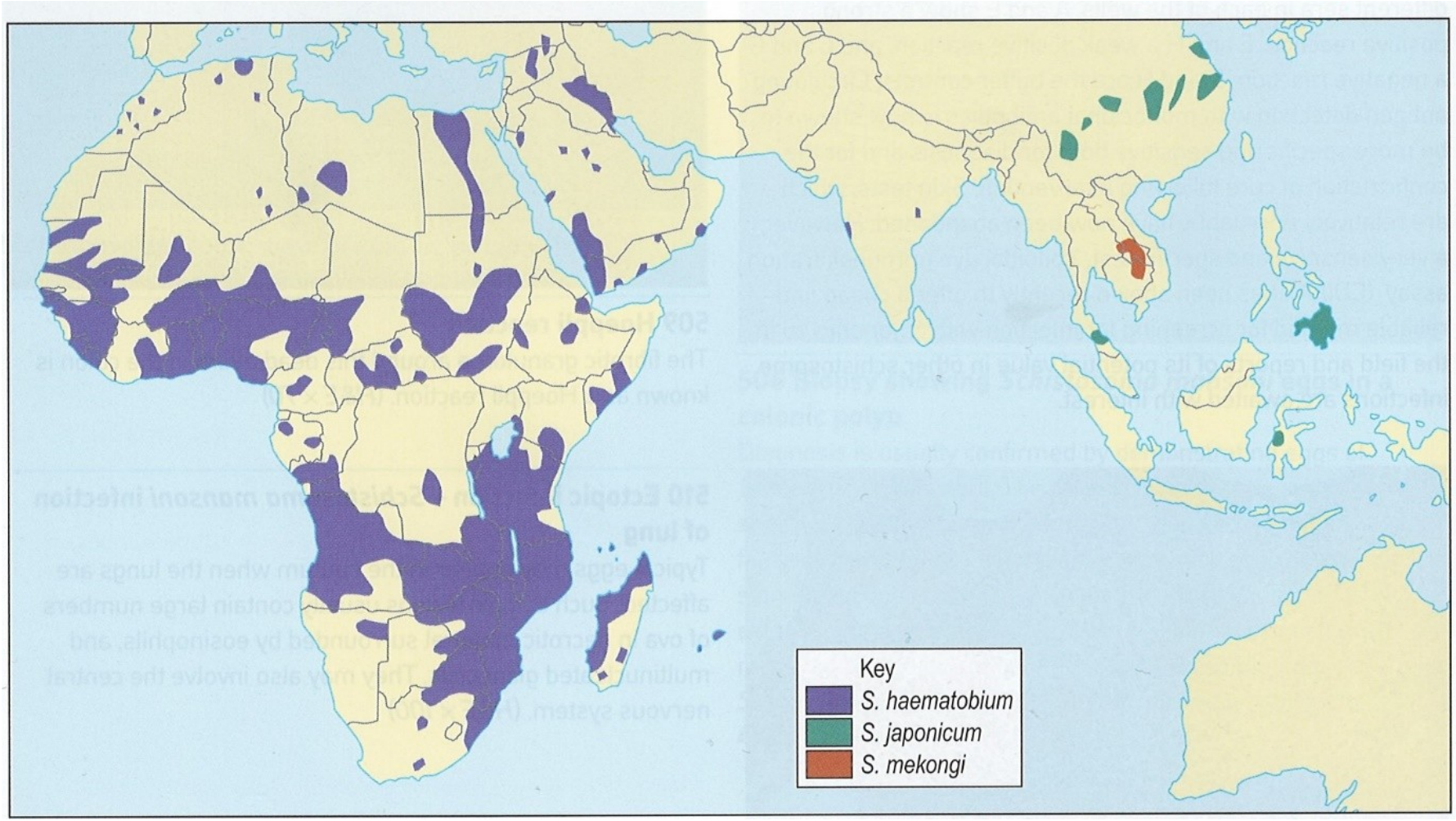
- Urogenitální schistosomóza
- Afrika, střední východ
- Kapiláry kolem močového měchýře (hematurie)
- Mezihostiteli plicnatí plži rodu Bulinus, Physopsis, Ferrisia
- Vajíčka uvolňována především močí
- Plicní forma po embolizaci vajíček
- Rezervoárem hlavně lidé


OS
BO
VS
CG
A
BO
B

Schistosoma haematobium



Schistosoma haematobium, S. japonicum a S mekongi

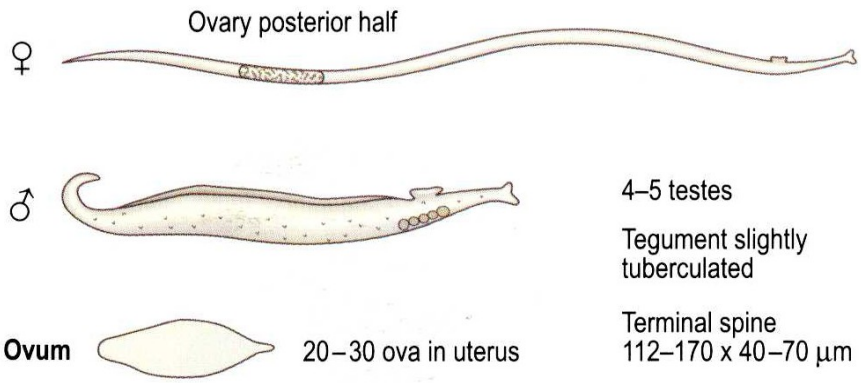


Schistosoma heamatobium

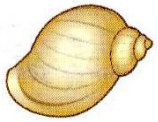
Schistosoma species (blood flukes) (Continued)

Morphology

S. haematobium

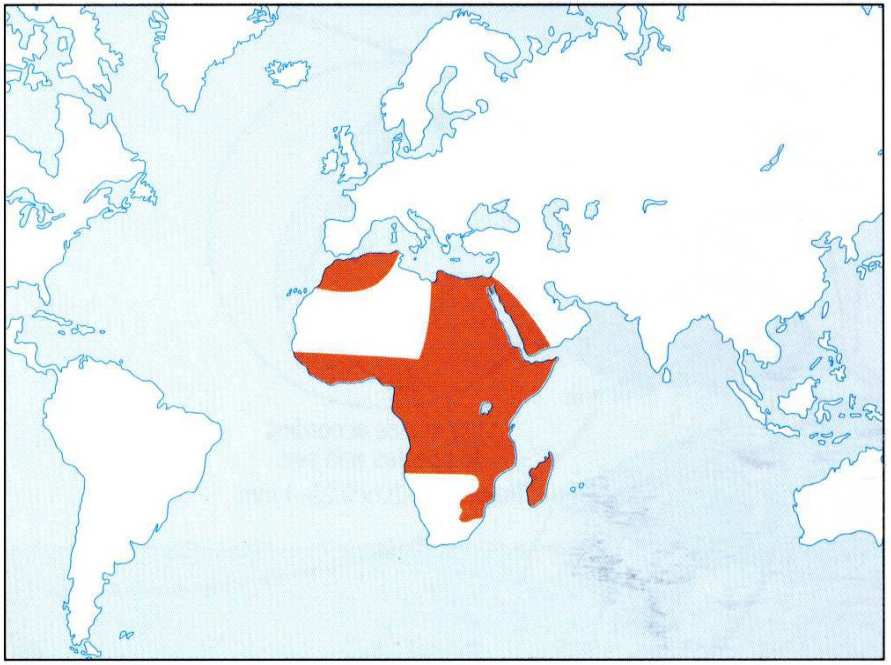


Host: *Bulinus*



Distribution

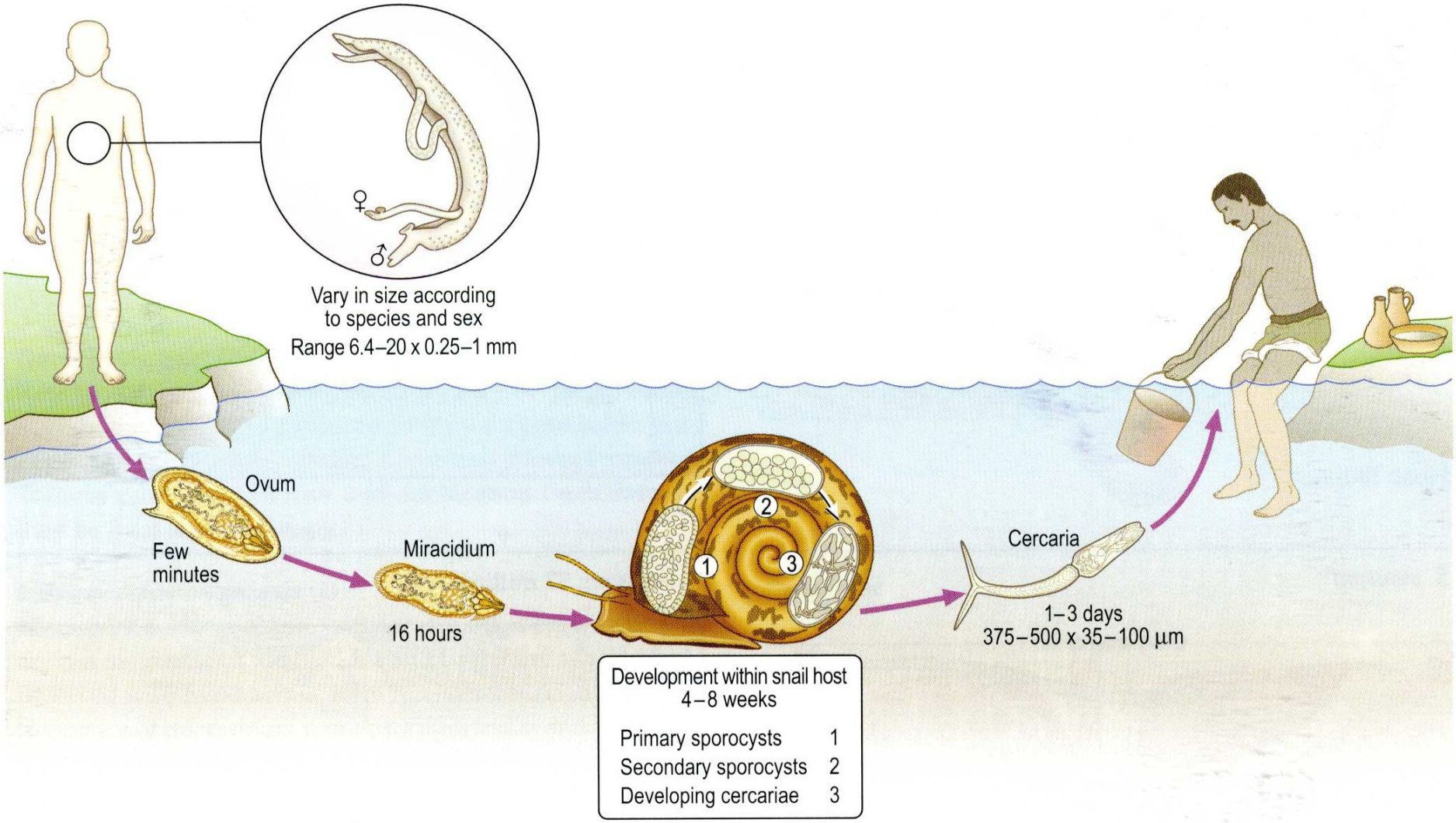
S. haematobium: 78 million



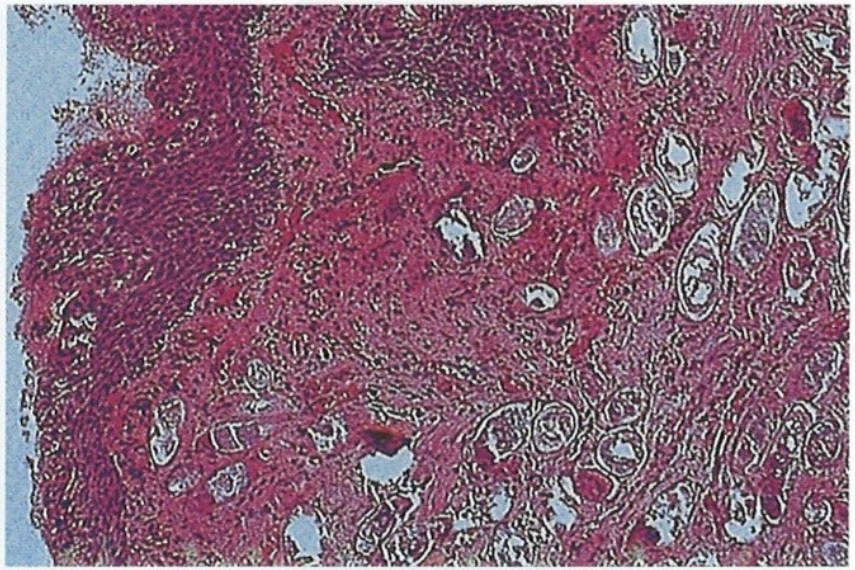
Trematode (flat) worms

Schistosoma species (blood flukes)

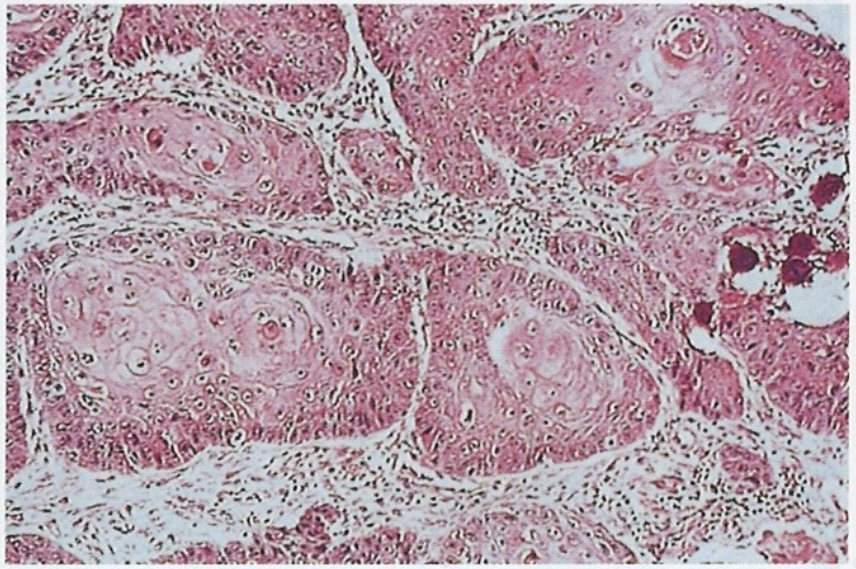
Life cycle for all species



Schistosoma haematobium – vajíčka ve stěně měchýře a karcinom stěny měchýře

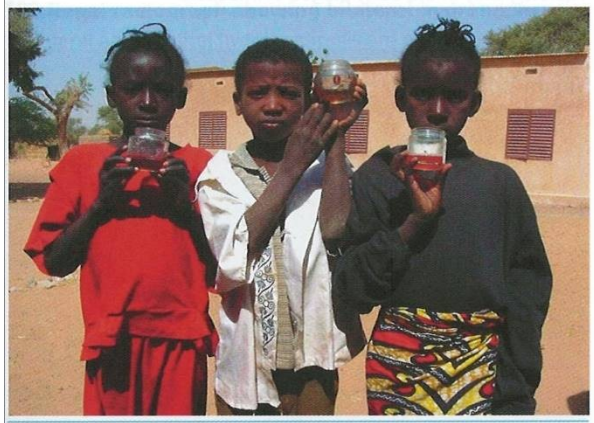


526 Eggs in section of bladder
Schistosome ova laid by female worms in the vesical plexus are retained in the vesical tissues and later become calcified. (*H&E* × *50*)

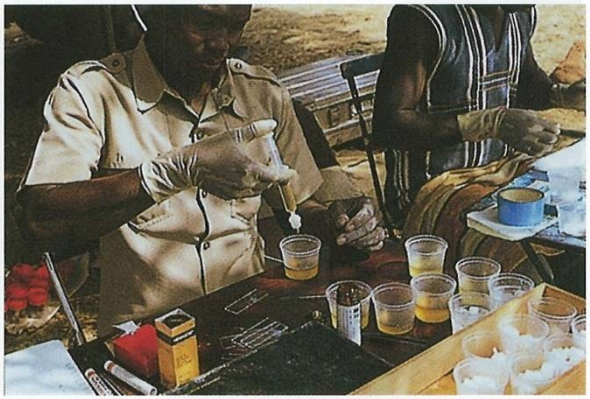


527 Squamous-cell carcinoma of the bladder
In areas where *S. haematobium* infection is intense, the incidence of bladder cancer is high. Squamous-cell carcinoma is the type most commonly found, and ova of *S. haematobium* are often present in such tumours. Adenocarcinoma also occurs. (*H&E* × *90*)

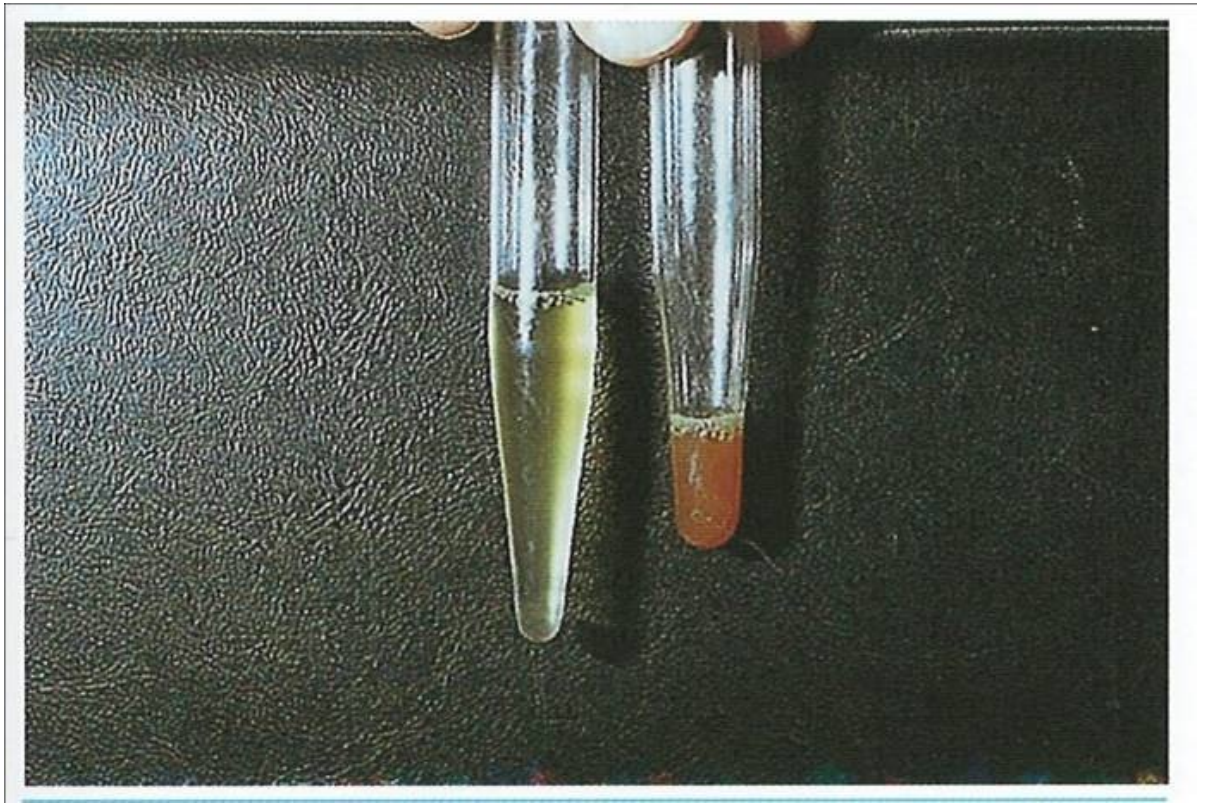
Schistosoma - haematurie



515 Children in a village in Niger with urine samples
Haematuria is often best seen at the end of urination and is a characteristic early clinical feature of infection with *S. haematobium*. (Photo by Dr Jurg Utzinger, Swiss Tropical Institute, courtesy of Professor Alan Fenwick.)



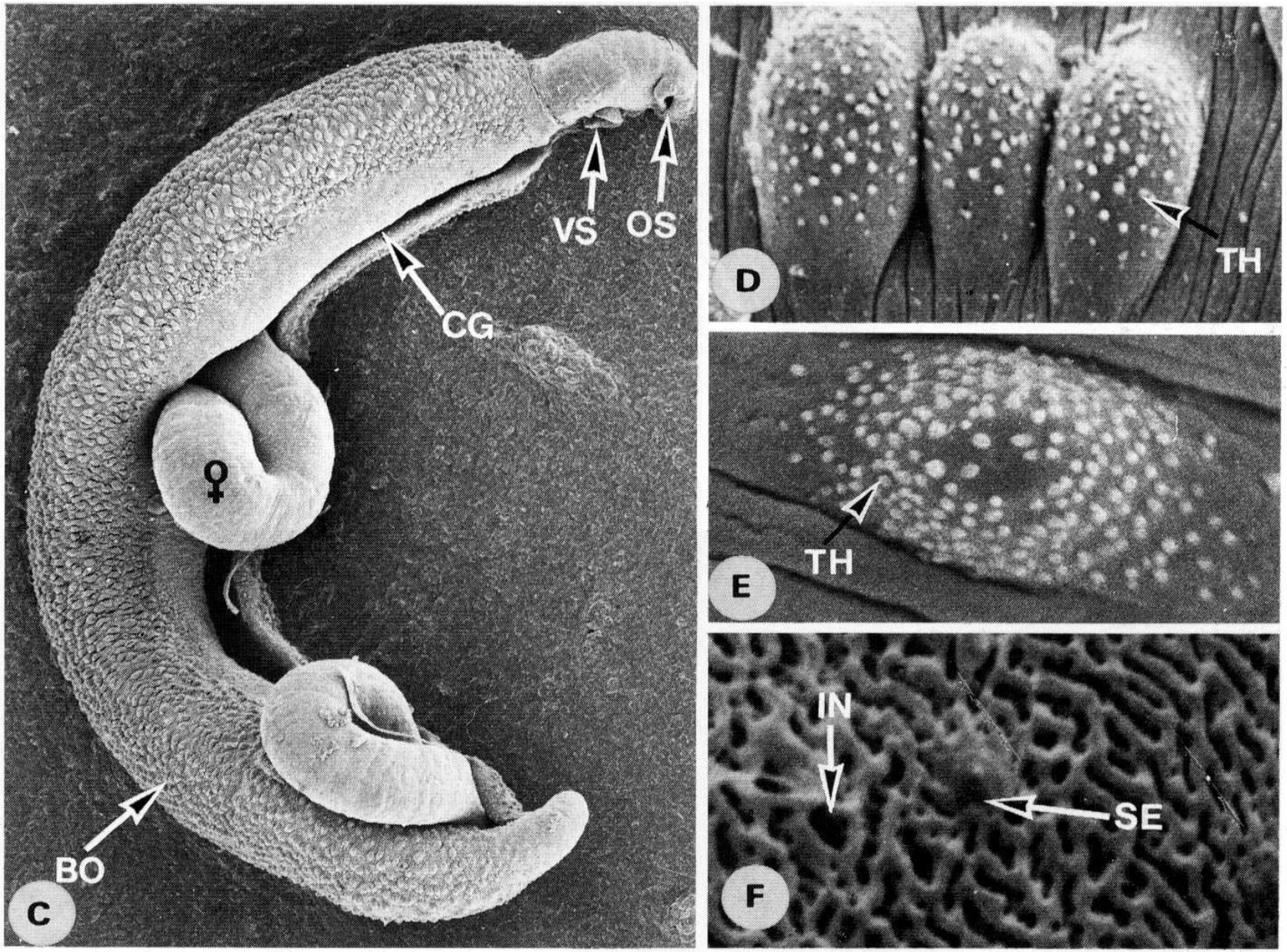
517 Village survey for urinary schistosomiasis
A simple and effective technique to detect eggs in urine is to pass samples through a nylon-mesh filter attached to a 10 ml syringe. The filter is removed and examined under the microscope using a × 10 objective, and the eggs collected on it are counted. A simple dipstick test for protein and blood is a useful supplementary method of assessing the prevalence of those passing eggs, and may even replace microscopy. This procedure, which saves labour, time and money, facilitates the delivery of treatment programmes in communities for which such intervention might otherwise be delayed (or not provided at all) and is valuable for assessing the effectiveness of such programmes.



Mezihostitelé Schistosoma haematobium - ekologie

Schistosoma mansoni

- Střevní schistosomósa
- Afrika, Střední Východ, Latinská Amerika,(Brazílie, Venezuela), karibská oblast
- Mezenterické cévy kolem střeva, především tlustého
- Hepatosplenomegalie
- Mezihostitelé vodní plicnatí plži Biomphalaria, Australorbis, Tropicorbis
- Vajíčka uvolňována stolicí
- Plicní forma po embolizaci
- Rezervoárem lidé, opice, hlodavci


VS
OS
CG
♀
BO
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E
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SE
F

Schistosoma mansoni

Fig. 2.45 Male and female *Schistosoma mansoni* adult worms. The slender female lies enveloped within the gynaecophoral groove of the larger male. (Courtesy, D. Establet. Beltran S., Boissier, J. Schistosome monogamy: who, how and why? In Trends in Parasitology.

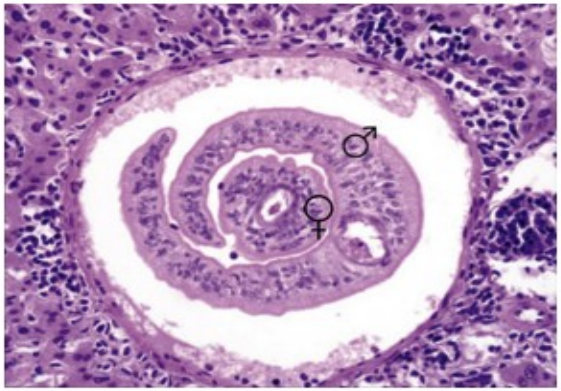
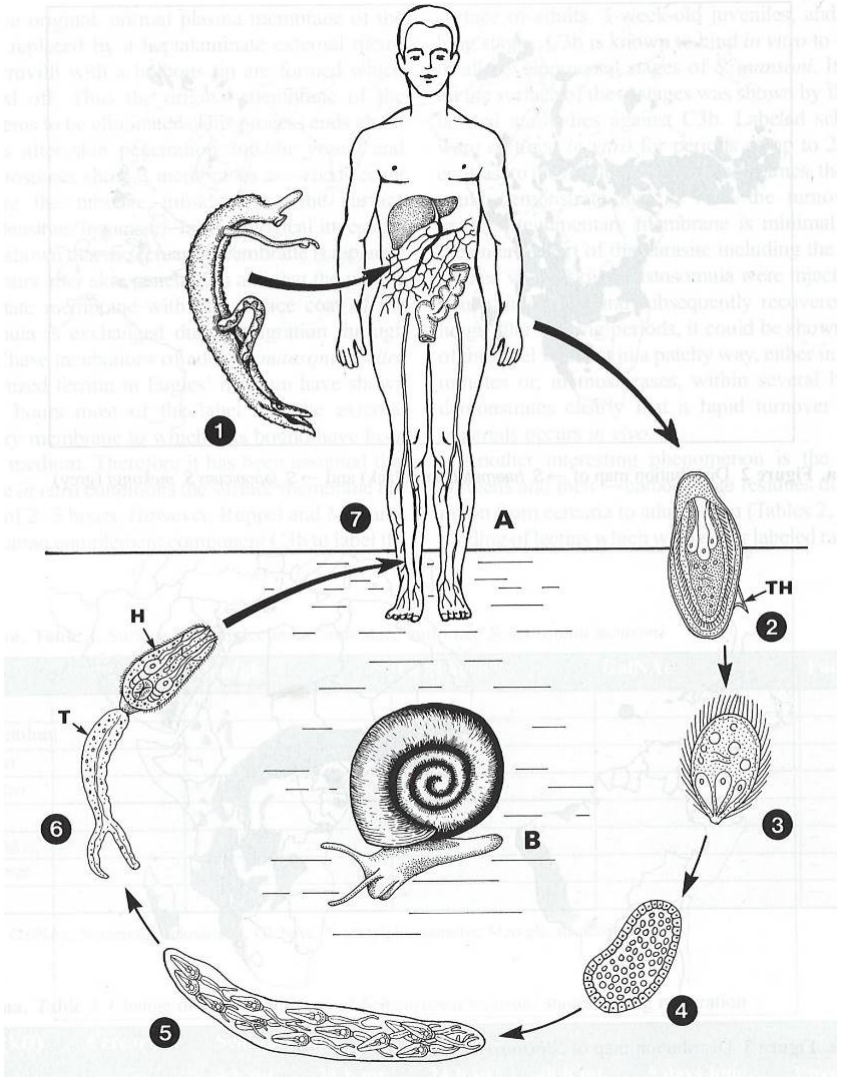
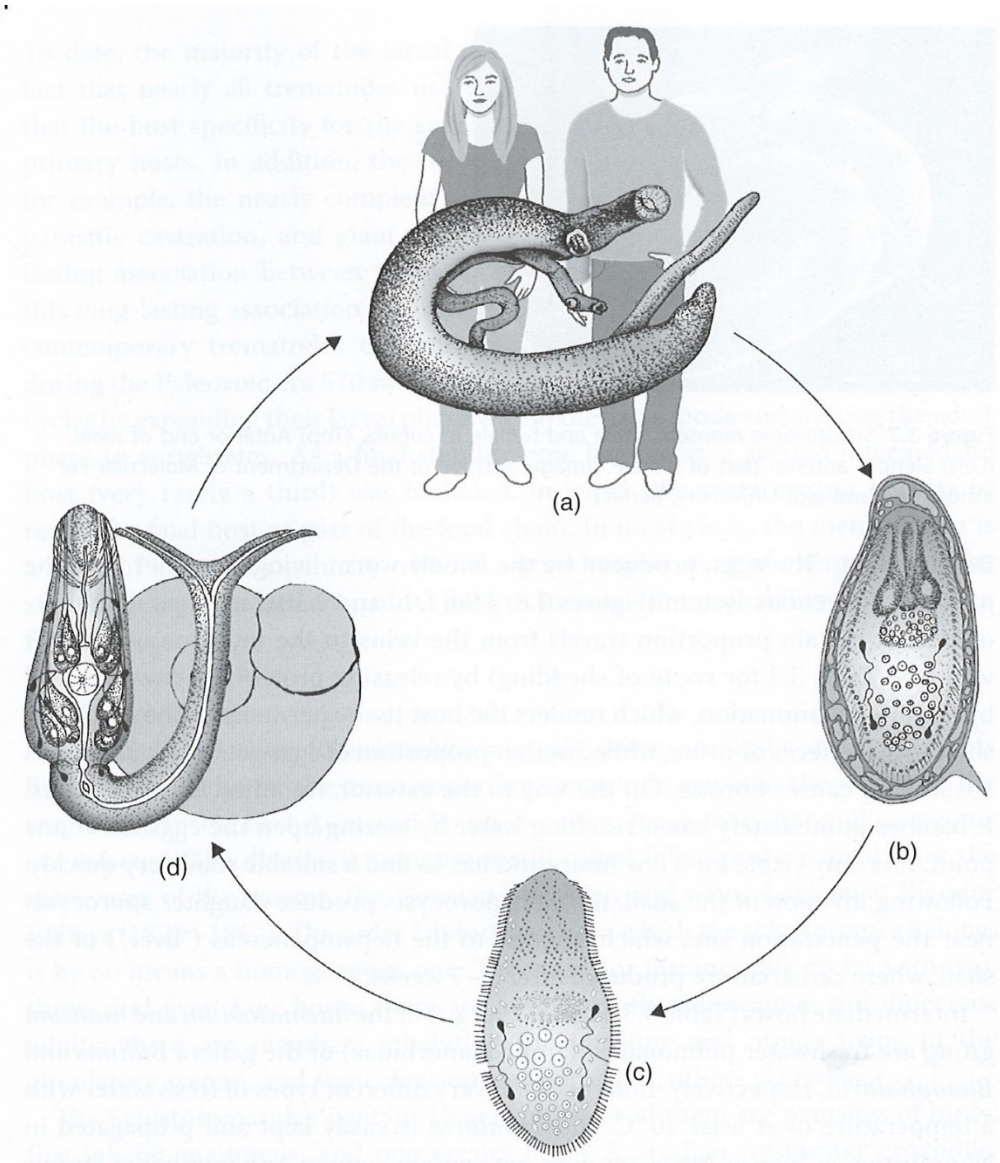


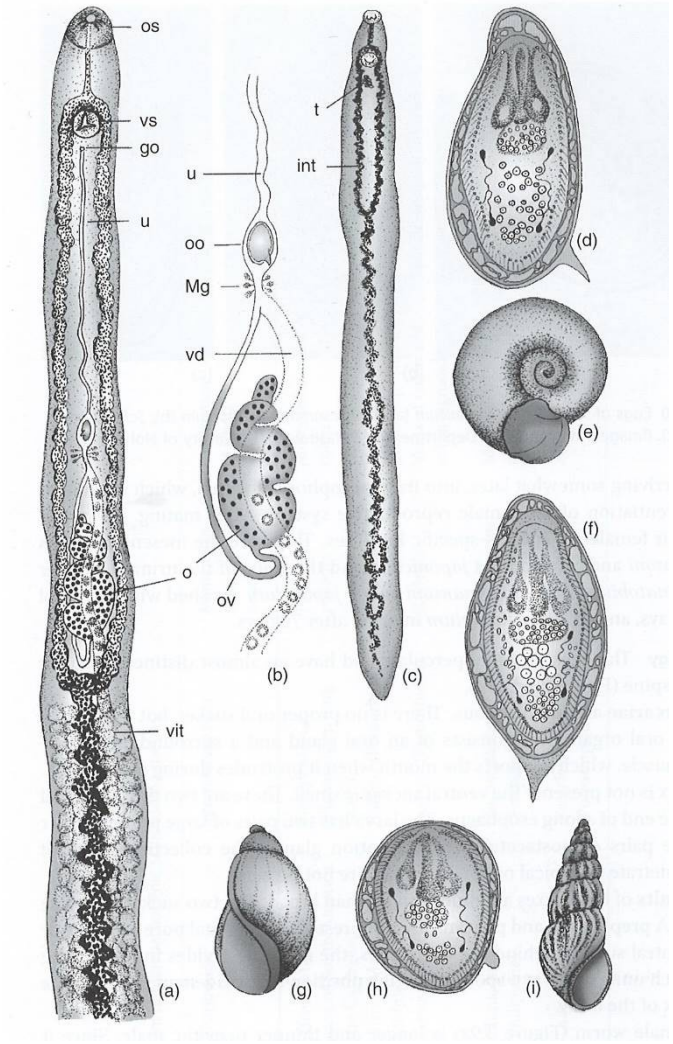
Fig. 2.46 Adult *Schistosoma mansoni* worm pair in portal tract. Cross-sectional view of adult worm pair in a state of permanent copulation in a branch of the portal vein. (Courtesy B.A.Mathison, from Zaki S.R., Alves V.A.F., Hale G.L. Non-hepatotropic viral, bacterial and parasitic infections of the liver. In: MacSween's Pathology of the Liver. Ch 7, 416-490. Figure 7.73B. e7. 2018. Elsevier.)



Schistosoma mansoni



Schistosoma mansoni



Schistosoma mansoni

480 Hatched miracidium of *Schistosoma mansoni*
The three common species of schistosomes infecting humans have easily recognisable eggs, although those of *S. haematobium* may be confused with those of *S. intercalatum*

Fig. 2.47 Biomphalaria sp.
The snail intermediate host of *Schistosoma mansoni*. (Courtesy. C. Whitehorn)

Schistosoma mansoni

Fig. 4.1 Scanning electron micrograph of a couple of the species *Schistosoma mansoni*. The male transports the female inside the so-called canalis gynaecophorous, which is produced by upfolding of the lateral sides of the male

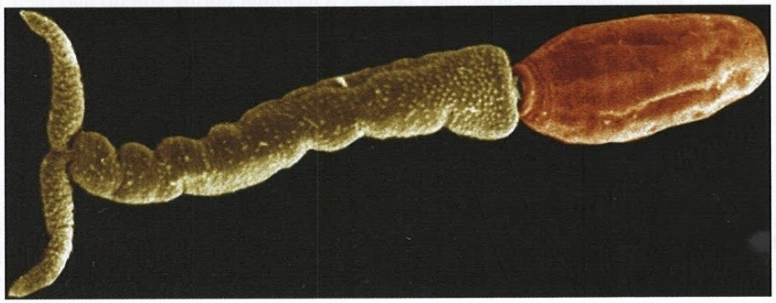
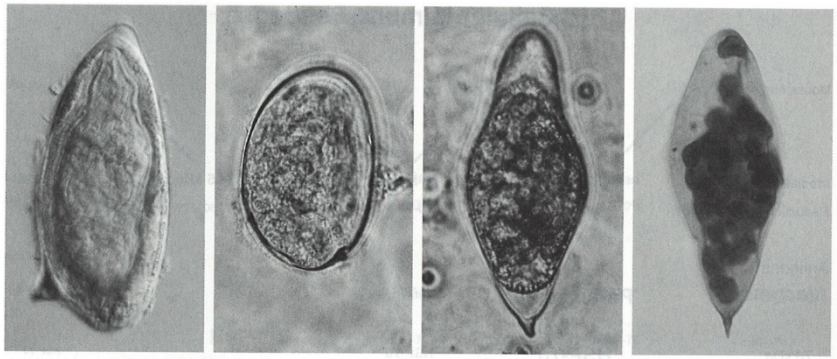
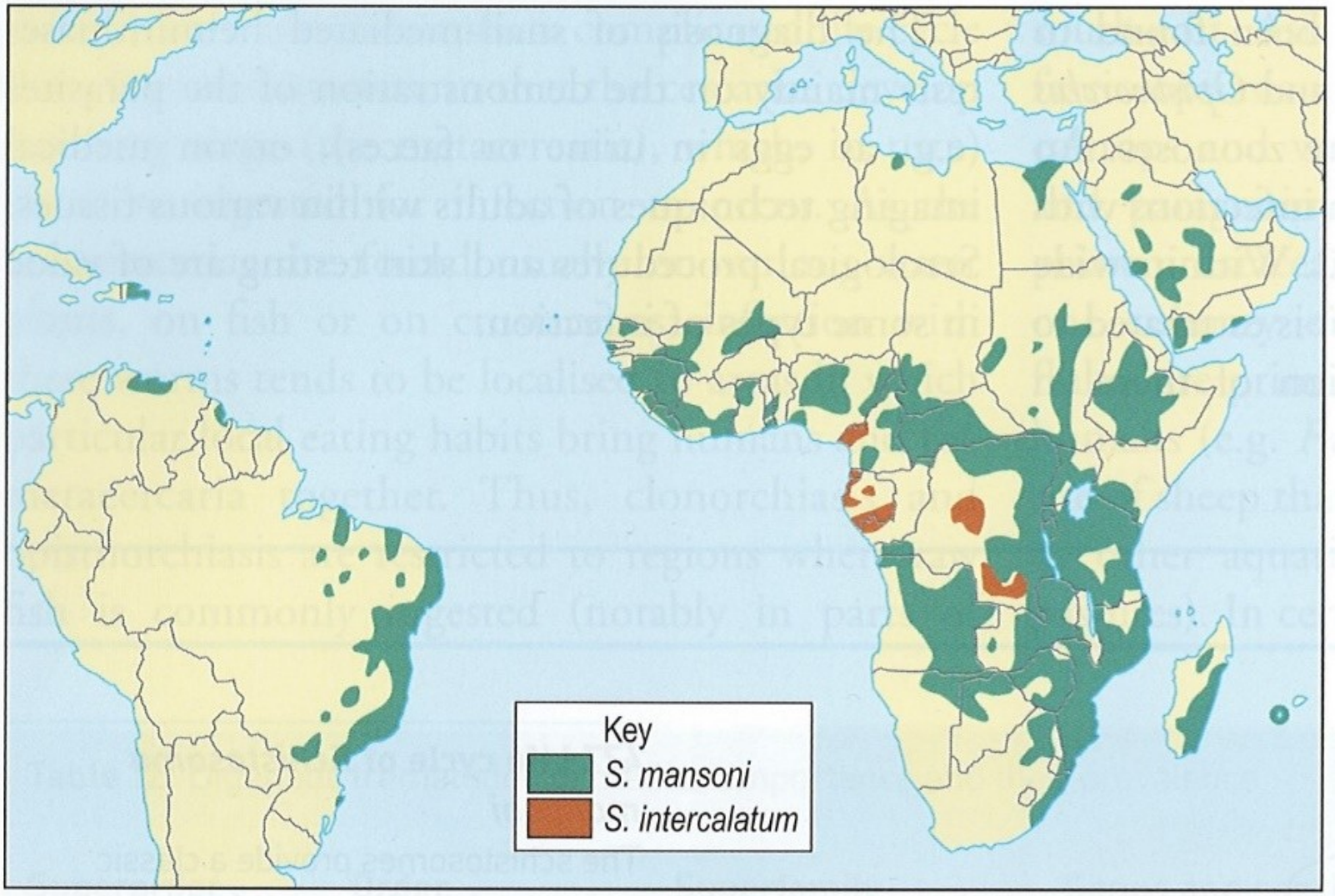


Fig. 4.2 Scanning electron micrograph of a cercaria of *S. mansoni*



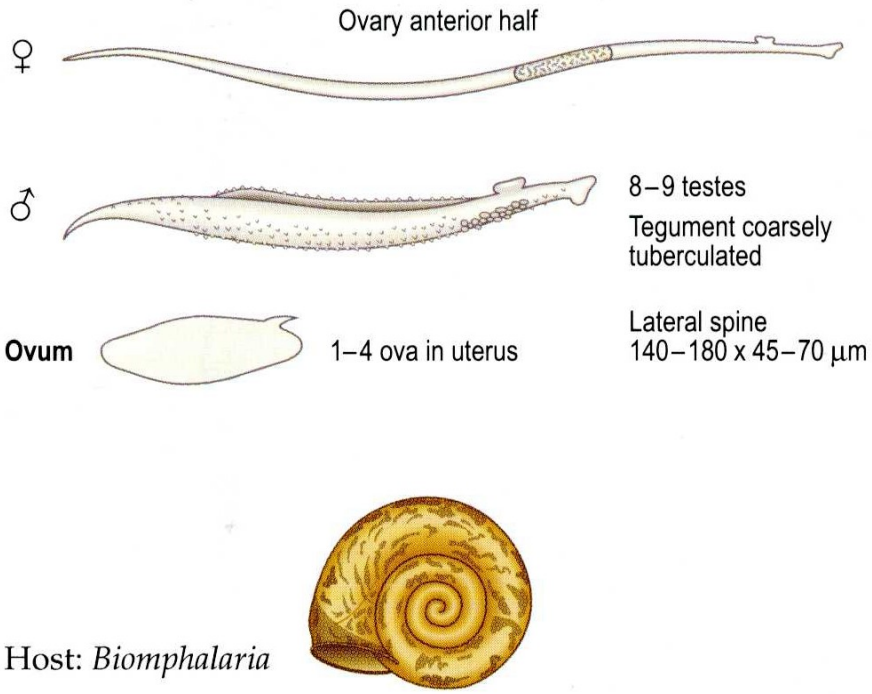
Schistosomiasis, Man. Figure 5 The eggs of the 4 important *Schistosoma* spp. (from left: *S. mansoni*, *S. japonicum*, *S. intercalatum*, *S. haematobium*).

Schistosoma mansoni a S.intercalatum

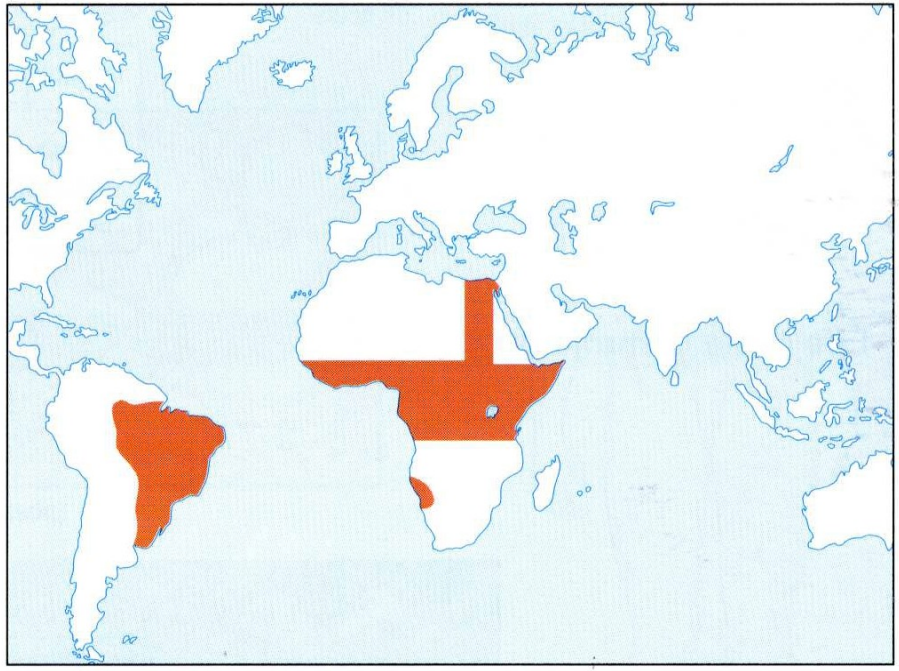


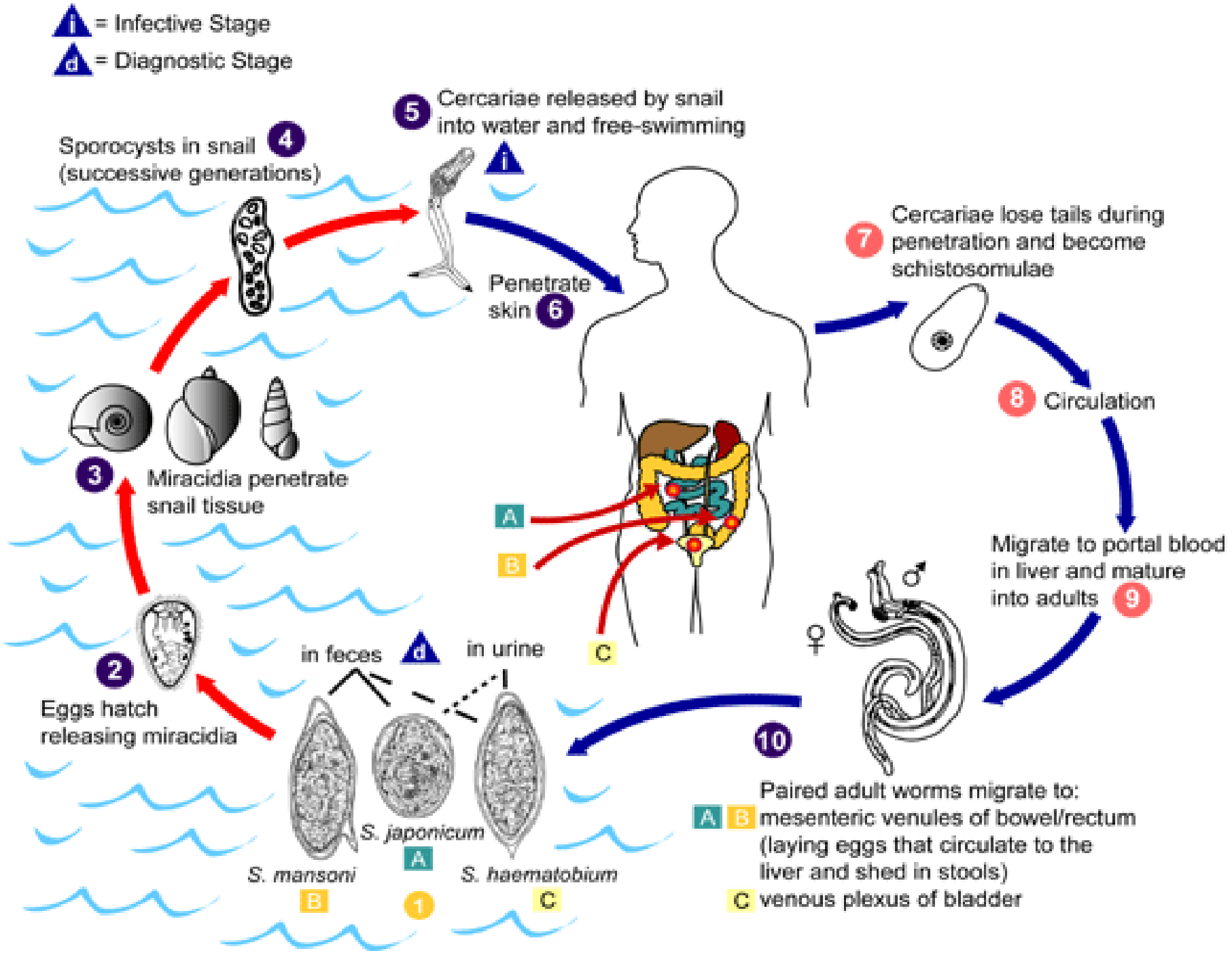
Schistosoma mansoni

S. mansoni



S. mansoni: 57 million




i = Infective Stage
d = Diagnostic Stage
1
Eggs hatch releasing miracidia
2
Miracidia penetrate snail tissue
3
Sporocysts in snail (successive generations)
4
Cercariae released by snail into water and free-swimming
5
Penetrate skin
6
Cercariae lose tails during penetration and become schistosomulae
7
Circulation
8
Migrate to portal blood in liver and mature into adults
9
Paired adult worms migrate to:
A B mesenteric venules of bowel/rectum (laying eggs that circulate to the liver and shed in stools)
C venous plexus of bladder
10
in feces
in urine
S. japonicum
A
S. mansoni
B
S. haematobium
C

Schistosoma mansoni v cévách hostitele

Figure 18.1 *Schistosoma mansoni* in a mesenteric vein of a hamster. Source: reproduced from Bae

Schistosoma mansoni

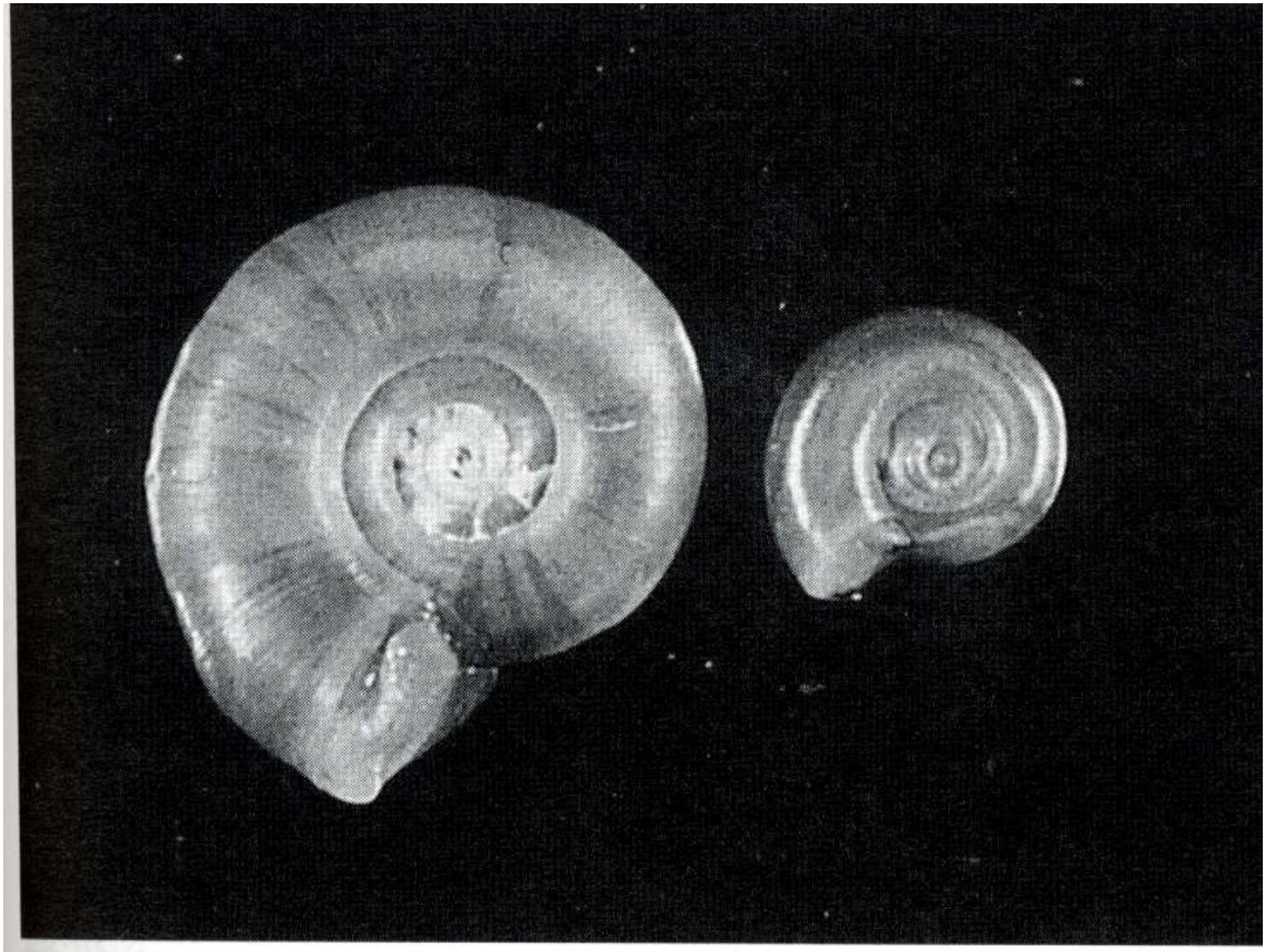


Figure 29.4 Biomphalaria glabrata, *an important intermediate*

Schistosoma mansoni

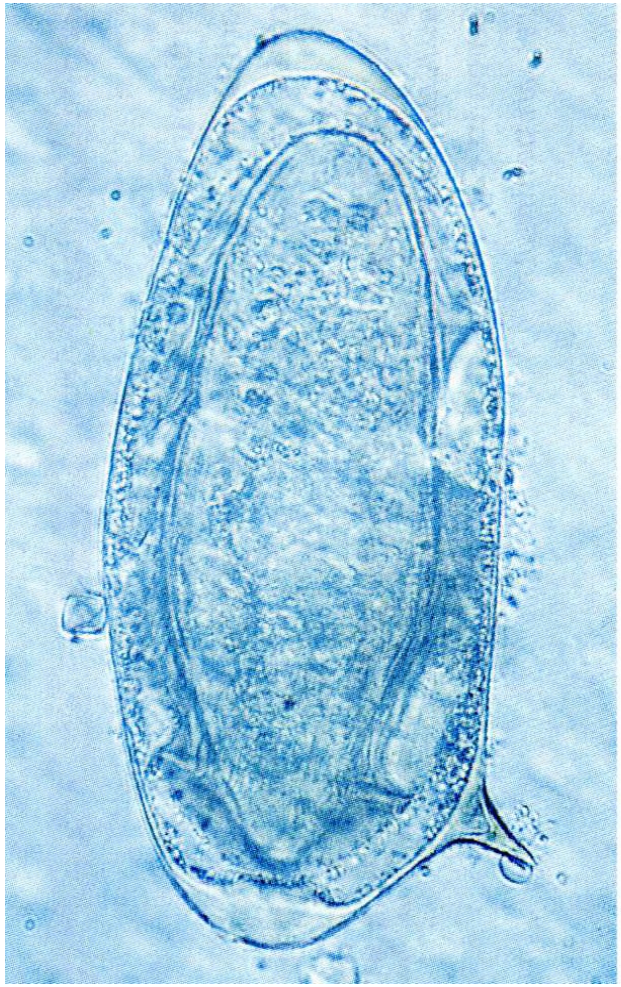
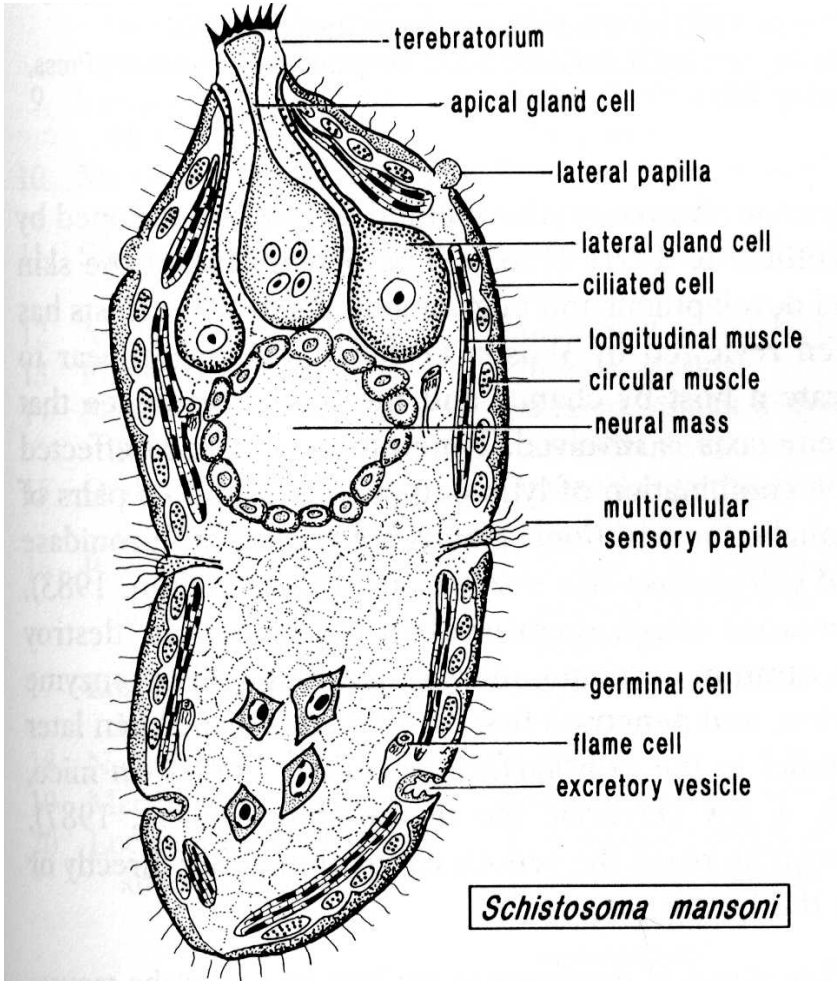


Figure 29.1 Schistosoma mansoni *ovum*.

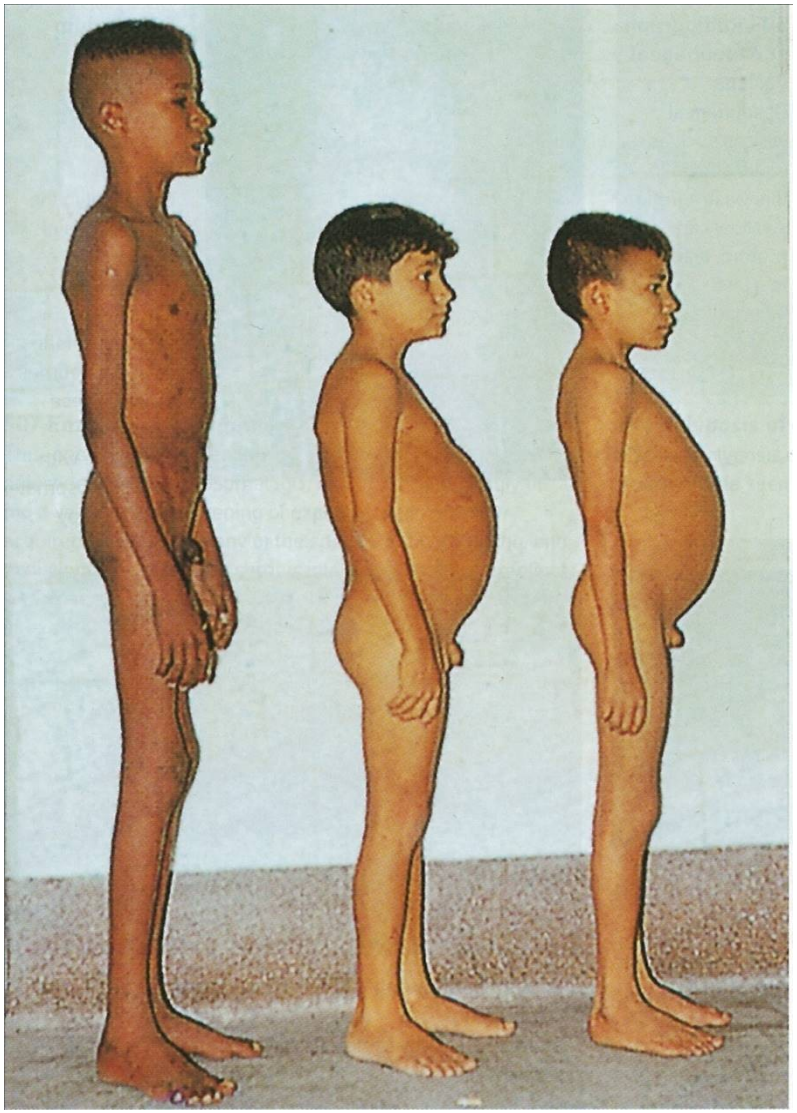


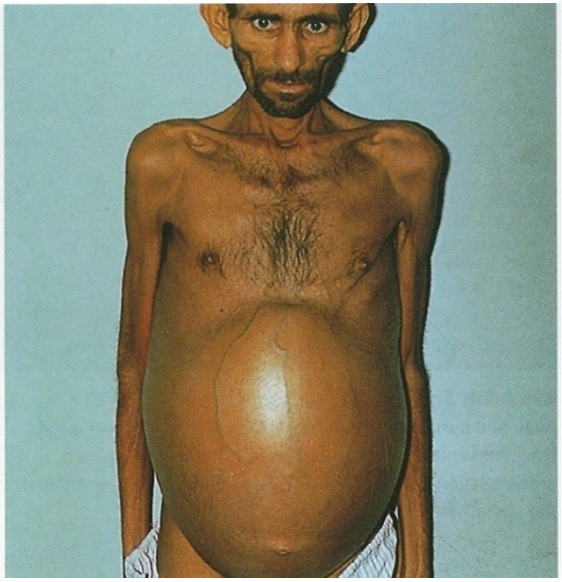
Schistosoma mansoni – přední konec cerkarie a schistosomulum

484 Head of cercaria
The apical and ventral suckers of the future schistosomule are clearly seen in this preparation. (*Mayer's haemalum* × *310*)

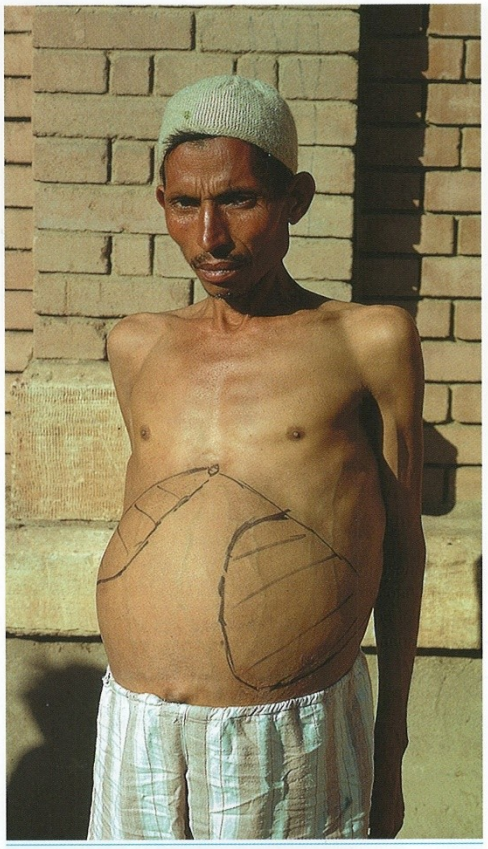
485 Schistosomule of *Schistosoma mansoni*
(*Phase-contrast* × *350*)

Schistosoma mansoni – retardovaný růst a splenomegalie





Chlapci mají 14, 13 a 12 let; dva vpravo pak chronickou infekci Schistosoma mansoni



499 Egyptian splenomegaly
The combination of enlarged, irregularly fibrosed liver and greatly enlarged spleen is commonly called 'Egyptian hepatosplenomegaly'.

Schistosoma mansoni – hepatosplenomegalie/fibróza jater

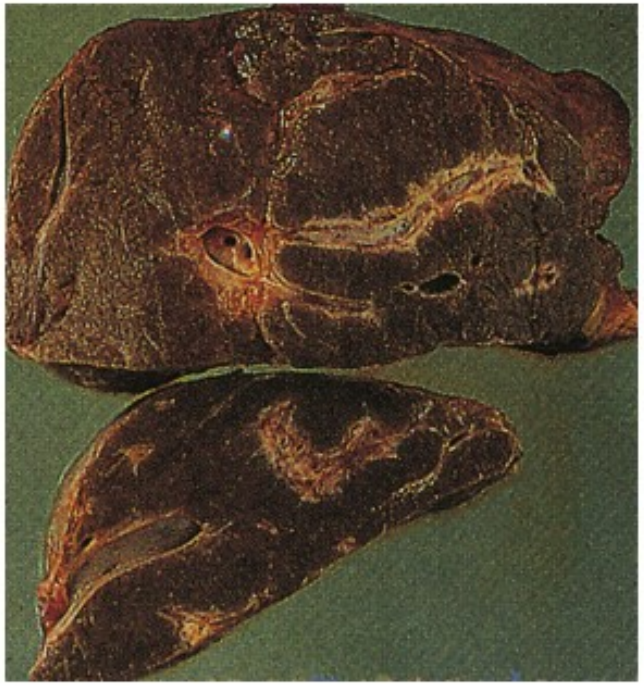


Fig. 2.55 Periportal 'pipestem' fibrosis.
This is the characteristic pathological lesion of hepatic schistosomiasis. Pipestem refers to the similarity of the appearance to old clay tobacco pipes. (Courtesy, Professor S Lucas)

Fig. 2.56 Hepatosplenomegaly due to *Schistosoma mansoni*.
An enlarged liver with splenomegaly in this young Ugandan boy would progress, if untreated, to development of ascites and collateral venous circulation reflecting portal hypertension in late-stage schistosomiasis. Gastrointestinal haemorrhage from oesophageal varices carries a slightly better prognosis than if the underlying cause is alcoholic liver disease, because the latter is further complicated by poor synthetic function and coagulopathy, which is not a feature of schistosomiasis. (Courtesy, Dr A Bustinduy.)

Schistosoma mansoni – granuloma v játrech

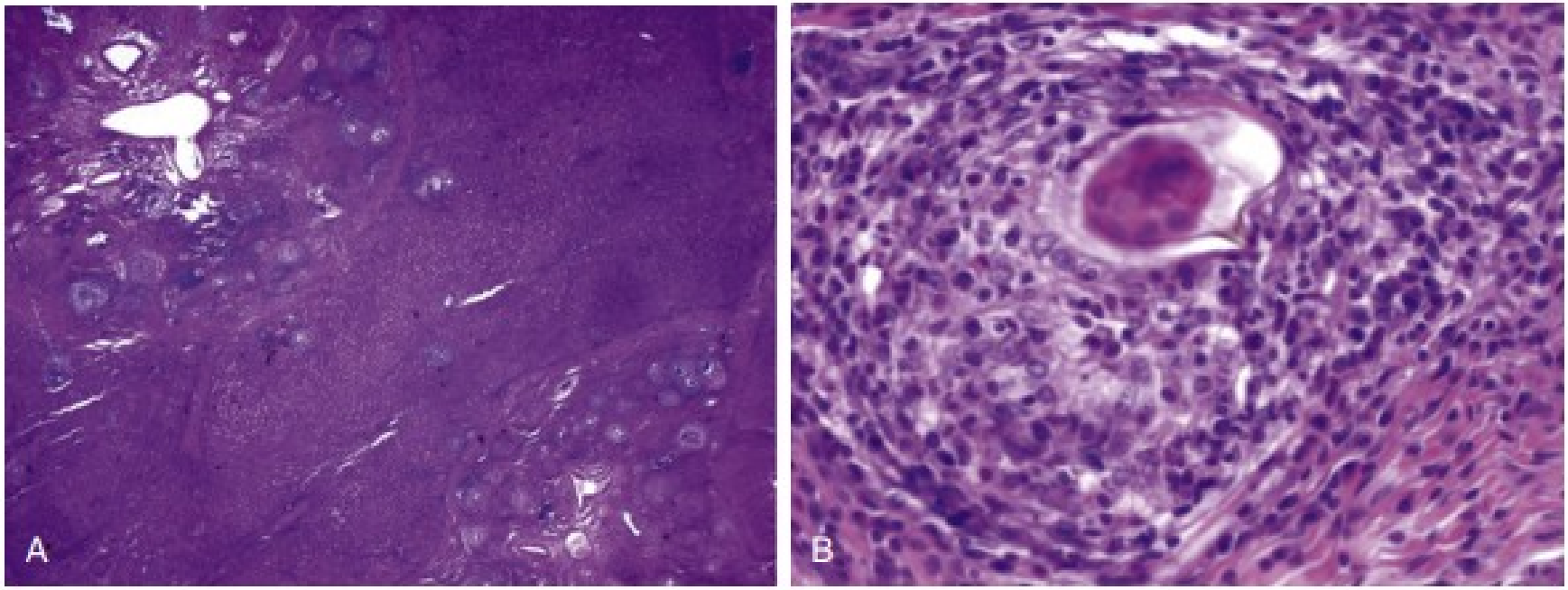
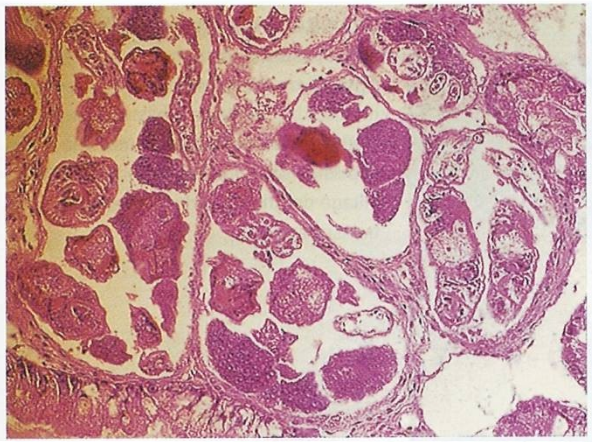
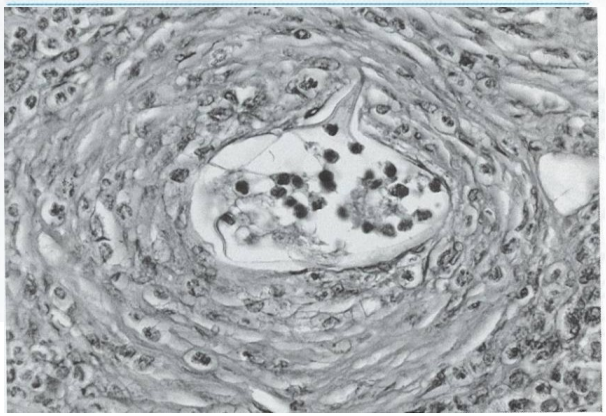


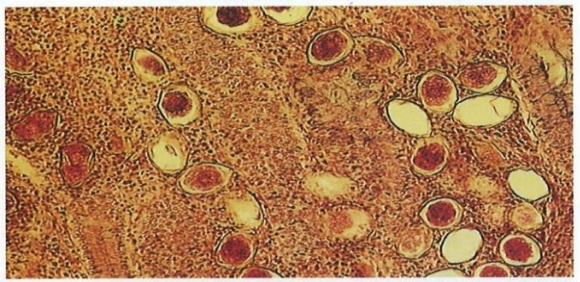
Fig. 2.54 Egg granuloma of *Schistosoma mansoni* in the liver.
Chronic granulomatous inflammation precedes the development of liver fibrosis and portal hypertension. Here the liver shows marked expansion of two portal areas with fibrosis and numerous granulomas, consistent with Symmer's pipestem fibrosis (A). There is no evidence of cirrhosis in the remaining liver. Under high-power a granuloma surrounding a schistosome ovum with the characteristic lateral spine is clearly seen (B). (From Masia, R., Misdraji, J. Liver and bile duct infections. In: Diagnostic Pathology of Infectious Disease. 2nd edition. Pages 272–322, Fig. 11.35. Copyright © 2018 by Elsevier, Inc. All rights reserved.)

Schistosoma – sporocysta, tlusté střevo, játra

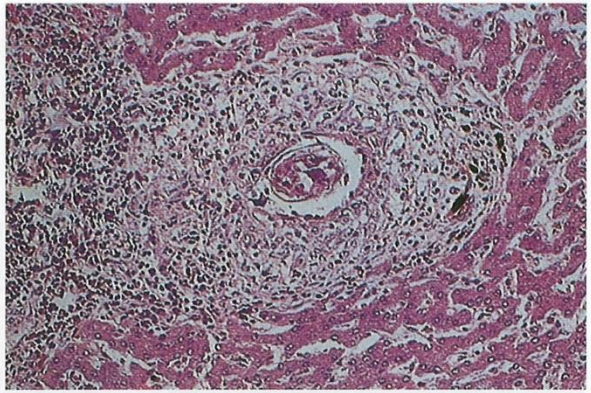


481 Section of 'mother' sporocyst in the hepatopancreas of a snail
The cycle in the snail is of variable duration, depending upon the species of parasite and host, and on the environmental conditions, but it is usually only 1 month. Cercaria develop in the second generation ('daughter') sporocysts. The figure shows several coils of the sporocyst in the hepatopancreas and sections of cercaria. (*Acetic carbol fuchsin × 130*)





533 Eggs of *Schistosoma japonicum* in wall of colon
The adult worms do not invade the vesical plexus, but usually inhabit the mesenteric plexus. The diagnosis of *S. japonicum* can usually be made by finding typical eggs in the faeces. However, it is commoner for eggs of *S. japonicum* to be deposited in ectopic sites than those of other schistosome species. (*H&E × 150*)



497 Granuloma surrounding egg of *Schistosoma mansoni* in liver
Eggs (**405**) may lodge ectopically in any tissues, where they cause characteristic granulomas. It has been suggested that toxic substances associated with the ova trigger the fibrotic process. In histological sections, the ova are seen in the portal and periportal regions. All types of reaction may be present from acute eosinophilic cellular infiltration (as seen here) to the dense collagenous deposition that leads to periportal fibrosis. (See also **509**.) (*H&E × 90*)

Granulom – S. mansoni

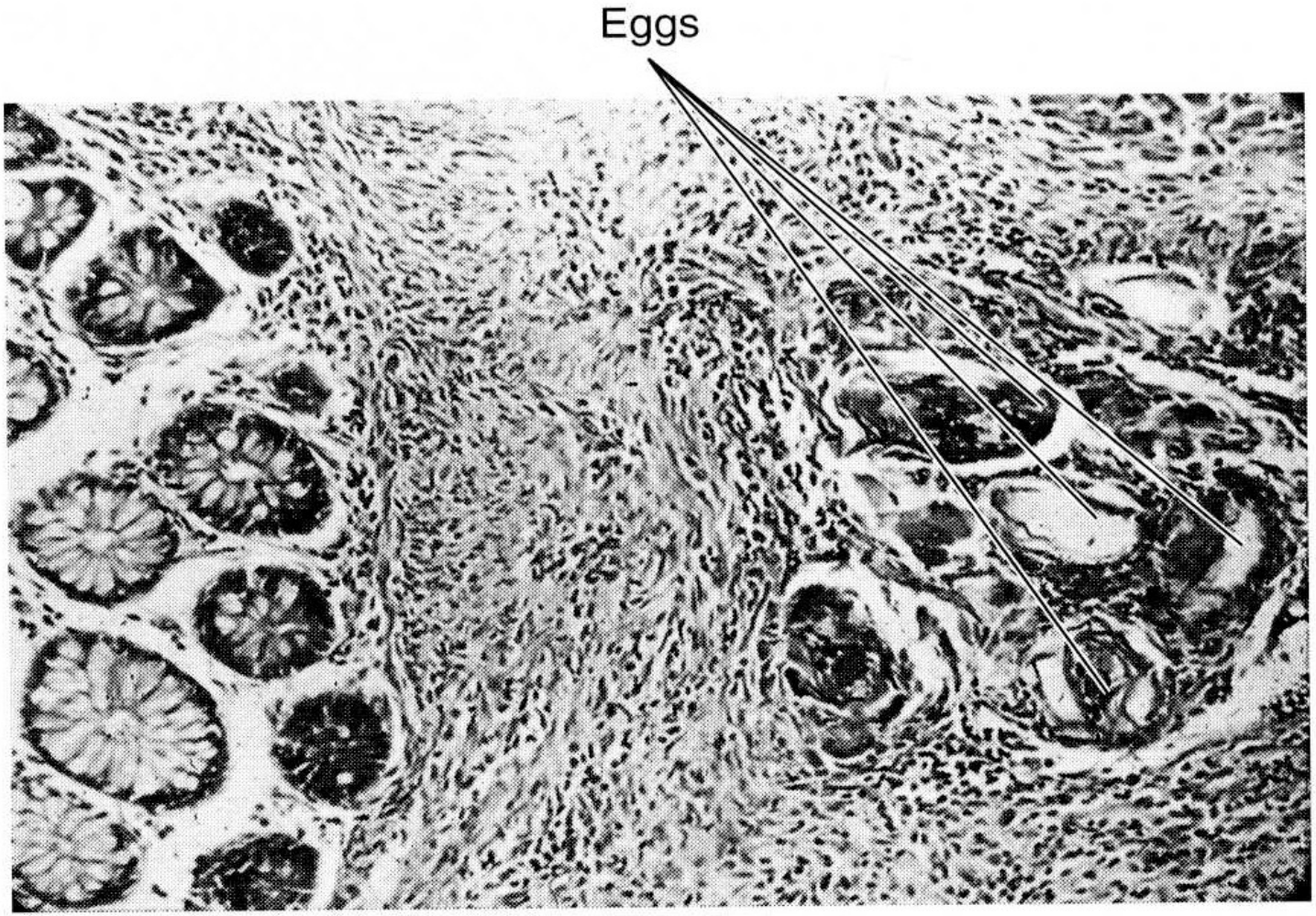


Figure 16.15 Eggs of *Schistosoma mansoni* in granuloma in intestinal wall.

Granulom S. mansoni

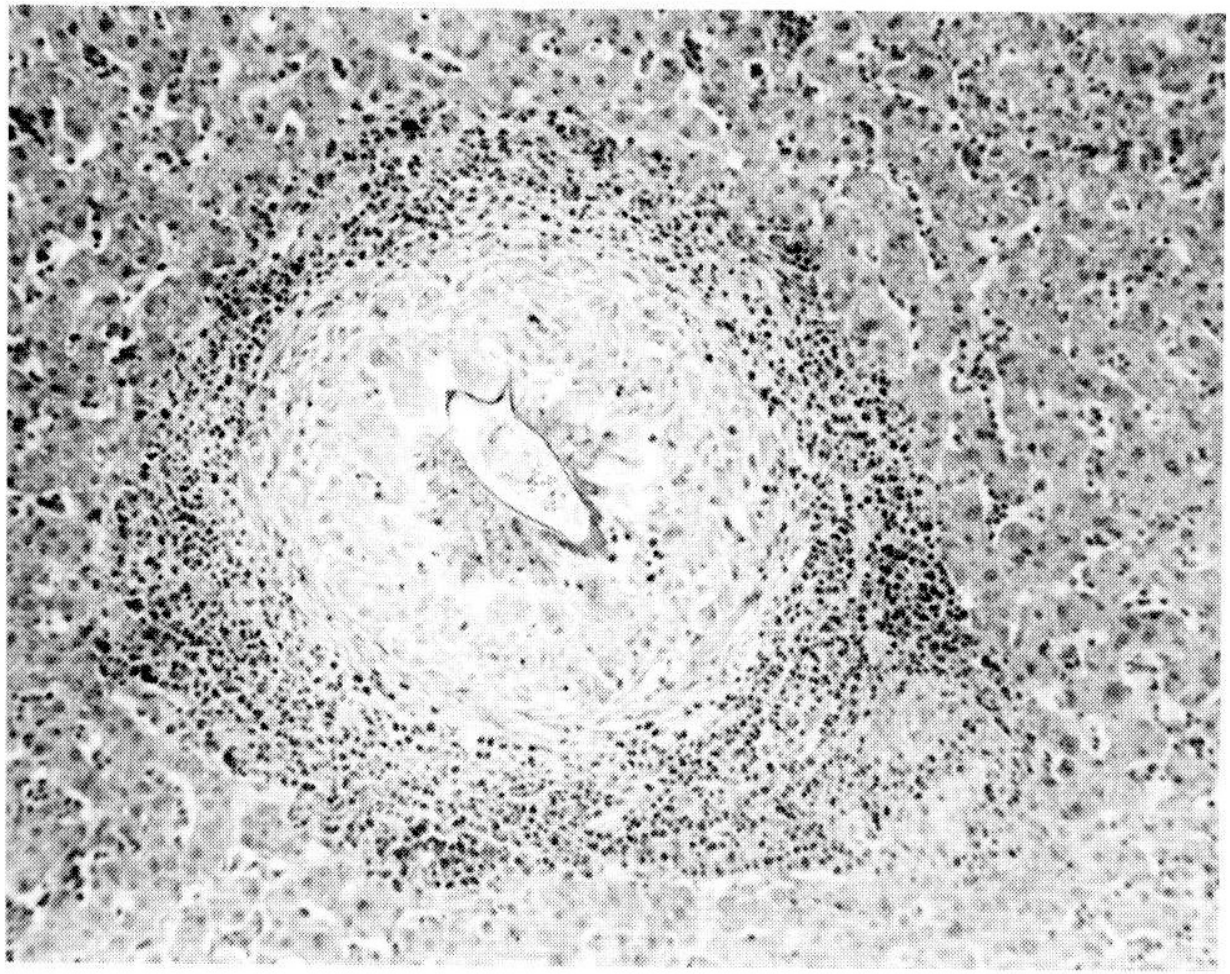
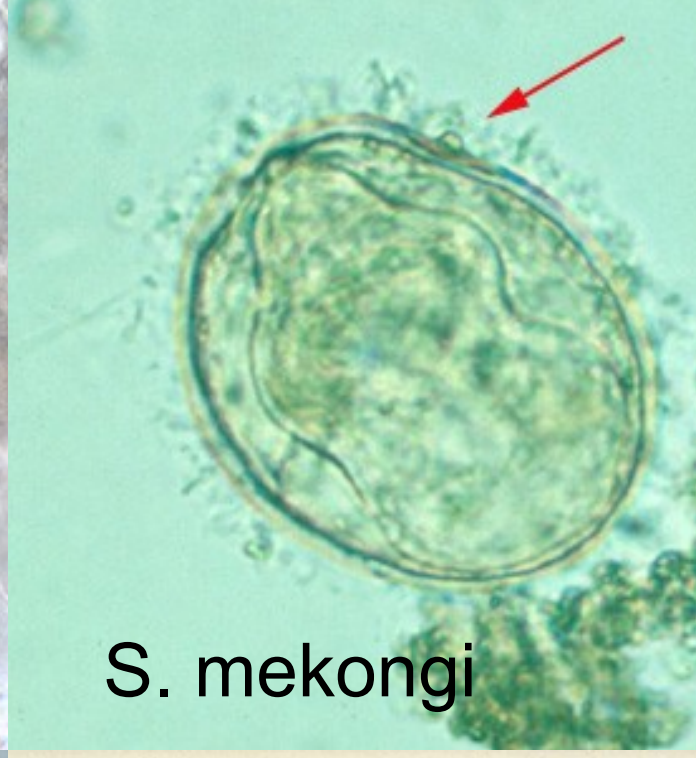


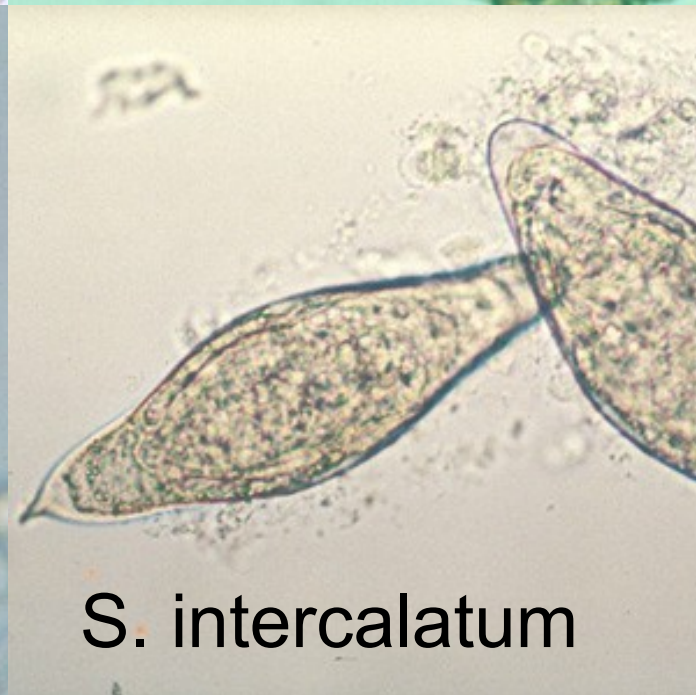
Figure 16.16 **Egg of *Schistosoma mansoni* in granuloma.**
Note leukocytic infiltration around the granuloma.


S. mansoni


S. japonicum


S. mekongi


S. haematobium

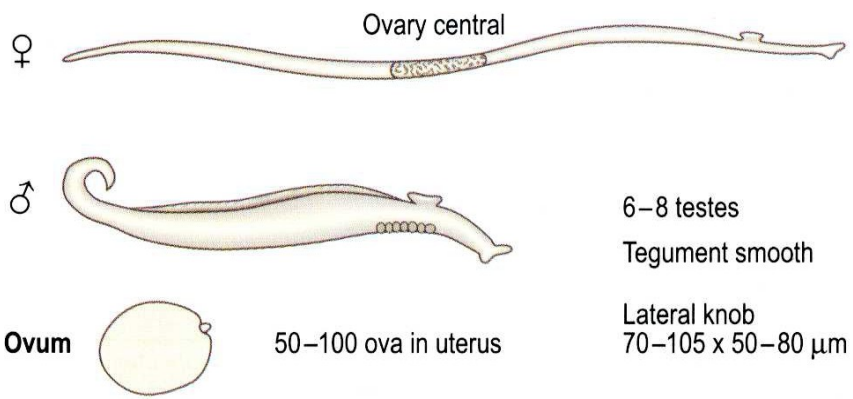

S. intercalatum

Schistosoma japonicum

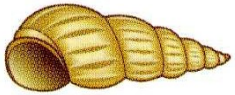
- Japonská schistosomósa
- Čína, Japonsko, Celebes
- Kapiláry mezenteria kolem střeva, především tlustého
- Hepatosplenomegalie
- Obojživejný předožádný plž Oncomelania
- Rezervoárem široké spektrum savců

Schistosoma japonicum

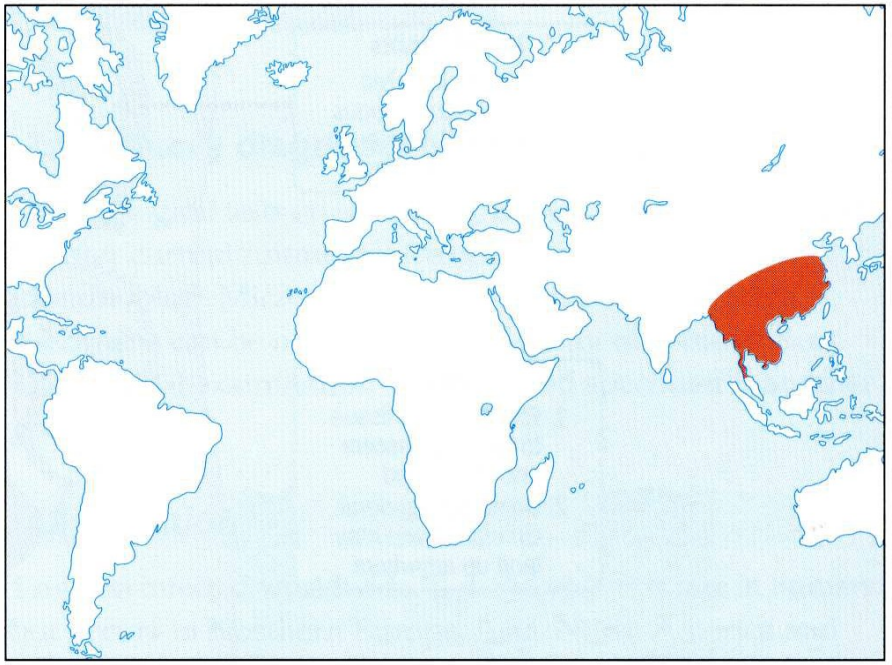
S. japonicum



Host: *Oncomelania*



S. japonicum: 69 million



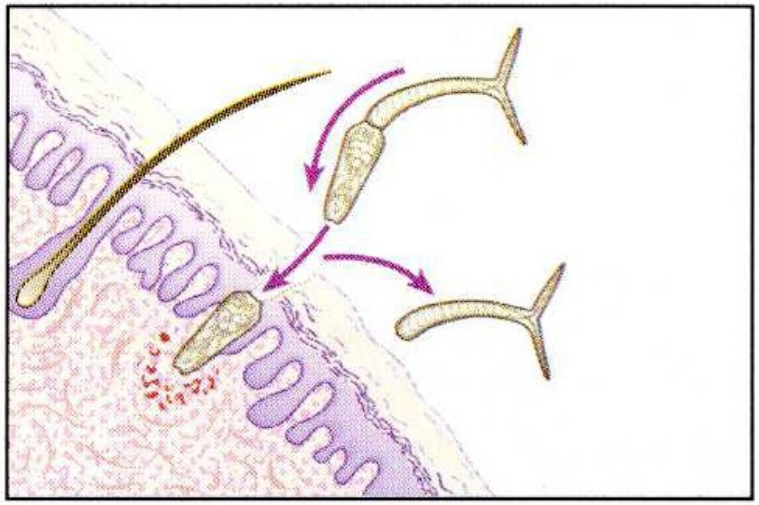
Schistosoma japonicum

Figure 30.2 *Intermediate snail hosts of* Schistosoma japonicum: *left,* Oncomelania hupensis nosophora *collected from Yamanashi,*

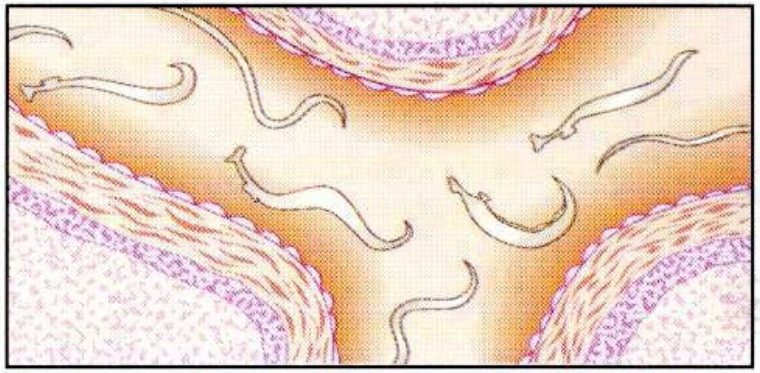
Patogenita - schistosomy

General

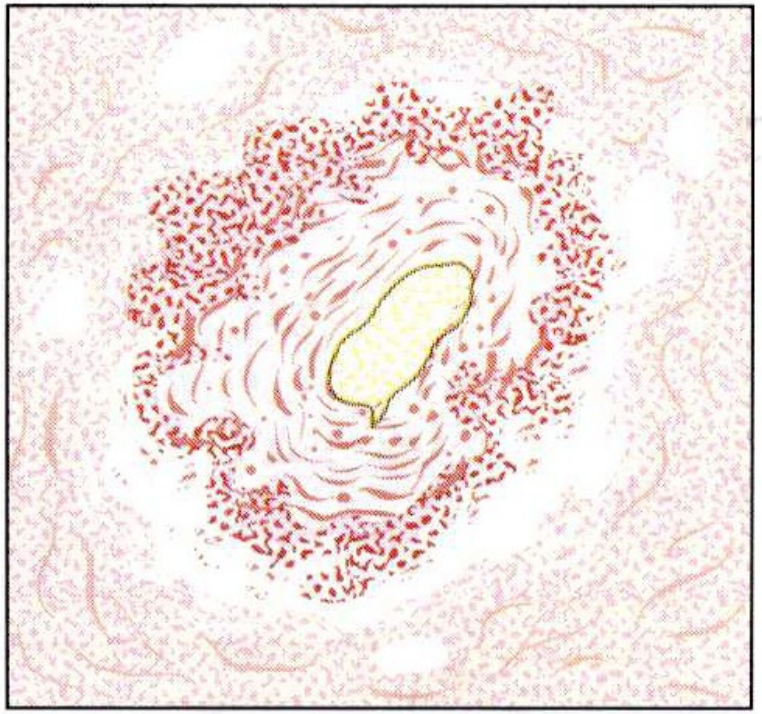
1



2



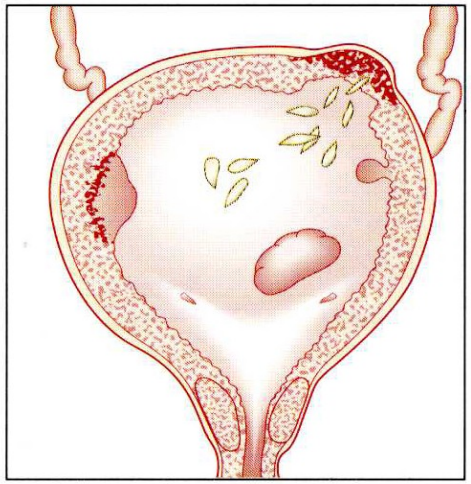
3



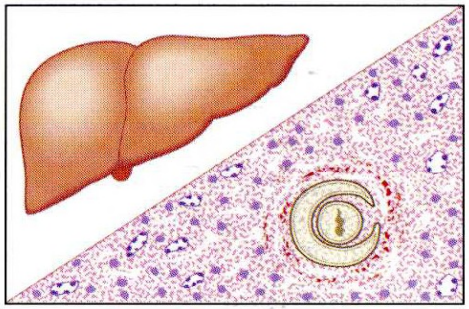
Patogenita shistosom

Particular

4



6



5

Jaterní cirhosa po S. japonicum

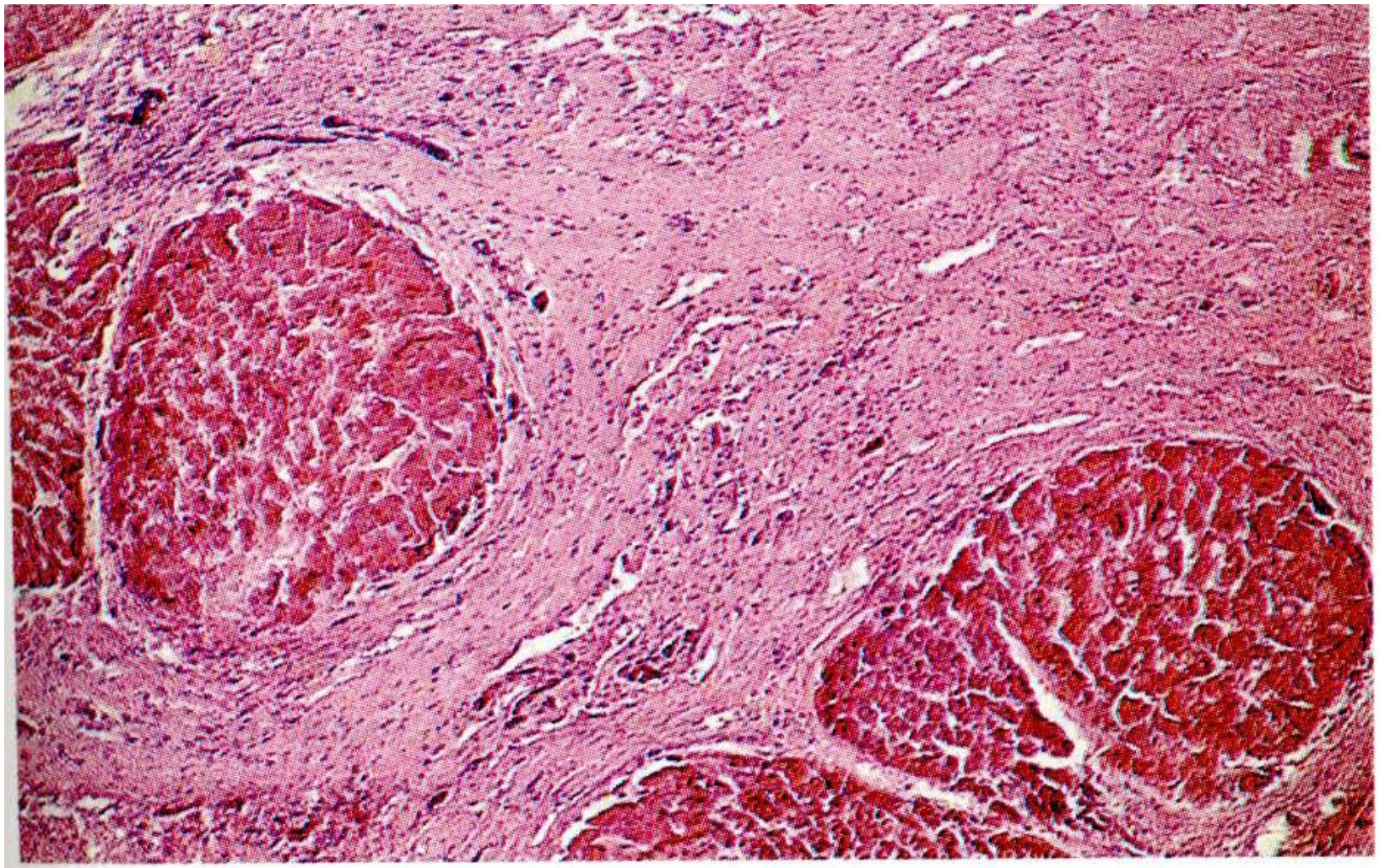
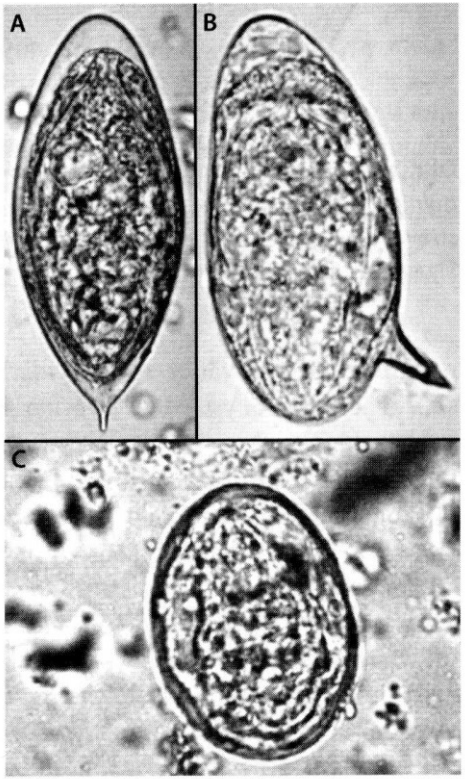
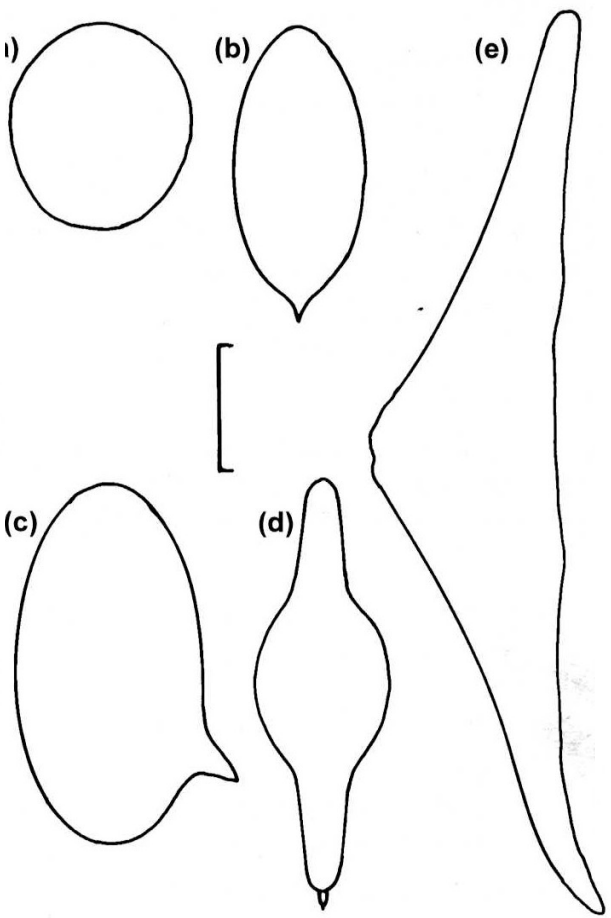


Figure 30.5 *Liver cirrhosis due to* Schistosoma japonicum

Srovnání vajíček schistosom



Obr. 3–15 Digenea, Schistosomatidae. Vajíčka nejběžnějších lidských schistosom. A – *S. haematobium*, **B** – *S. mansoni*, **C** – *S. japonicum* (dle různých autorů, upra-



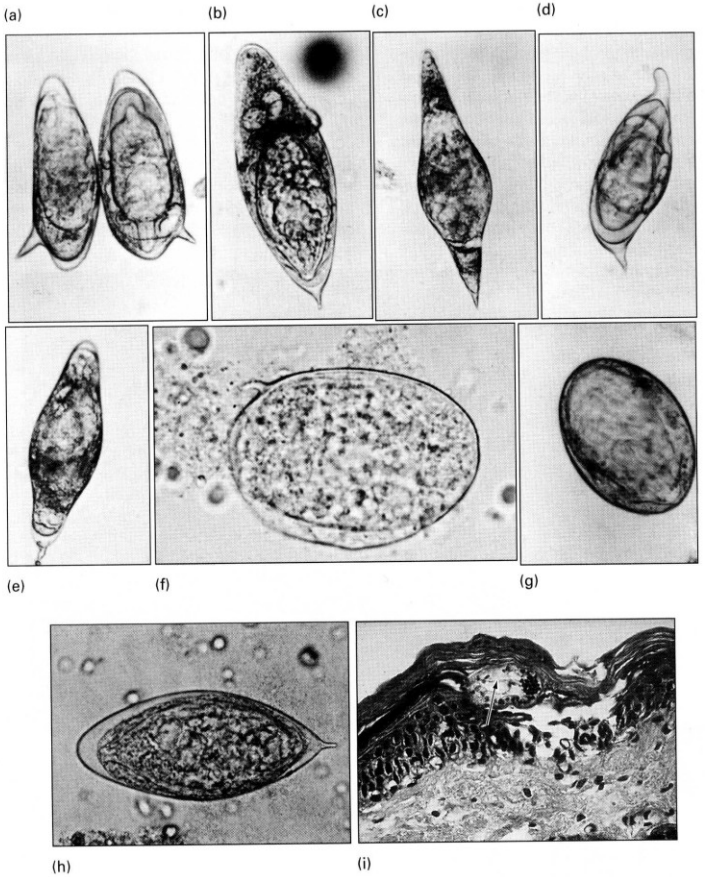
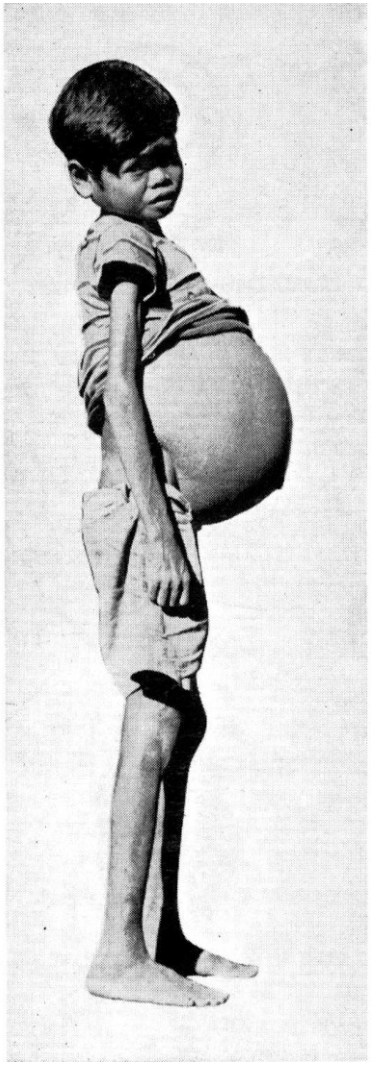


Figure 18.3 The eggs of *Schistosoma* spp. (*a*) *S. japonicum*. (*b*) *S. haematobium*. (*c*) *S. mansoni*. (*d*) *S. bovi* (*e*) *S. spindale*. Scale bar: 50 μm. Source: reproduced from Sambon, 1909.

Granulom kolem nakladených vajíček

Pokročilá schistosomiasa japonica



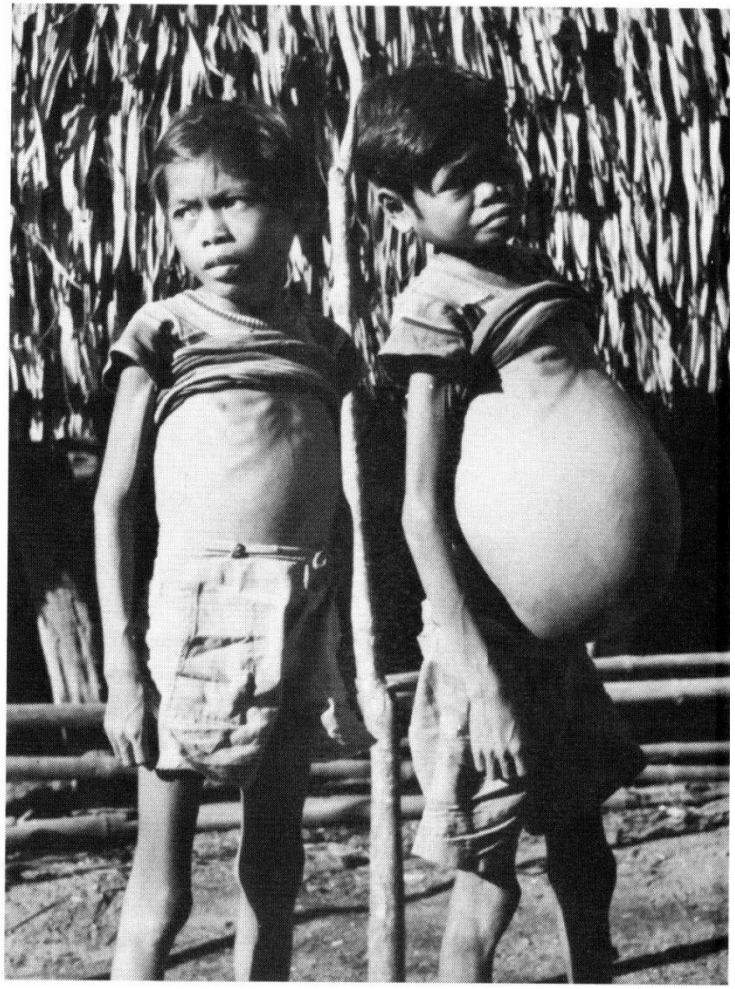


Figure 16.17 Ascites in advanced schistosomiasis japonica, Leyte, Philippines *(right)*.

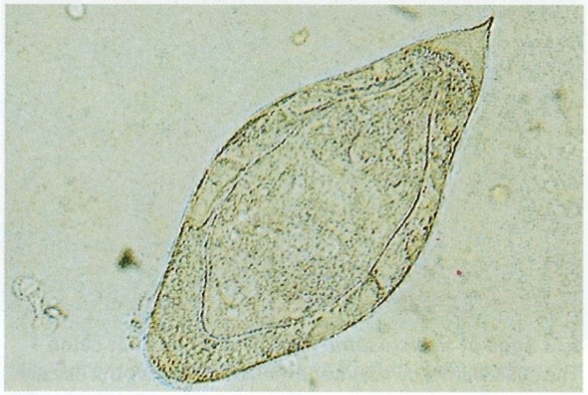
Schistosoma - zástupci

- **Schistosoma intercalatum** – člověk, západní a střední Afrika
- **Schistosoma mekongi** – člověk, jihovýchodní Asie
- **Schistosoma bovis** – dobytek, ovce, Afrika, Střední Východ, jižní Evropa
- **Schistosoma mattehei** – ovce, jižní Afrika
- **Sshistosoma margrebowiei** – antilopy, buvoli, střední Afrika

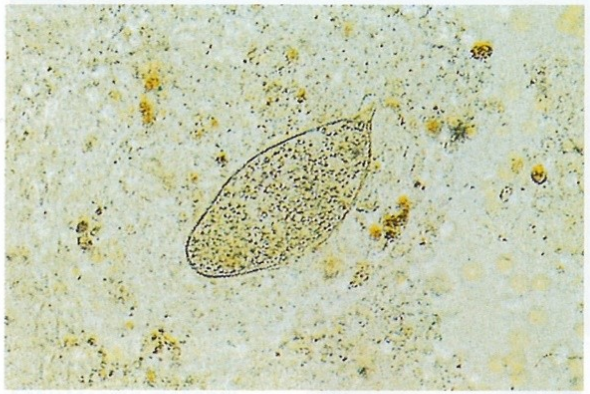
Schistosoma intercalatum a S. matteei

535–538 Eggs of unusual schistosomes seen in humans

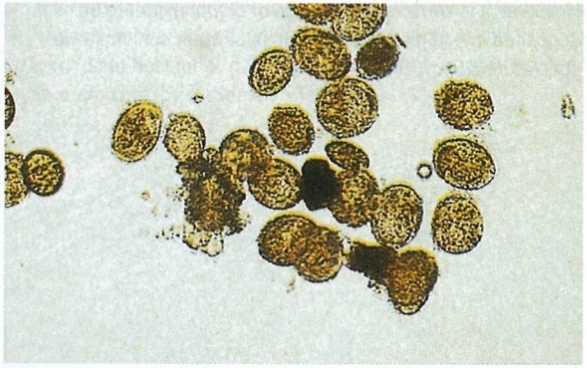
The eggs of *S. intercalatum* (**535**) are similar to those of *S. haematobium*, but are found only in the faeces. *S. mattheei* (**536**), which occurs in sheep and cattle, has been found in humans on rare occasions (× *290*). *S. mekongi* (**537**) is easily mistaken for *S. japonicum*, which is shown here for comparison (**538**). (× *140*) (*S. intercalatum* is decreasing in prevalence; the incidence of human infection with *S. mekongi* has been considerably reduced by mass chemotherapy but its main intermediate snail host, *Neotricula aperta* is difficult to control.)



535



536



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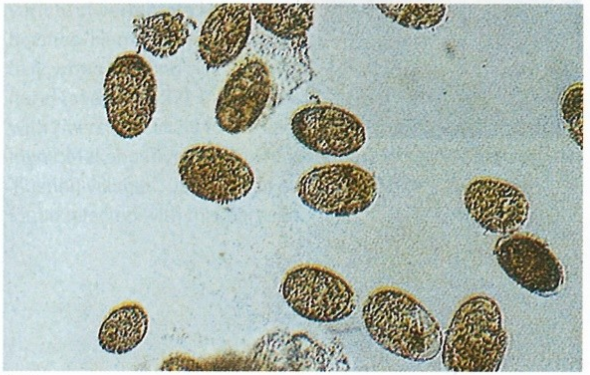
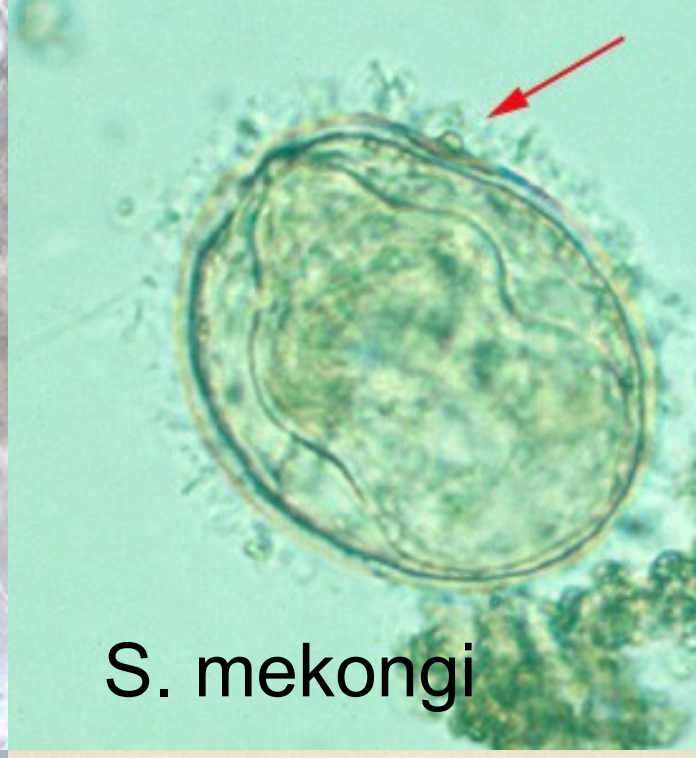


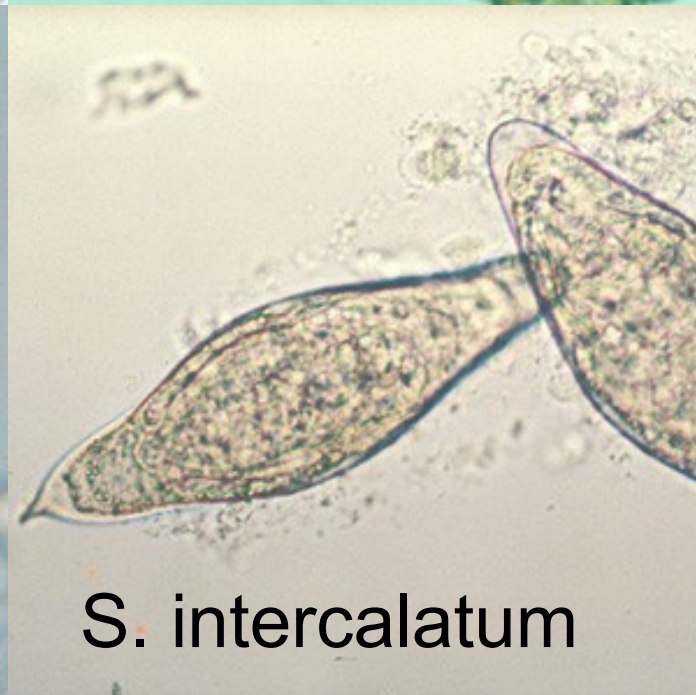
538

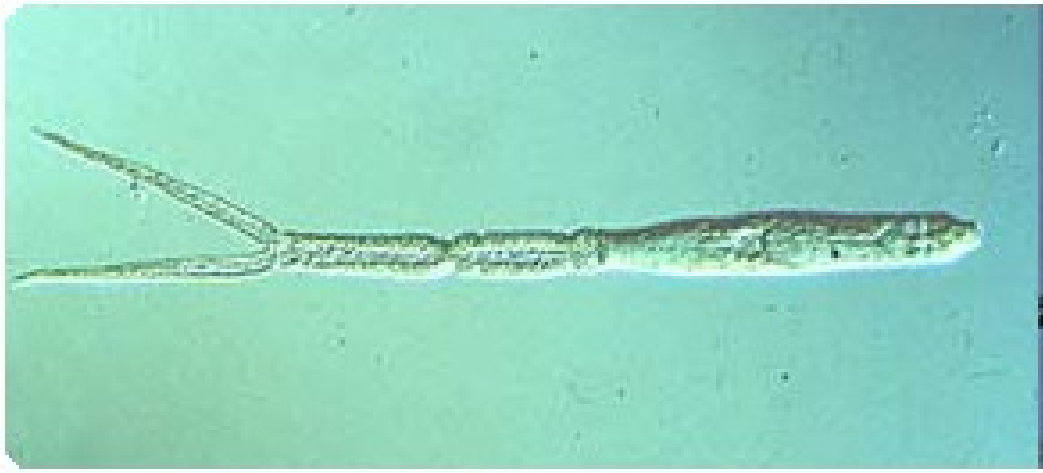

S. mansoni


S. japonicum


S. mekongi


S. haematobium


S. intercalatum



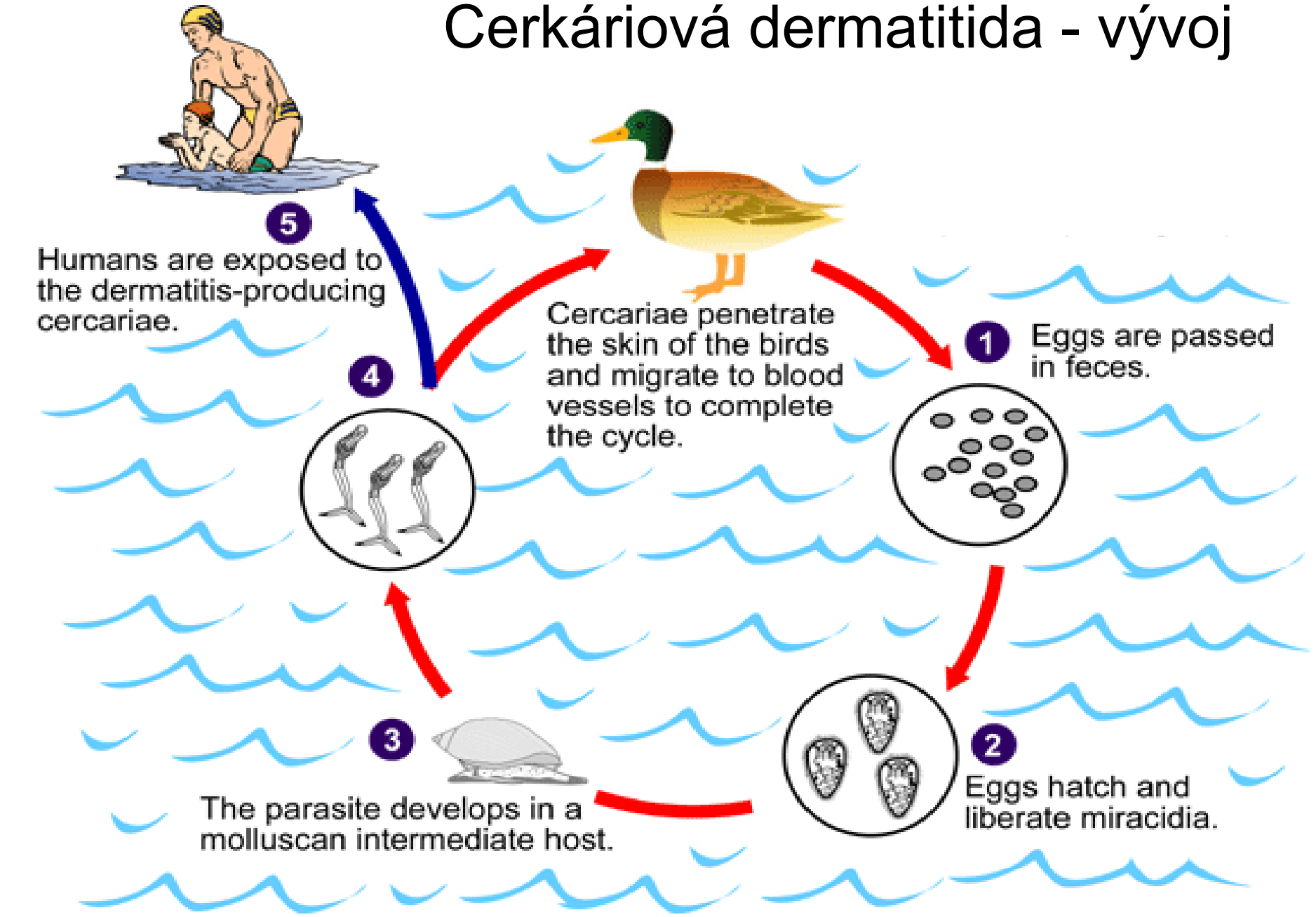
- **Cerkáriová dermatitida** vzniká jako důsledek alergické reakce pokožky na průnik cerkárií schistosom vyvíjejících se běžně u ptáků a některých savců.

- Tito cizopasníci se vyvíjejí ve různých druzích sladkovodních a mořských plžů a kontaminují tak prostředí jezer, rybníků a moří.

- Cerkárie se při dostávají při koupání do kontaktů s lidskou pokožkou, do které se zavrtávají a vyvolávají tak alergickou reakci.

- U většiny případů cerkáriové dermatitidy není nutnou vyhledat lékaře.

Cerkáriová dermatitida - vývoj



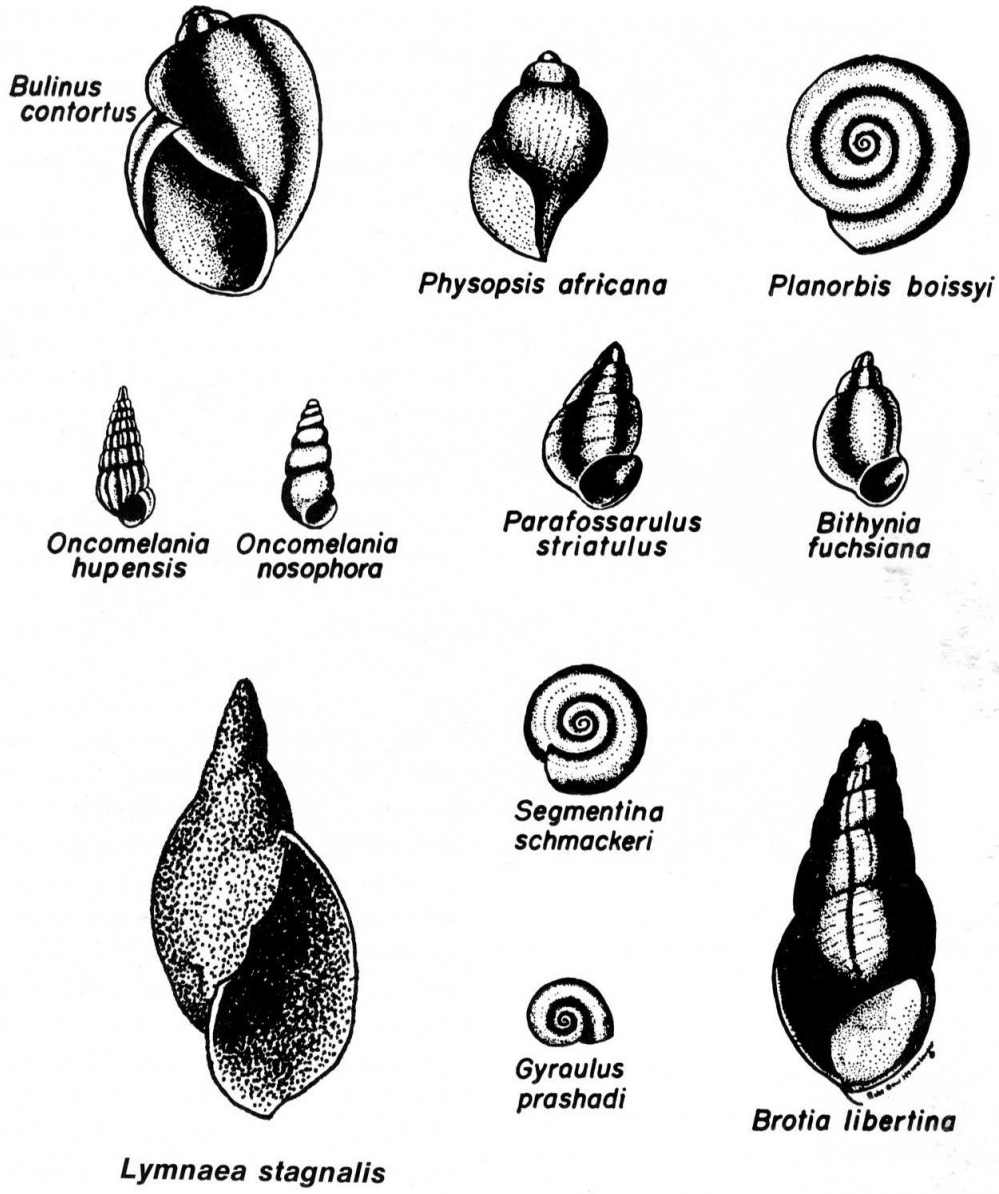


Fig. 10–7. First intermediate hosts of human flukes. (From the United States Naval Medical School Laboratory

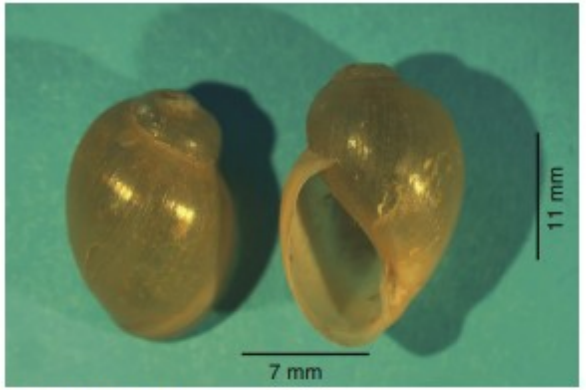


Fig. 2.48 Bulinus sp.
The snail intermediate host of *Schistosoma haematobium*. (Courtesy. C. Whitehorn.)

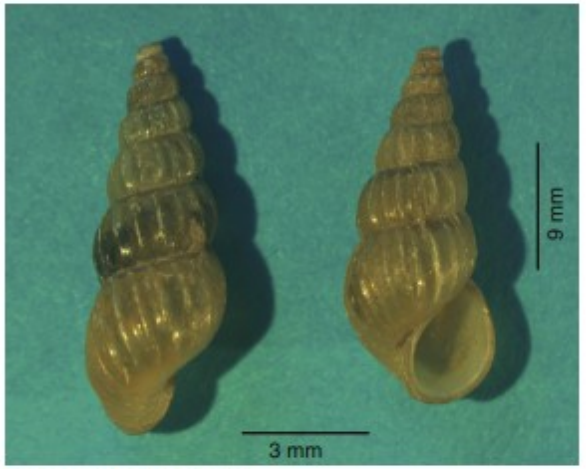


Fig. 2.49 Oncomelania sp.
The snail intermediate host of *Schistosoma japonicum*. (Courtesy. C. Whitehorn.)

Co je třeba dělat pro omezení cerkáriové dermatitidy ?

- Neplavat a nekoupat se v místech, kde je vysoká pravděpodobnost vzniku CD.
- Neplavat v blízkosti zarostlých vodních ploch, kde se obvykle vyskytuje velké množství plžů
- Okamžitě po vystoupení z vody je nutno se utřít ručníkem.
- Nelákejte a nekrmte ptáky v blízkosti vodních nádrží, kde se lidé koupou.
- Oznamte na patřičných místech, kde je CD problém, aby tyto oblasti mohly být patřičně označeny.

Jaké jsou příznaky cerkariové dermatitidy ?

Symptomy:

- Zarudnutí, pálení a svědění pokožky
- Malé zarudlé pupínky
- Drobné puchýřky

Trichobilharzia, Ornithobilharzia

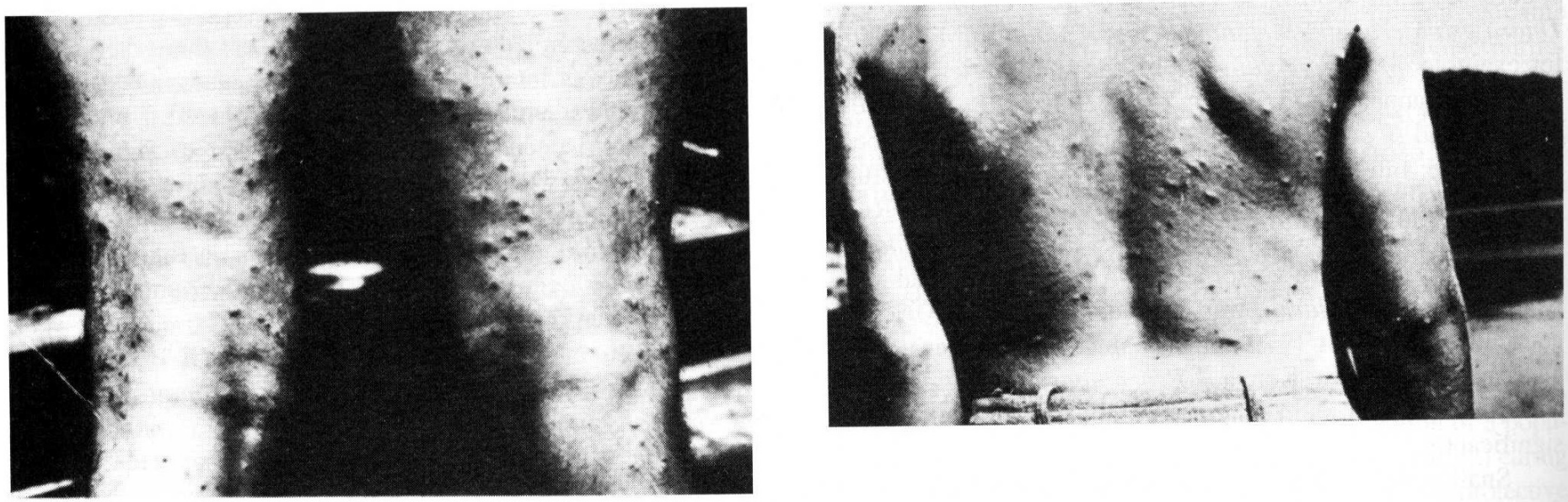
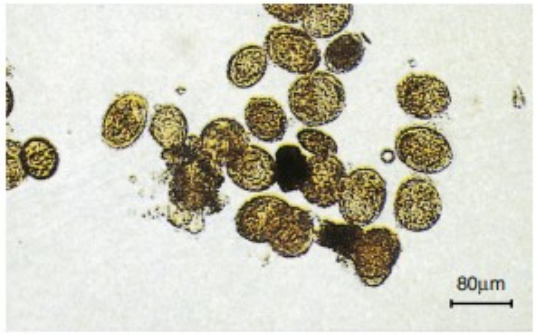


Figure 16.19 Cercarial dermatitis, or "swimmer's itch," caused by cercariae of avian blood flukes.

Schistosoma – cerkáriová dermatitida

Fig. 2.67 Cercarial dermatitis 3 days after exposure.
Though 'swimmer's itch' usually describes the cercarial dermatitis caused by human pathogenic schistosomes, as here, cercarial dermatitis can occur in countries non-endemic for human schistosomiasis, following exposure to avian schistosomes. (From Pavlin,

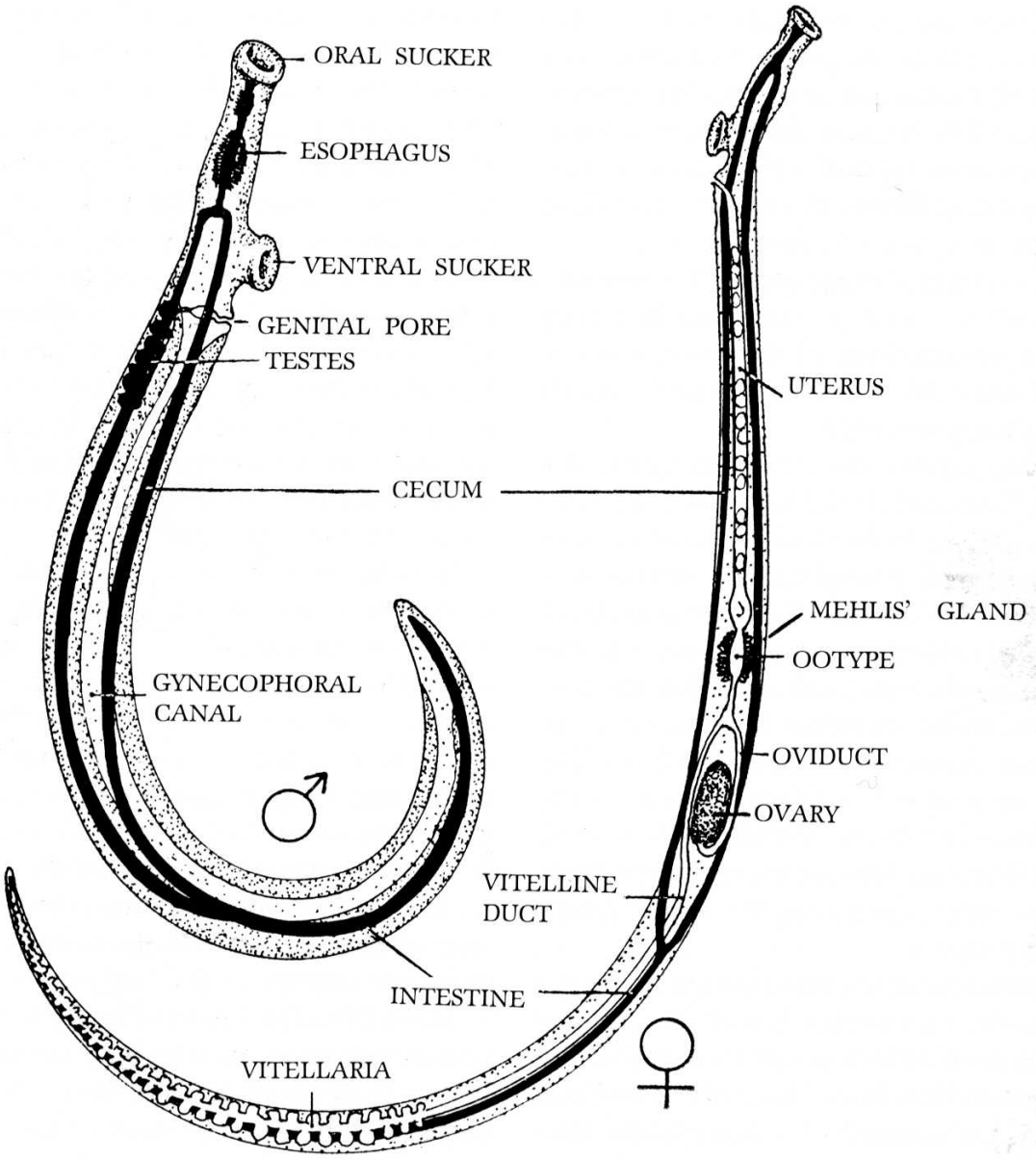
Fig. 2.68



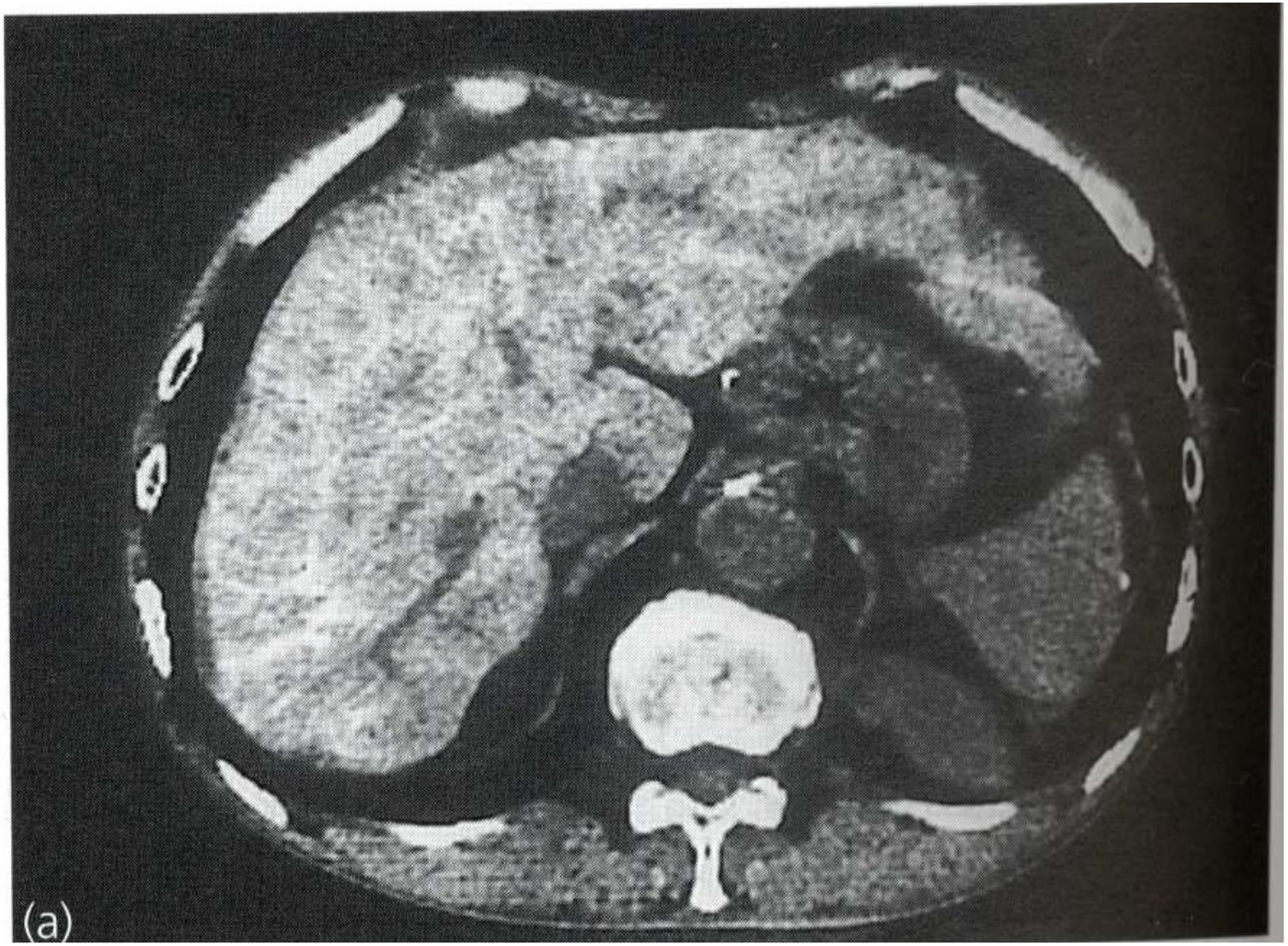
Cerkariová dermatitida

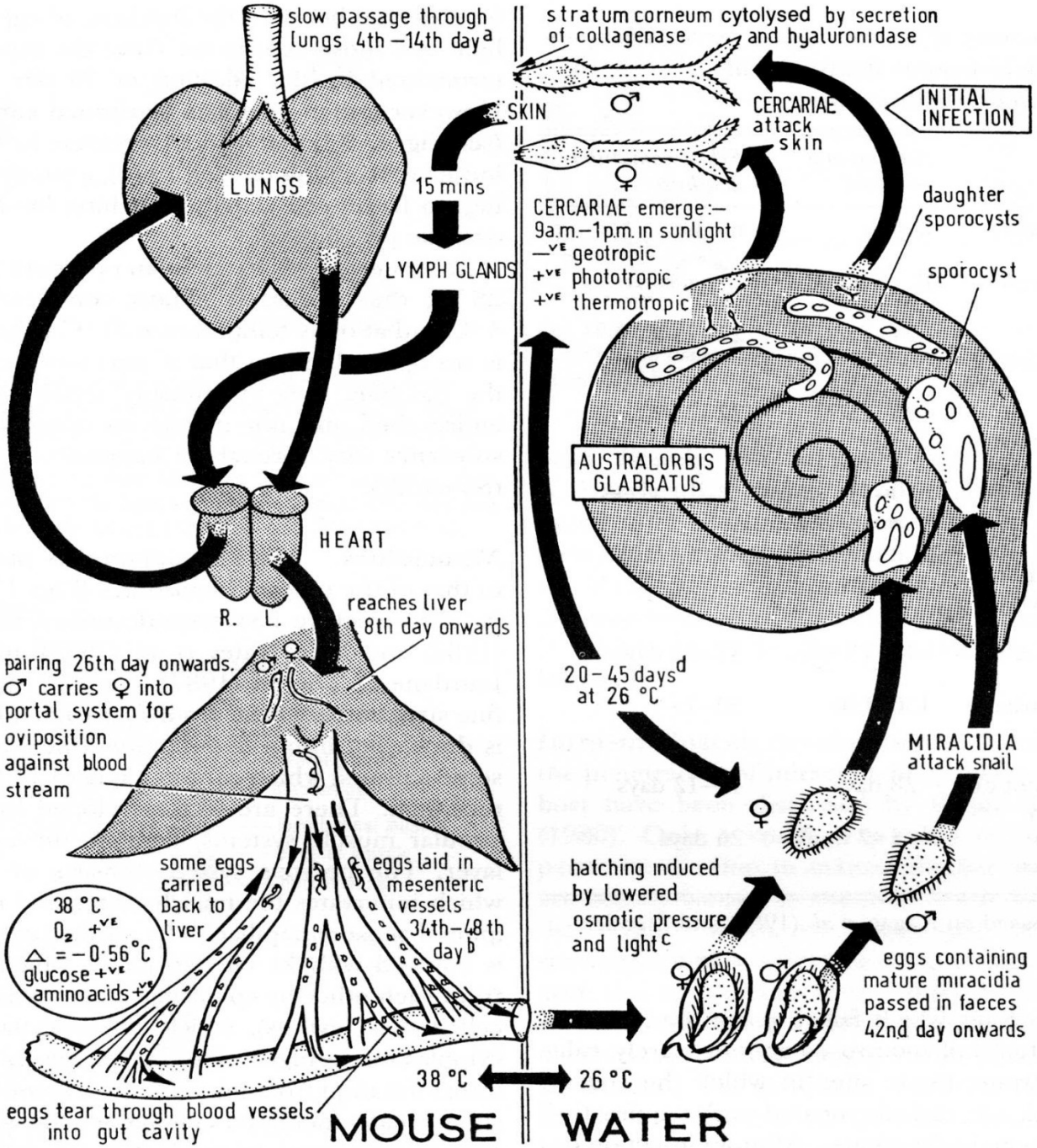
- Cerkariová dermatitida je působena cerkáriemi běžných druhů motolic parazitujících obvykle u ptáků a některých savců.
- Cerkárie těchto motolic mají chemotrofickou reakci na lidskou pokožku a aktivně se do ní zavrtávají. Tato penetrace působí lokální podráždění pokožky.
- Běžně ji působí schistosomy *rodů, Trichobilharzia a Ornithobilharzia* parazitující obvykle u kachen.
- Případy CD jsou známy jak se sladkovodního, tak brakického prostředí.
- Plž druhu *Nassarius obsoletus*, je mezihostitelem druhu *Austrobilharzia* které se vyvíjejí v mořském prostředí a vyskytuje se na mořských plážích mírného pásma,
- CD by neměla být zaměňována se sežehnutím mořskými medůzami.


Děkuji za pozornost


ORAL SUCKER
ESOPHAGUS
VENTRAL SUCKER
GENITAL PORE
TESTES
UTERUS
CECUM
MEHLIS' GLAND
OOTYPE
GYNECOPHORAL CANAL
OVIDUCT
OVARY
VITELLINE DUCT
INTESTINE
VITELLARIA

Japonica ?




slow passage through lungs 4th–14th day[a]
stratum corneum cytolysed by secretion of collagenase and hyaluronidase
SKIN
♂
♀
CERCARIAE attack skin
INITIAL INFECTION
LUNGS
15 mins
LYMPH GLANDS
CERCARIAE emerge:–
9a.m.–1p.m. in sunlight
–ve geotropic
+ve phototropic
+ve thermotropic
daughter sporocysts
sporocyst
AUSTRALORBIS GLABRATUS
HEART
R. L.
reaches liver 8th day onwards
pairing 26th day onwards. ♂ carries ♀ into portal system for oviposition against blood stream
20–45 days[d] at 26 °C
MIRACIDIA attack snail
some eggs carried back to liver
eggs laid in mesenteric vessels 34th–48th day[b]
38 °C
O2 +ve
△ = –0·56 °C
glucose +ve
amino acids +ve
hatching induced by lowered osmotic pressure and light[c]
eggs containing mature miracidia passed in faeces 42nd day onwards
38 °C ⟷ 26 °C
eggs tear through blood vessels into gut cavity
MOUSE
WATER

Schistosoma - diverzita