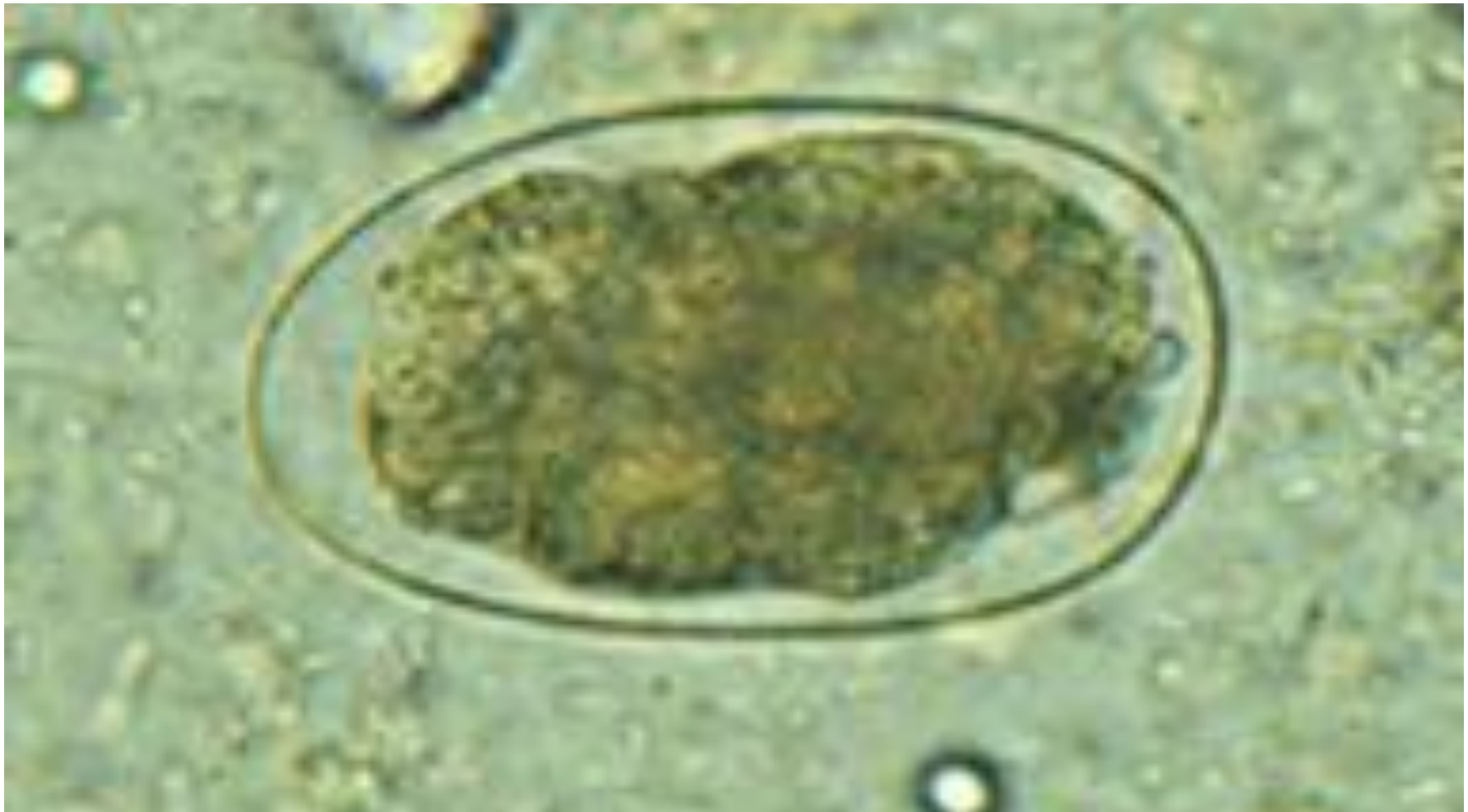

©1999 Don Lehman

Entamoeba coli

Entamoeba coli

Hookworm ova



Ascaris ova

Unfertilized and fertilized eggs, (left and right, respectively).

Ascaris worm

An adult *Ascaris* worm.

Hookworm ova

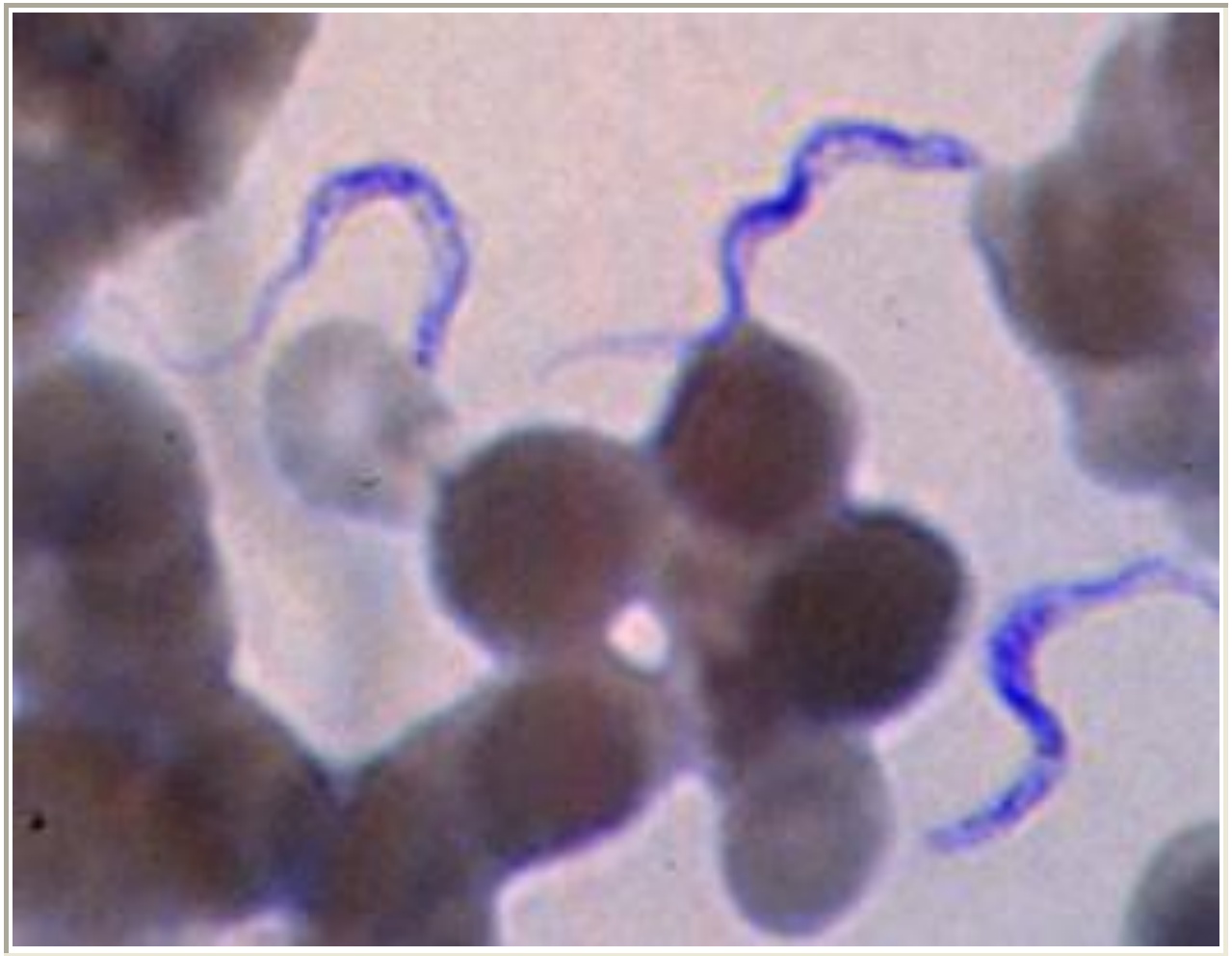
A	B

A: Hookworm egg, advanced cleavage (iodine).
B: Embryonated hookworm egg.

Ascaris ova

Egg containing a larva, which will be infective if ingested.

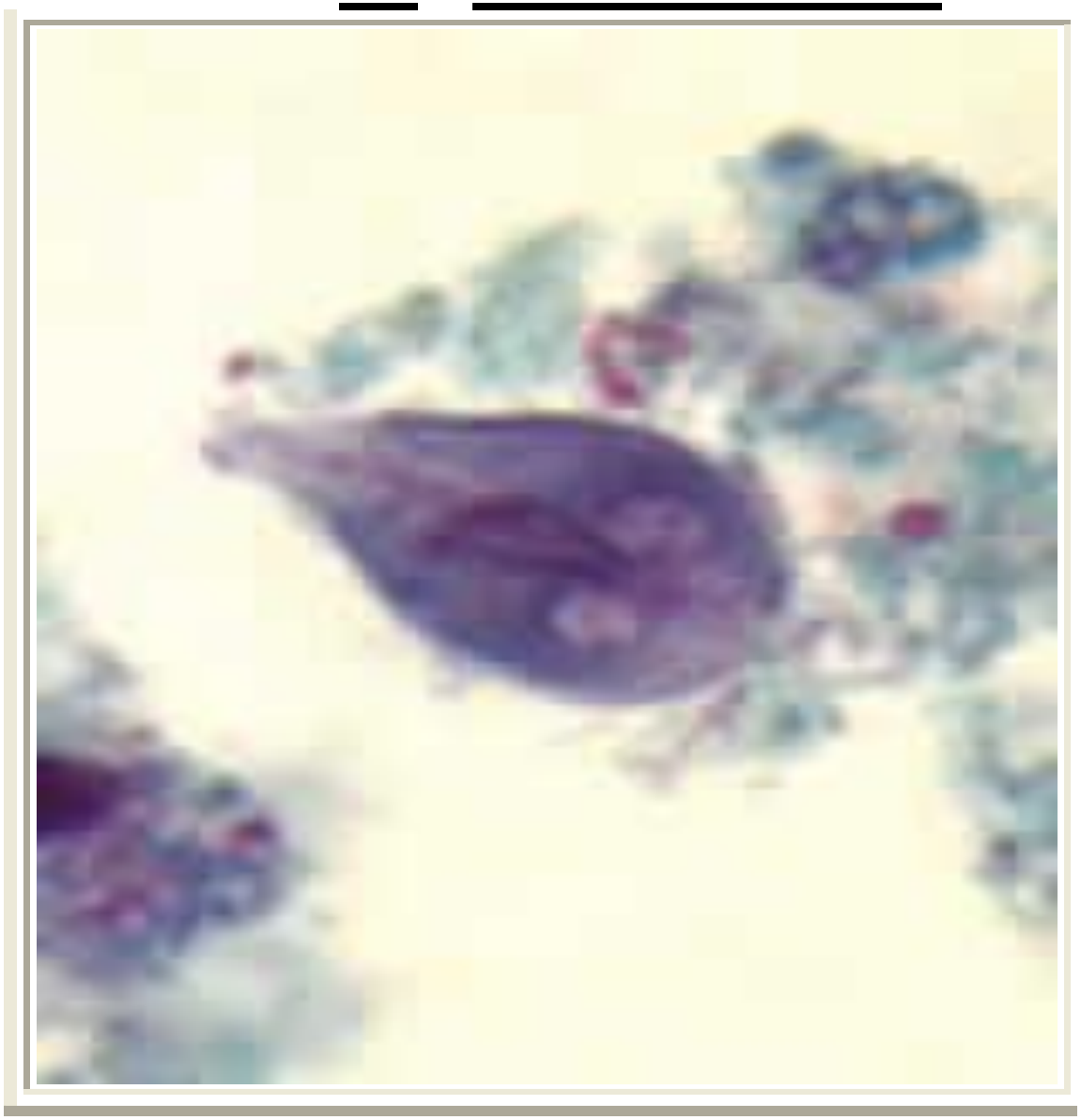
Trypanosoma brucei gambiense]
[T. b. rhodesiense]



Reduviid bug

Triatomine bugs are a type of reduviid bug that can carry Trypanosoma cruzi, the parasite that causes Chagas disease.

G. intestinalis ??

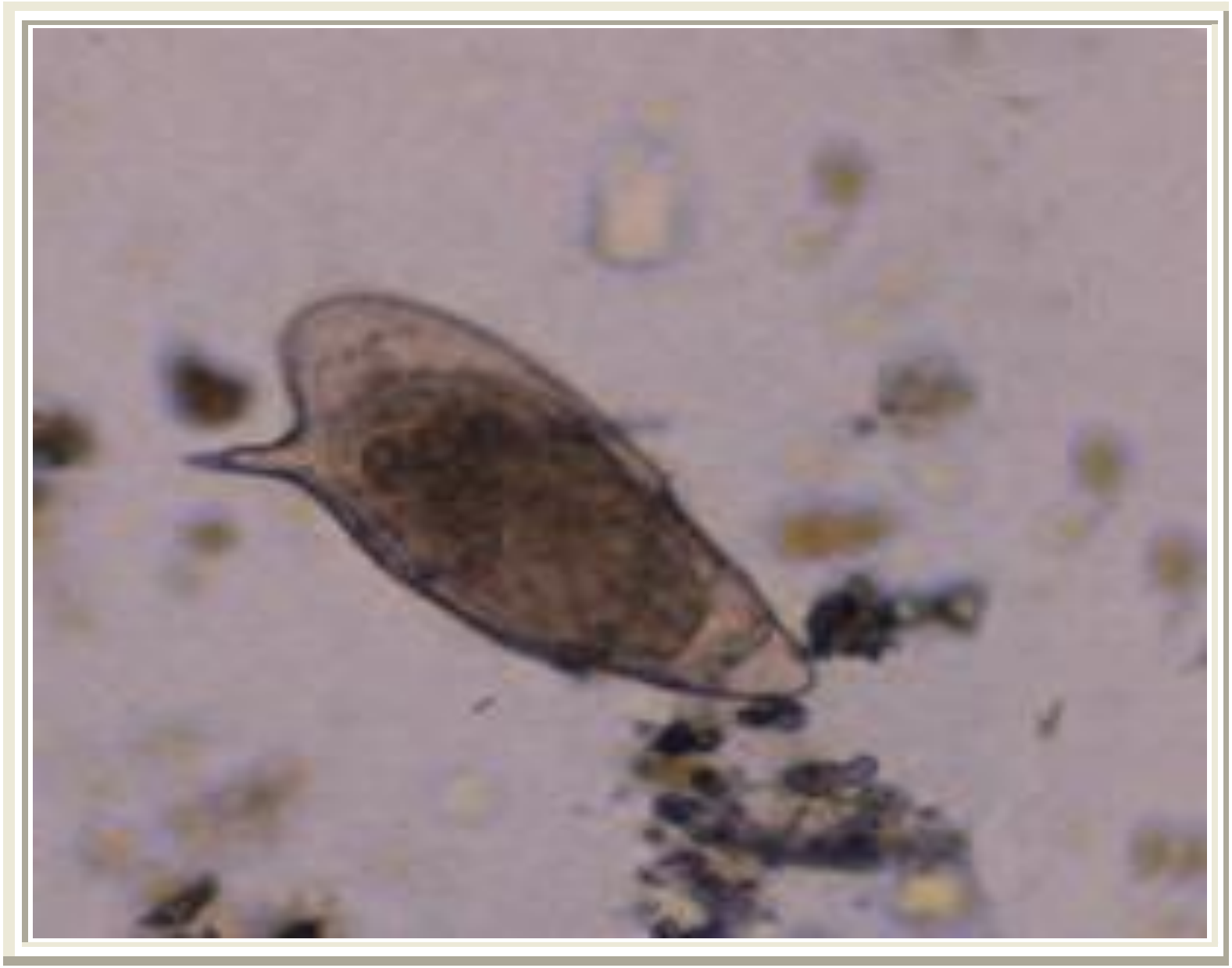


Stained in trichrome stain

W. bancrofti

Microfilaria of *Wuchereria bancrofti*, from a patient seen in Haiti.

S.Mansoni egg



S.japonicum

A

B

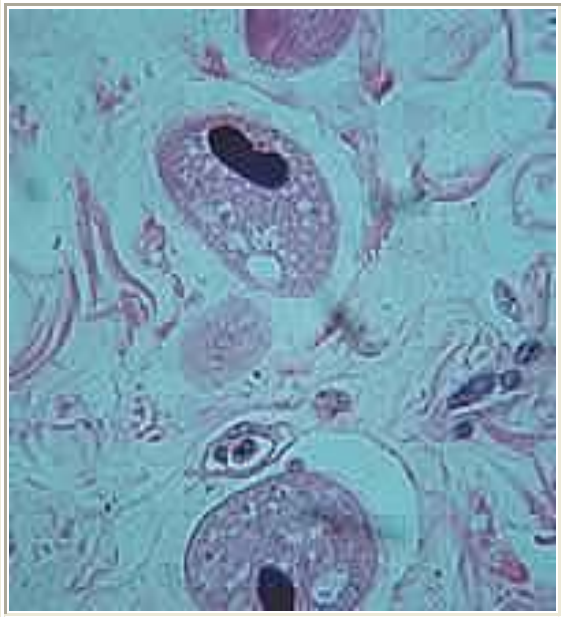
S.Haematobium egg

C

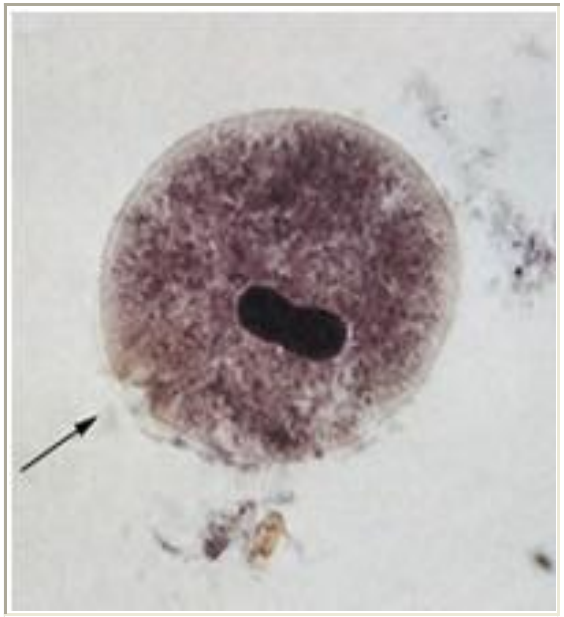
D

A, **B**, **C**, **D:** *Schistosoma haematobium* eggs. In this species, the eggs are large and have a prominent terminal spine at the posterior end

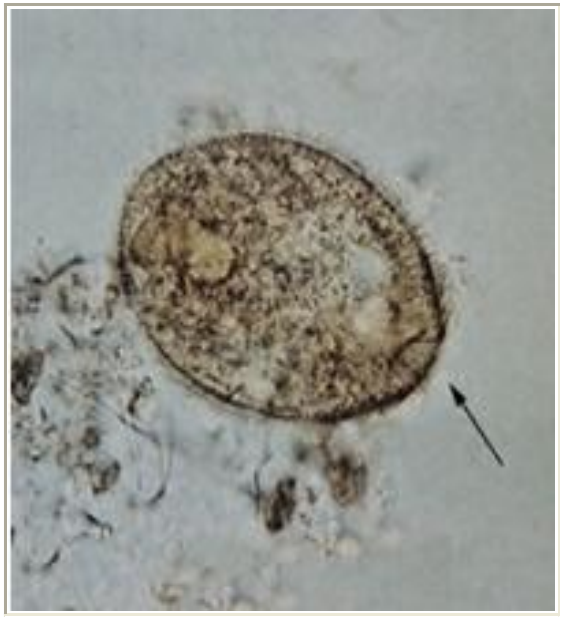
causes balantidiasis



A



B



C

A: *Balantidium coli* trophozoites in tissue, hematoxylin and eosin stain.
B, **C:** *Balantidium coli* trophozoites. These are characterized by:

- their large size (40 µm to more than 70 µm).
- the presence of cilia on the cell surface, particularly visible in Figure **C**.
- a cytostome (arrows).
- a bean shaped macronucleus which is often visible, see Figure **B** and a smaller, less conspicuous micronucleus.

Adult fluke-F. buski

Fasciolopsis buski]

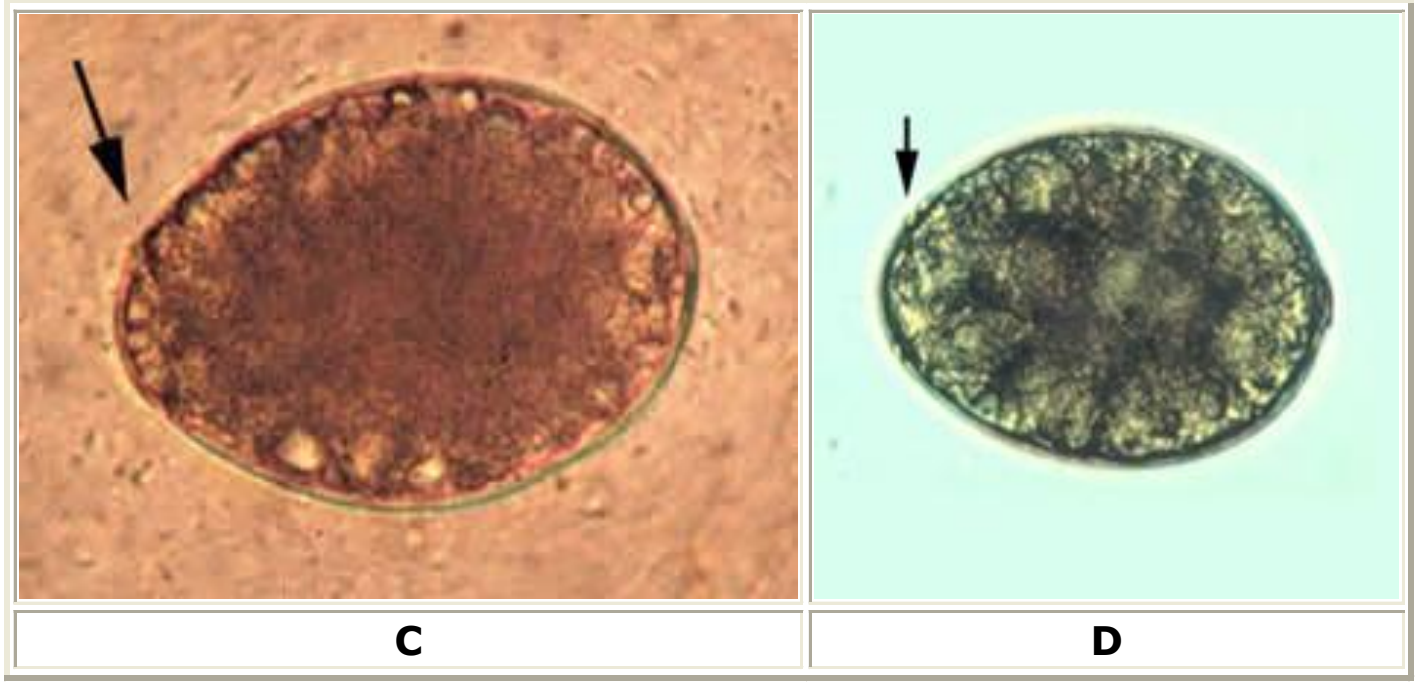
Adult fluke of *Fasciolopsis buski*

Fasciolopsiasis

a trematode.

D. latum eggs

small knob that can be barely discernible. The eggs are passed in the stool unembryonated. Size range: 58 to 76 µm by 40 to 51 µm.



C **D**

C, **D:** Eggs of *Diphyllobothrium latum*. These eggs are oval or ellipsoidal, with at one end an operculum (arrows) that can be inconspicuous (**D**). At the opposite (abopercular) end is a small knob that can be barely discernible (**C**). The eggs are passed in the stool unembryonated. Size range: 58 to 76 µm by 40 to 51 µm. Figure **C** contributed by Georgia Division of Public Health.

Hydatid sand

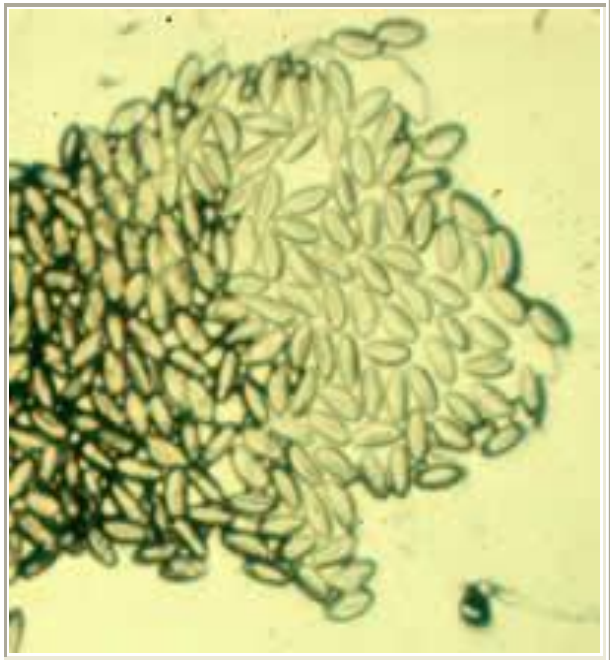
"Hydatid sand". Fluid aspirated from a hydatid cyst

E.vermicularis

Enterobius vermicularis]

A

B



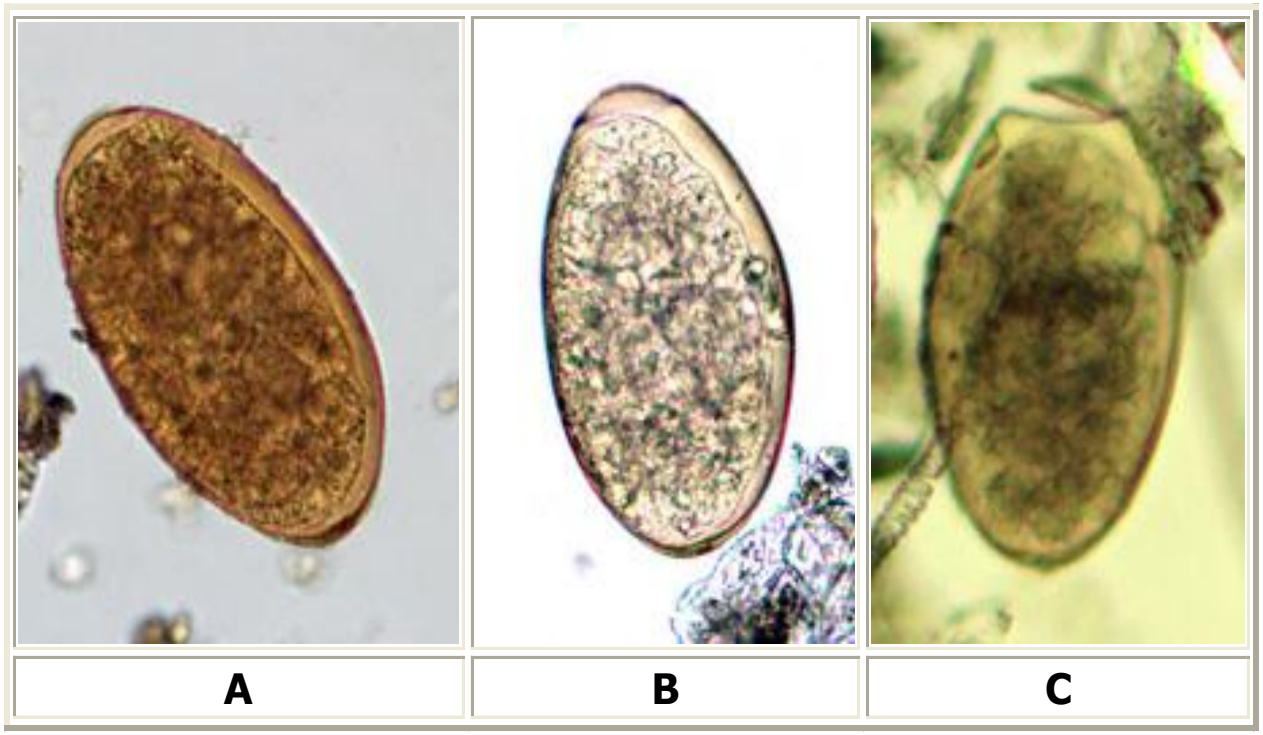
C

A and **B:** *Enterobius* eggs. Eggs measure 50 to 60 µm by 20 to 32 µm.
C: *Enterobius* eggs on cellulose tape prep.

perineal itchiness
school children
self infect

Fasciola eggs

Fasciola hepatica] [Fasciola gigantica]



A	B	C

A, **B**, **C:** *Fasciola hepatica* eggs. Wet mounts with iodine. The eggs are ellipsoidal. They have a small, barely distinct operculum (upper end of the eggs in **A** and **B**). The operculum can be opened (**C**), for example when a slight pressure is applied to the coverslip

Head lice(P.humanus capitis)

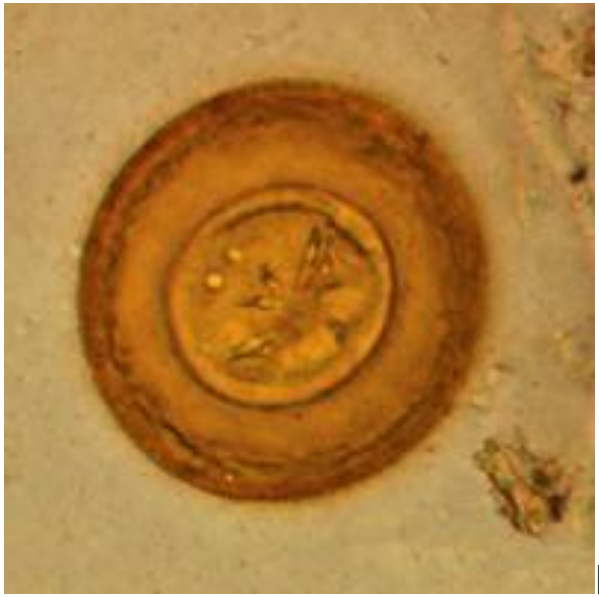
Pediculus humanus capitis]

A

B

A: Adult female louse
B: Adult louse

H.diminuta


Egg of *Hymenolepis diminuta*. These eggs are round or slightly oval, size 70 - 86 µm X 60 - 80 µm, with a striated outer membrane and a thin inner membrane. The space between the membranes is smooth or faintly granular. The oncosphere has six hooks (of which at least four are visible at this level of focus).

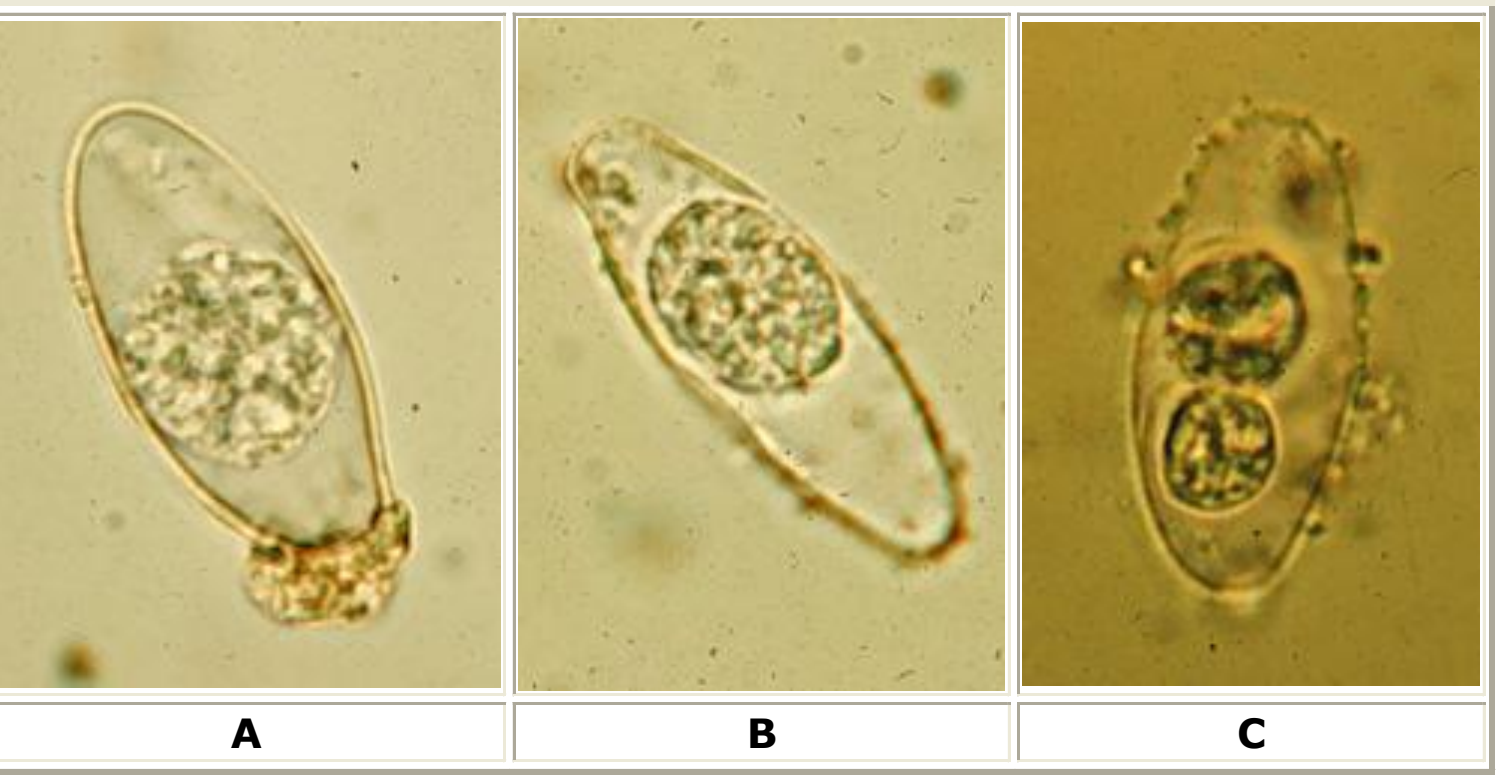
Hymenolepis nana] [H. diminuta]

H. nana

Egg of *Hymenolepis nana*. These eggs are oval and smaller than those of *H. diminuta*, their size being 30 to 55 µm. On the inner membrane are two poles, from which 4-8 polar filaments spread out between the two membranes. The oncosphere has six hooks (seen as dark lines at 8 o'clock). Image contributed by Georgia Department of Public Health.

I. belli

Isospora belli]

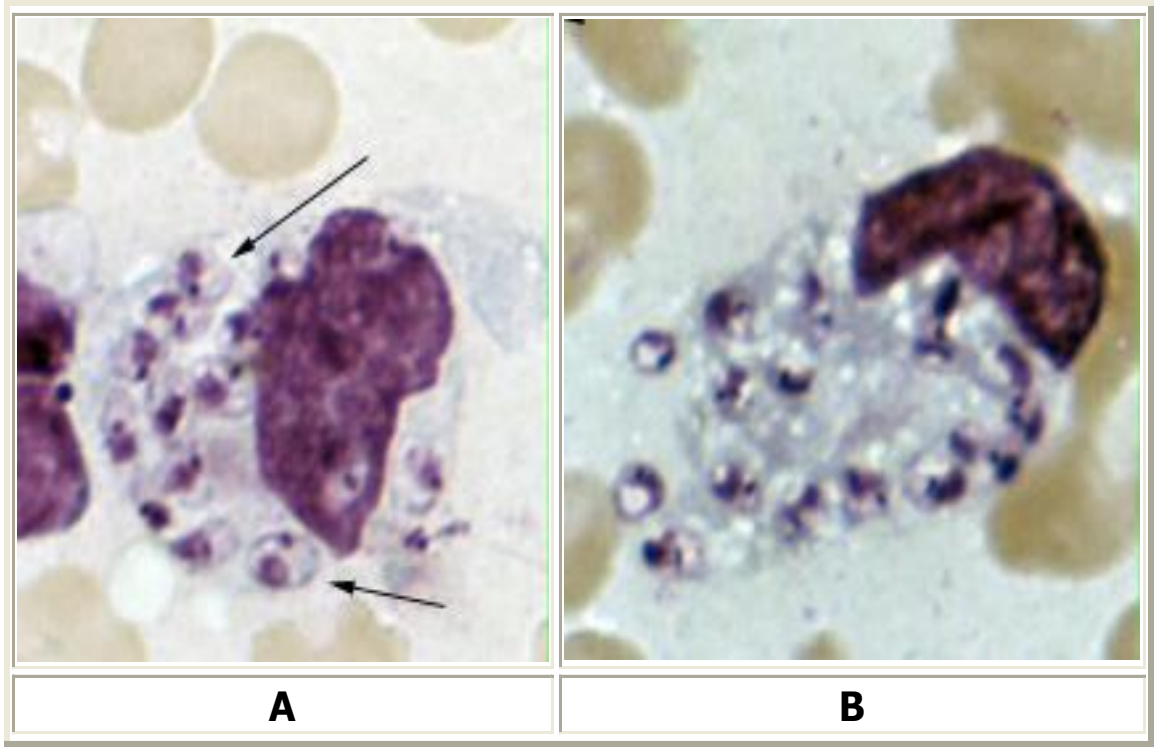


A	B	C

A, **B**, **C:** Oocysts of *Isospora belli*. The oocysts are large (25 to 30 µm) and have a typical ellipsoidal shape. When excreted, they are immature and contain one sporoblast (**A**, **B**). The oocyst matures after excretion: the single sporoblast divides in two sporoblasts (**C**), which develop cyst walls, becoming sporocysts, which eventually contain four sporozoites each. Images contributed by Georgia Division of Public Health.

Leishmania spp

Leishmania spp.]



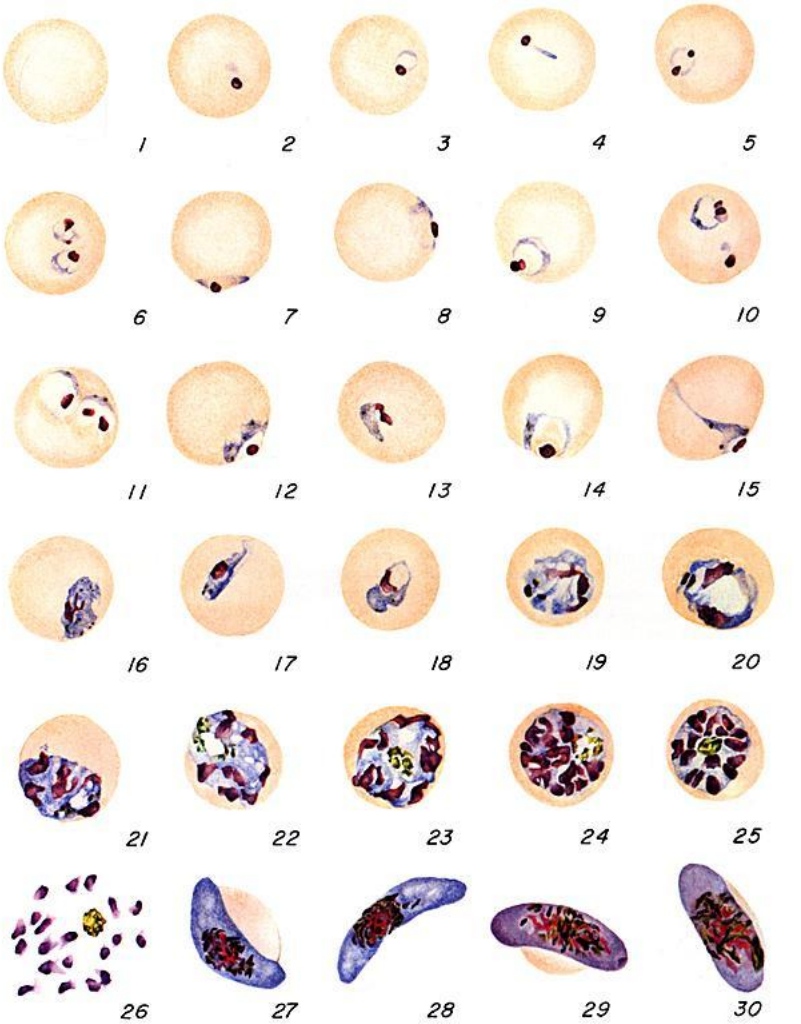
A, **B:** *Leishmania tropica* amastigotes from an impression smear of a biopsy specimen from a skin lesion. In **A**, an intact macrophage is practically filled with amastigotes (arrows), several of which have a clearly visible nucleus and kinetoplast; in **B**, amastigotes are being freed from a rupturing macrophage

M.Perstans & Loa loa

LOALOA
SHEATHED
RELATIVELY DENSE NUCLEAR COLUMN

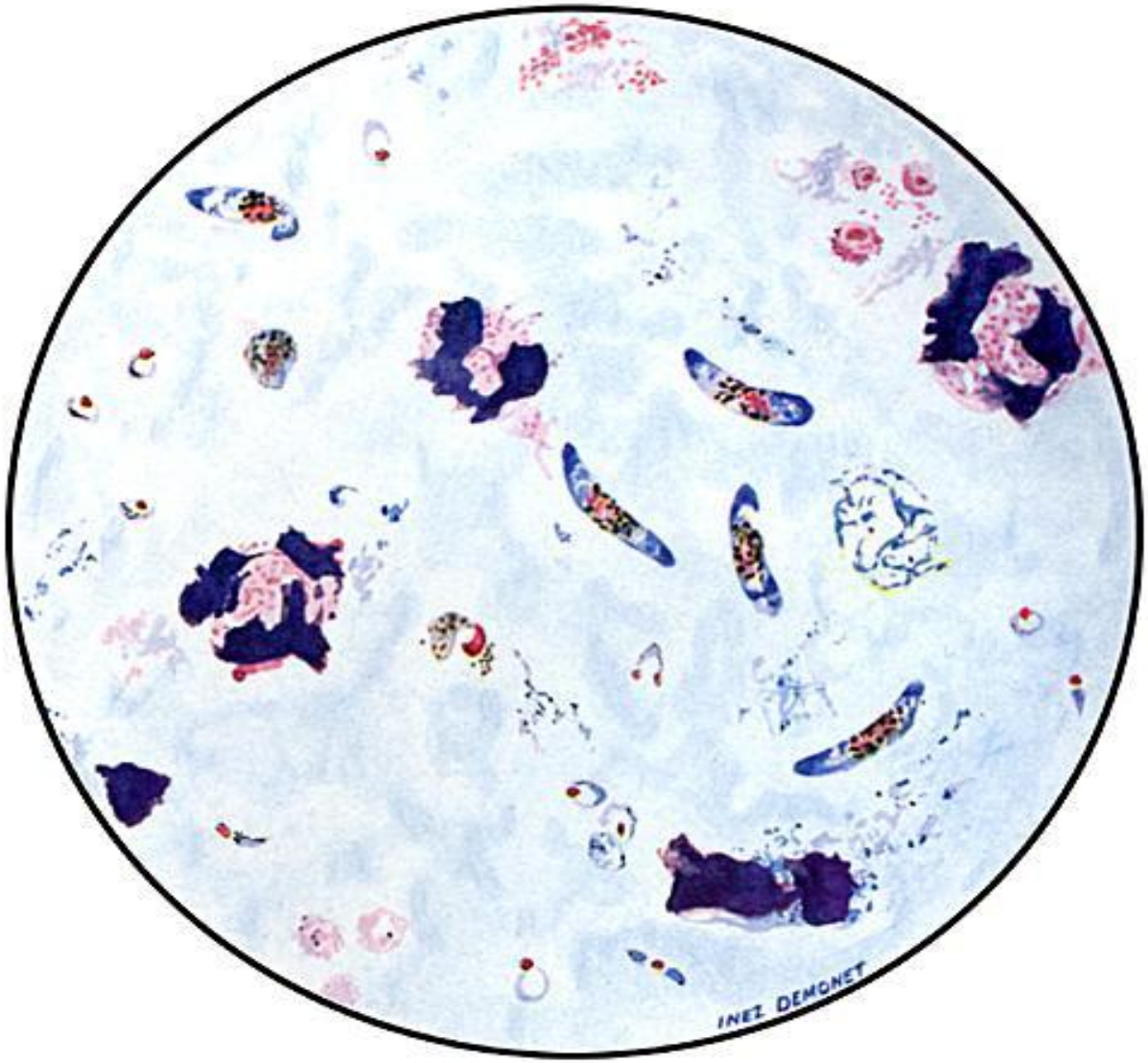
Microfilariae of *Loa loa* (right) and *Mansonella perstans* (left). Patient seen in Cameroon. Thick blood smear stained with hematoxylin. *Loa loa* is sheathed, with a relatively dense nuclear column; its tail tapers and is frequently coiled, and nuclei extend to the end of the tail. *Mansonella perstans* is smaller, has no sheath, and has a blunt tail with nuclei extending to the end of the tail.

Illustrations from
Health, Education a



Department of

P.falciparum

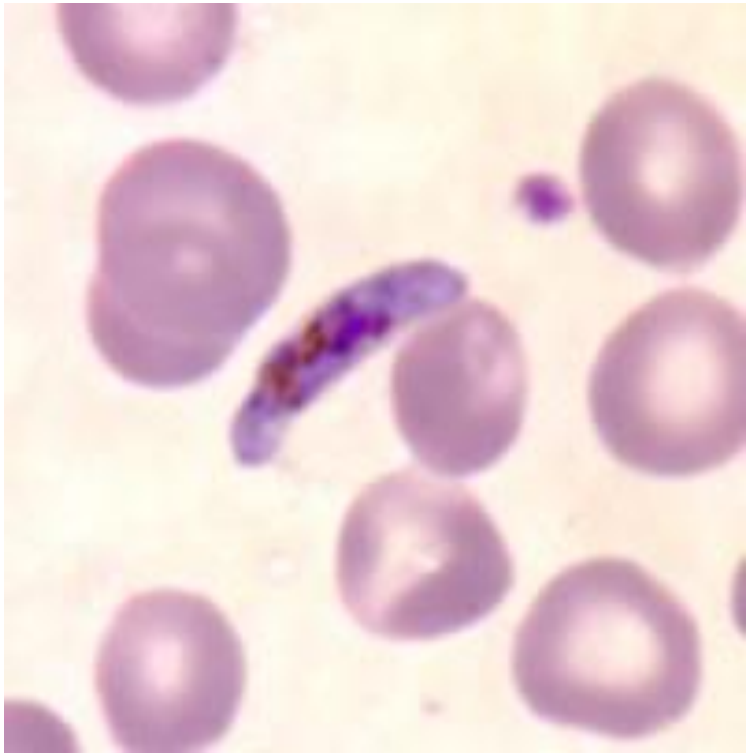


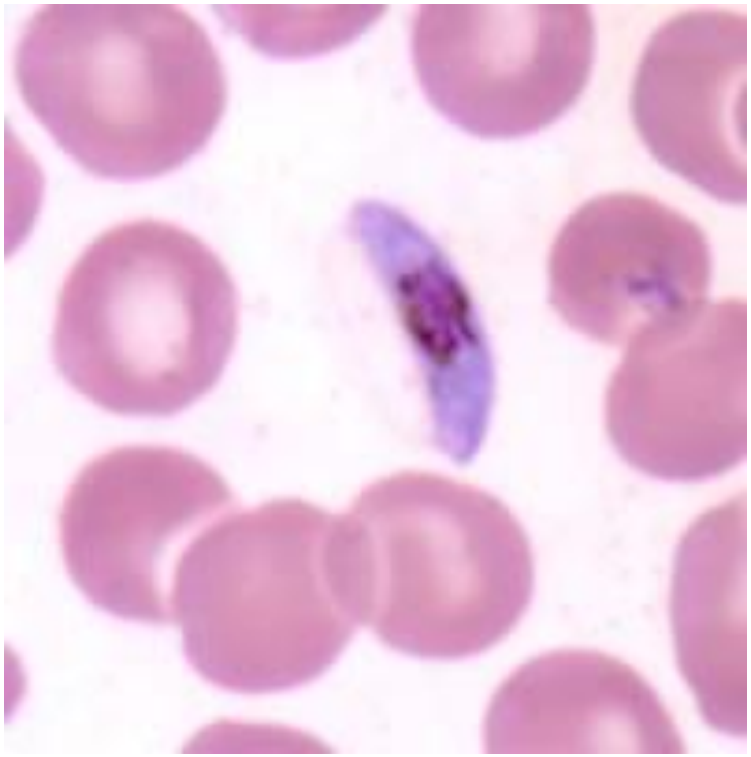
Manual for the Microscopical Diagnosis of Malaria in

P.Falciparum gametocytes

Plasmodium falciparum: **Gametocytes**

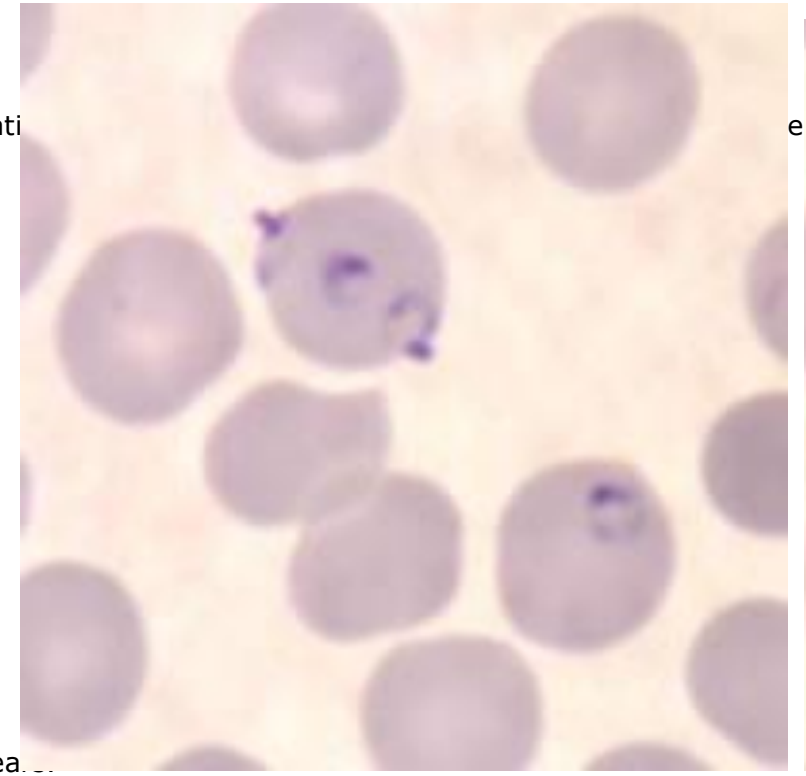
MALE IS PINK
FEMALE IS BLUE
OPPOSITE ISHHHH



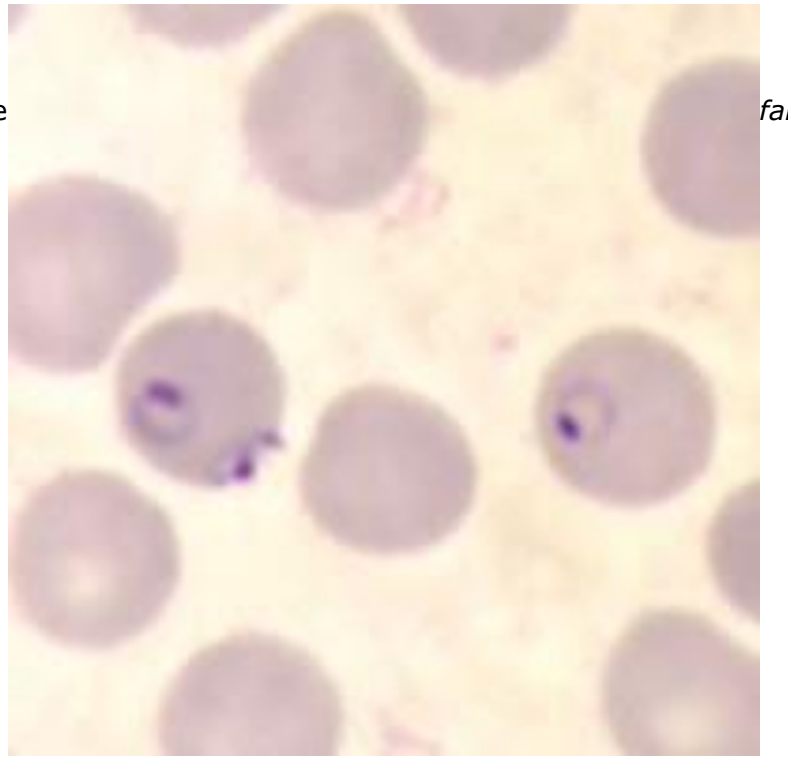


P.Falciparum rings

all chromati



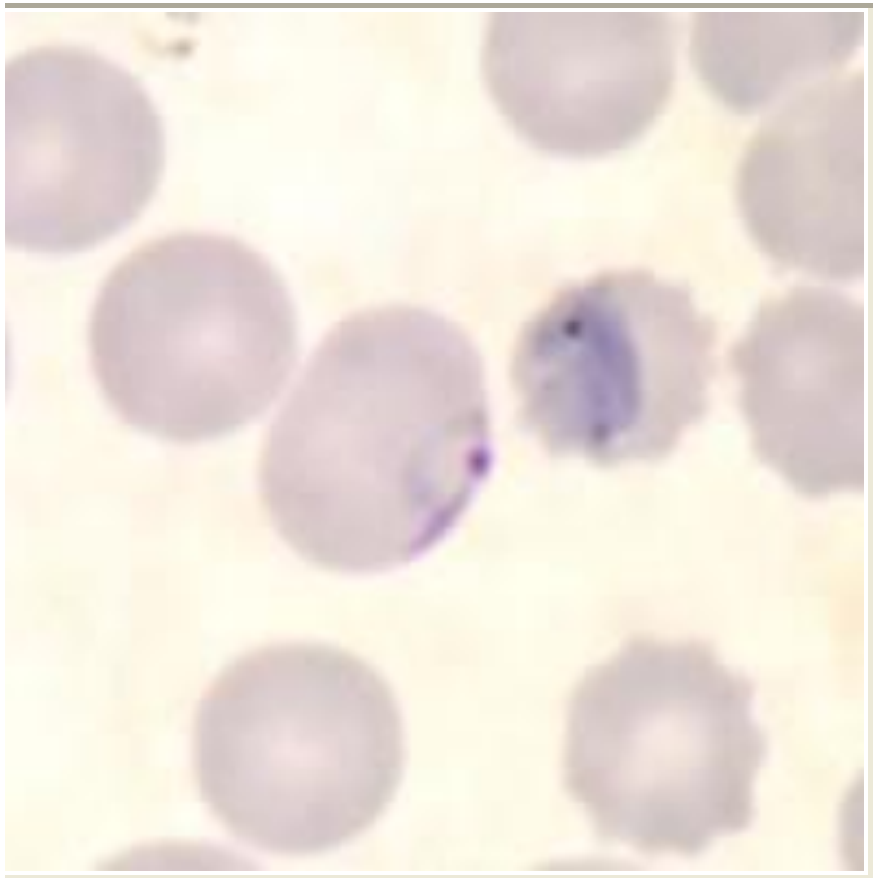
e



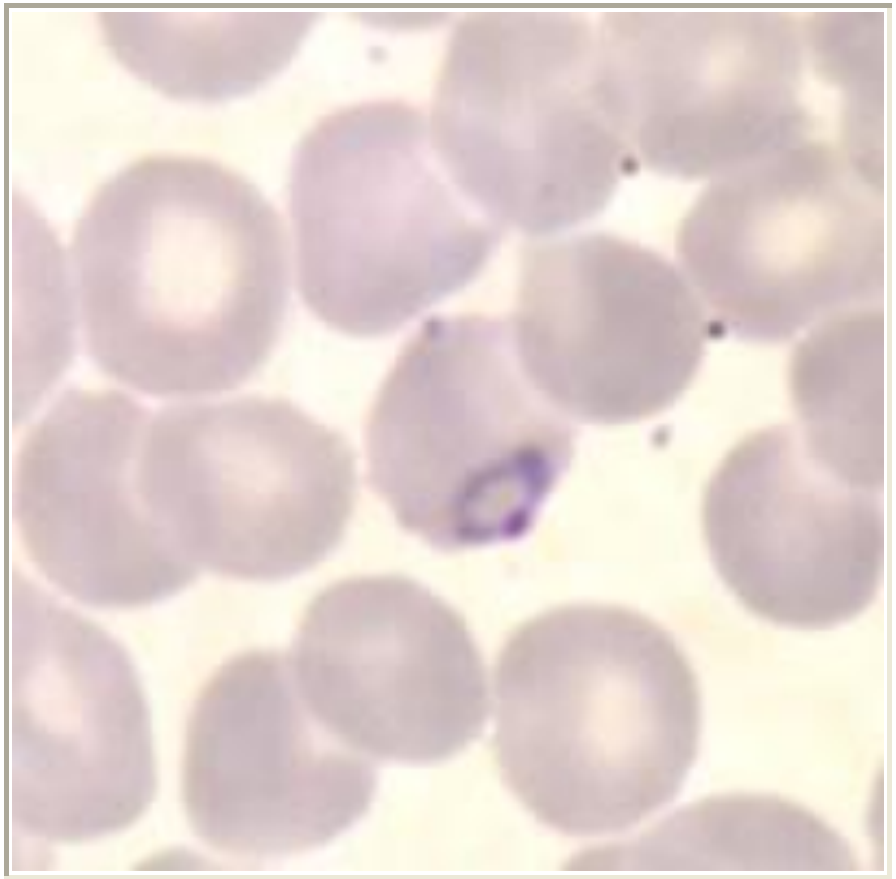
falciparum than i

blood smea

Mature trophozoites



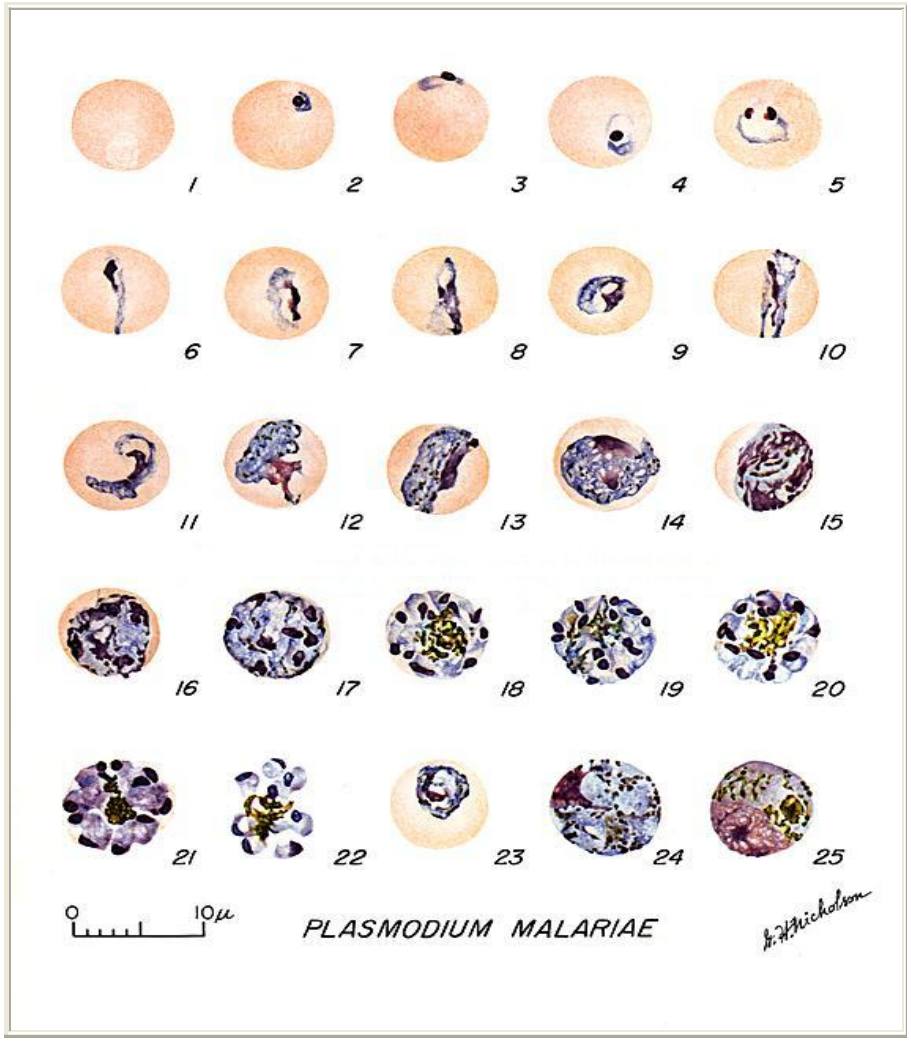
A



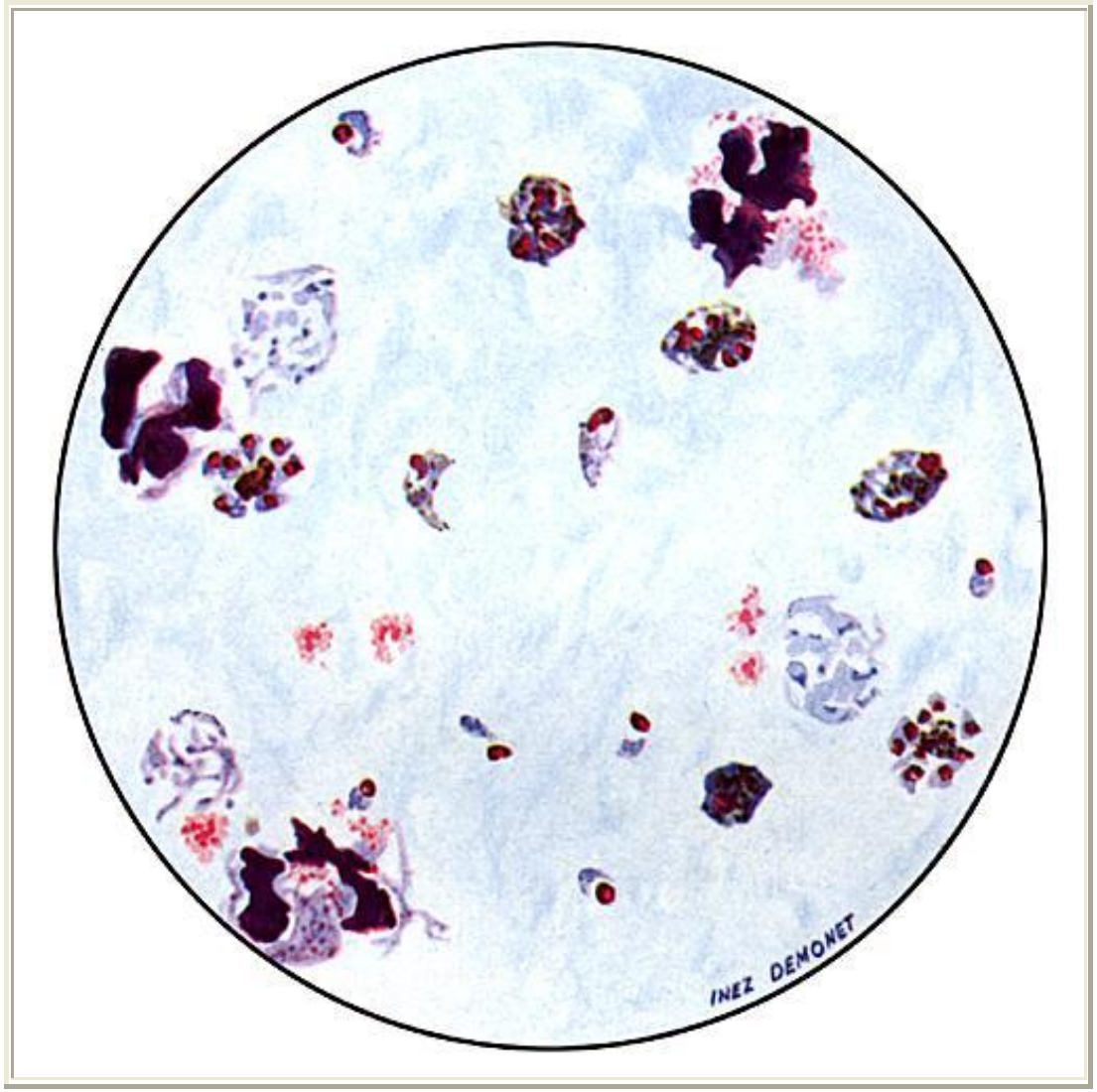
B

P. Malariae in thin film.

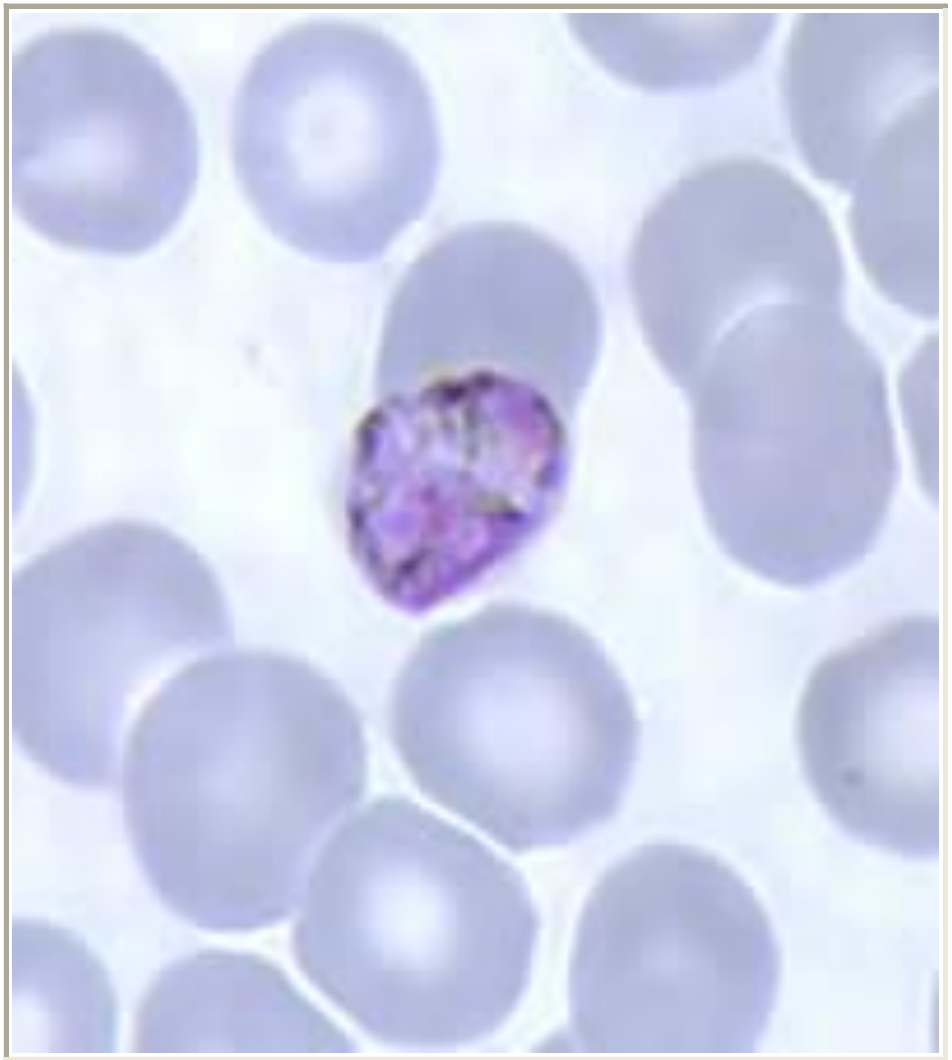
Illustration from Coatney, GR, Collins, WE, Warren, M, Contacos PG. The Primate Malarias. Bethesda: U.S. Department of Health, Education and Welfare; 1971.

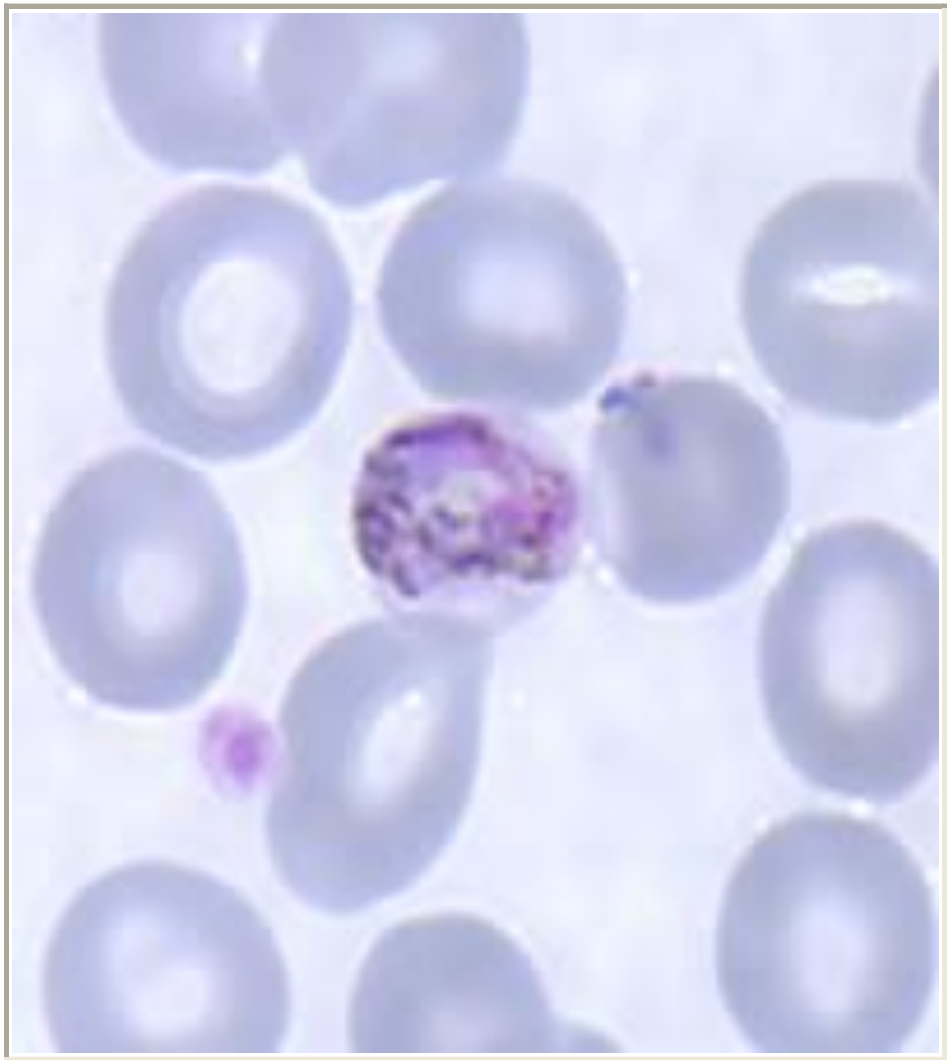


P.Malariae-thick film

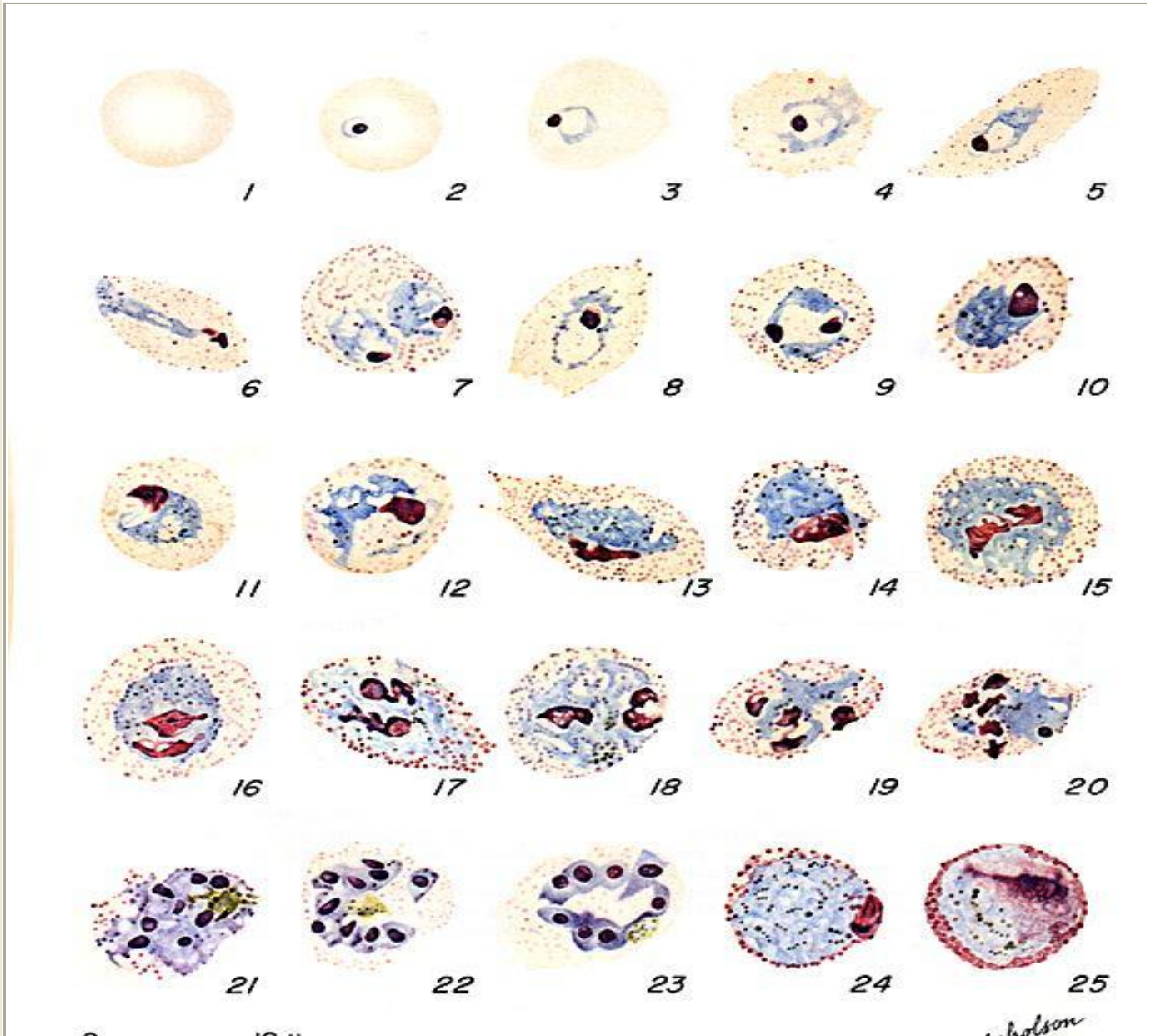


Gametocyte in P. malariae-thin smear



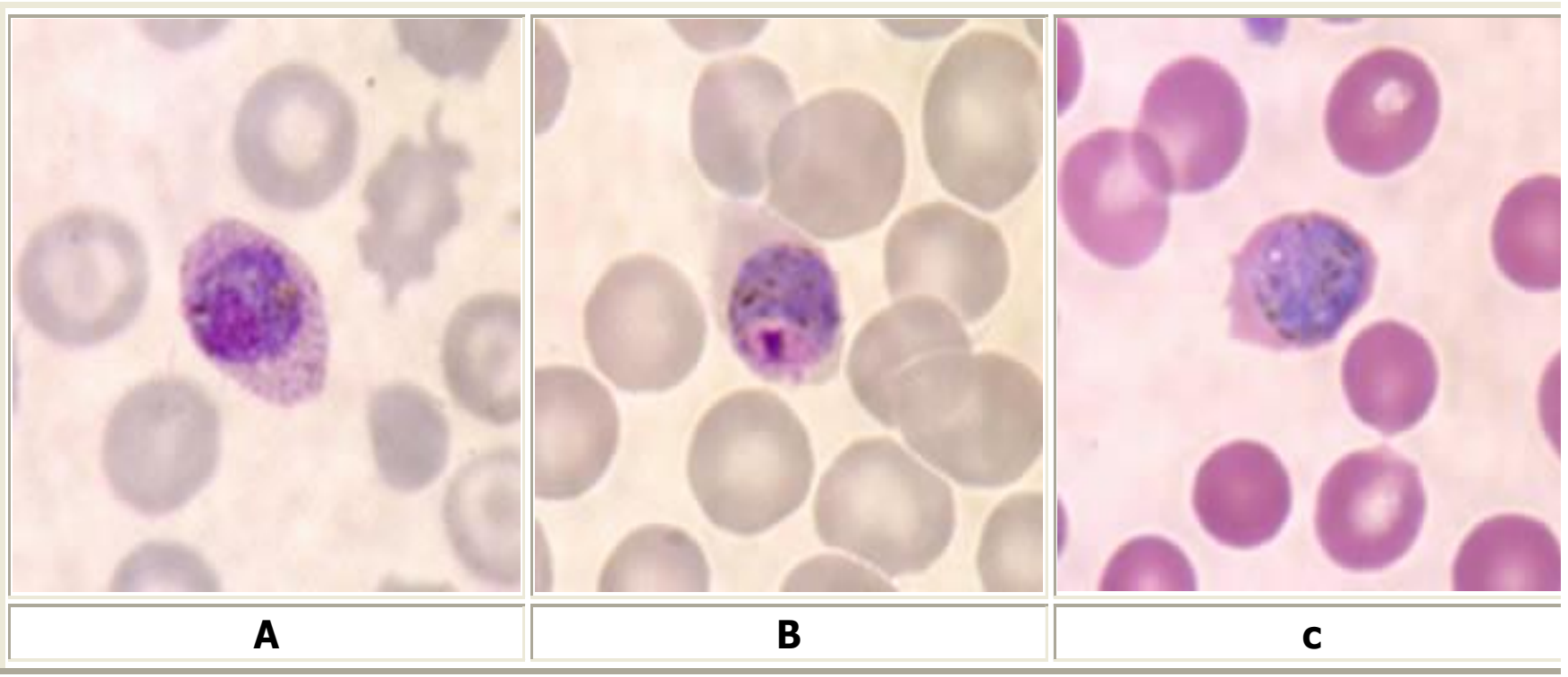


P.ovale –In thin film.



P.Ovale Gametocyte.

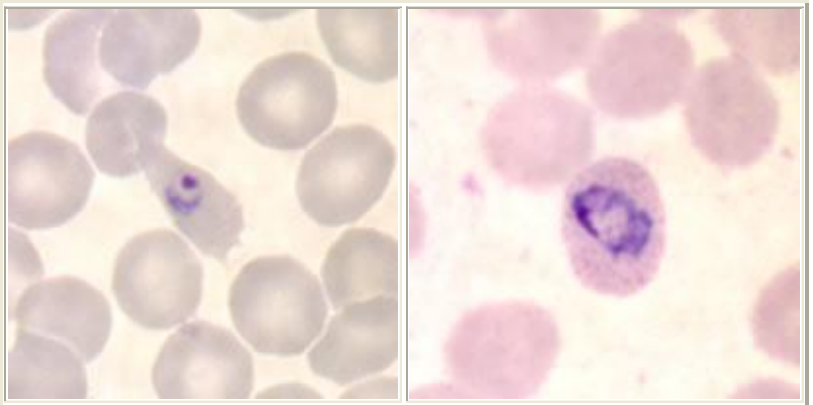
Plasmodium ovale gametocytes are round to oval, and may almost fill the red blood cells (RBCs). Pigment is brown and more coarse than that of *P. vivax*. RBCs are normal to sligl enlarged (1 1/4 ×), may be round to oval, and are sometimes fimbriated. Schüffner's dots visible under optimal conditions.



A, **B**, **C:** Gametocytes in thin blood smears. The Schüffner's dots can be seen in the infect oval RBC in **A**, and the erythrocytes in **B** and **C** show fimbriation.

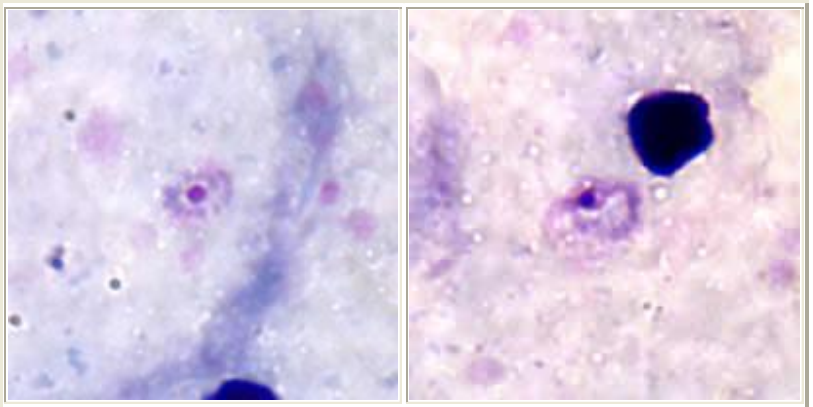
P.Ovale ring in thin and thick film

Plasmodium ovale rings have sturdy cytoplasm and large chromatin dots. Red blood cells (RBCs) are normal to slightly enlarged (1 1/4 ×), may be round to oval, and are sometimes fimbriated. Schüffner's dots are visible under optimal conditions.



A | B

A, **B:** *P. ovale* rings in thin blood smears. **A** shows fimbriation of the infected RBC. **B** shows Schüffner's dots.



C | D

P.Vivax blood stage parasites

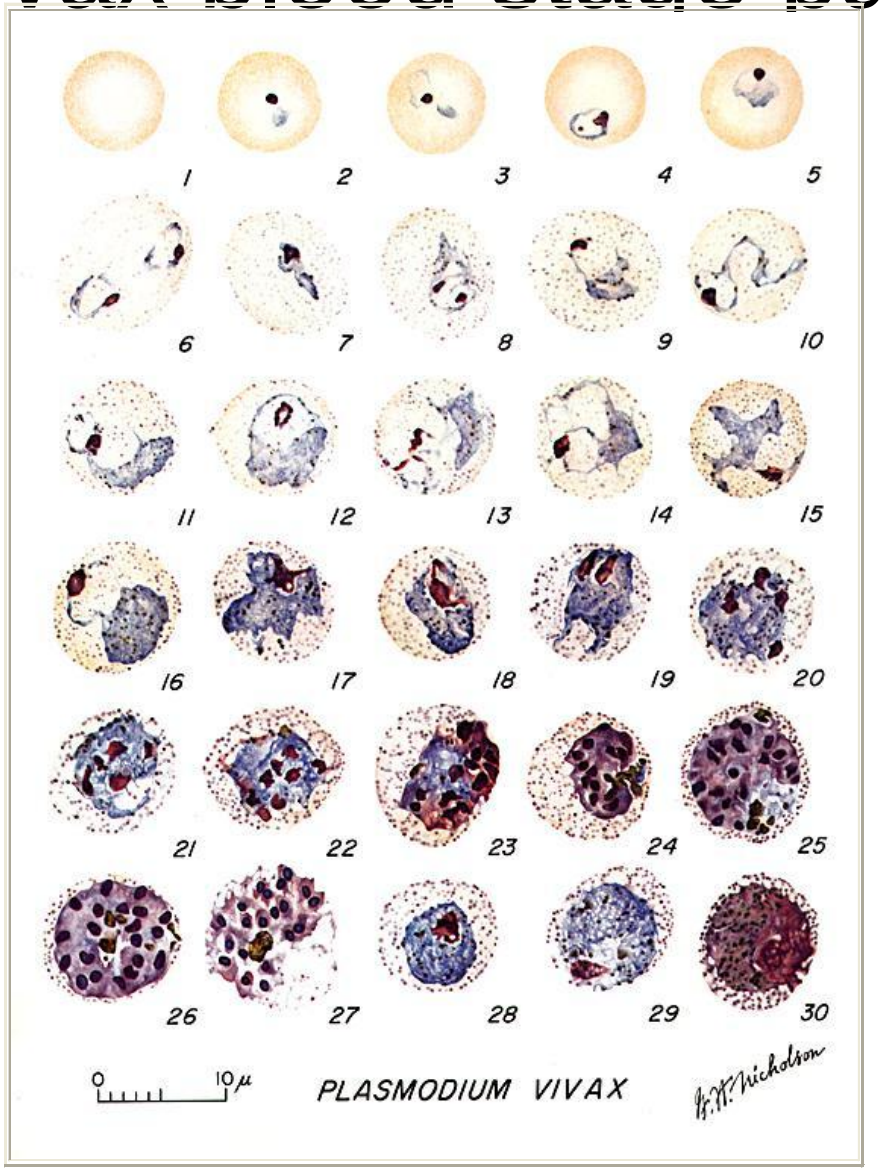
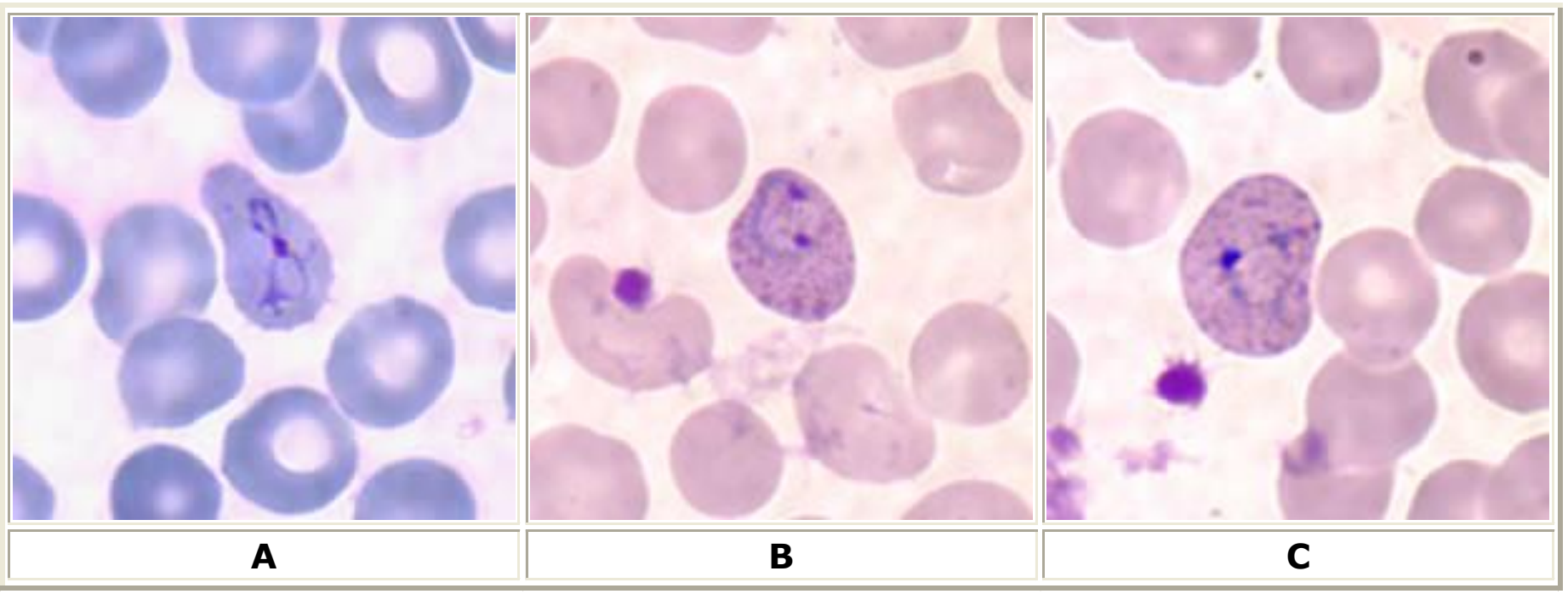


Fig. 1: Normal red cell; **Figs. 2**-**6:** Young trophozoites (ring stage parasites); **Figs. 7**-**18:** Trophozoites; **Figs. 19**-**27:** Schizonts; **Figs. 28** and **29:** Macrogametocytes (female); **Fig. 30:** Microgametocyte (male).

P. Vivax rings in a thin smear

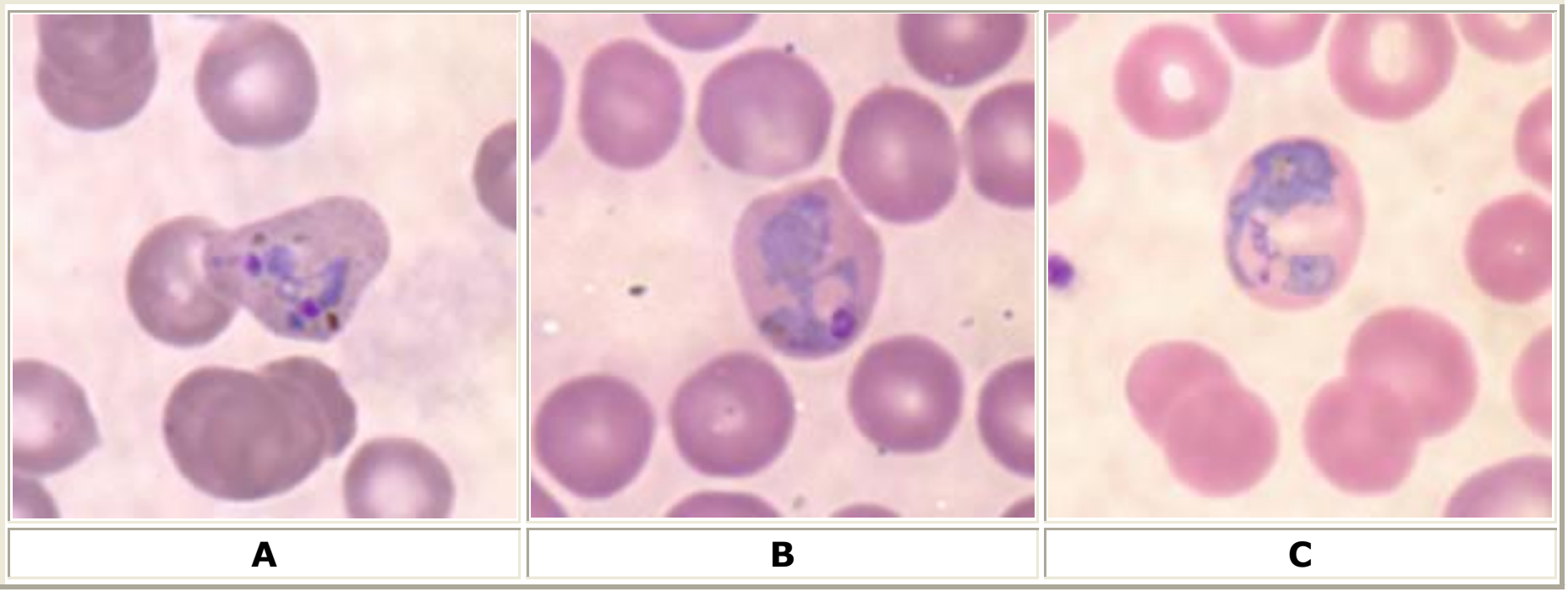


A	B	C

A, **B**, **C:** Rings in thin blood smears. **A** and **C:** Rings are amoeboid and the RBCs are enlarged and distorted. **B:** Ring with double chromatin dot. Schüffner's dots can be seen in **B** and **C**.

P. Vivax trophozoites

Plasmodium vivax trophozoites show amoeboid cytoplasm, large chromatin dots, and have fine, yellowish-brown pigment. Red blood cells are enlarged 1 1/2 to 2 × and may be distorted. Under optimal conditions, Schüffner's dots may appear more fine than those seen in *P. ovale*.



A	B	C

A, **B**, **C:** Large, amoeboid trophozoites of *P. vivax* in thin blood smears.

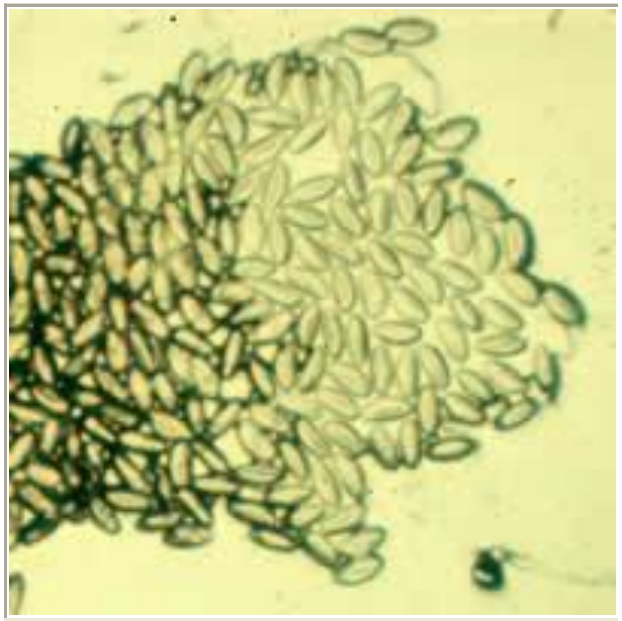
P.westermani

Egg of *Paragonimus westermani*. The average egg size is 85 µm by 53 µm (r
µm by 39 to 67 µm). They are yellow-brown, ovoidal or elongate, with a thic
asymmetrical with one end slightly flattened. At the large end, the operculun
visible. The opposite (abopercular) end is thickened. The eggs of *P. westerm*
unembryonated

E.Vermicularis eggs

A

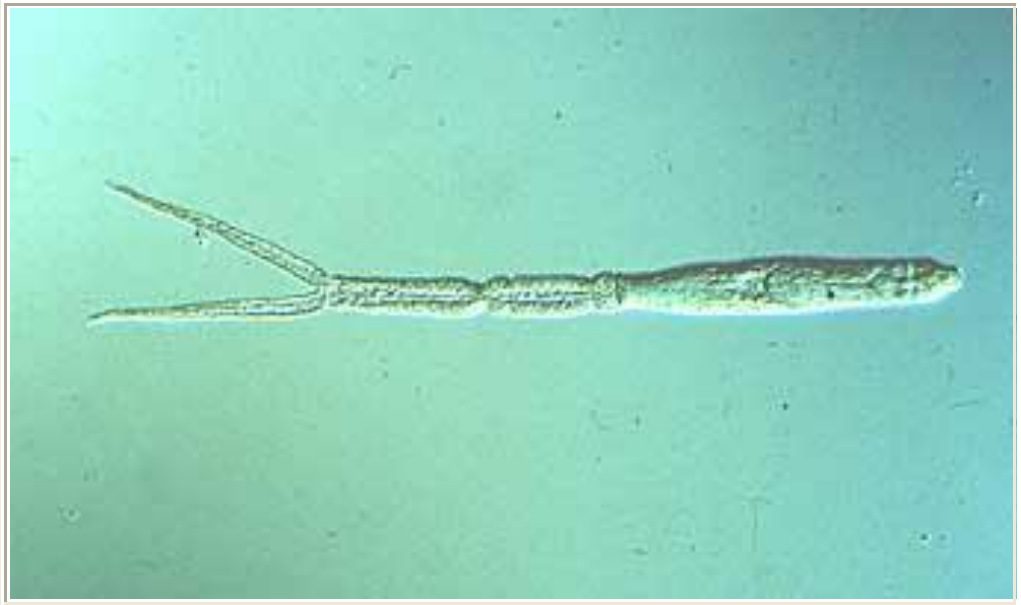
B



C

A and **B:** *Enterobius* eggs. Eggs measure 50 to 60 µm by 20 to 32 µm.
C: *Enterobius* eggs on cellulose tape prep.

Cercariae



A

B

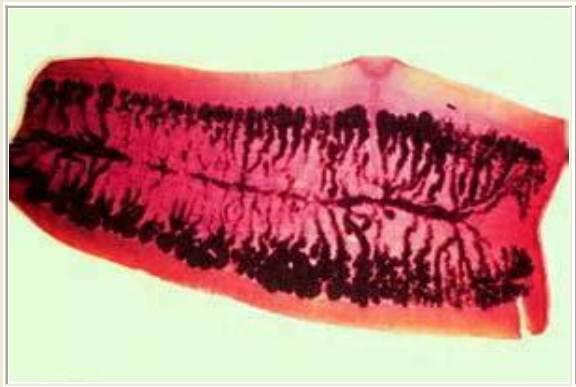
CAUSES SWIMMERS ITCH
SCHISTOSOMA

Taenia egg

[Taenia saginata] [T. solium]

Taenia segments

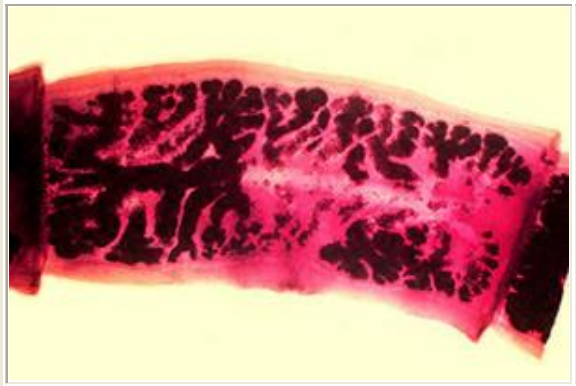
[Taenia saginata][T. solium]



A

B

T.SAGINATA



C

D

T.SOLIUM

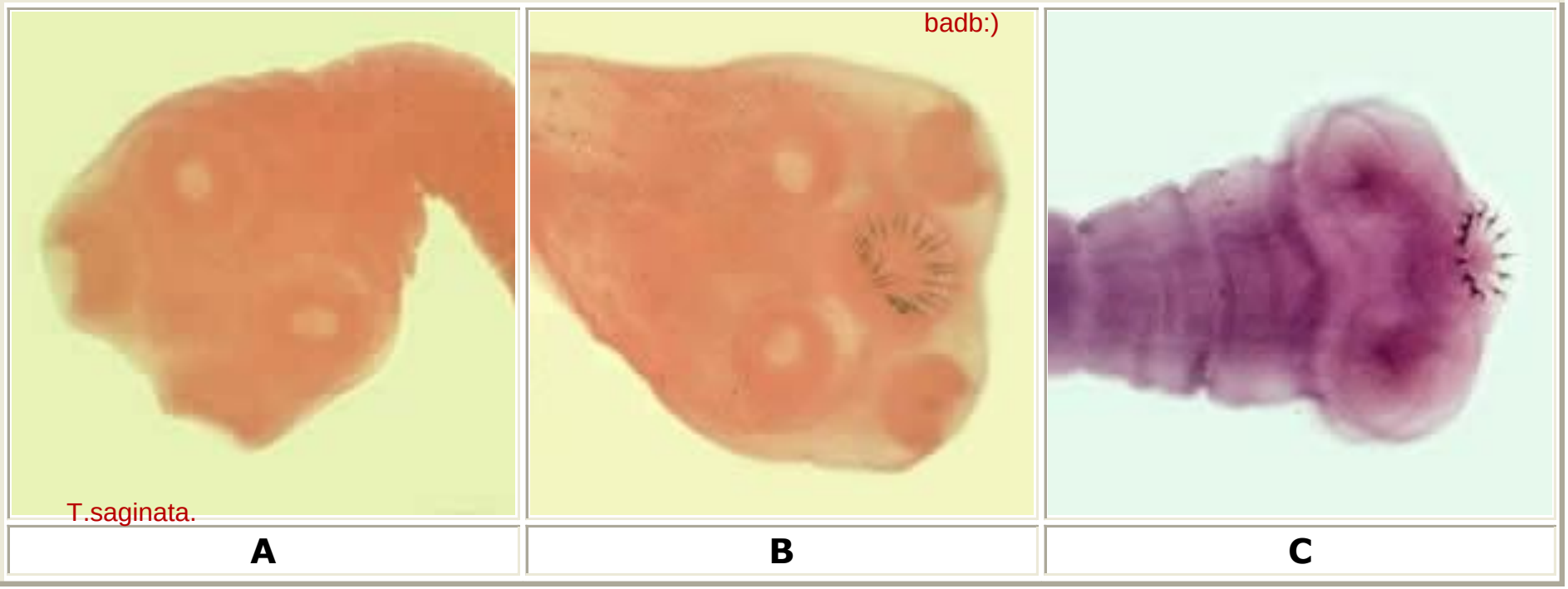
A, **B**, **C**, **D:** Gravid proglottids of *Taenia saginata* (Figures **A** and **B**) and *Taenia solium* (Figures **C** and **D**). Injection of India ink in the uterus allows visualization of the primary lateral branches. Their number allows differentiation between the two species: *T. saginata* has 15 to 20 branches on each side (Figure **A** and **B**), while *Taenia solium* has 7 to 13 (Figures **C** and **D**). Note the genital pores in mid-lateral position.

Taenia Scoleces

t,solium
short
hooks

Taenia saginata] [T. solium]

badb:)

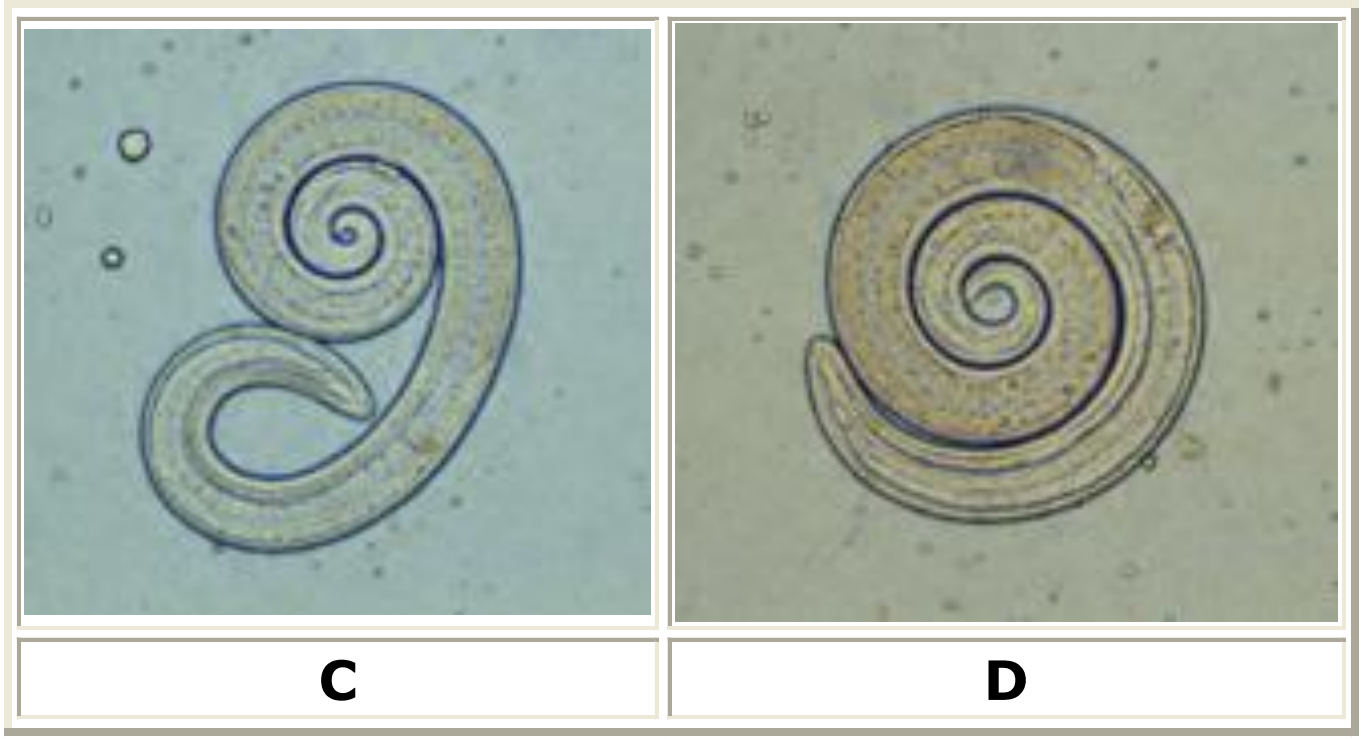


A, **B**, **C:** Scoleces of *Taenia saginata* (Figure **A**) and *Taenia solium* (Figures **B** and **C**). Scolex of *T. saginata* has 4 suckers and no hooks. *T. solium* has 4 suckers in addition to a double row of hooks.

T.Spiralis larvae

[Trichinella spiralis] [T. pseudospiralis]
[T. nativa] [T. nelsoni] [T. britovi]

encysted larvae in striated muscle
undercooked pork....



C

D

C, **D:** Larvae of *Trichinella*, freed from their cysts, typically coiled; Alaskan bear.

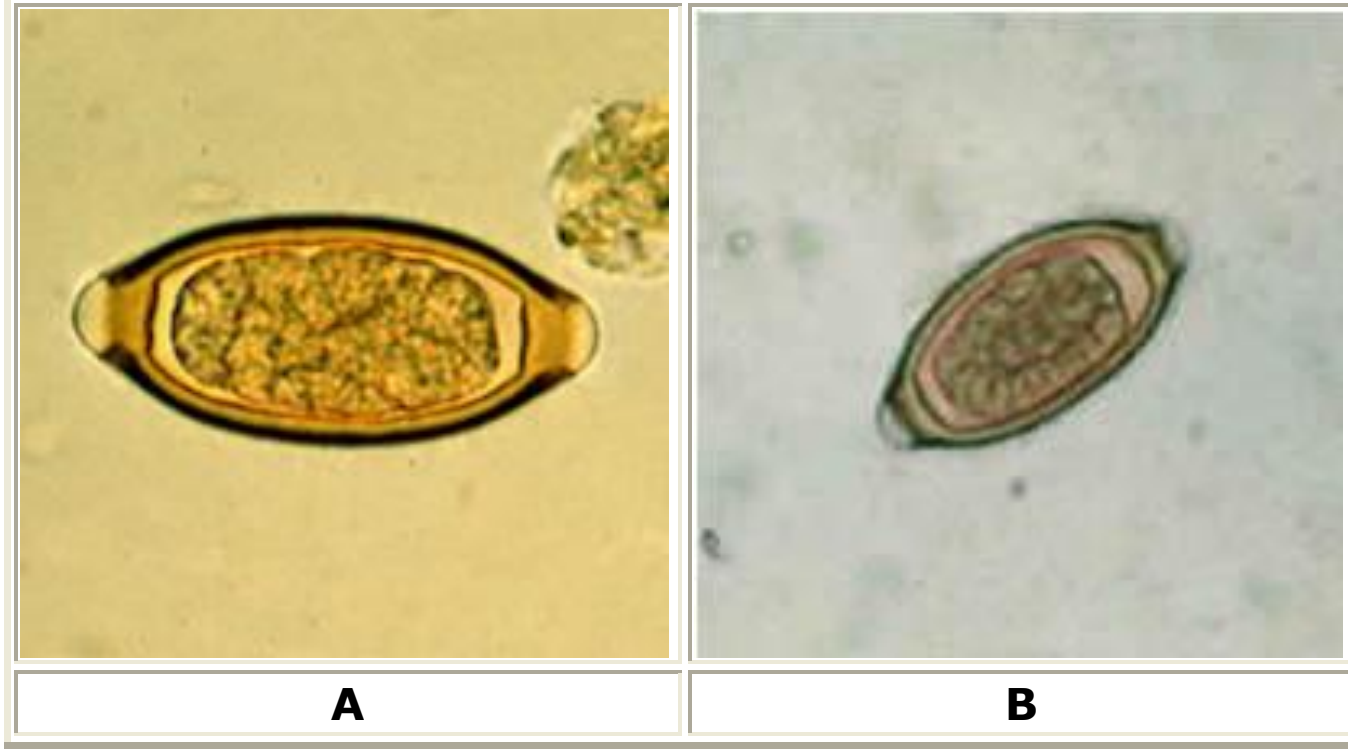
T. Vaginalis trophozoites

Trichomonas vaginalis]

Two trophozoites of *Trichomonas vaginalis* with Giemsa.

T. Trichiura eggs

[Trichuris trichiura]



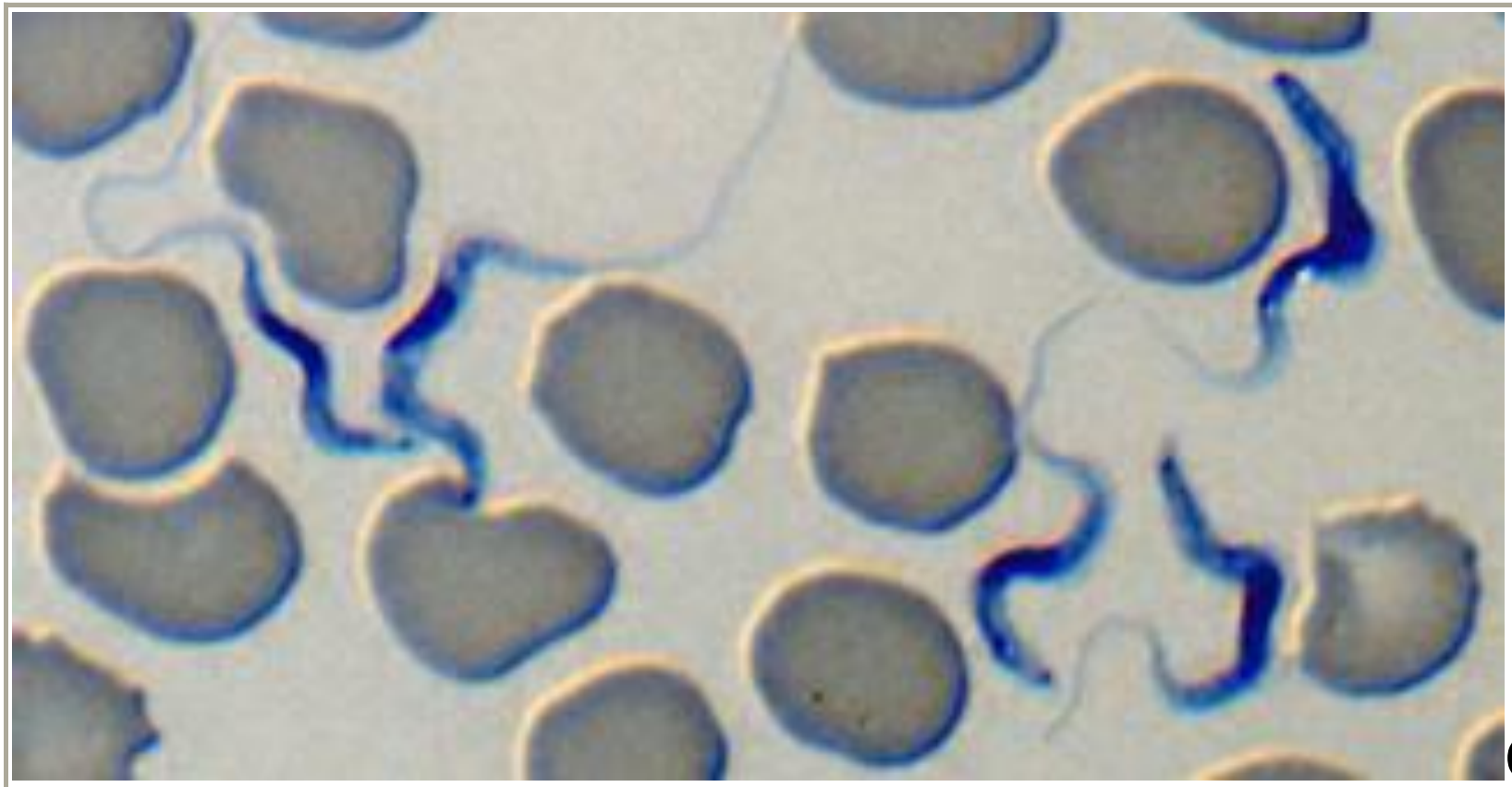
A	B

A, **B:** *Trichuris trichiura* eggs (wet preparation). The diagnos

- a typical barrel shape
- two polar plugs, that are unstained
- size: 50 to 54 µm by 22 to 23 µm

Trypanosomes

[Trypanosoma brucei gambiense] [T. b. rhodesiense]



C

Fasciolopsis buski fluke

trematode

B.Coli cyst and trophozoite

The trophozoite is oval and measures approximately 50 to 100 µm long and 40 to 70 µm wide. ***Balantidium coli*** is the only pathogenic ciliate. The image on the left was taken at 400x. In the image on the right, the cytostome is visible (arrow), image courtesy Gustavo Gini.

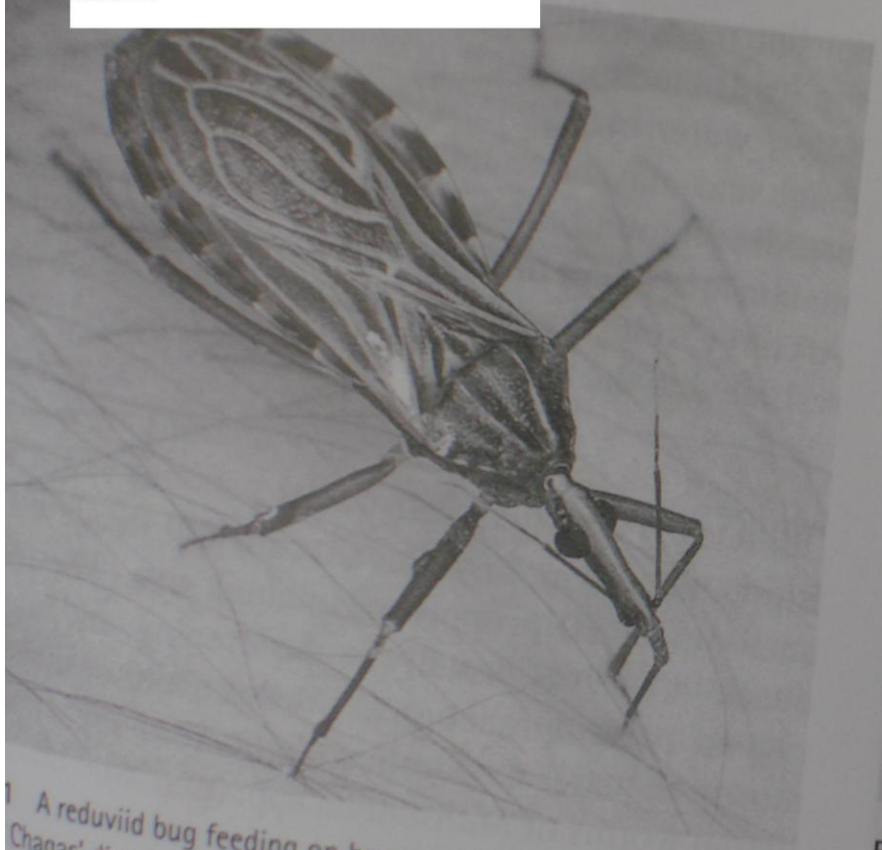
G.lamblia

H. nana-, have polar filaments (arrow)

P.westermani-yellowish-brown ova are operculated

L.loa

A reduviid bug- transmits chagas' disease



A reduviid bug feeding on human skin. These
Chagas' disease in

The Rat flea-Xenopsylla cheopsis. Vector of plague

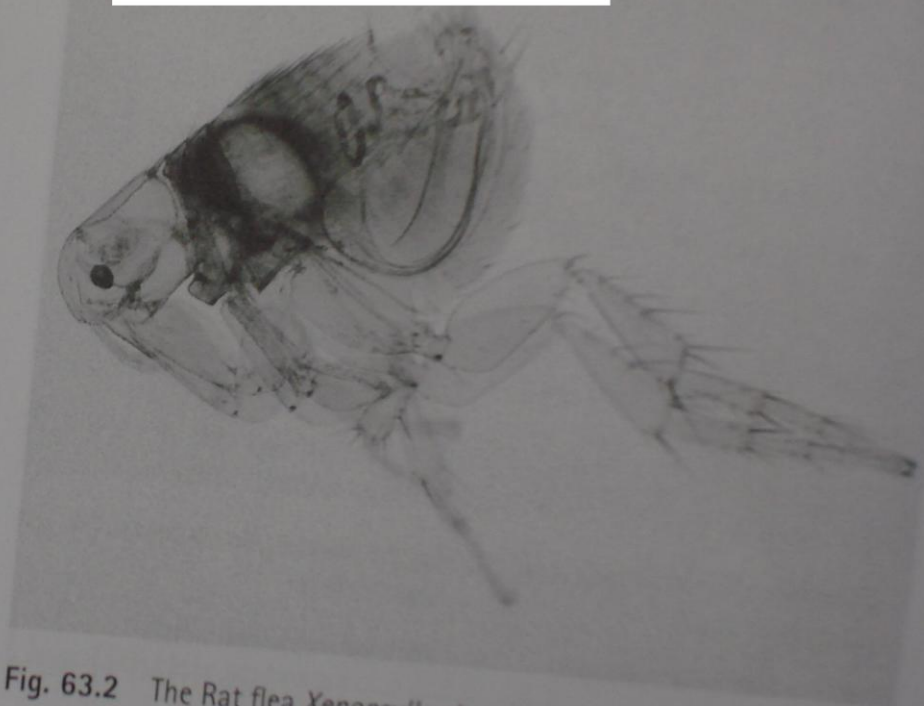
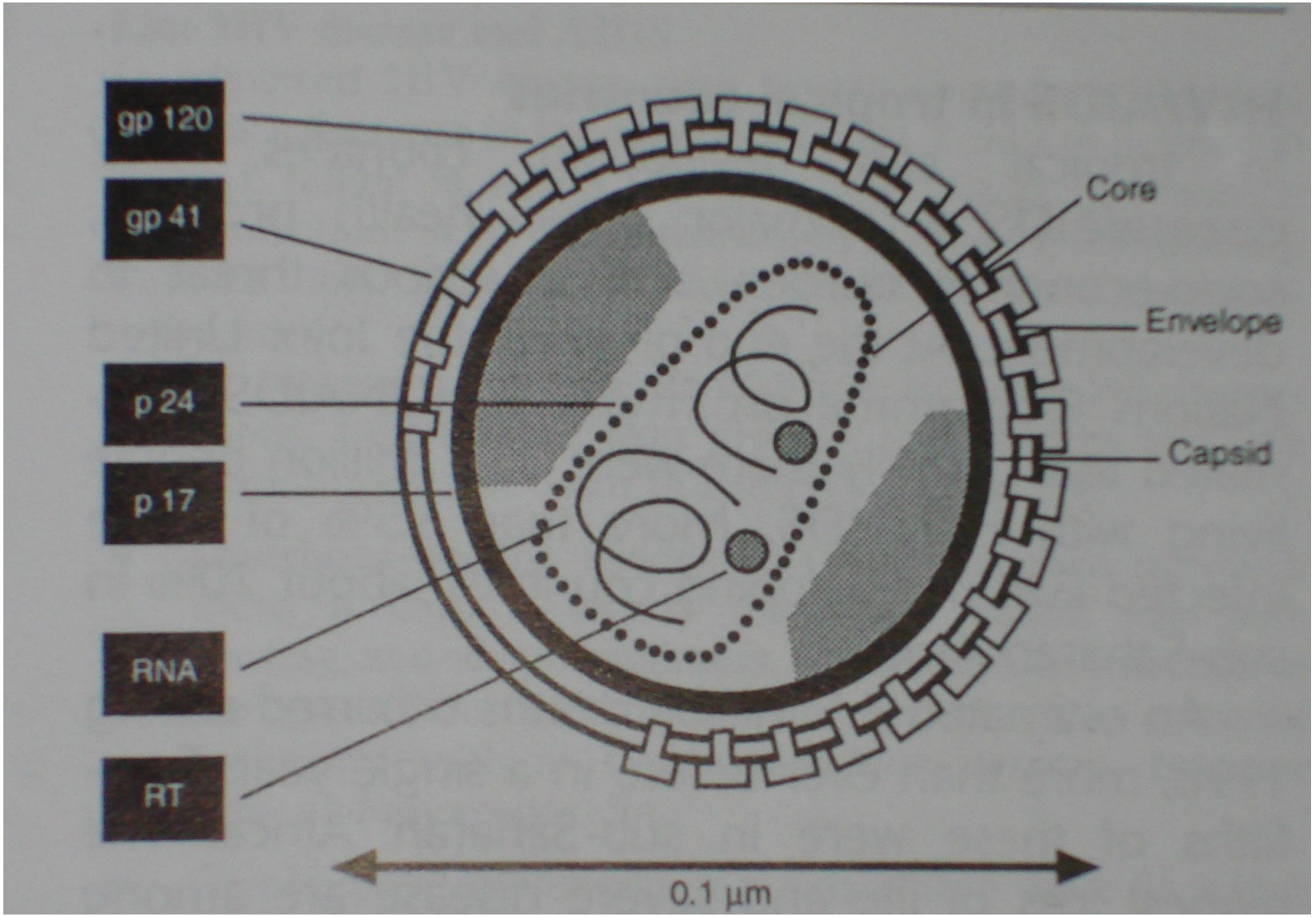


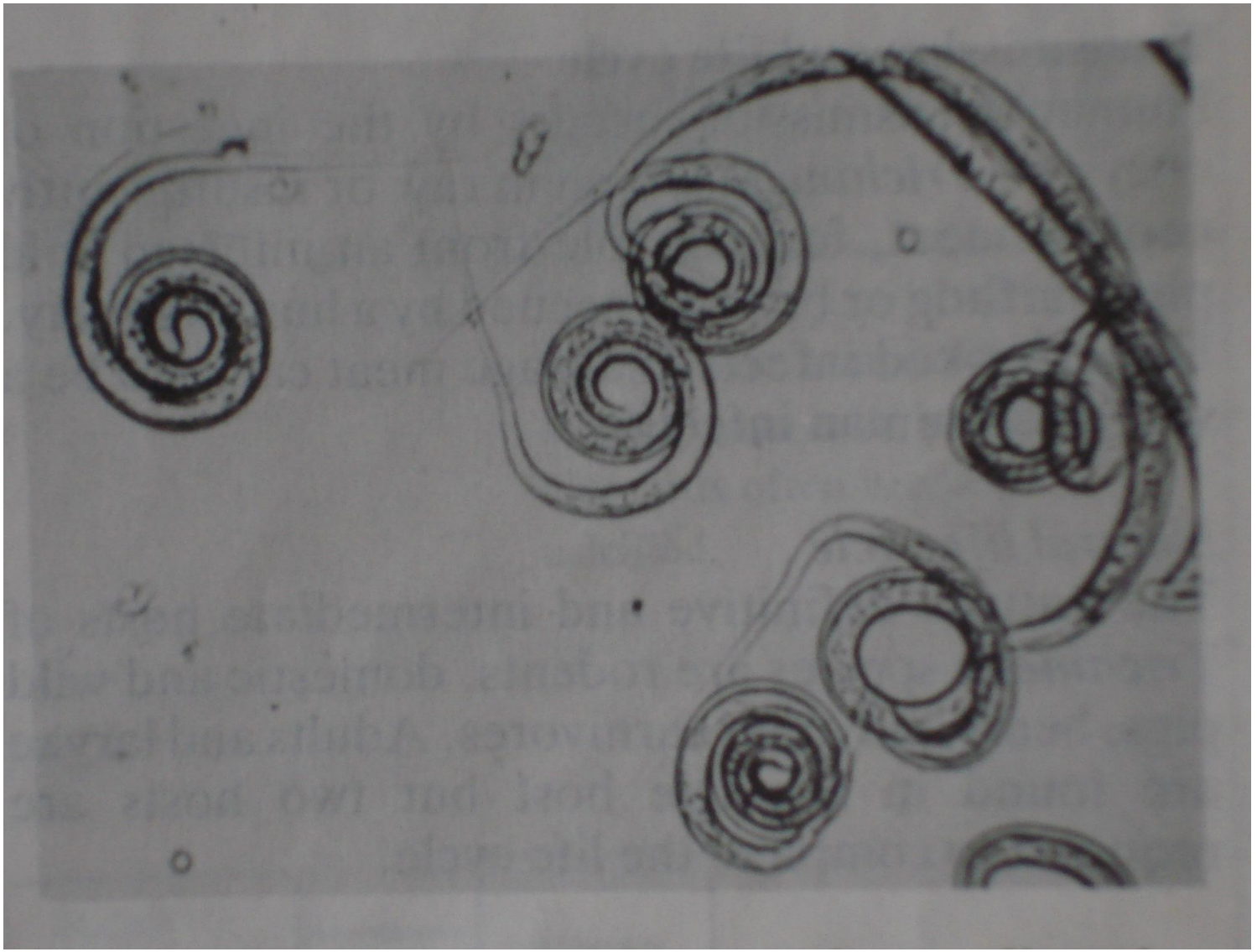
Fig. 63.2 The Rat flea

HIV

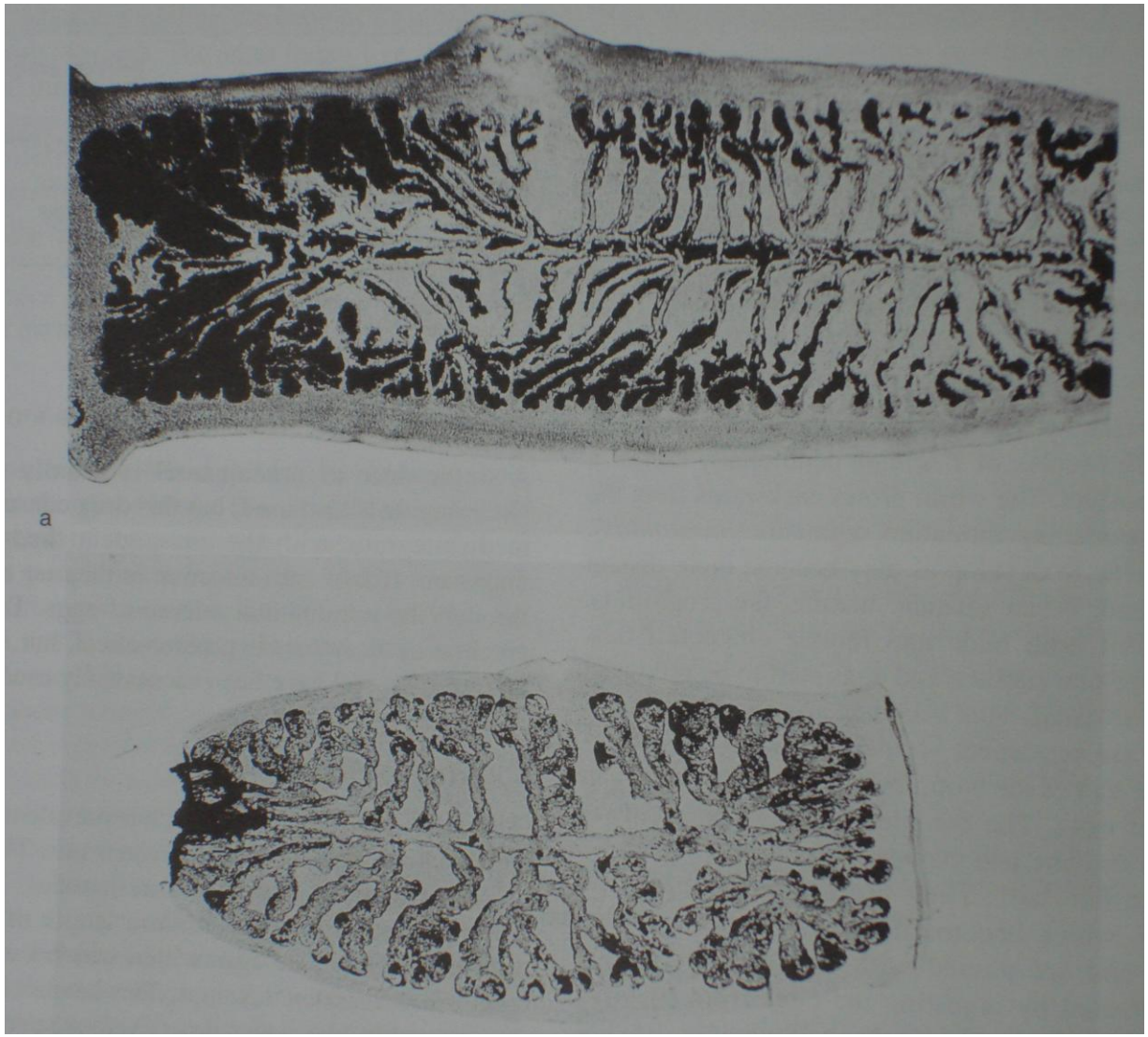


D..mednensis larvae

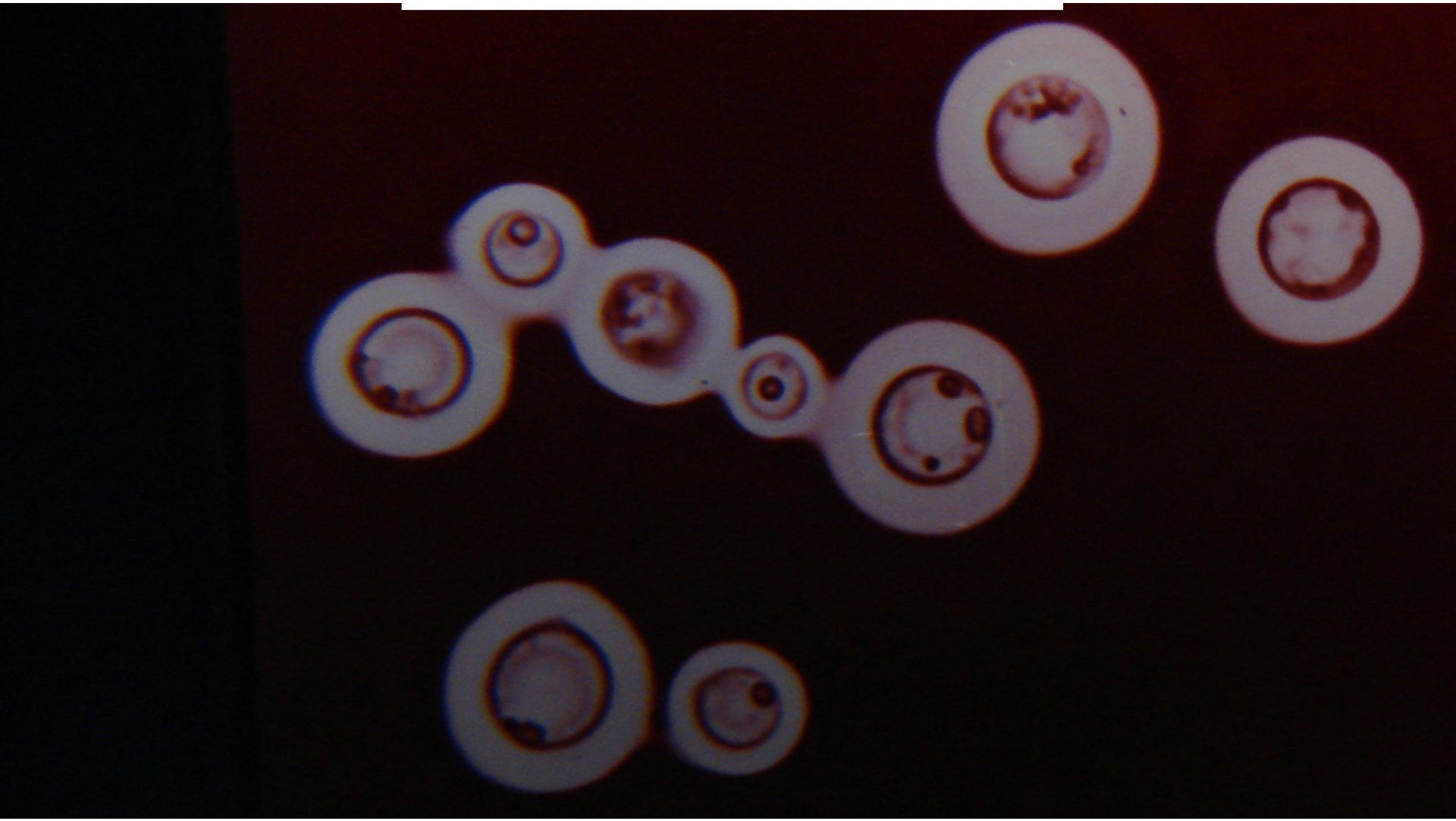
drancuculus medinensis.... guinea worm



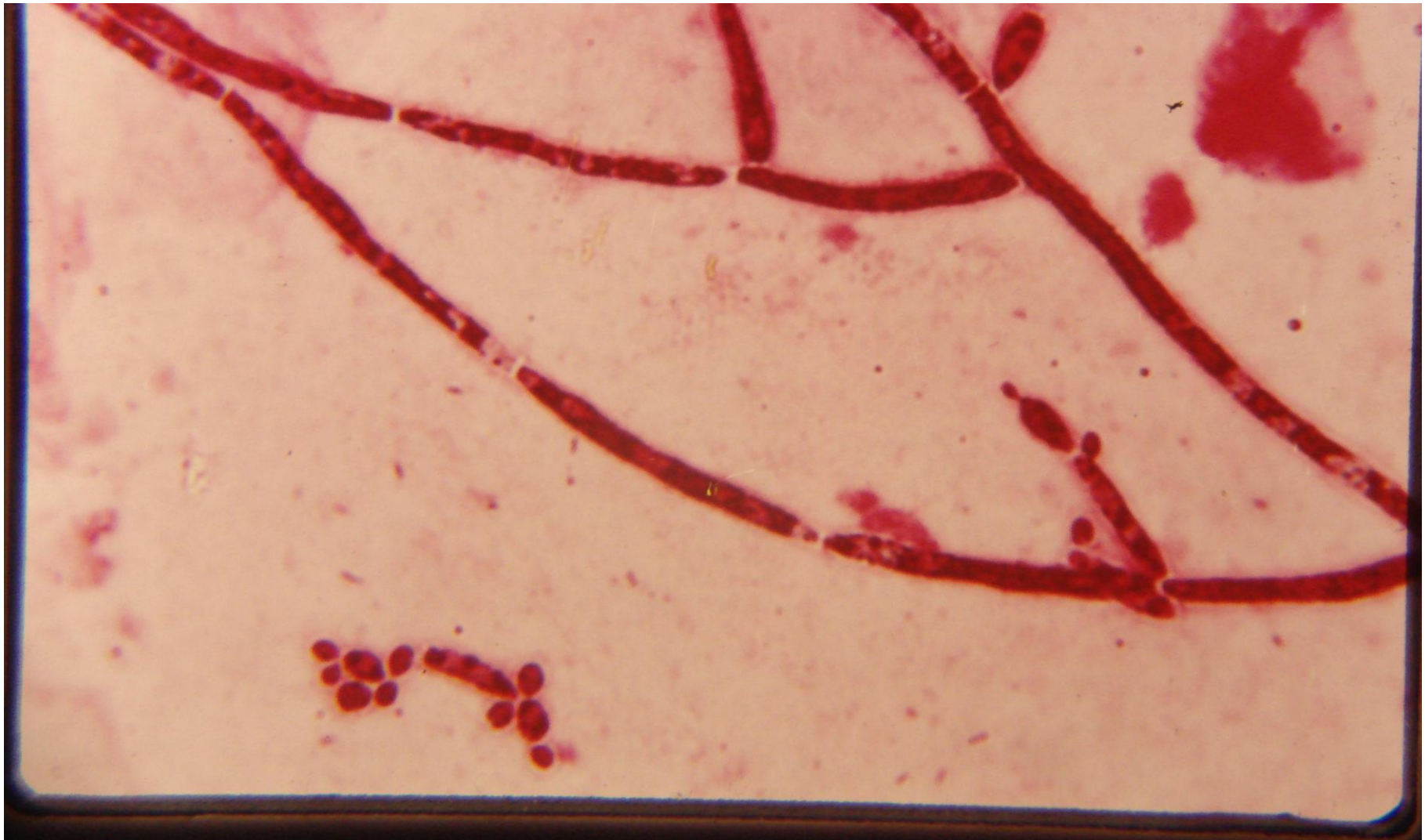
T.Sagnata and T.solium segments resp.



Cry.neoformans in India Ink

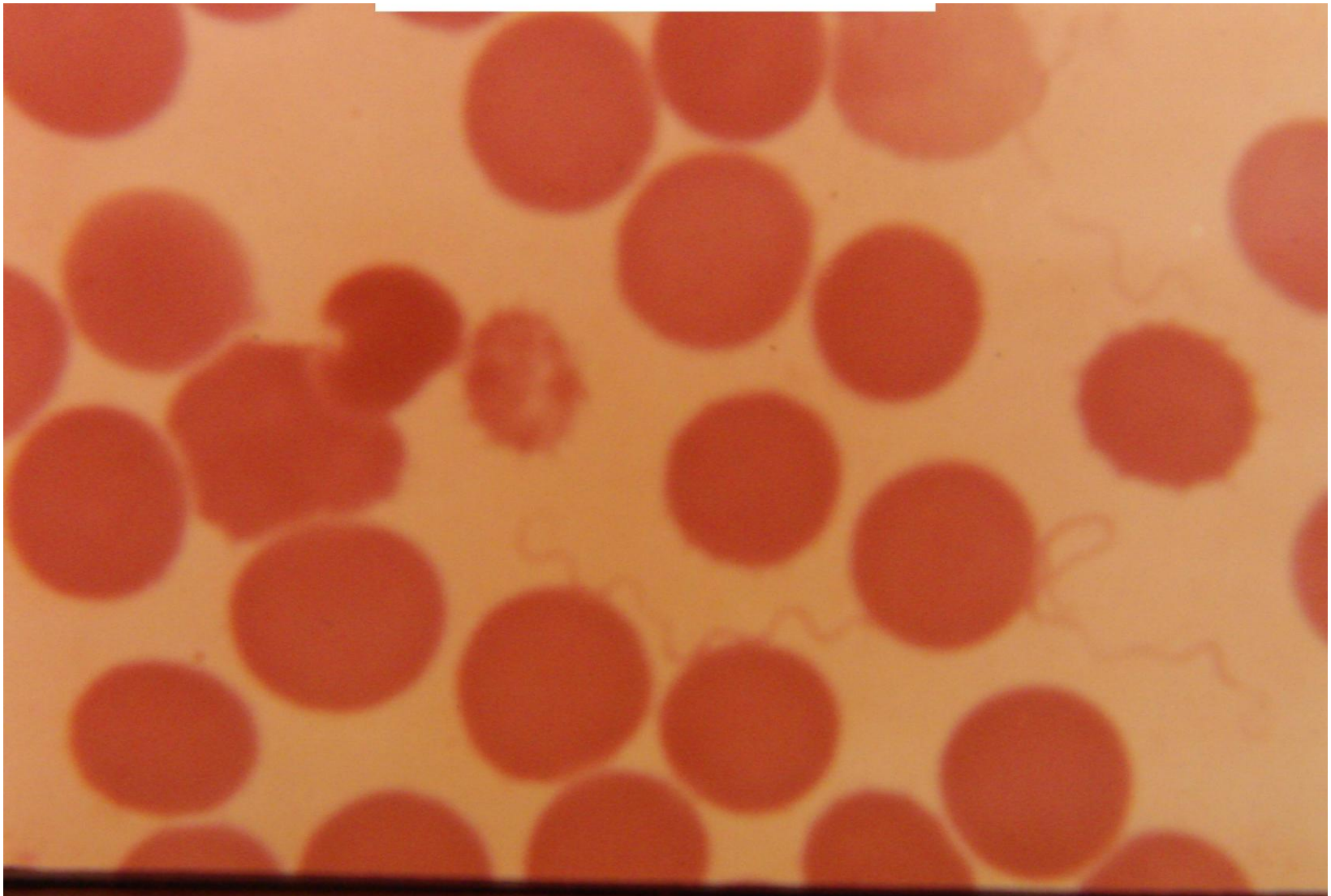


Yeast hyphae



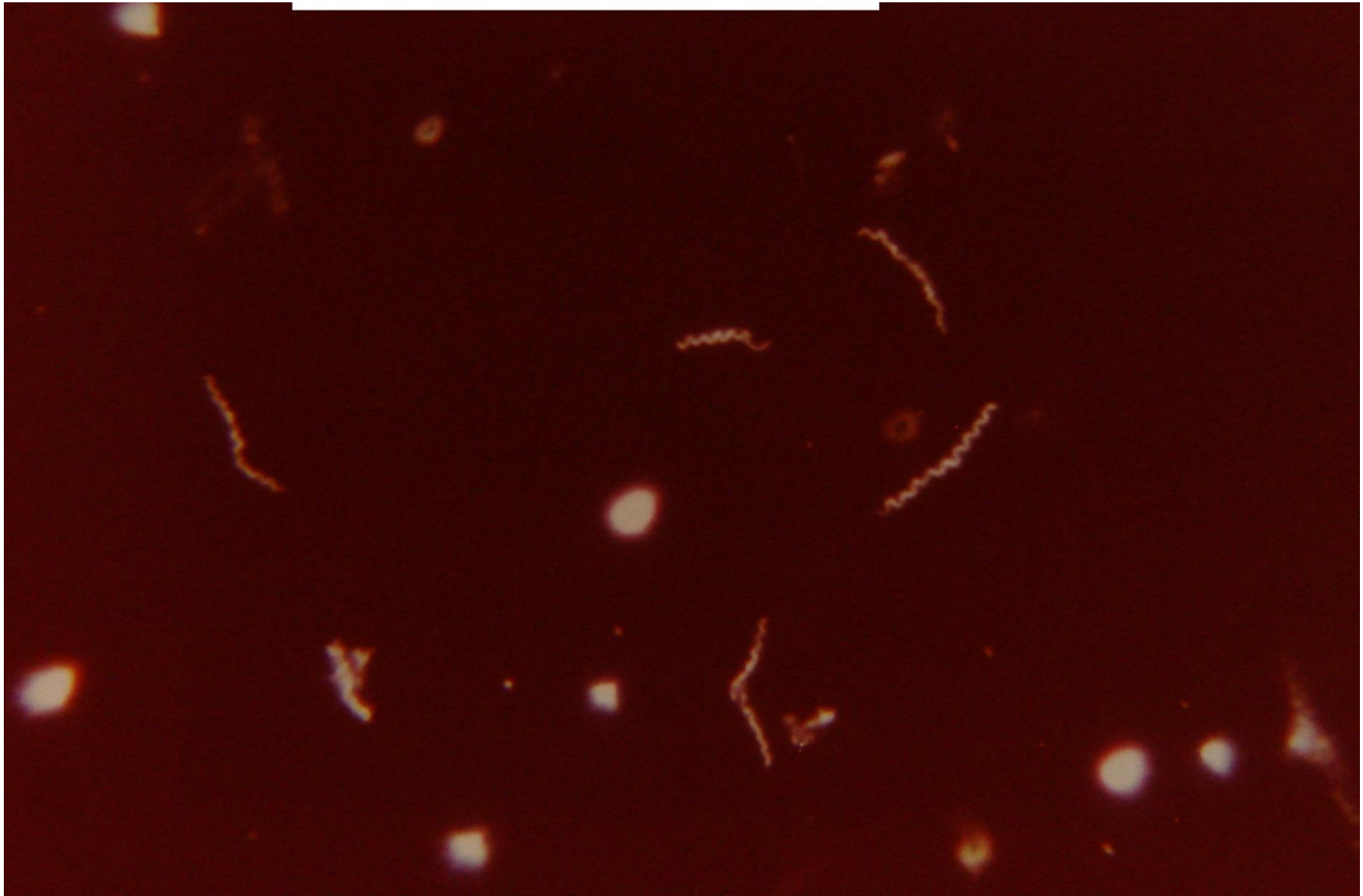
B.Recurrents in thin smear

it is a spitochete that is transmitted by body lice



T.Pallidum in dark field microscopy

tryponema pallidum causes syphillis
treated with pen G



erythroblasts

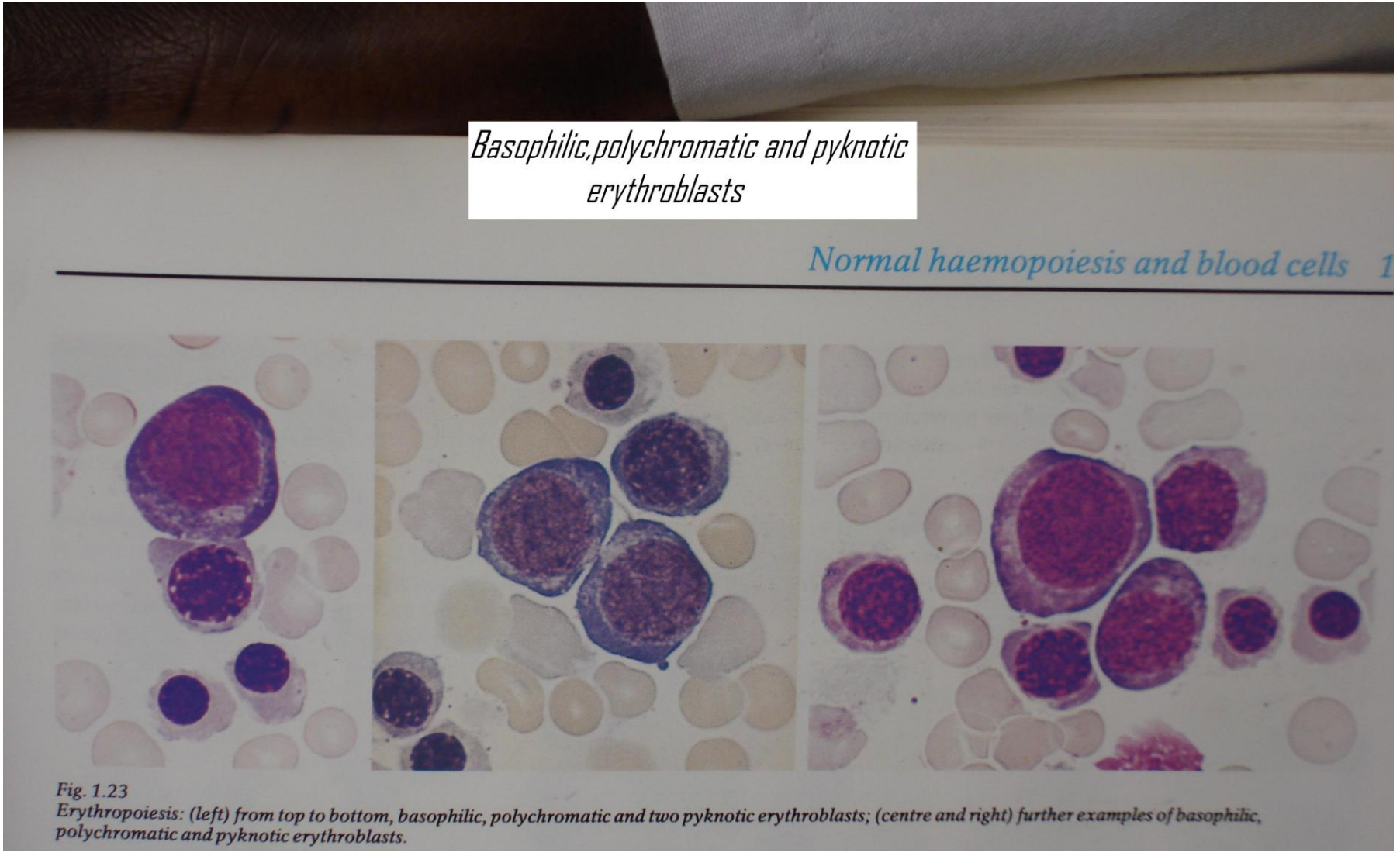


Fig. 1.23
Erythropoiesis: (left) from top to bottom, basophilic, polychromatic and two pyknotic erythroblasts; (centre and right) further examples of basophilic, polychromatic and pyknotic erythroblasts.

Supra vital staining of Rbcs

Reticulocytes showing precipitated RNA-supravital staining eg bcb

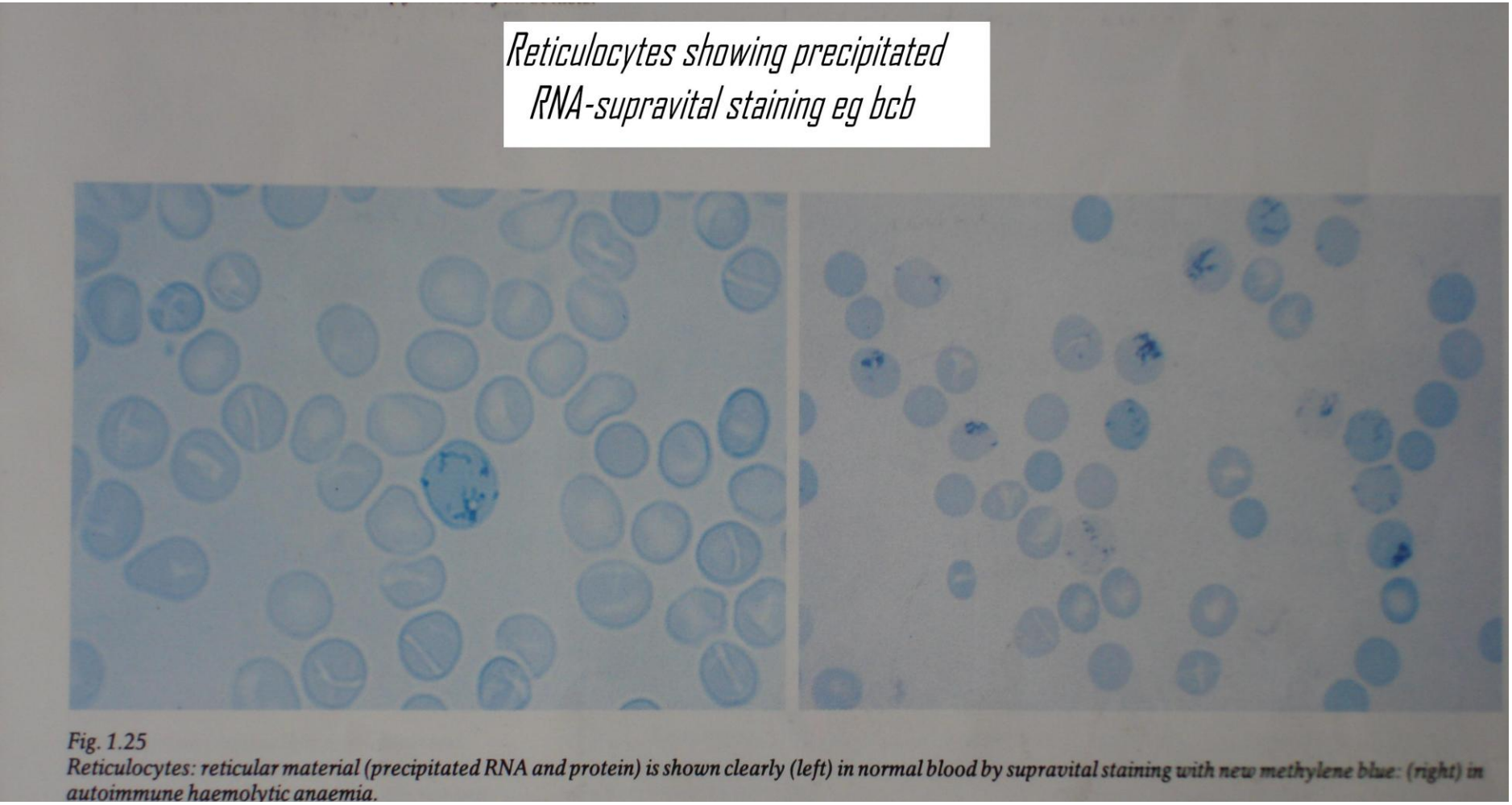


Fig. 1.25
Reticulocytes: reticular material (precipitated RNA and protein) is shown clearly (left) in normal blood by supravital staining with new methylene blue: (right) in autoimmune haemolytic anaemia.

Granulopoiesis

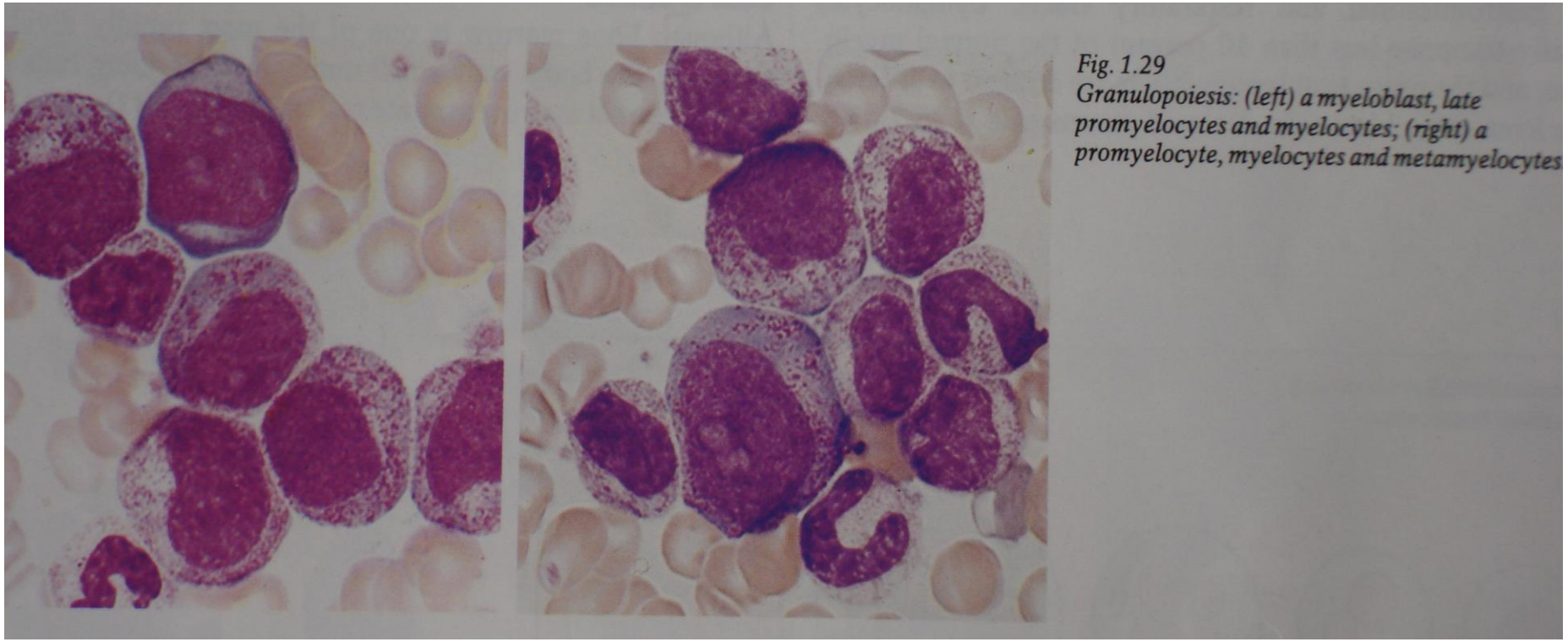


Fig. 1.29
Granulopoiesis: (left) a myeloblast, late promyelocytes and myelocytes; (right) a promyelocyte, myelocytes and metamyelocytes

Granulopoiesis

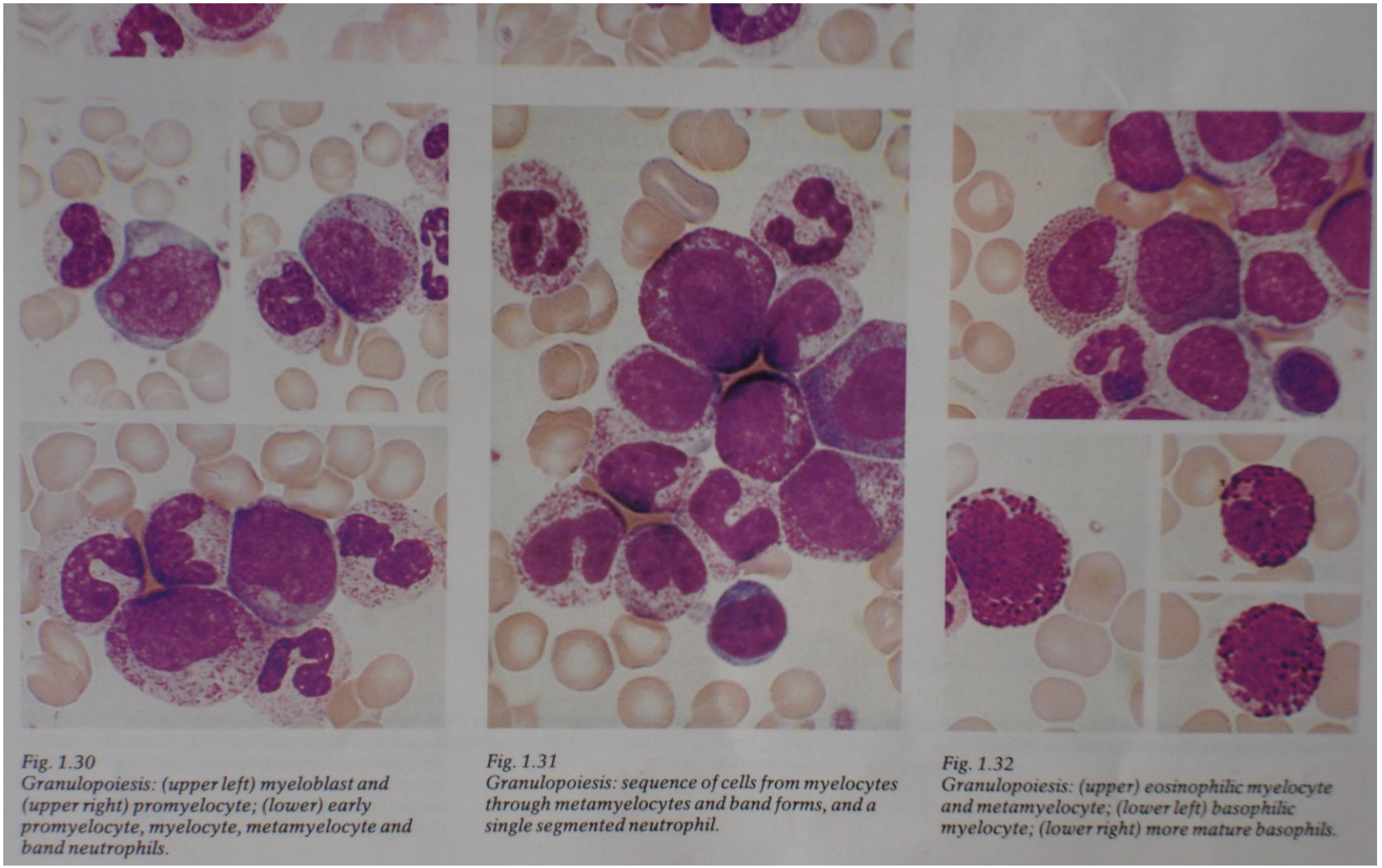
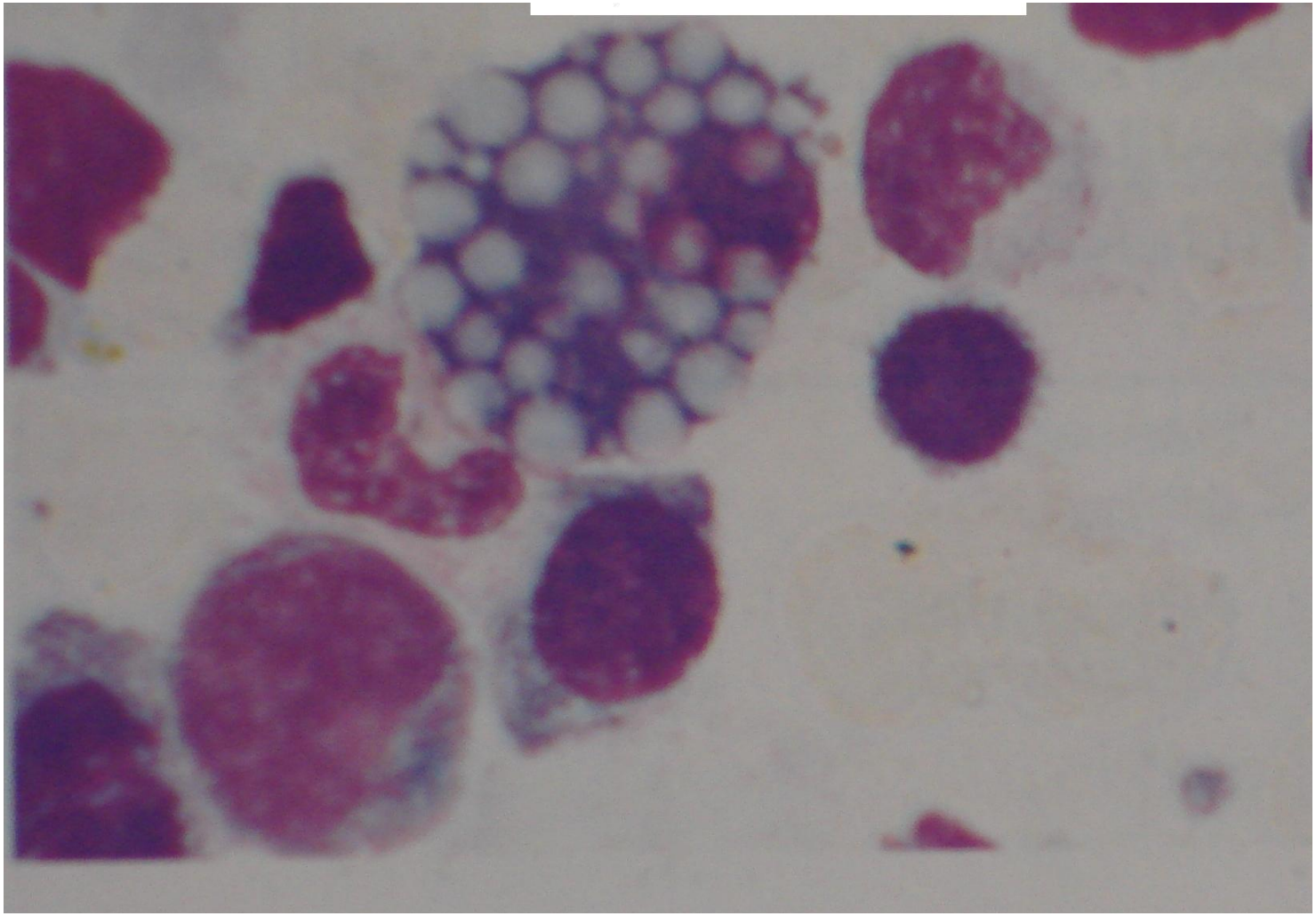


Fig. 1.30
Granulopoiesis: (upper left) myeloblast and (upper right) promyelocyte; (lower) early promyelocyte, myelocyte, metamyelocyte and band neutrophils.

Fig. 1.31
Granulopoiesis: sequence of cells from myelocytes through metamyelocytes and band forms, and a single segmented neutrophil.

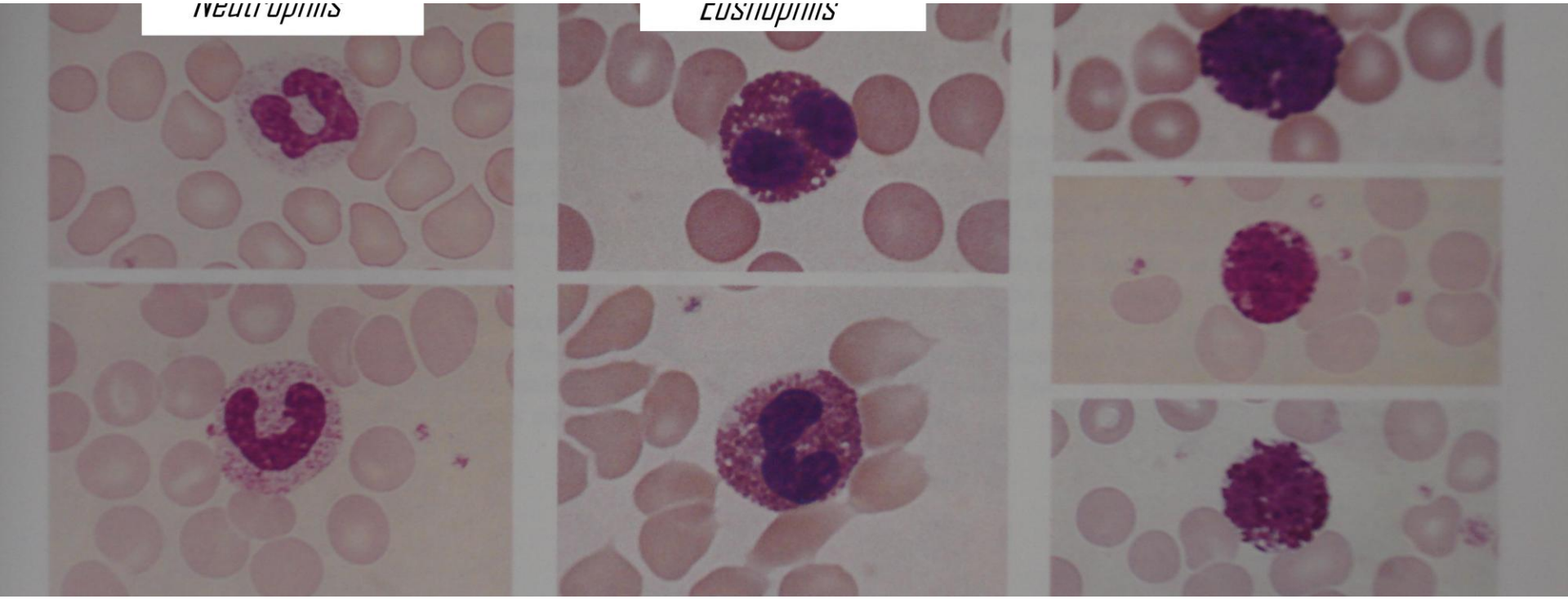
Fig. 1.32
Granulopoiesis: (upper) eosinophilic myelocyte and metamyelocyte; (lower left) basophilic myelocyte; (lower right) more mature basophils.

Mott cell(Plasma cell)-Contains spherical cytoplasmic inclusions.



Neutrophils,Eosinophils,Basophils resp.

granulocytes



Monocytes and Lymphocytes

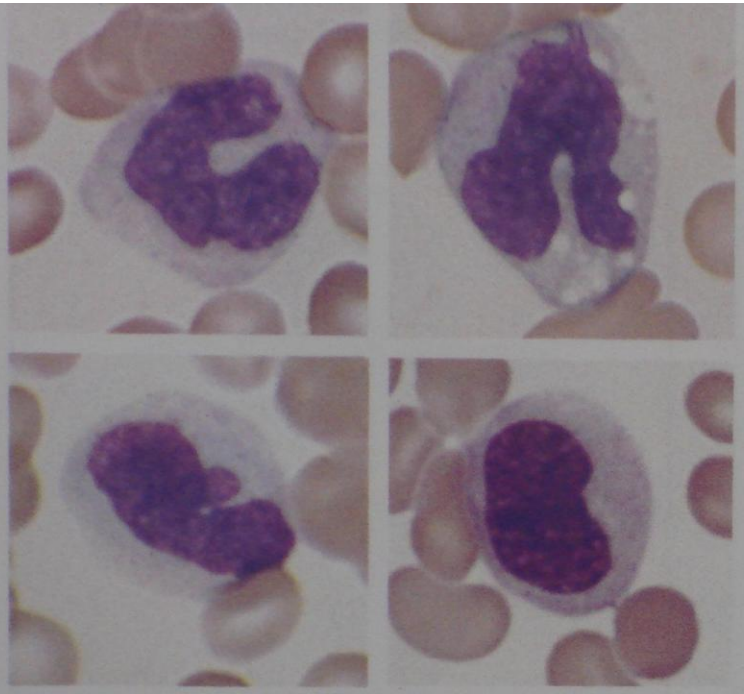


Fig. 1.51
Monocytes: these cells are usually the largest white cells found in normal blood. The nucleus is usually folded or convoluted, with a moderately fine chromatin pattern. The cytoplasm typically has a grey 'ground glass' appearance with fine azurophilic granules. Some (upper right) have rather prominent cytoplasmic vacuoles.

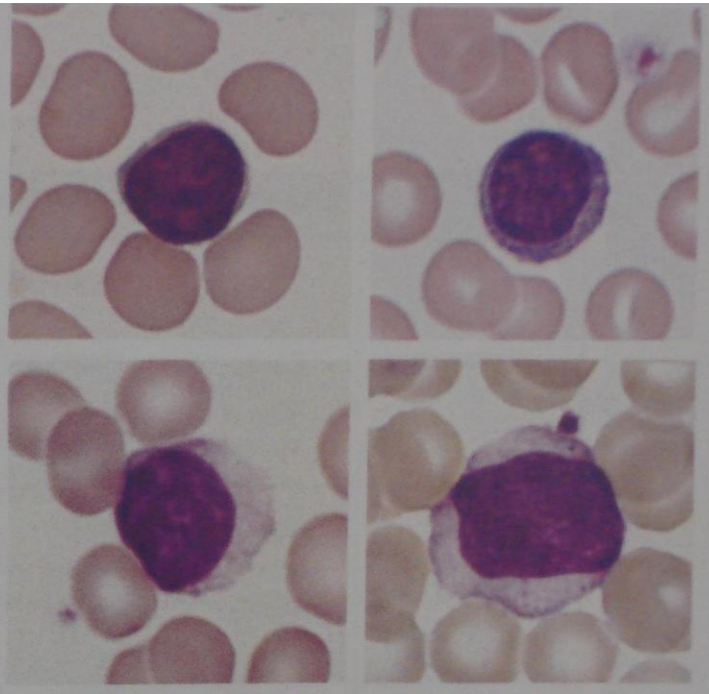
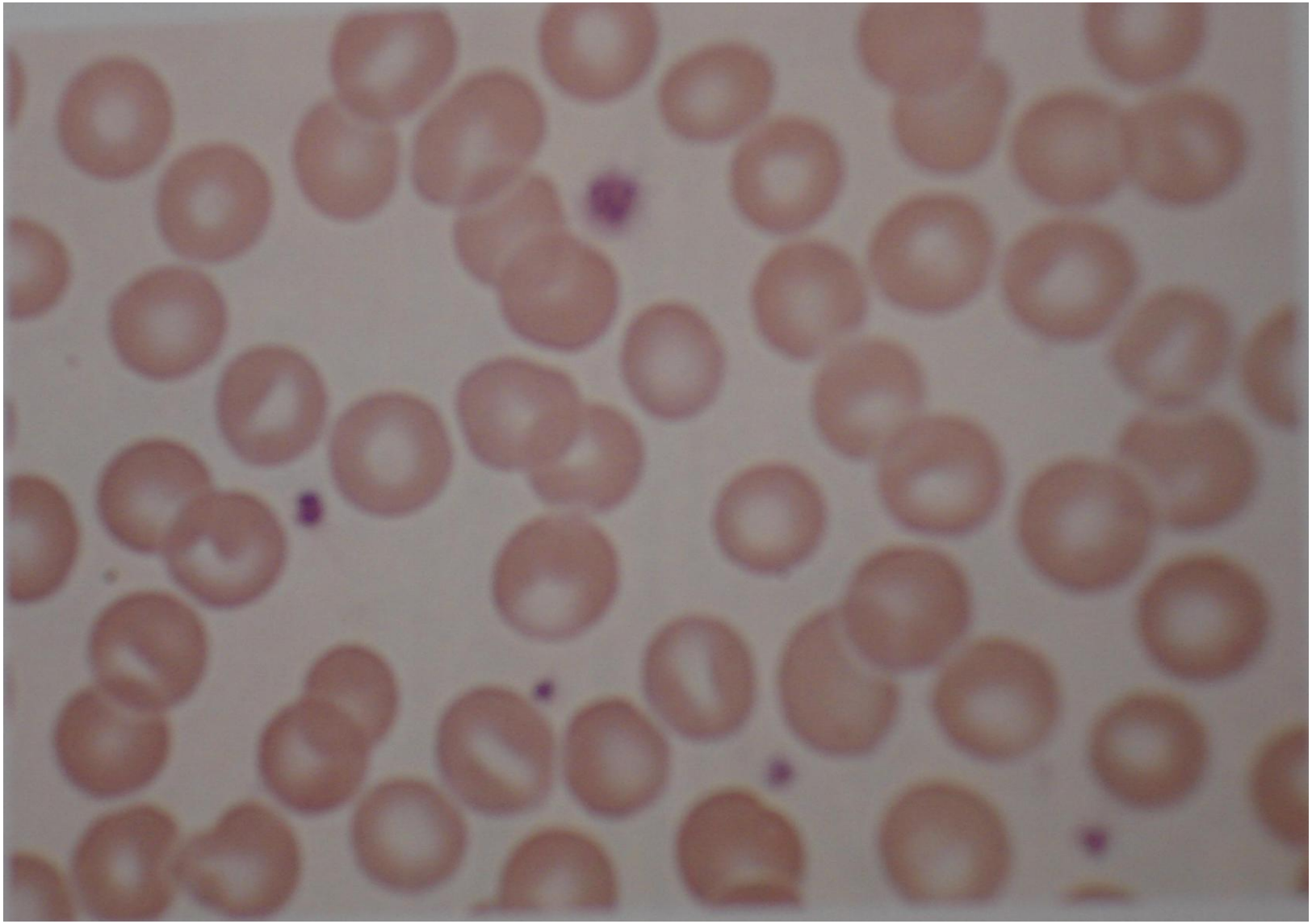
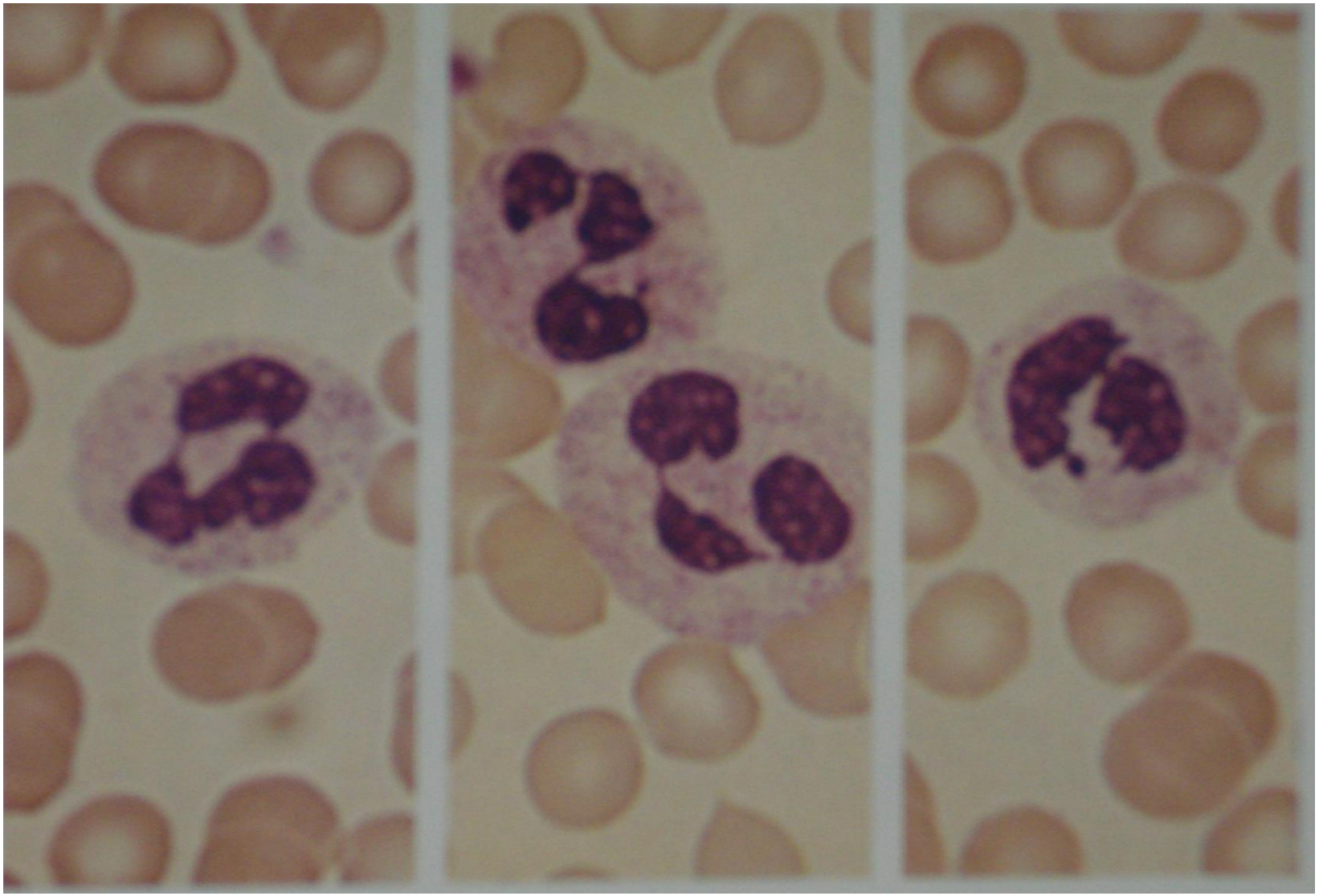


Fig. 1.52
Lymphocytes: (upper) normal small lymphocytes are 7–12 μm in diameter with light blue scanty cytoplasm and a central round nucleus with a condensed amorphous chromatin pattern. Some lymphocytes (lower) have diameters up to 20 μm, and even larger forms are found during viral and other infections.

Normal Rbcs



Normal neutrophils



T lymphocyte rosetting with shee Rbcs