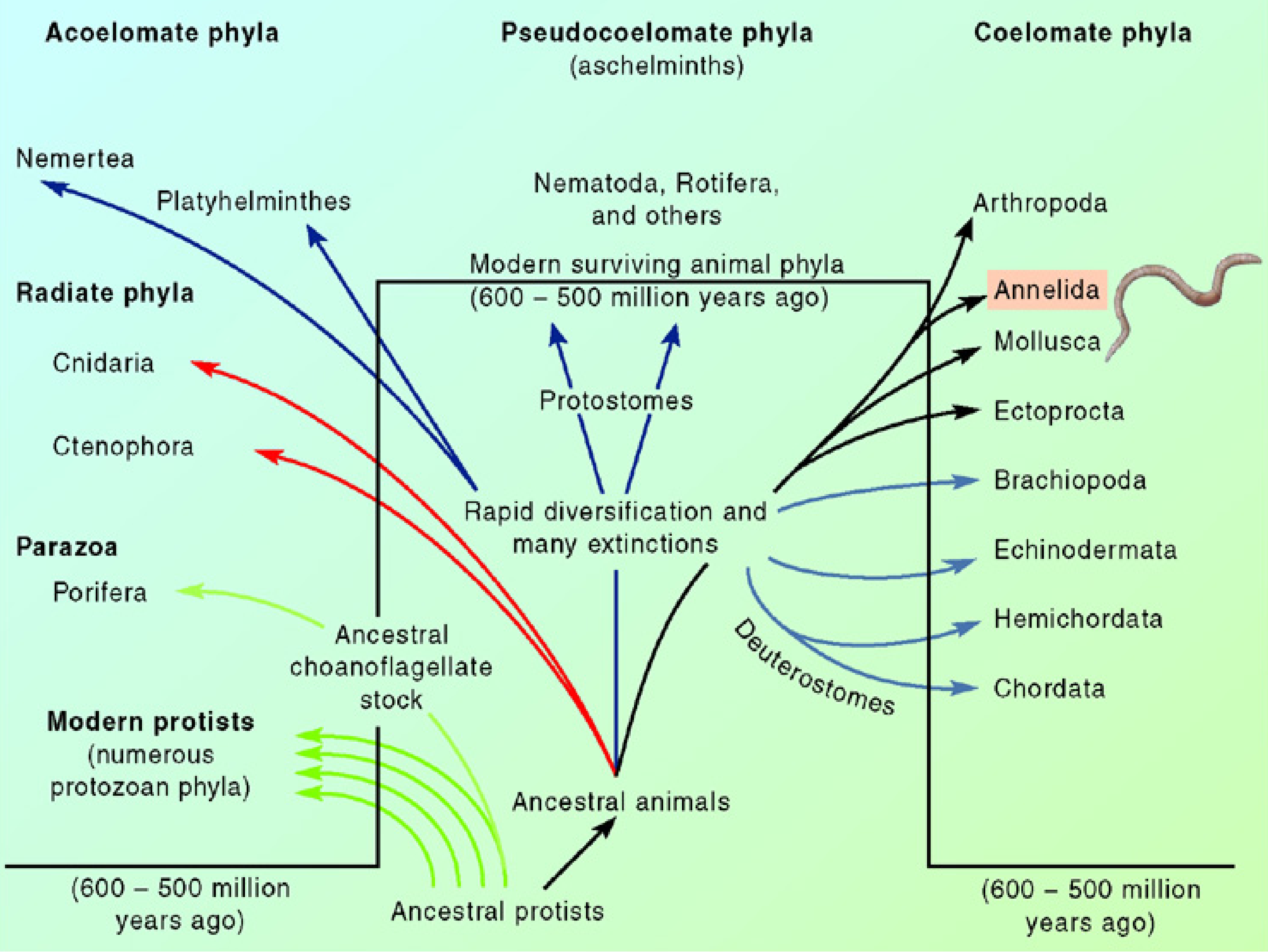
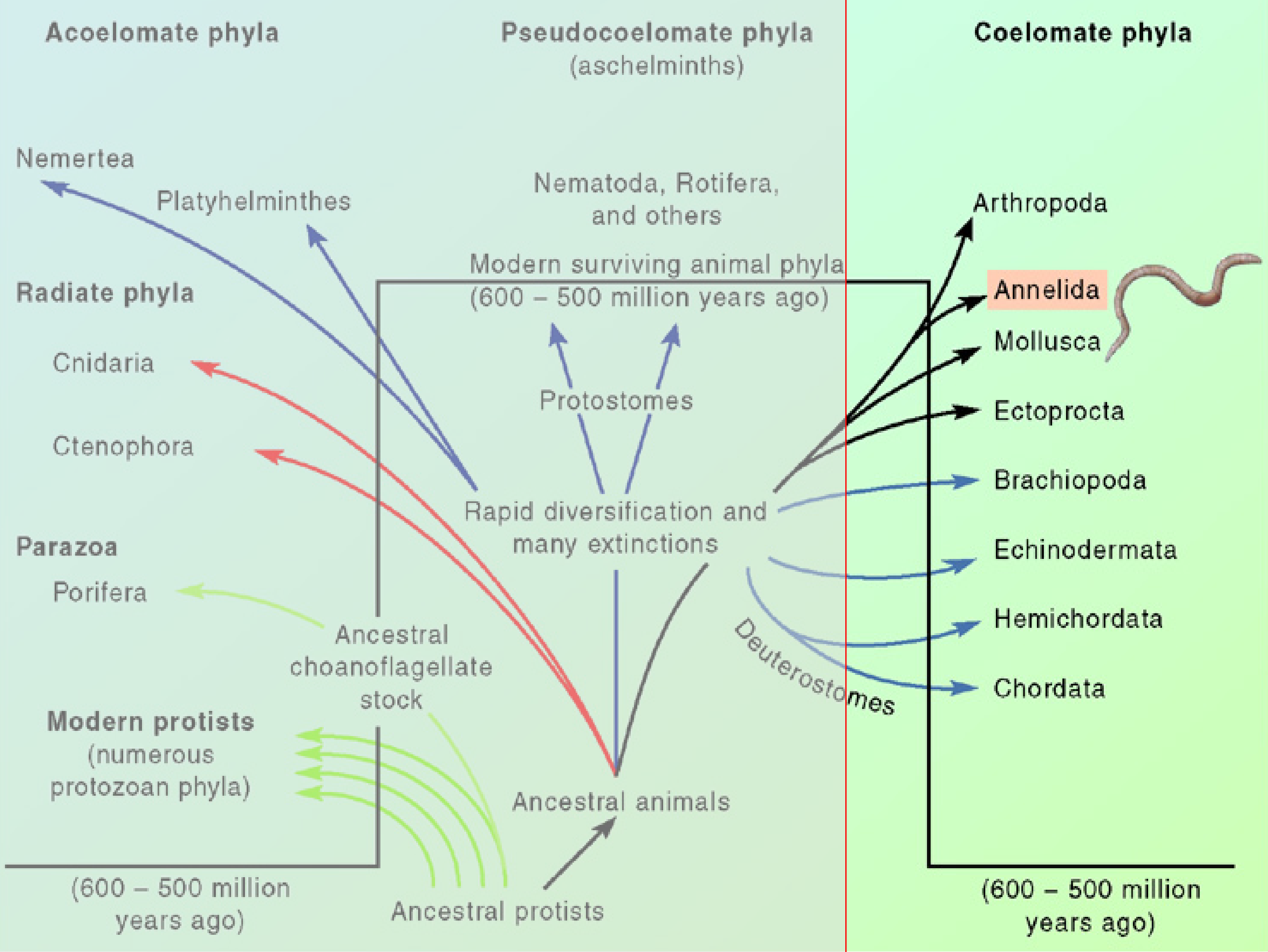
环节动物门
Annelida


Acoelomate phyla
Pseudocoelomate phyla
(aschelminths)
Coelomate phyla
Nemertea
Platyhelminthes
Nematoda, Rotifera,
and others
Arthropoda
Modern surviving animal phyla
(600 – 500 million years ago)
Radiate phyla
Annelida
Mollusca
Cnidaria
Protostomes
Ectoprocta
Ctenophora
Brachiopoda
Rapid diversification and
many extinctions
Parazoa
Echinodermata
Porifera
Hemichordata
Ancestral
choanoflagellate
stock
Deuterostomes
Chordata
Modern protists
(numerous
protozoan phyla)
Ancestral animals
(600 – 500 million
years ago)
Ancestral protists
(600 – 500 million
years ago)



Acoelomate phyla
Pseudocoelomate phyla
(aschelminths)
Coelomate phyla
Nemertea
Platyhelminthes
Nematoda, Rotifera,
and others
Arthropoda
Modern surviving animal phyla
(600 – 500 million years ago)
Annelida
Radiate phyla
Mollusca
Cnidaria
Protostomes
Ectoprocta
Ctenophora
Brachiopoda
Rapid diversification and
many extinctions
Parazoa
Echinodermata
Porifera
Hemichordata
Ancestral
choanoflagellate
stock
Deuterostomes
Chordata
Modern protists
(numerous
protozoan phyla)
Ancestral animals
(600 – 500 million
years ago)
Ancestral protists
(600 – 500 million
years ago)

一、主要特征

1、体腔

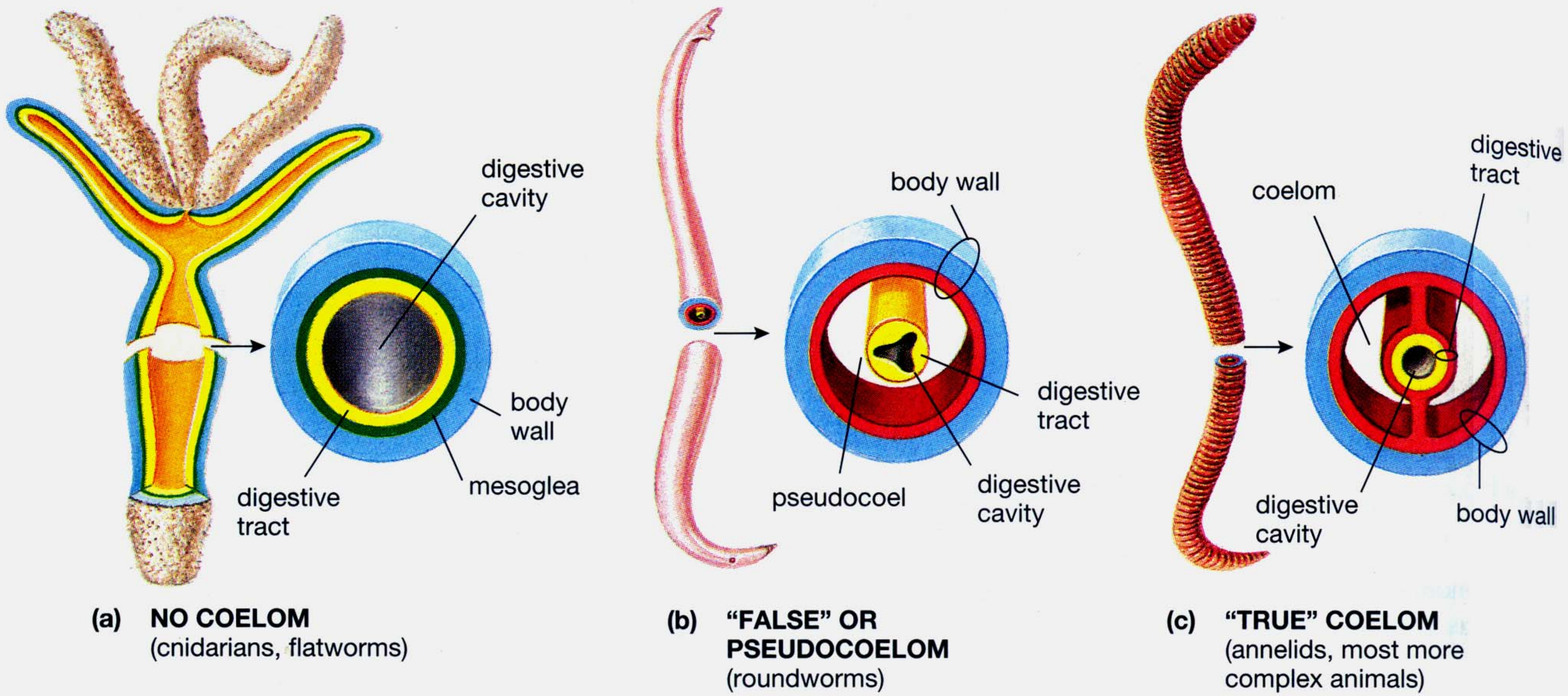


Figure 24-3 Trends in body cavities

体腔出现的意义

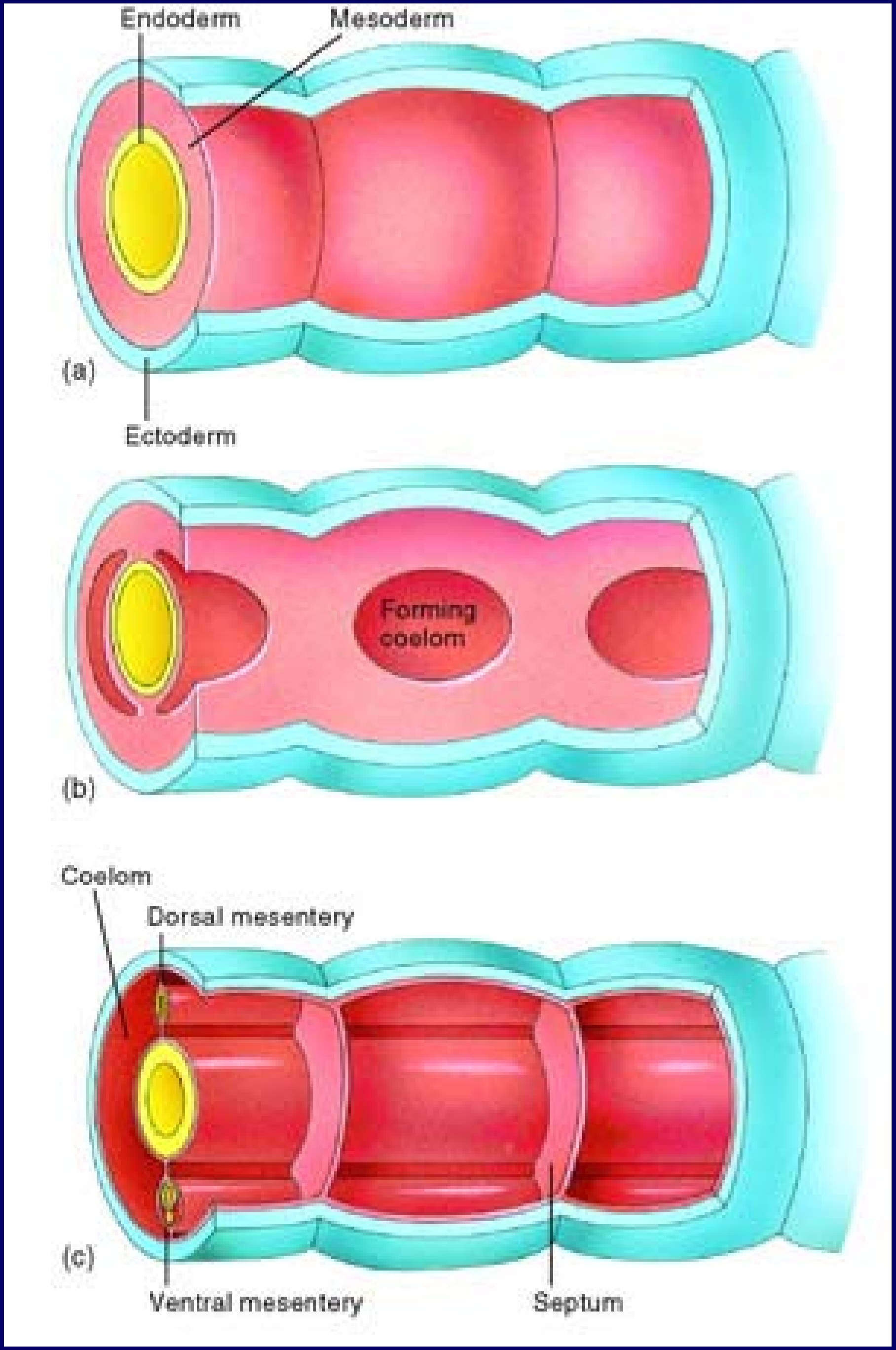
消化-肠蠕动

利于快速运动-固定器官

排泄系统加强-体腔导管和后肾管

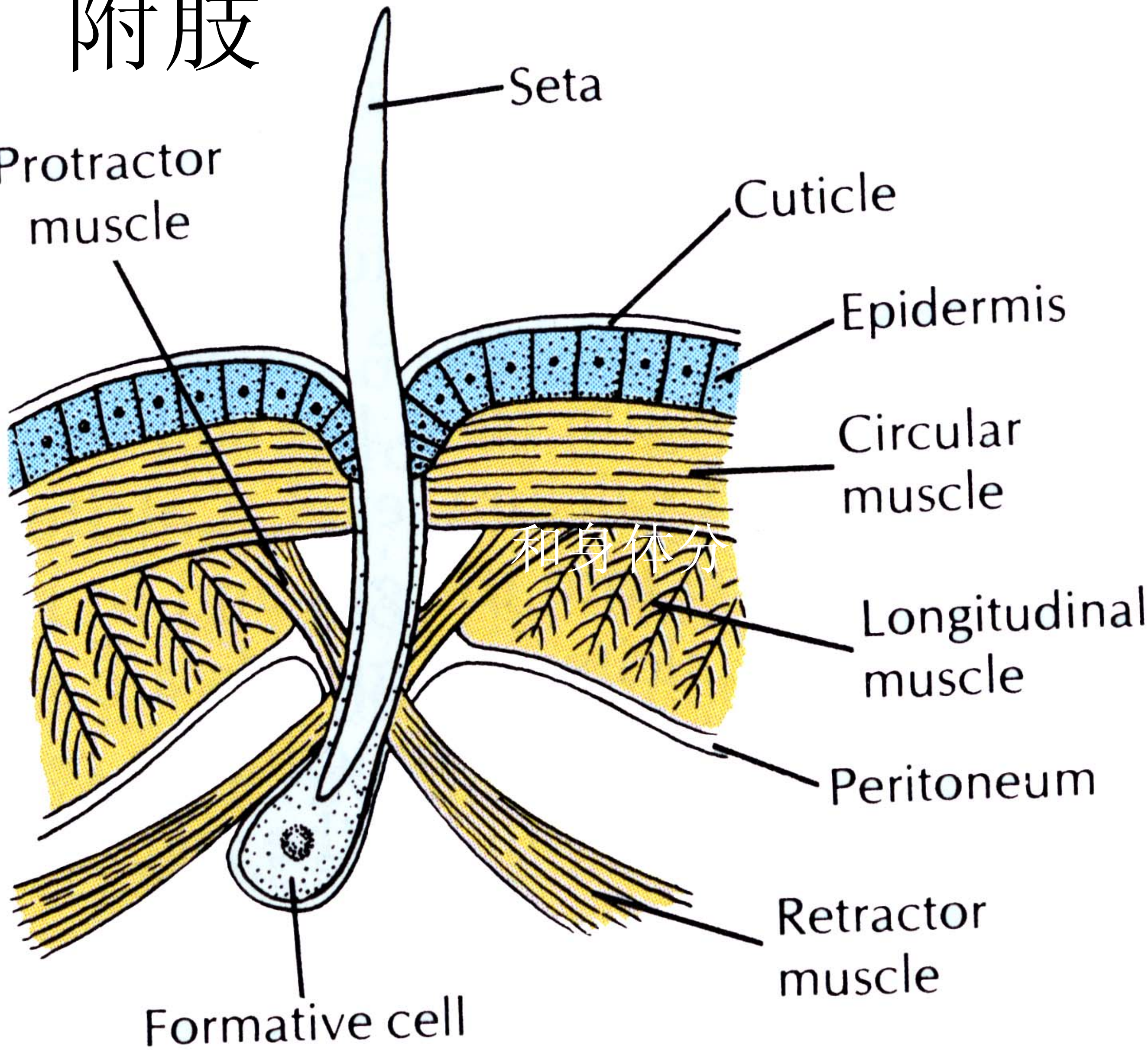
循环系统-开（闭）管式

2、身体分节

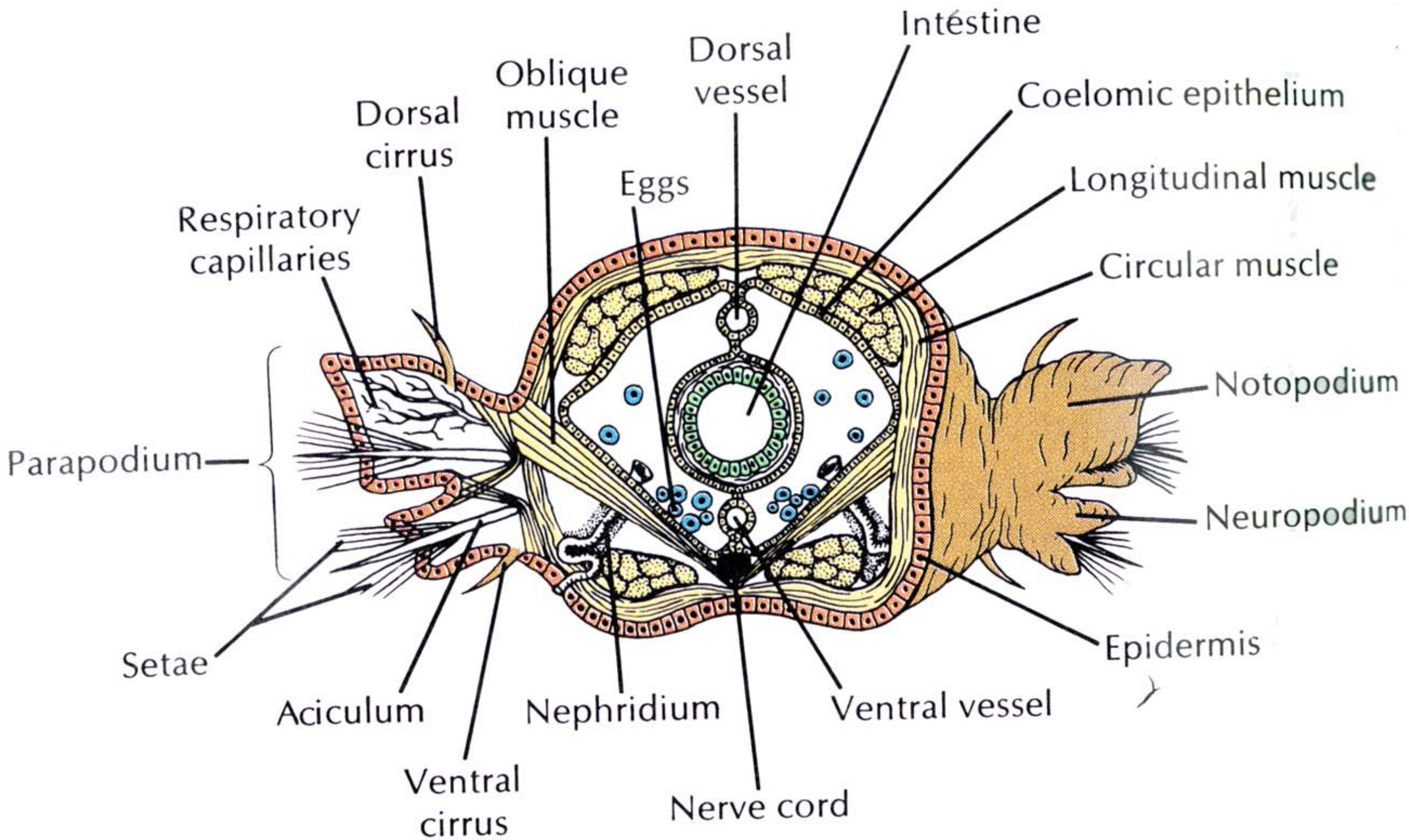


Endoderm
Mesoderm
(a)
Ectoderm
Forming coelom
(b)
Coelom
Dorsal mesentery
(c)
Ventral mesentery
Septum

3、附肢

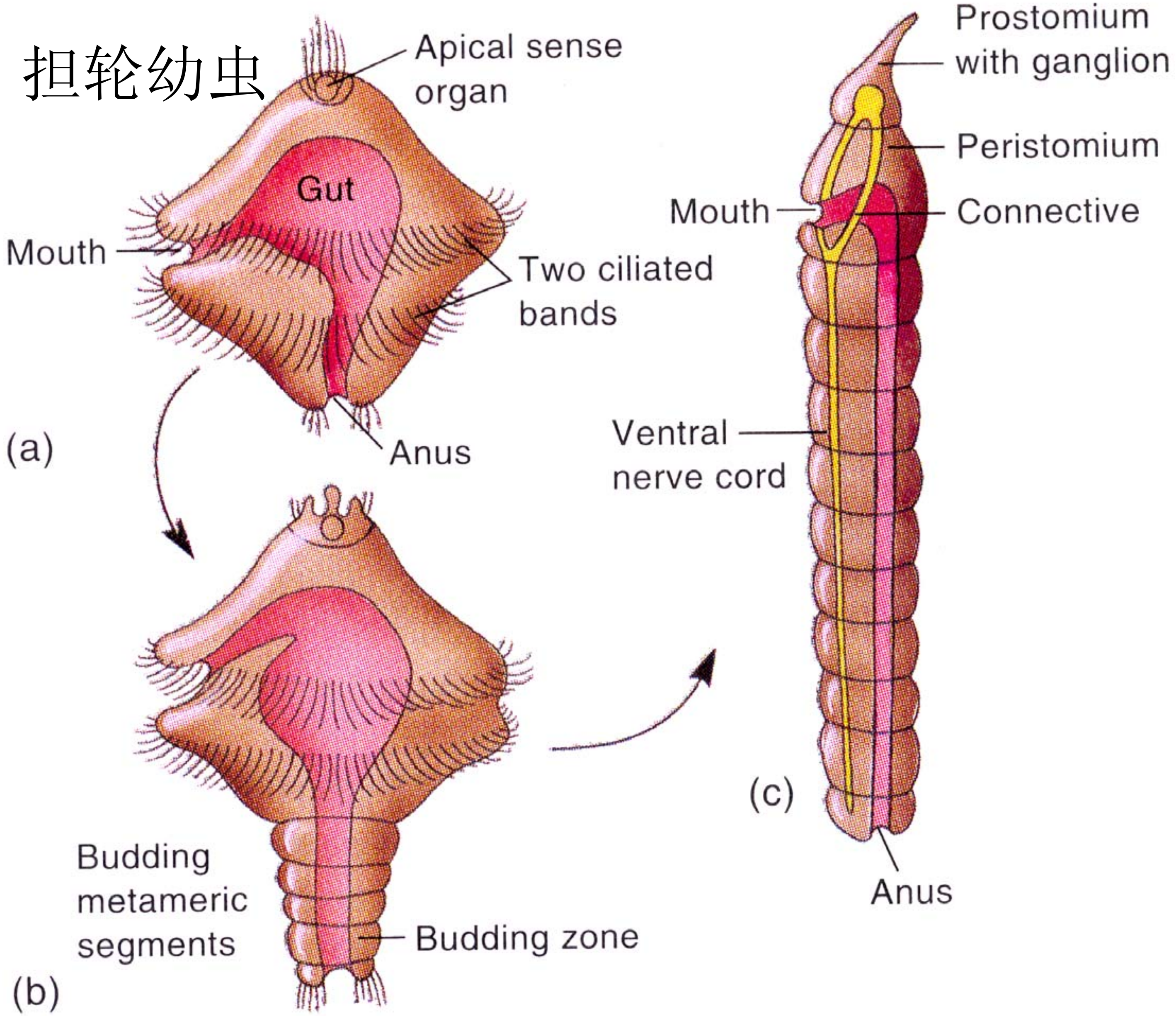

Seta
Protractor muscle
Cuticle
Epidermis
Circular muscle
Longitudinal muscle
Peritoneum
Retractor muscle
Formative cell

和身体分


Intestine
Dorsal vessel
Oblique muscle
Dorsal cirrus
Coelomic epithelium
Eggs
Longitudinal muscle
Respiratory capillaries
Circular muscle
Notopodium
Parapodium
Neuropodium
Setae
Epidermis
Aciculum
Nephridium
Ventral vessel
Ventral cirrus
Nerve cord

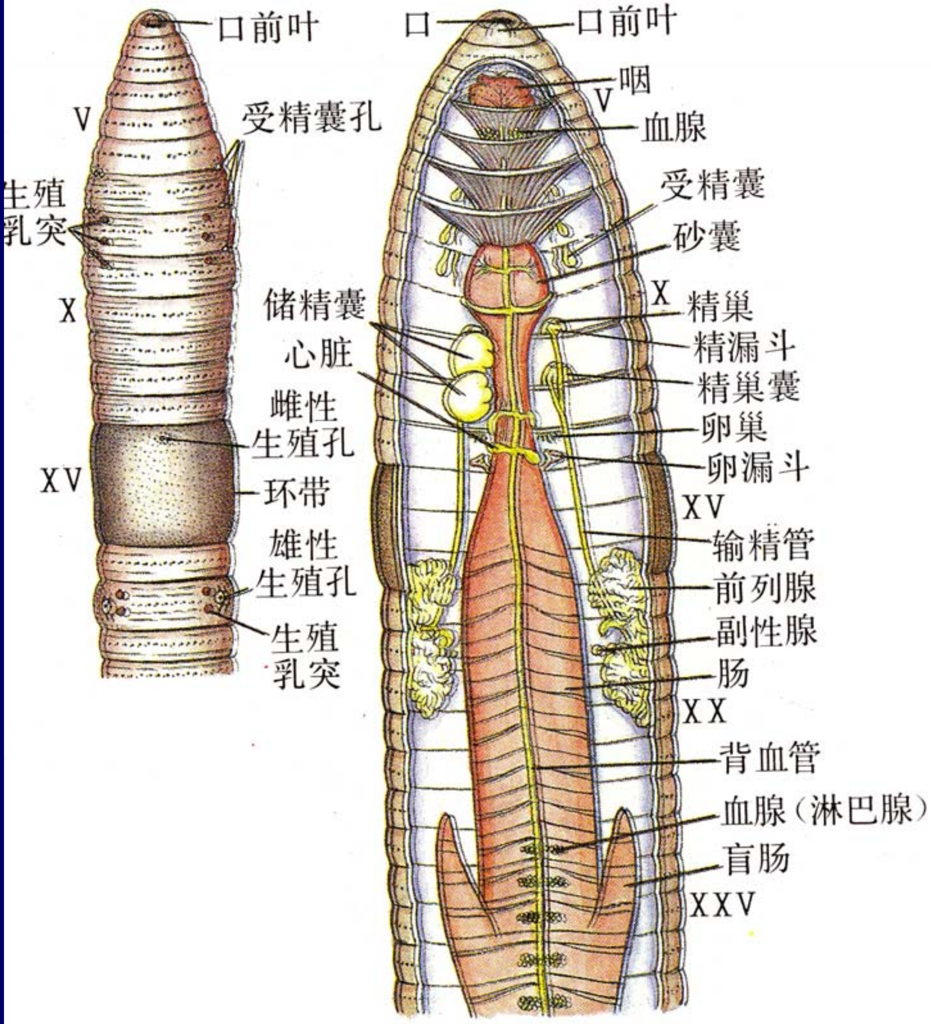
5、神经系统

6、担轮幼虫


Apical sense
organ
Gut
Mouth
Two ciliated
bands
Anus
(a)
Budding
metameric
segments
Budding zone
(b)
Prostomium
with ganglion
Peristomium
Mouth
Connective
Ventral
nerve cord
(c)
Anus

二、代表动物—环毛蚓 *Pheretima*

1、外形

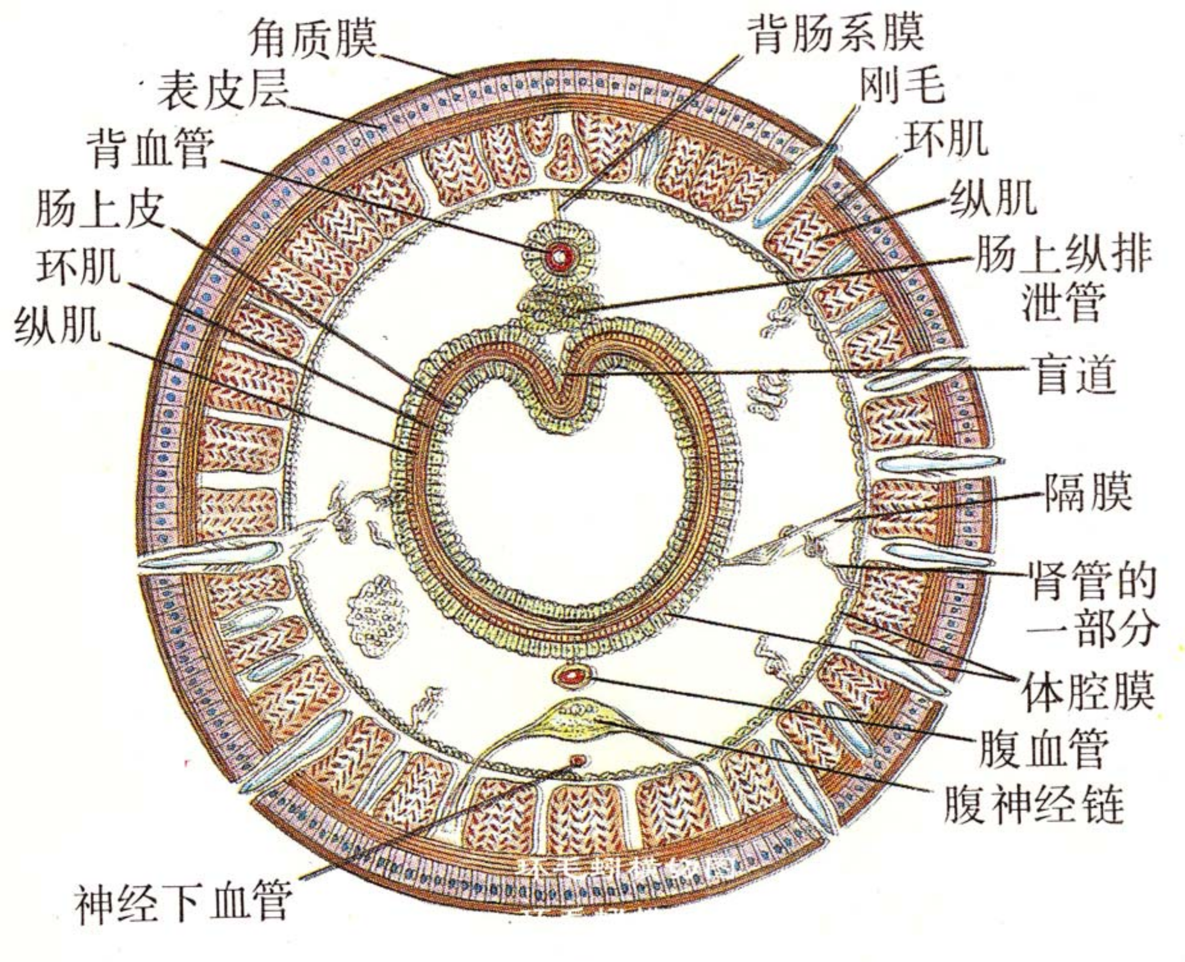


口前叶
V
受精囊孔
生殖
乳突
X
雌性
生殖孔
XV
环带
雄性
生殖孔
生殖
乳突
口
口前叶
咽
V
血腺
受精囊
砂囊
储精囊
心脏
X
精巢
精漏斗
精巢囊
卵巢
卵漏斗
XV
输精管
前列腺
副性腺
肠
XX
背血管
血腺（淋巴腺）
盲肠
XXV

环毛蚓的腹面观和解剖

2、内部结构

1）体壁
和肠壁



环毛蚓横切图

这个贴子最后由108nikko在 2006/10/06 10:54pm 编辑]

不能再等啦！今天，俺终于发现了一个能够成功注册的方法！

最近，咱们的生态学论坛最近不知出了什么问题，注册后的密码根本发不到邮箱里来。

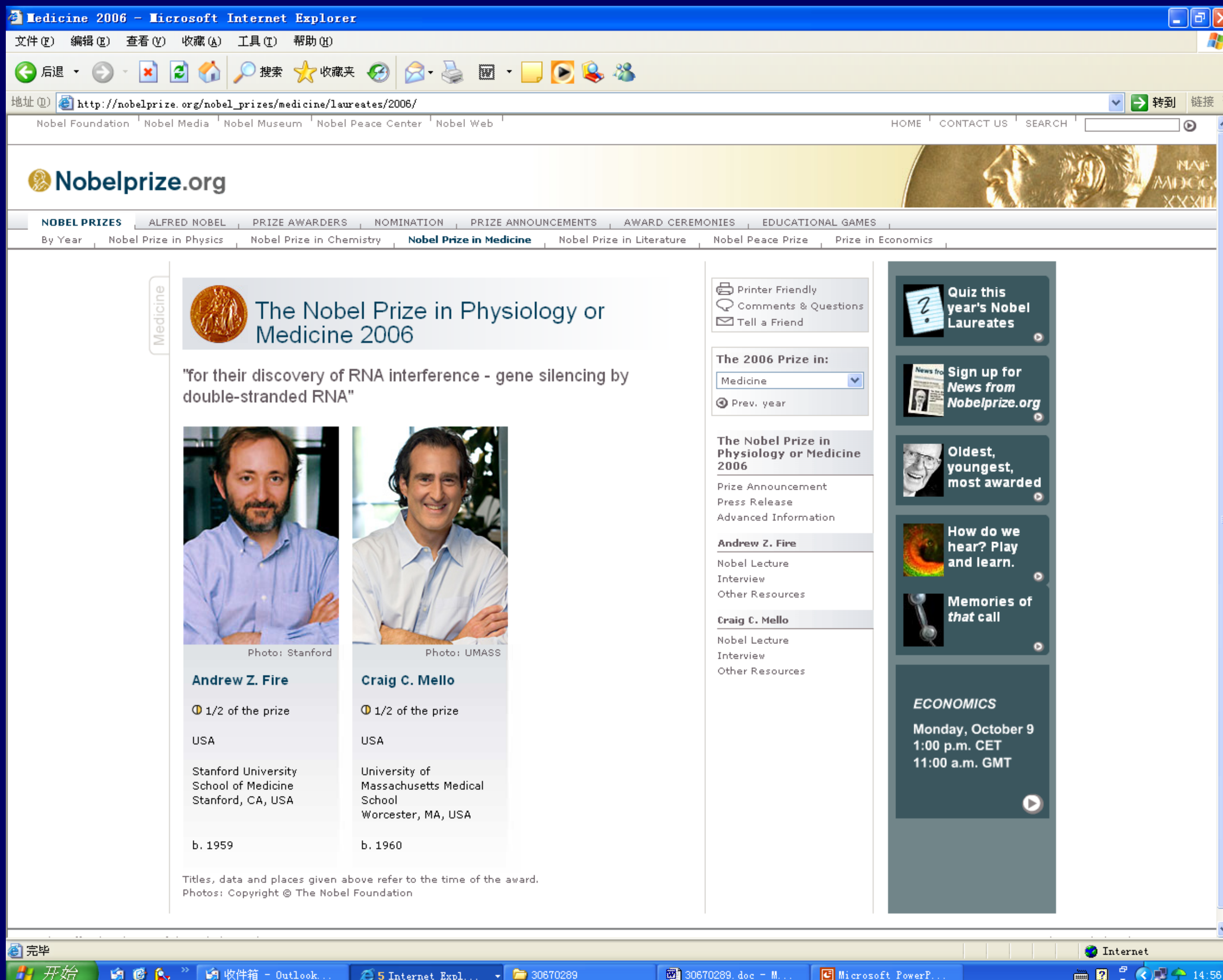
从新人列表可以看到，最近还是不断有人试图注册的，但只有名字，根本得不到密码登陆，发帖数统统是“0”！

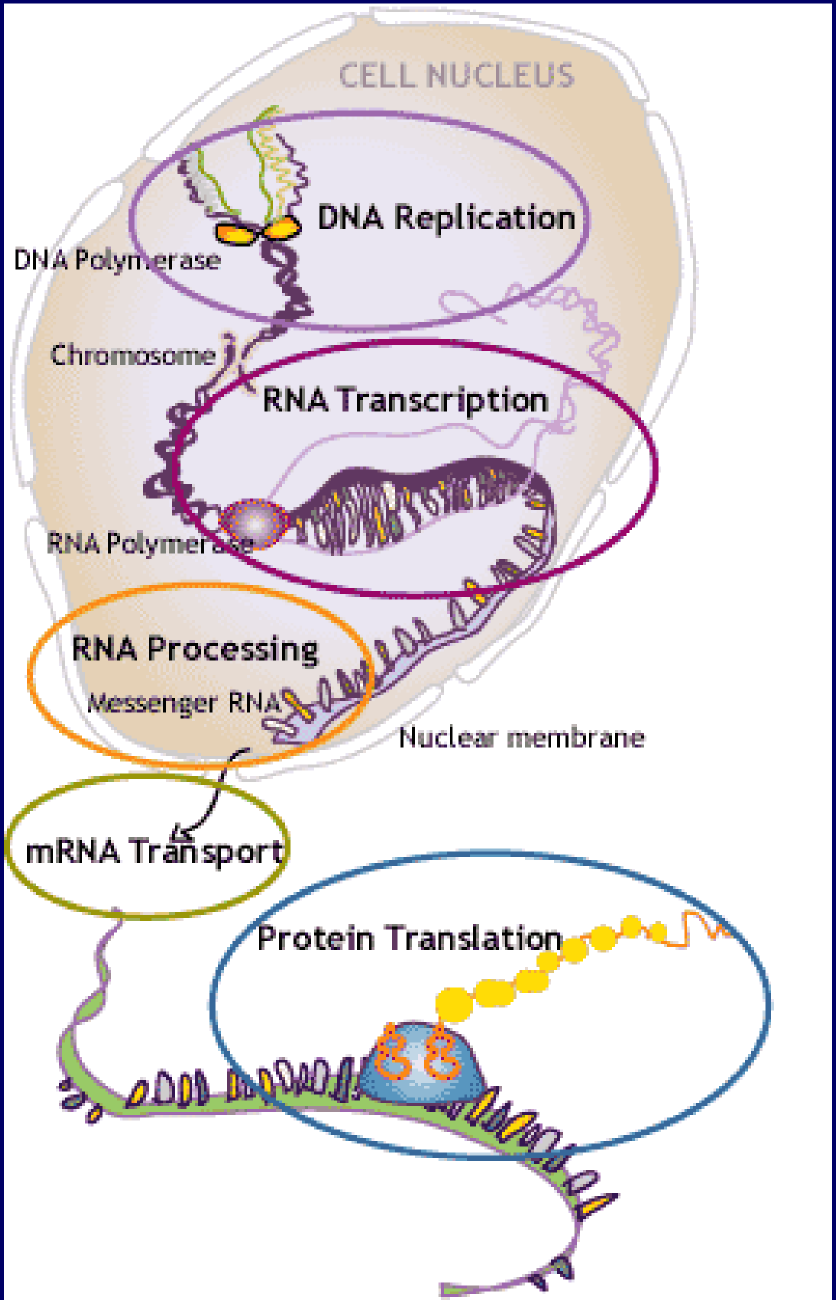
注册的方法是：

随便写一个邮箱，然后务必务必填写好密码提示问题和答案。注册后进入论坛首页，点登陆那栏旁边的“忘记密码”。哈哈哈，这下发现密码提示问题的作用了吧！赶紧输入问题和答案，密码将会直接在网页上显示！！！！！赶紧试试吧！

希望这帖能够一直一直置顶，直到注册功能恢复正常。所以请大家经常顶一顶！让它一直出现在“最后更新”里面，好让更多人能够注册！

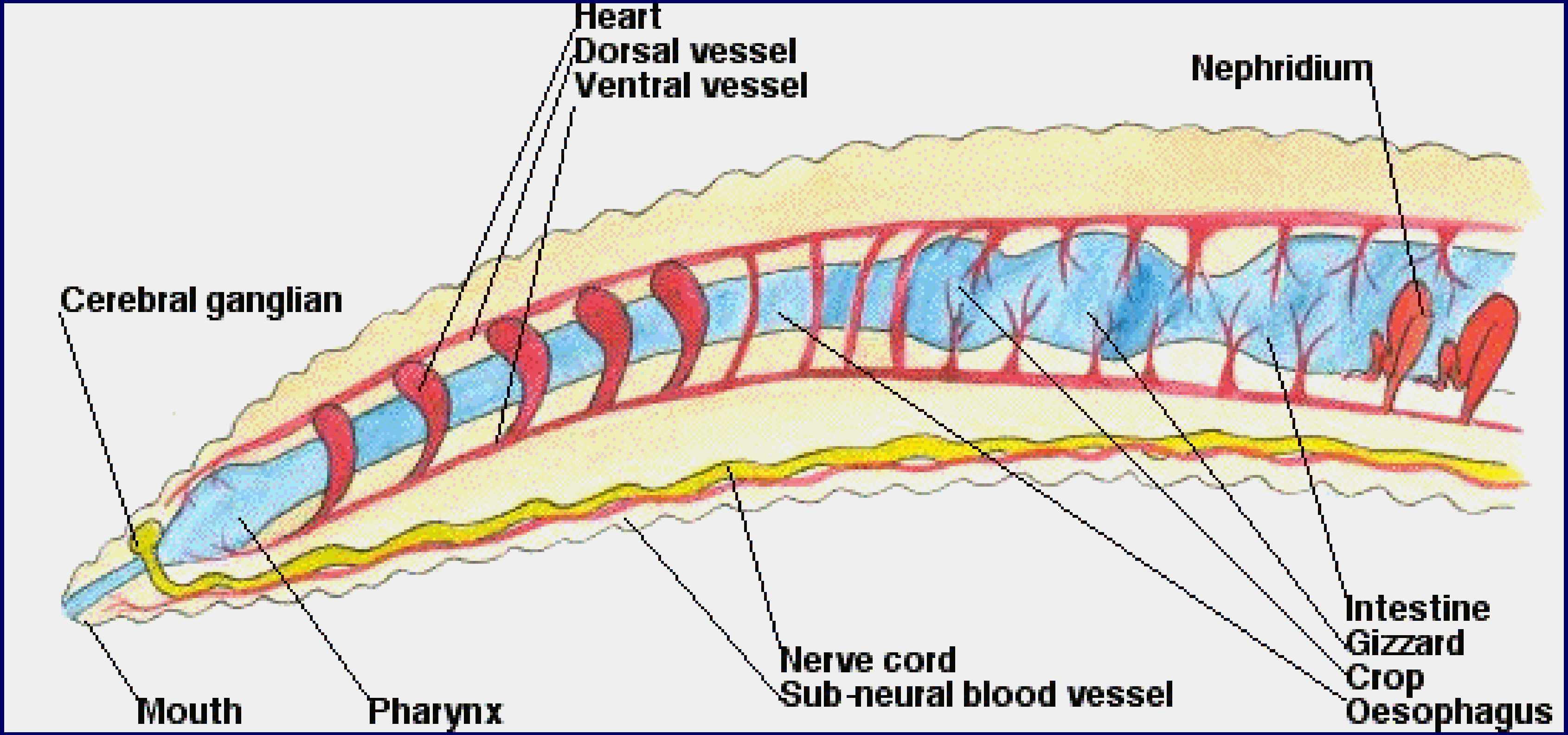
2006 Nobel Prize - Physiology and Medicine




CELL NUCLEUS
DNA Replication
DNA Polymerase
Chromosome
RNA Transcription
RNA Polymerase
RNA Processing
Messenger RNA
Nuclear membrane
mRNA Transport
Protein Translation

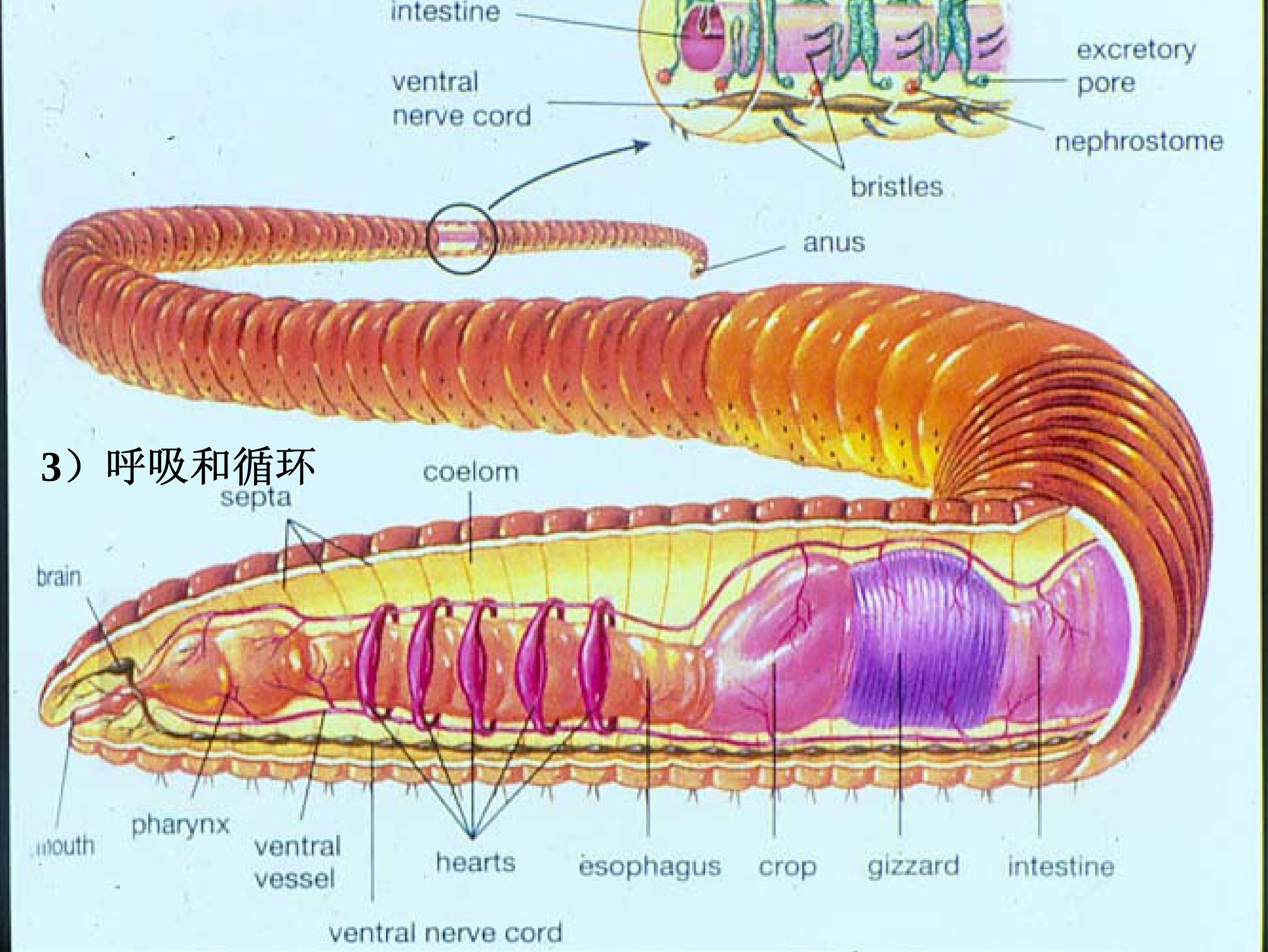
Carvalho S, Barrière A & Pires-daSilva A. The world of a worm: a framework for *Caenorhabditis* evolution. Workshop on the Study of Evolutionary Biology with *Caenorhabditis elegans* and Closely Related Species. Nature, *EMBO reports* 7. 2006, 10：981–984.

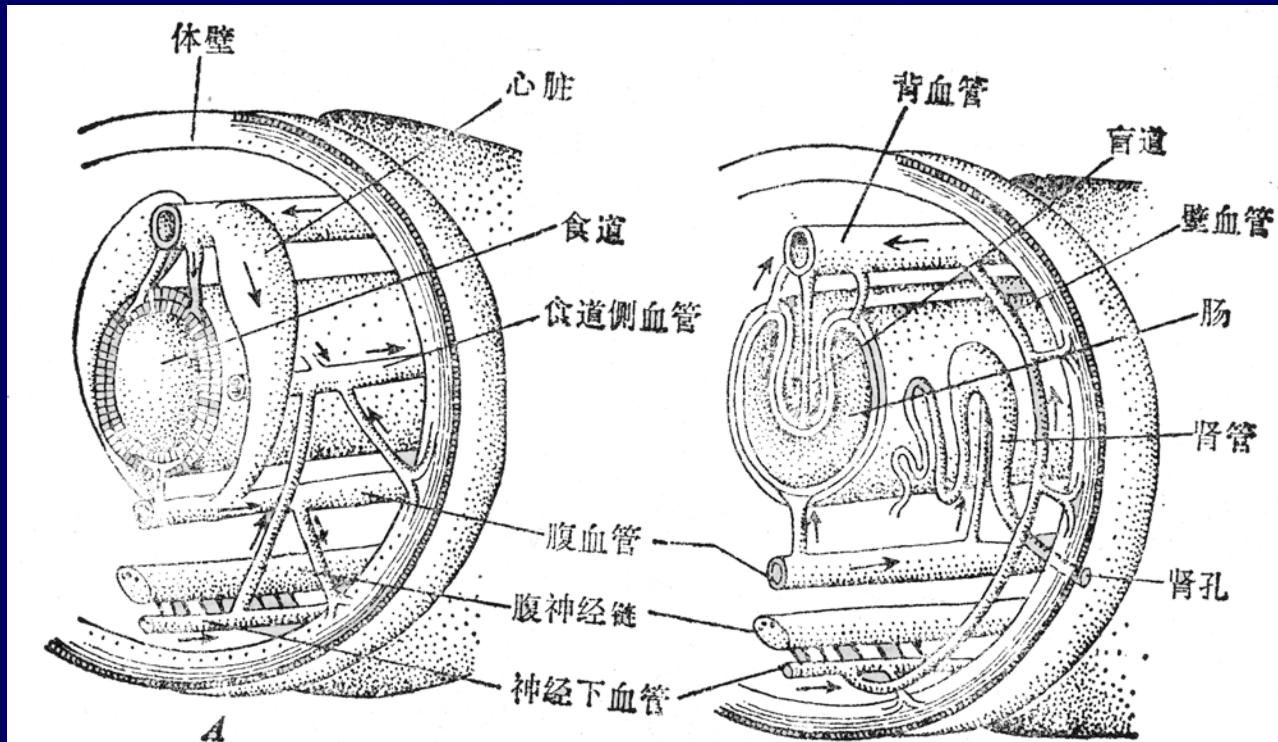
2）消化系统

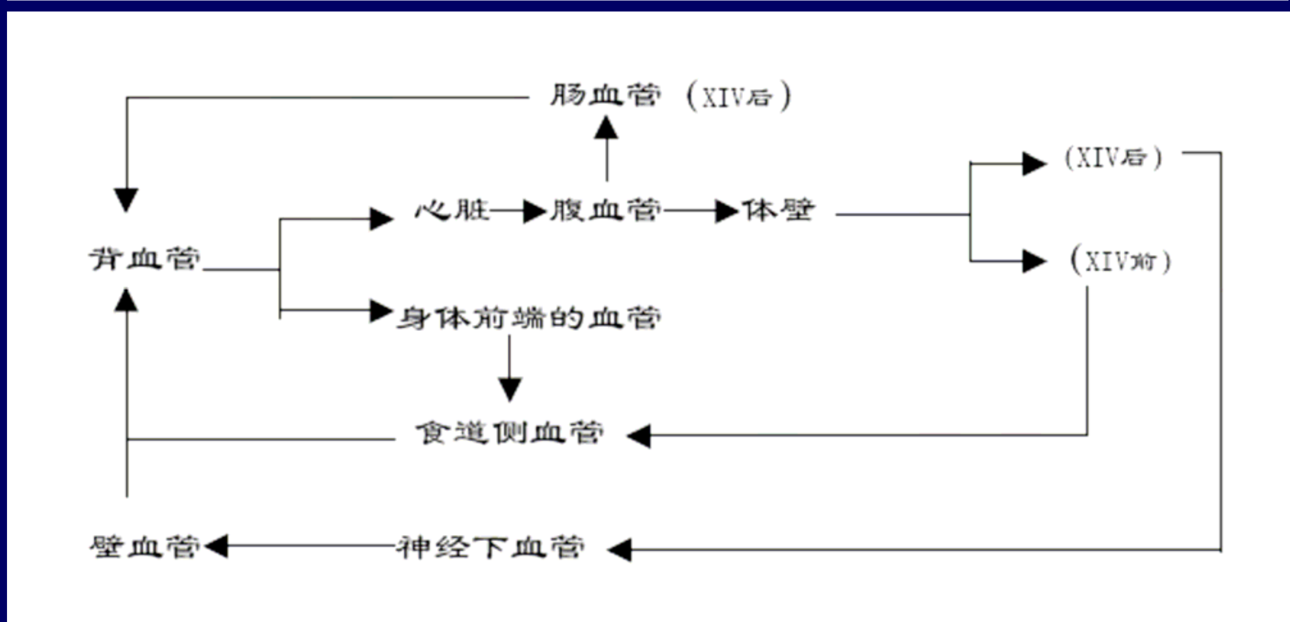


Heart
Dorsal vessel
Ventral vessel
Nephridium
Cerebral ganglian
Intestine
Gizzard
Crop
Oesophagus
Nerve cord
Sub-neural blood vessel
Mouth
Pharynx

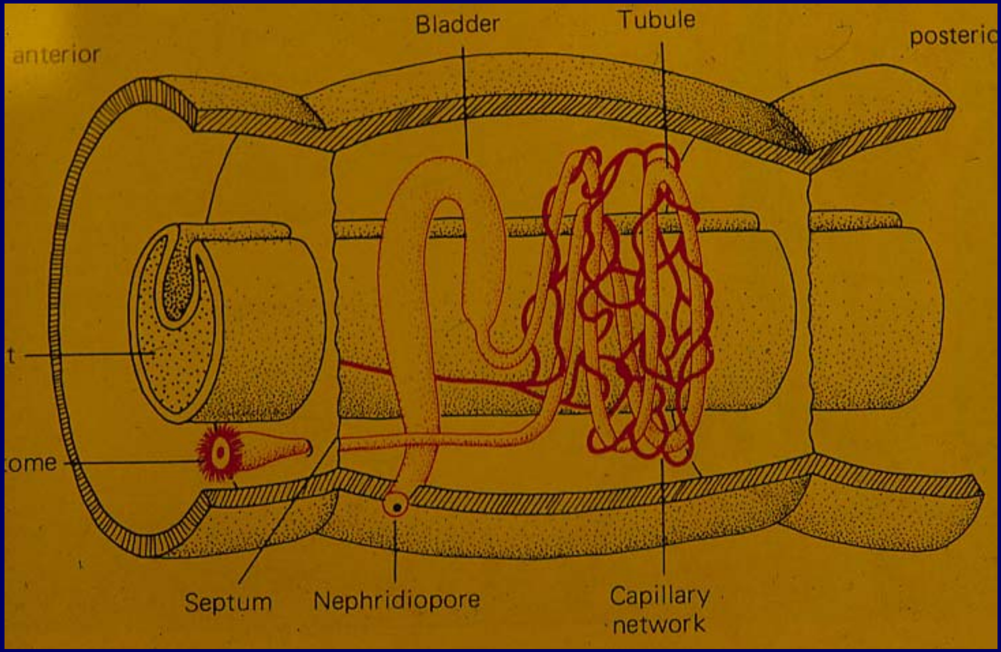
3）呼吸和循环


intestine
excretory
pore
ventral
nerve cord
nephrostome
bristles
anus
coelom
septa
brain
mouth
pharynx
ventral
vessel
hearts
esophagus
crop
gizzard
intestine
ventral nerve cord


体壁
心脏
食道
食道侧血管
腹血管
腹神经链
神经下血管
A
背血管
盲道
壁血管
肠
肾管
肾孔

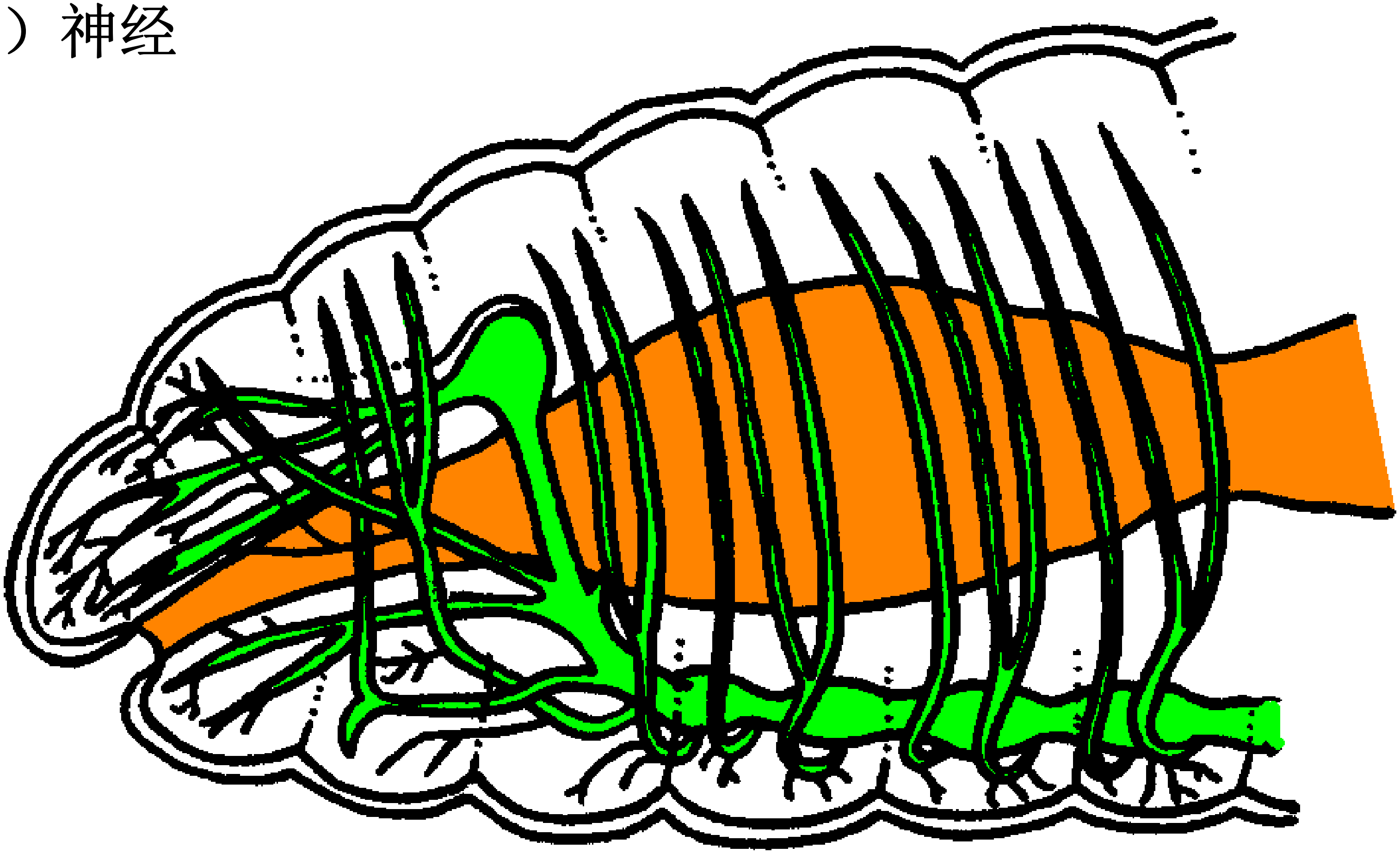

肠血管（XIV后）
心脏
腹血管
体壁
（XIV后）
背血管
（XIV前）
身体前端的血管
食道侧血管
壁血管
神经下血管

4）排泄

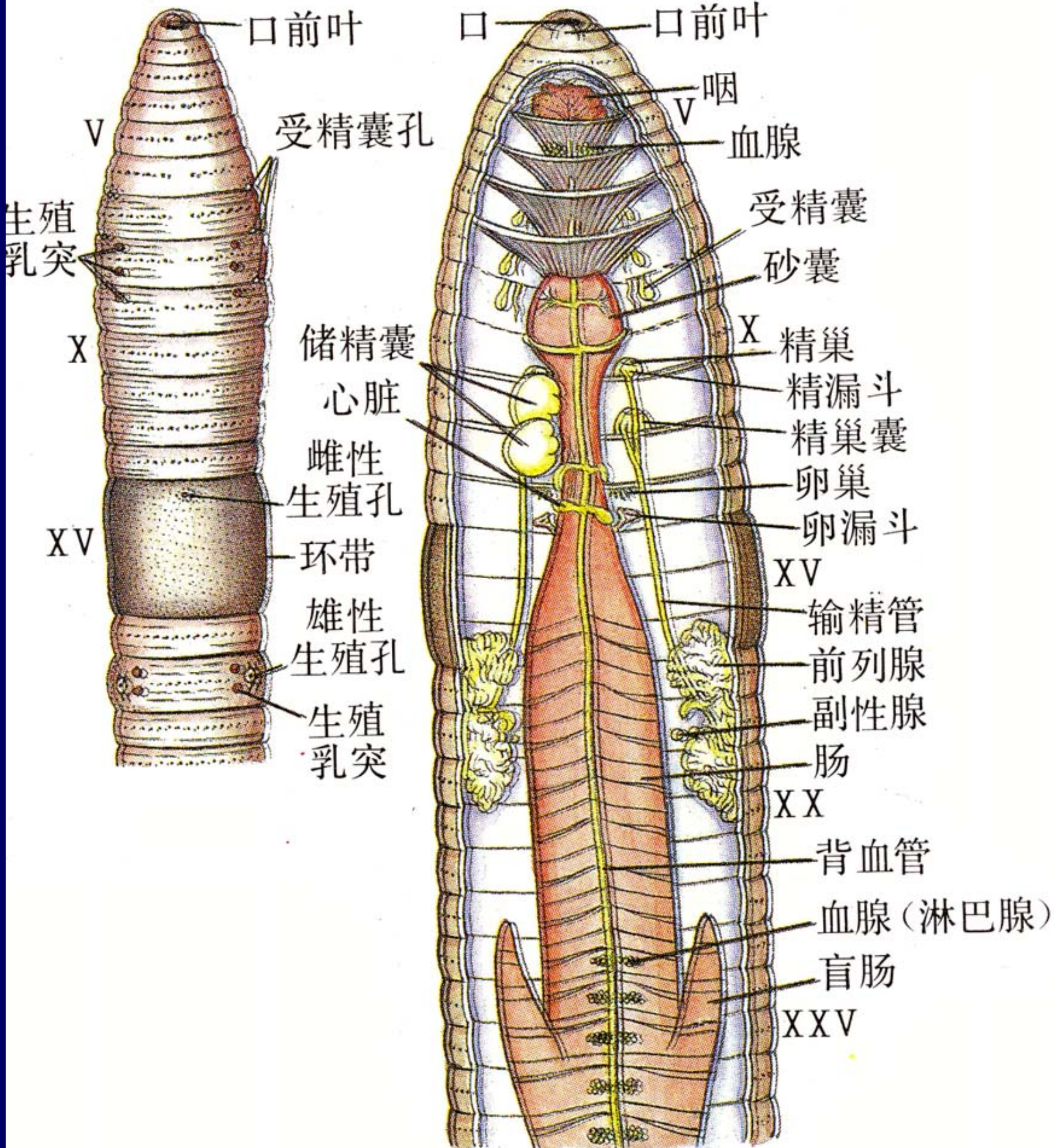


➢**体壁小肾管：**分布全身，肾孔开口在体外，无肾口。每节200余条。
➢**隔膜小肾管：**XIV节， 漏斗状的肾口开口与体腔，肾孔开口于肠内。每节有数十条
➢**咽头小肾管：**咽头和食道两侧，IV~VI体节的隔膜上，成束和成对，肾孔通到消化道

5）神经



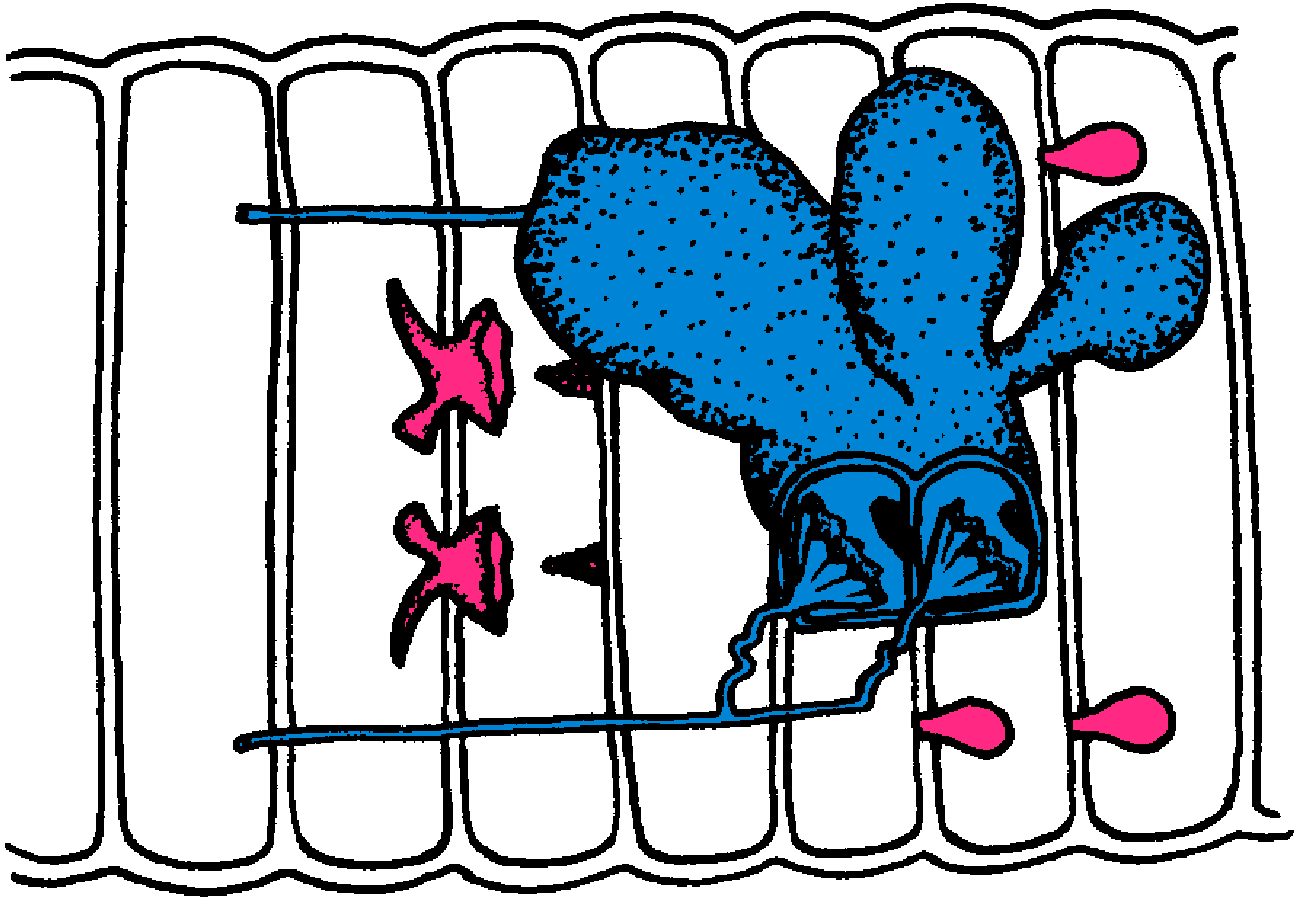
J. Soucie © BIODIDAC



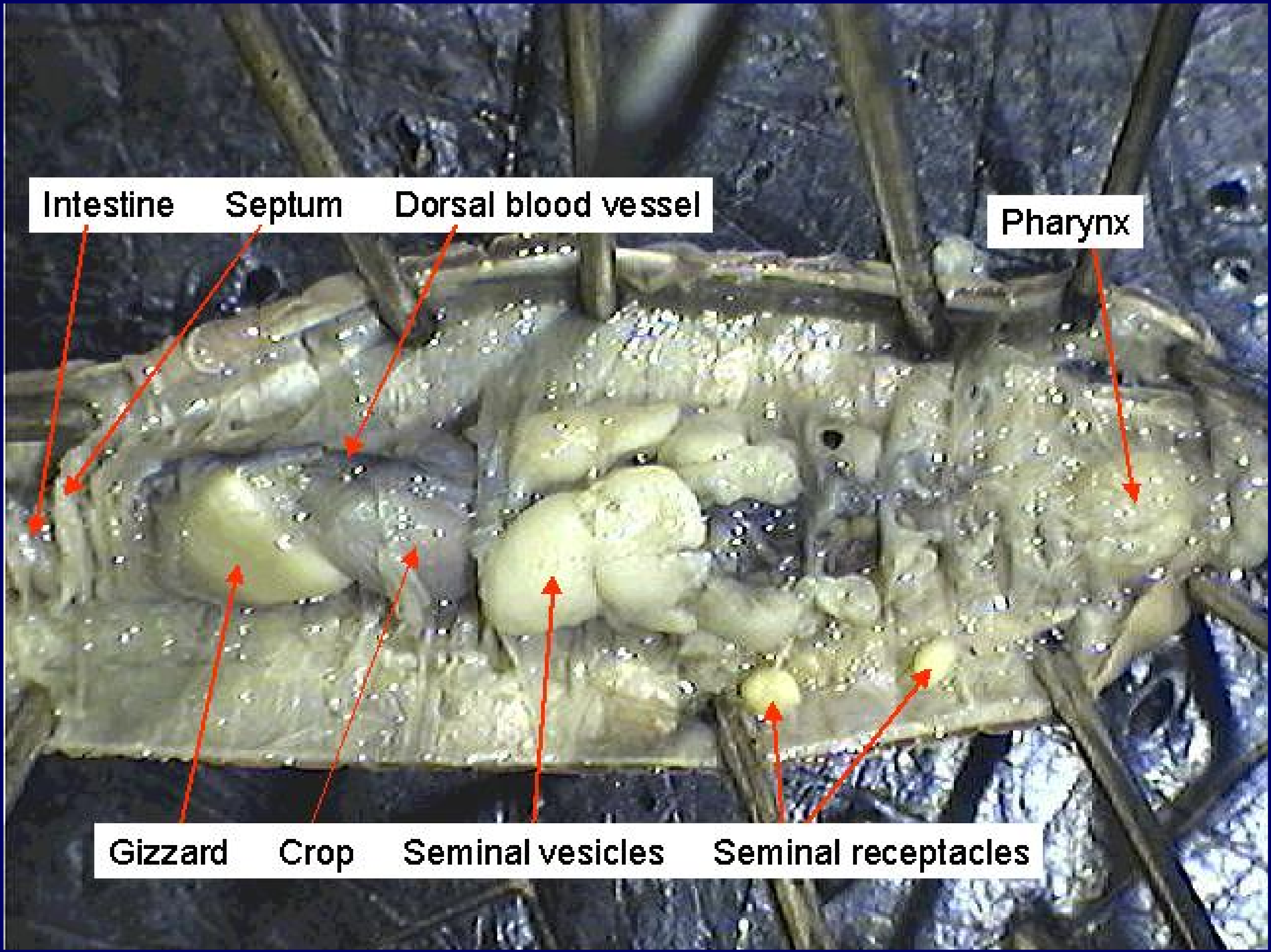
口前叶
V
受精囊孔
生殖
乳突
X
雌性
生殖孔
XV
环带
雄性
生殖孔
生殖
乳突
口
口前叶
咽
V
血腺
受精囊
砂囊
X
精巢
储精囊
精漏斗
心脏
精巢囊
卵巢
卵漏斗
XV
输精管
前列腺
副性腺
肠
XX
背血管
血腺（淋巴腺）
盲肠
XXV

环毛蚓的腹面观和解剖

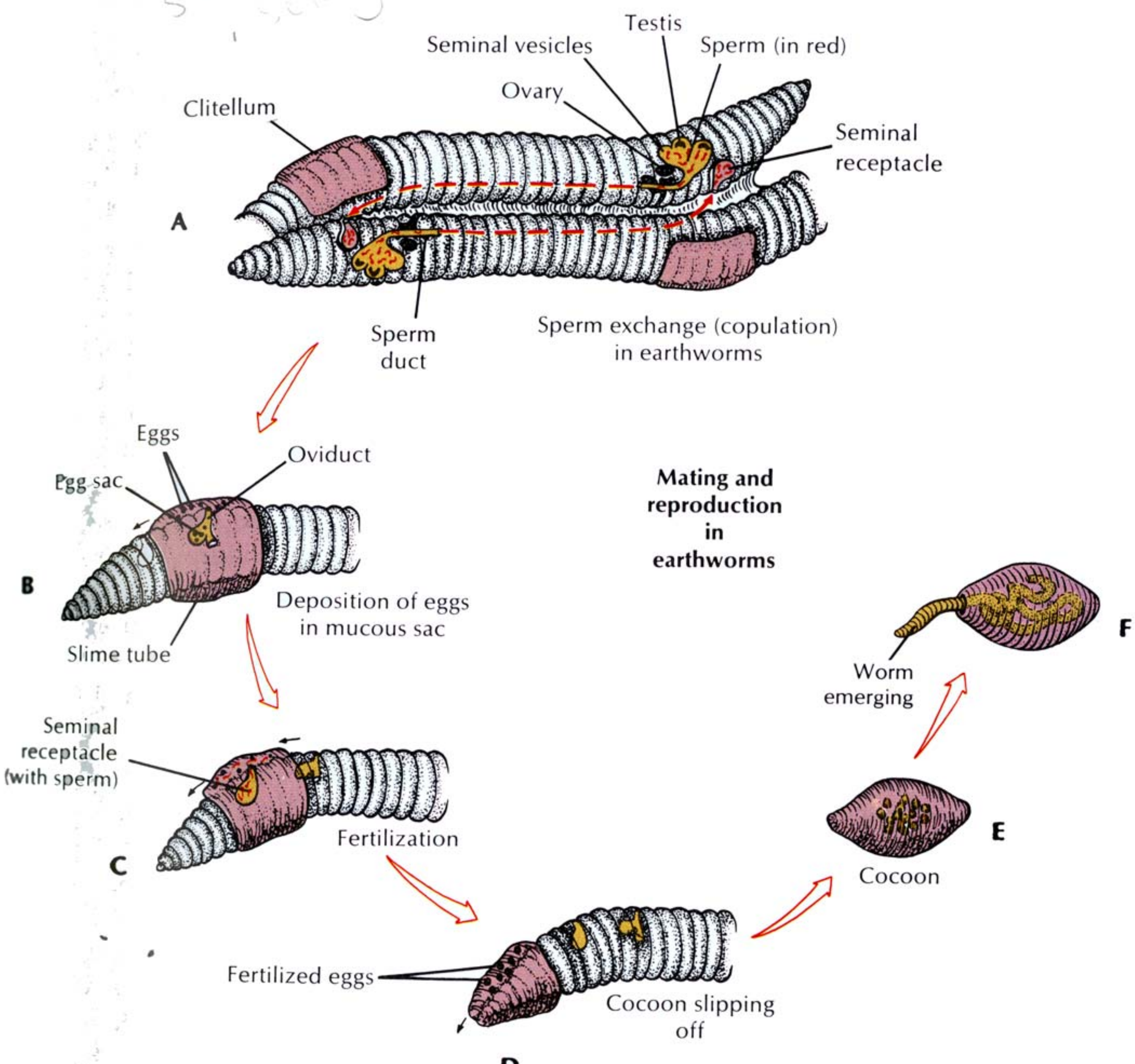
6）生殖



J. Soucie © BIODIDAC


Intestine
Septum
Dorsal blood vessel
Pharynx
Gizzard
Crop
Seminal vesicles
Seminal receptacles

3、生殖和发育


Testis
Seminal vesicles
Sperm (in red)
Ovary
Clitellum
Seminal receptacle
A
Sperm duct
Sperm exchange (copulation) in earthworms
Eggs
Oviduct
Egg sac
Mating and reproduction in earthworms
B
Deposition of eggs in mucous sac
Slime tube
F
Worm emerging
Seminal receptacle (with sperm)
E
Cocoon
Fertilization
C
Fertilized eggs
Cocoon slipping off
D

三、环节动物分类

多毛纲

游走目

隐居目

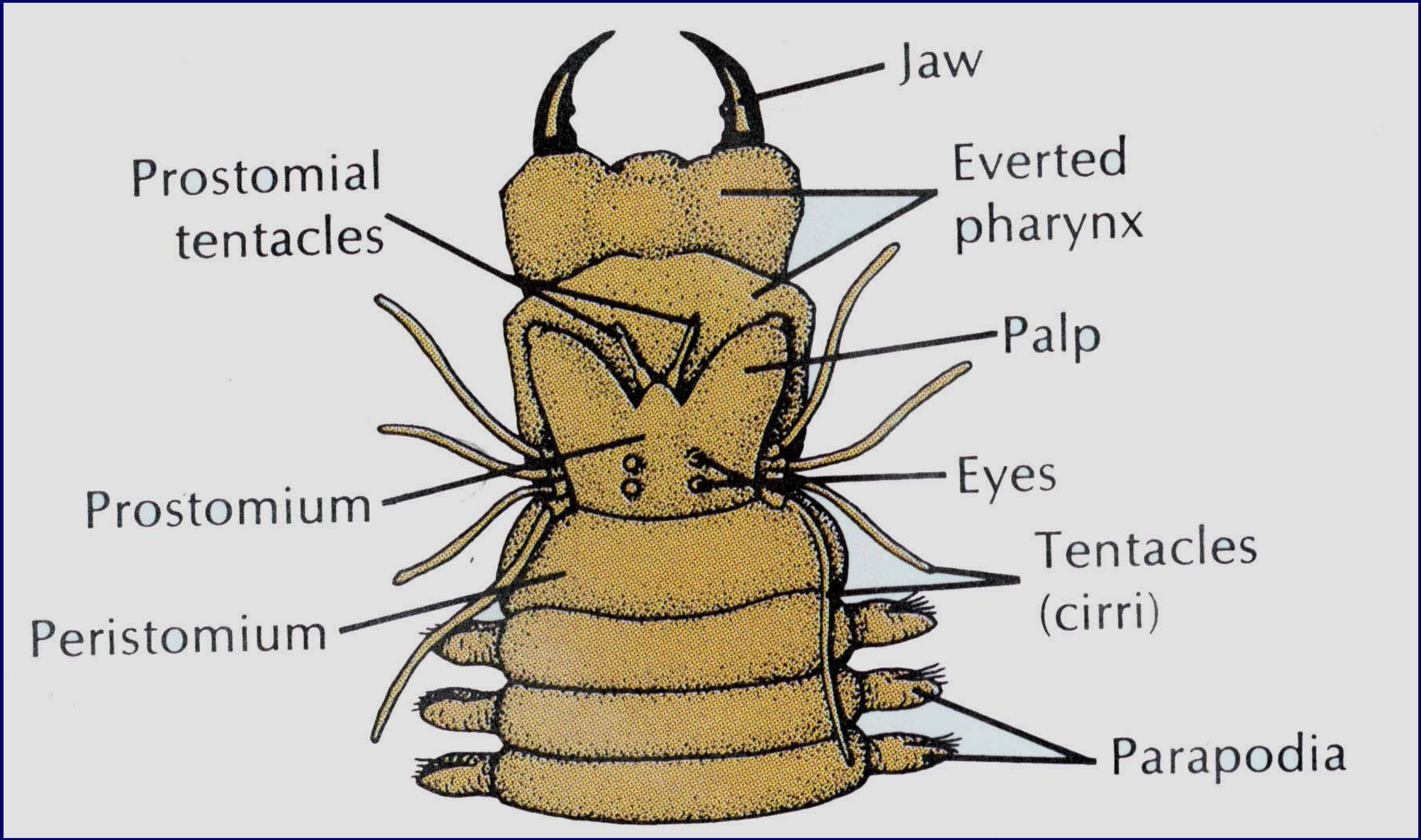
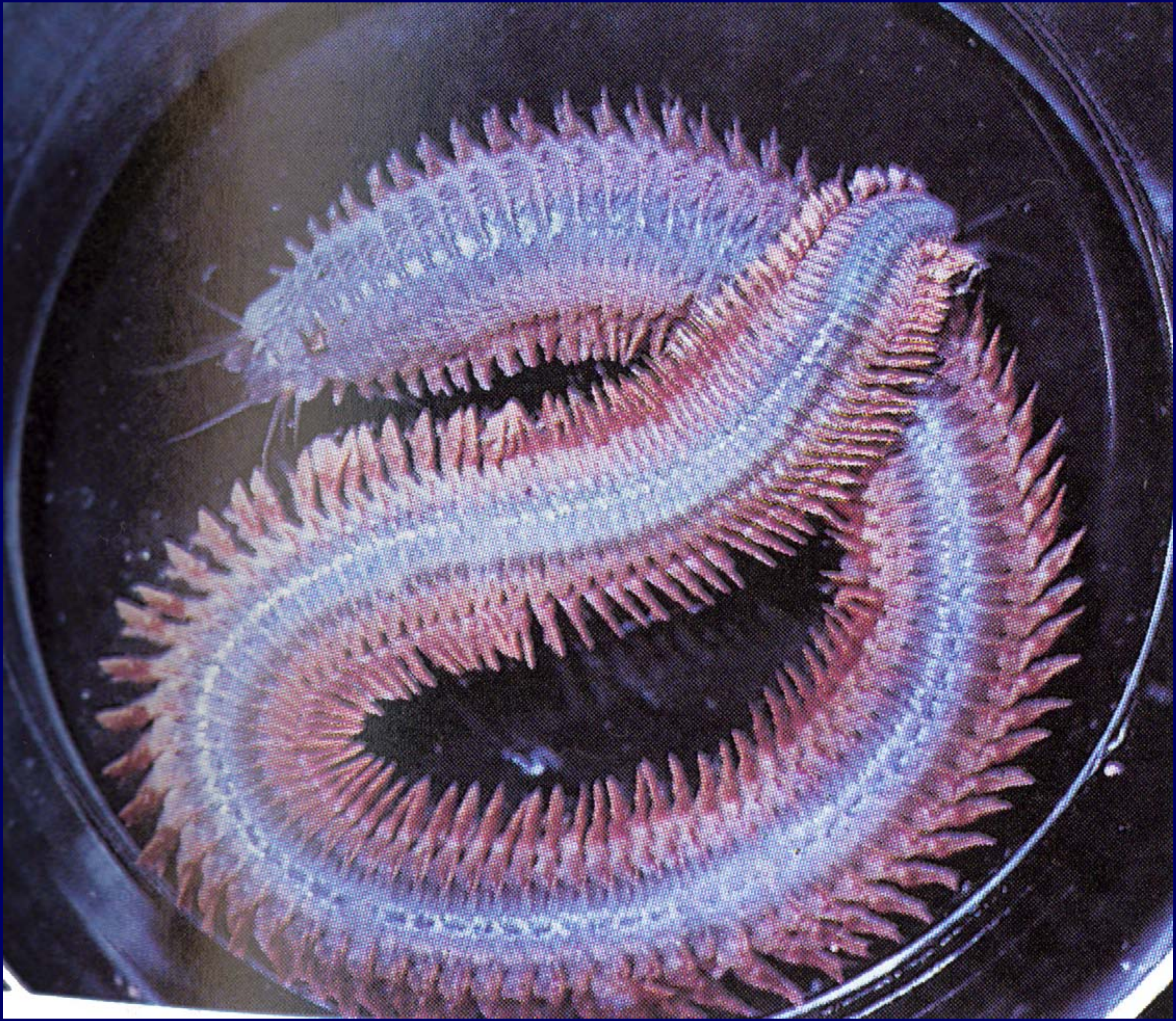
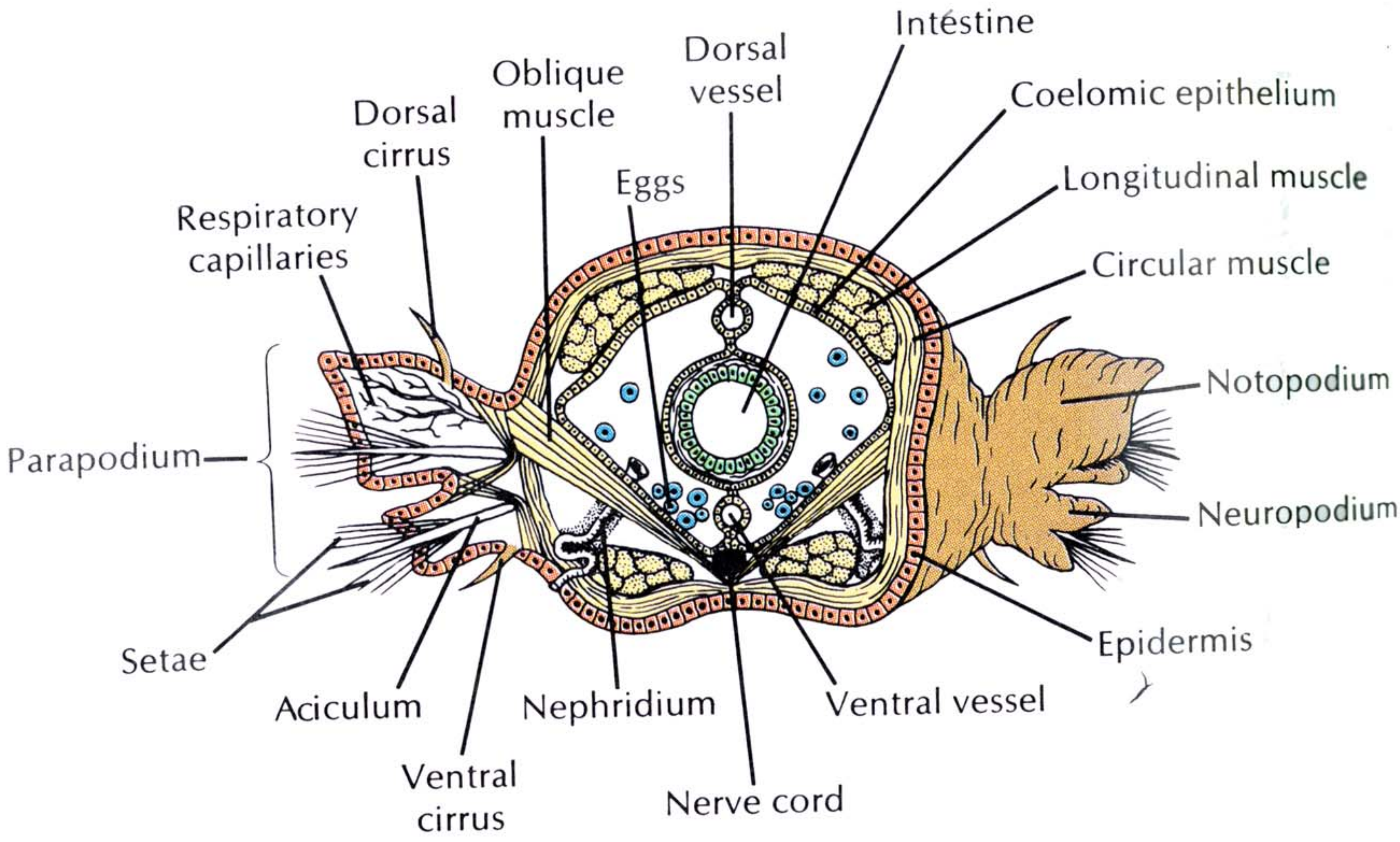
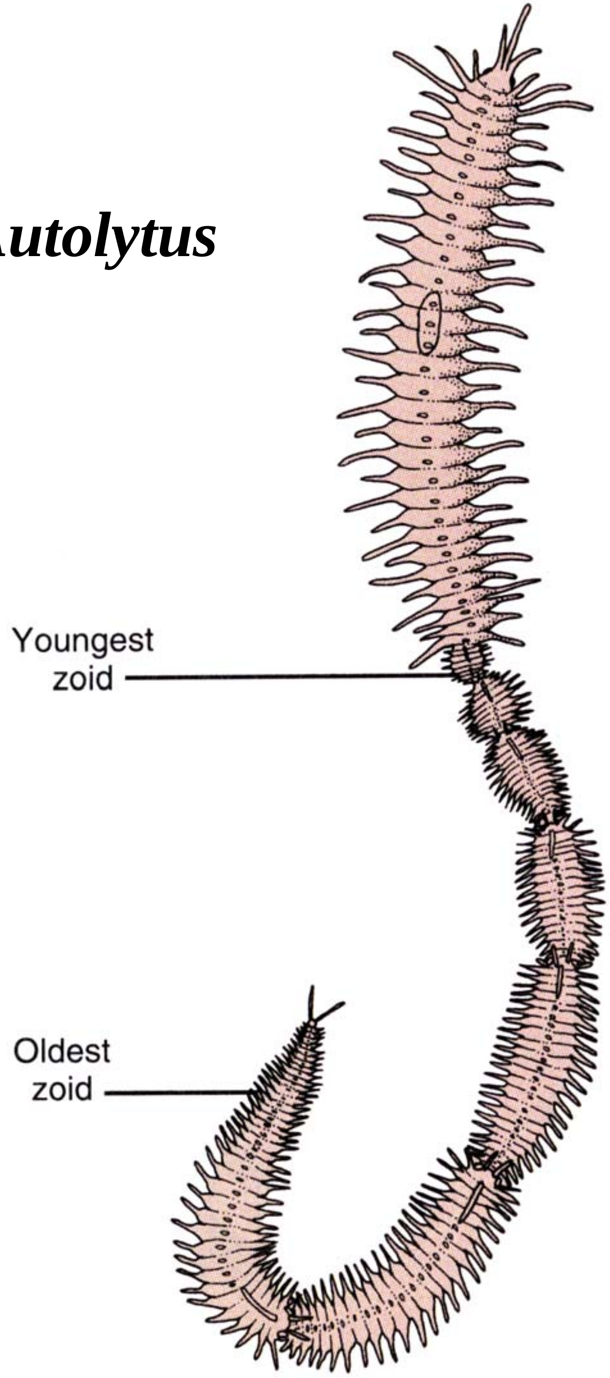

Jaw
Prostomial tentacles
Everted pharynx
Palp
Eyes
Prostomium
Tentacles (cirri)
Peristomium
Parapodia

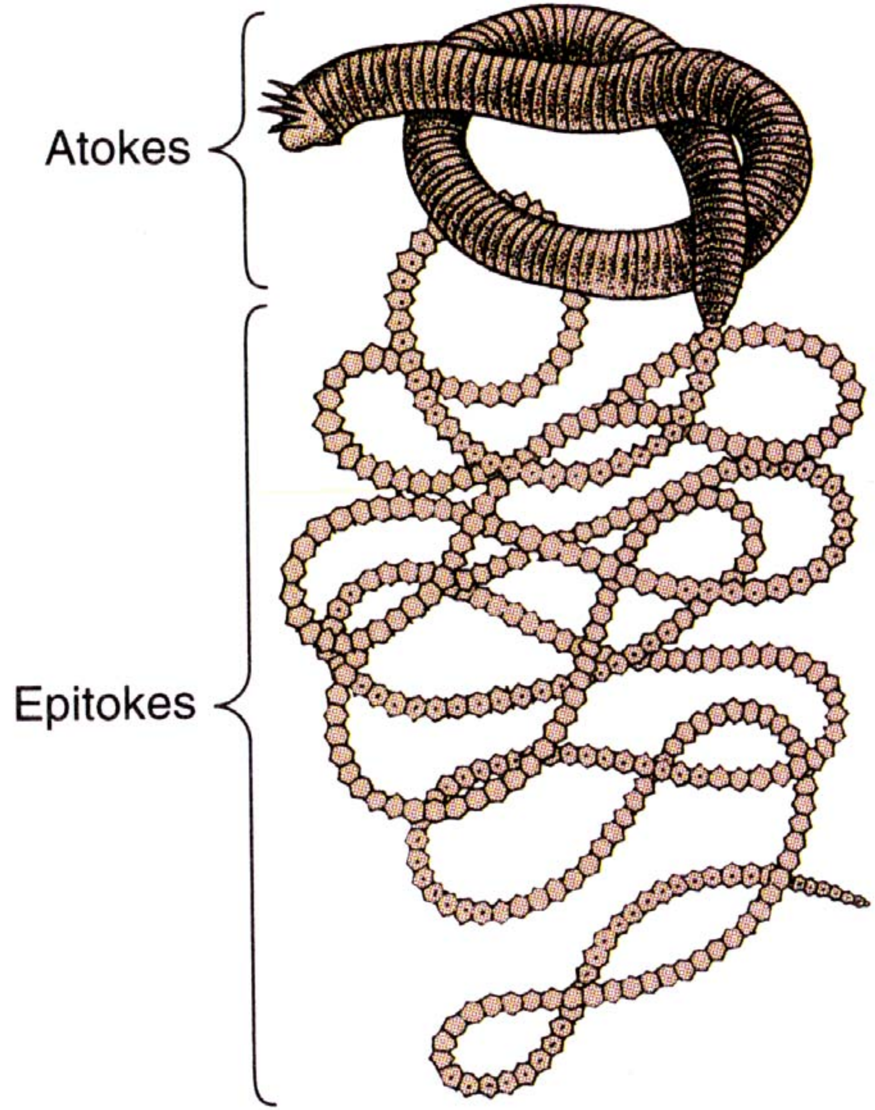

Photo by Leslie Harris



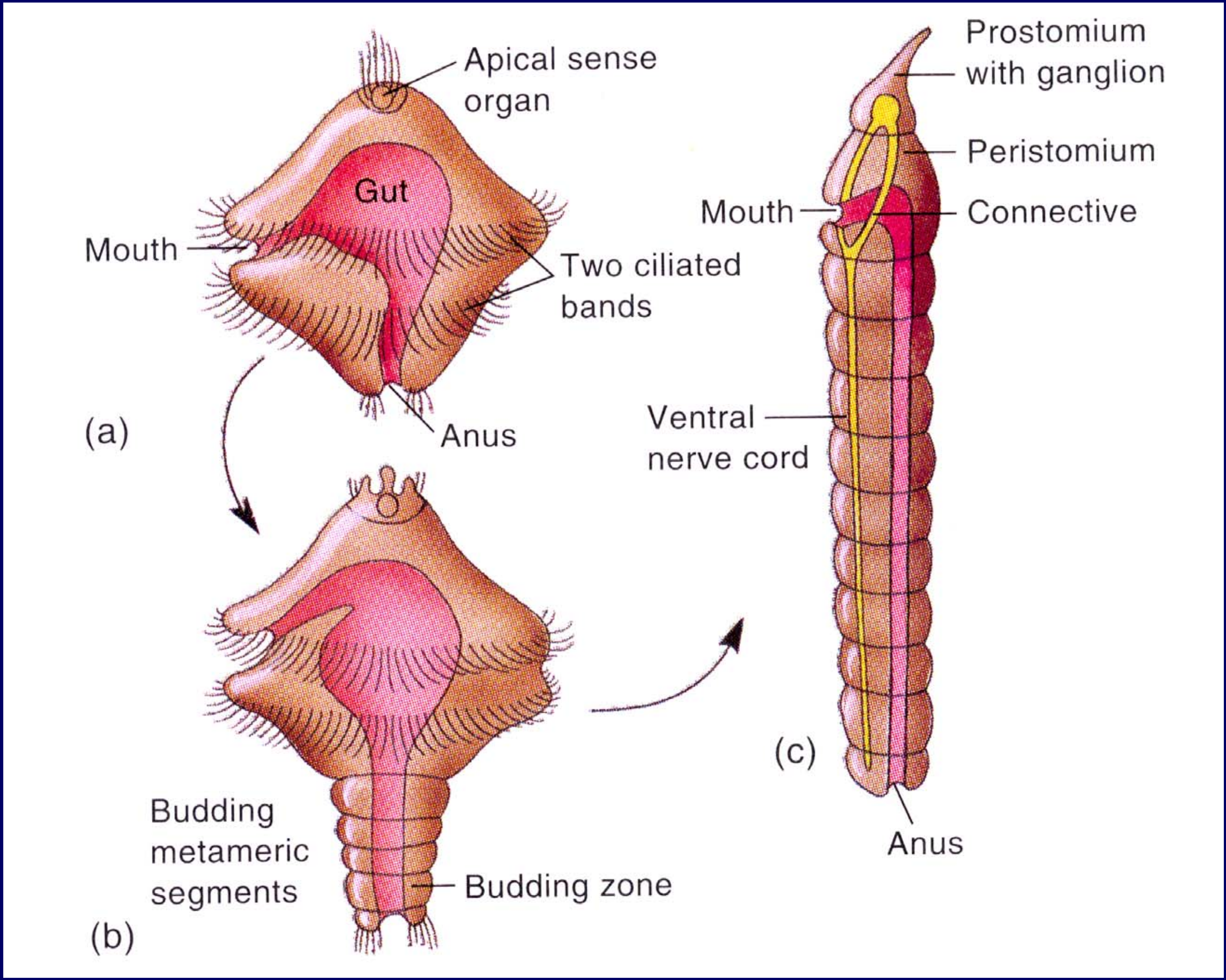

Intestine
Dorsal vessel
Oblique muscle
Dorsal cirrus
Coelomic epithelium
Eggs
Longitudinal muscle
Respiratory capillaries
Circular muscle
Notopodium
Parapodium
Neuropodium
Epidermis
Setae
Aciculum
Nephridium
Ventral vessel
Ventral cirrus
Nerve cord

Autolytus

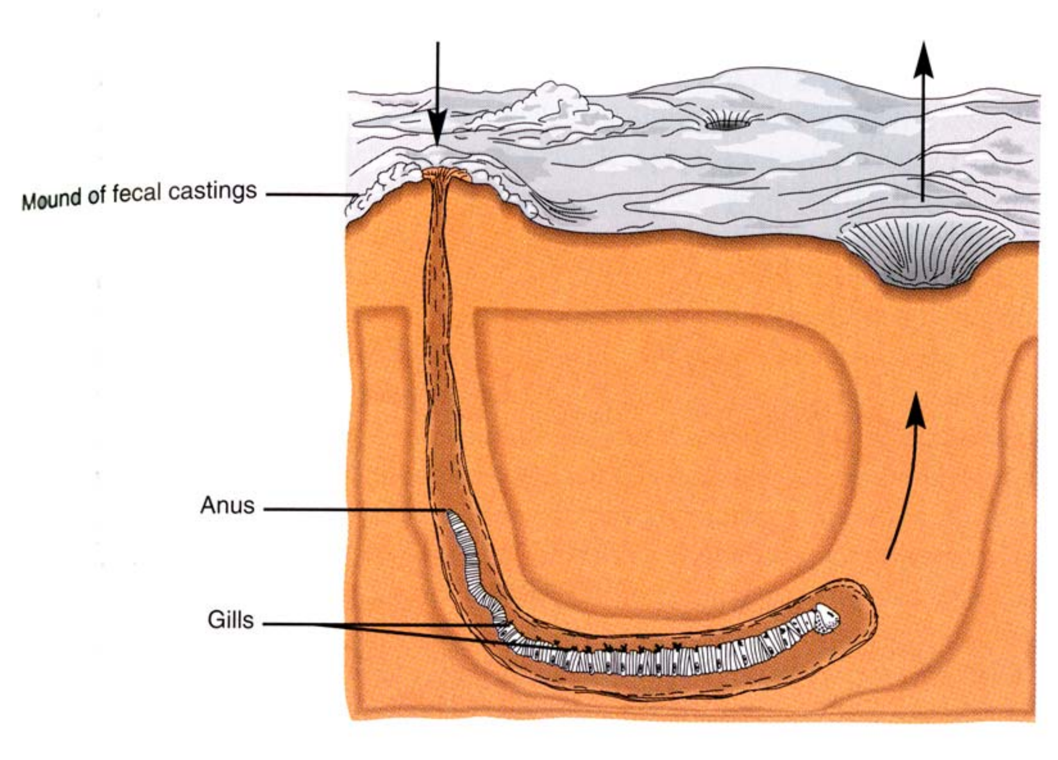




The Pacific palolo worm *Palola viridis*


Apical sense organ
Gut
Mouth
Two ciliated bands
Anus
(a)
Budding metameric segments
Budding zone
(b)
Prostomium with ganglion
Peristomium
Mouth
Connective
Ventral nerve cord
(c)
Anus

隐居目



Christmas tree tube worm *Spirobranchus giganteus.*

寡毛纲

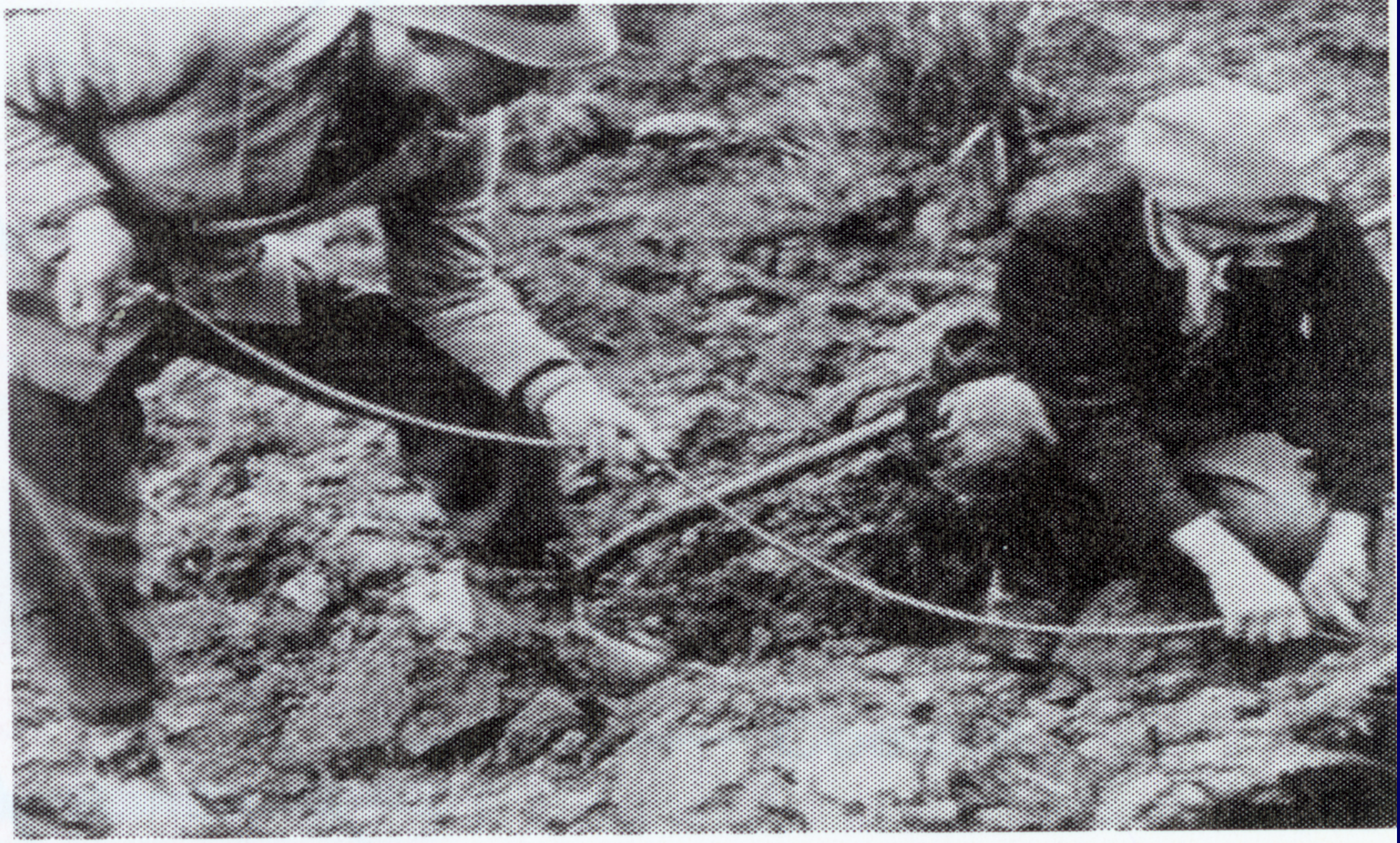
近孔目

前孔目

后孔目

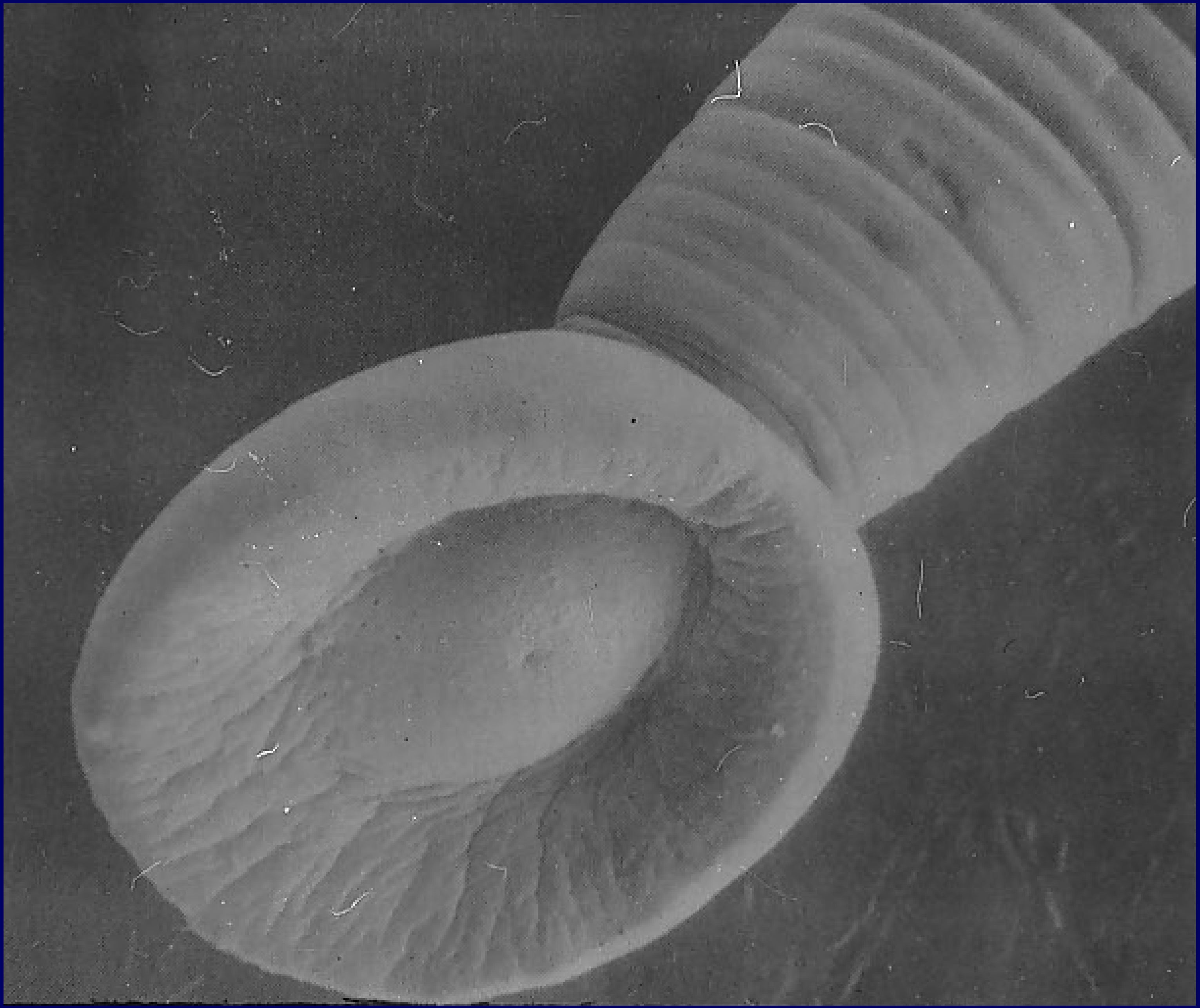

Multi-Vitamin Enriched
Hikari
TUBIFEX WORMS
Free of Parasites & Harmful Bacteria
HIKARI BIO-PURE
Freeze Dried Food

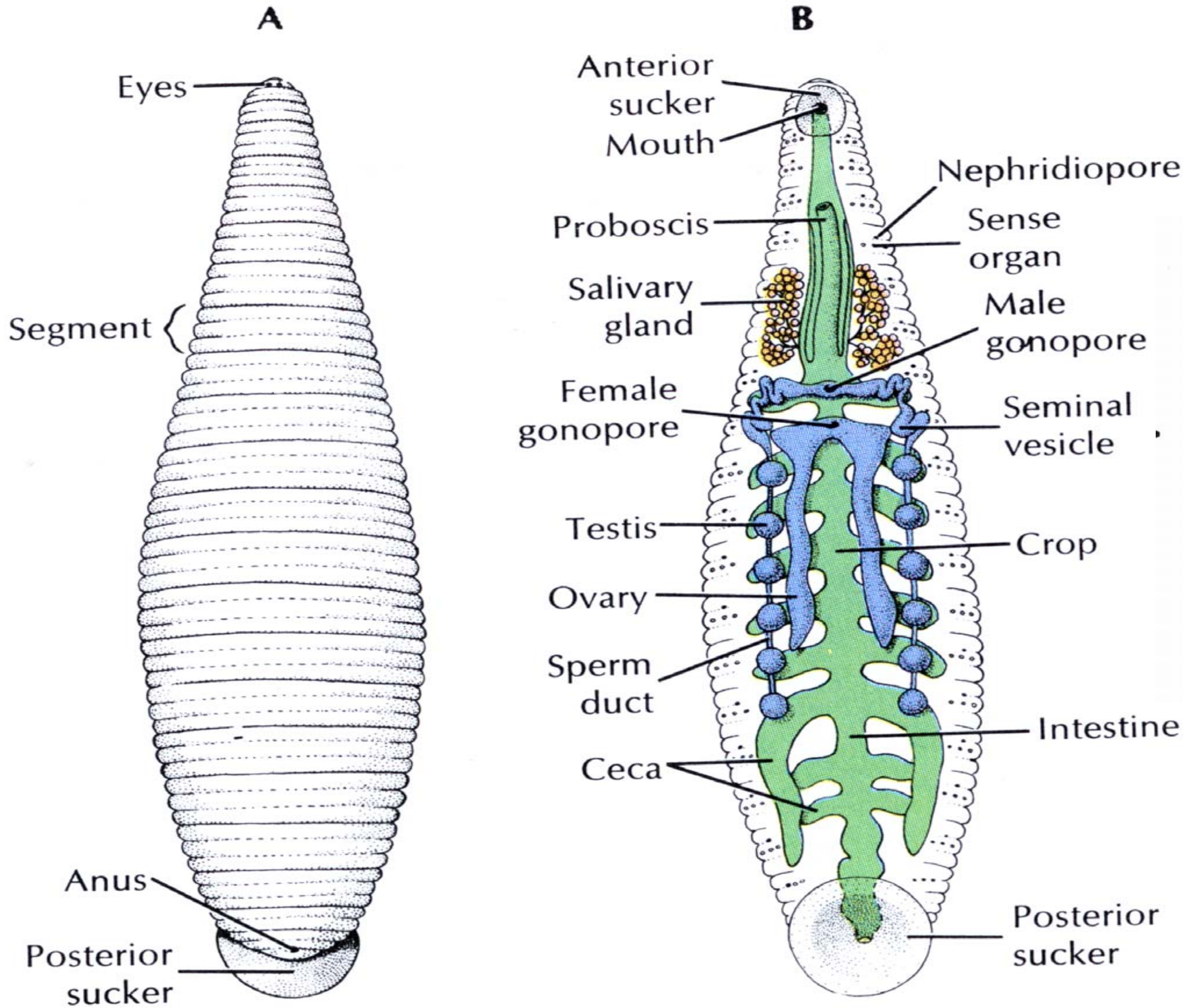
爱胜蚓（生殖带位于XXV-XXXIII节）

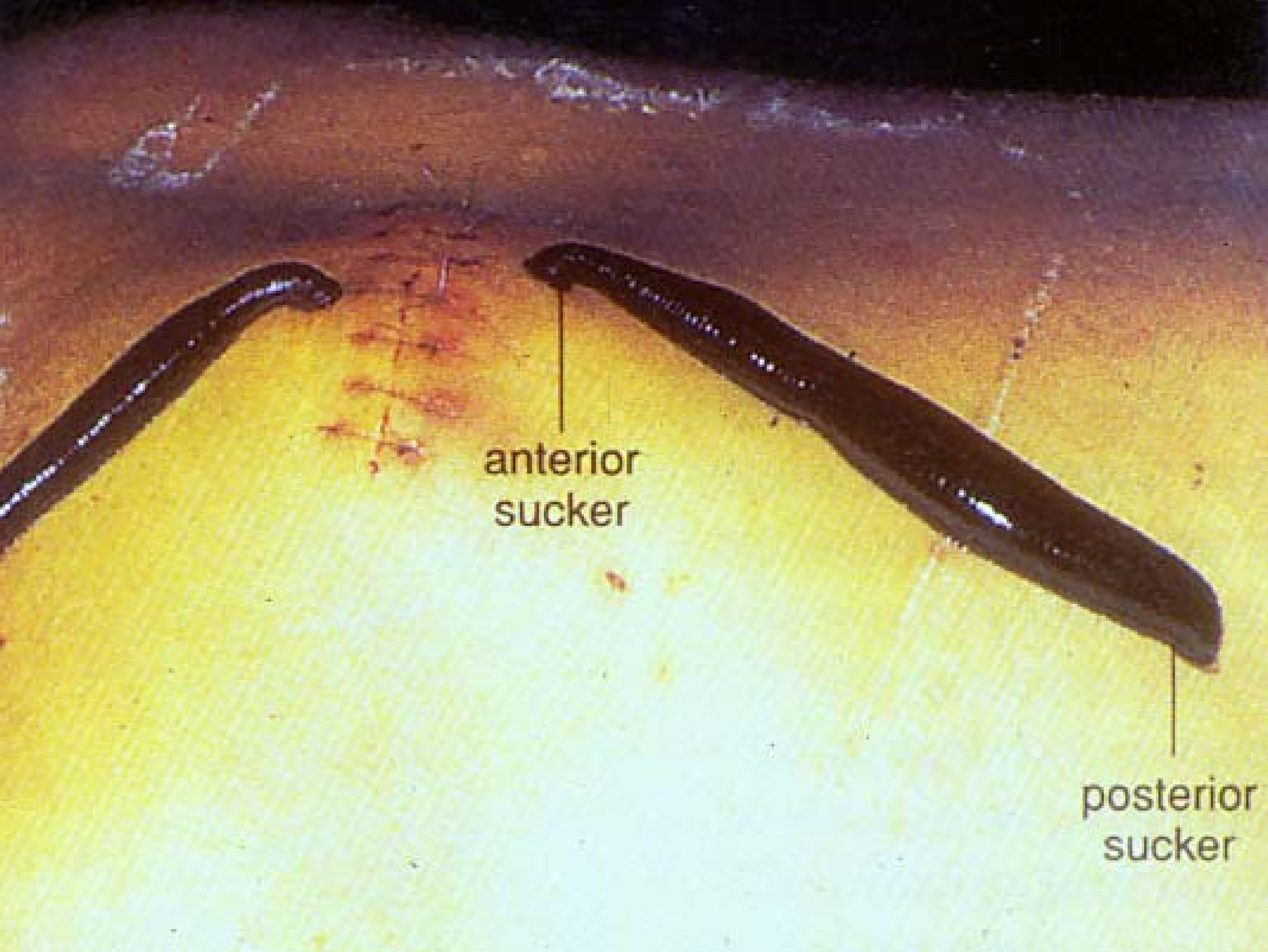


An Australian giant earthworm *Megascolides australis* being extracted from its burrow.

蛭　纲




A
B
Eyes
Segment
Anus
Posterior
sucker
Anterior
sucker
Mouth
Nephridiopore
Proboscis
Sense
organ
Salivary
gland
Male
gonopore
Female
gonopore
Seminal
vesicle
Testis
Crop
Ovary
Sperm
duct
Intestine
Ceca
Posterior
sucker


anterior
sucker
posterior
sucker

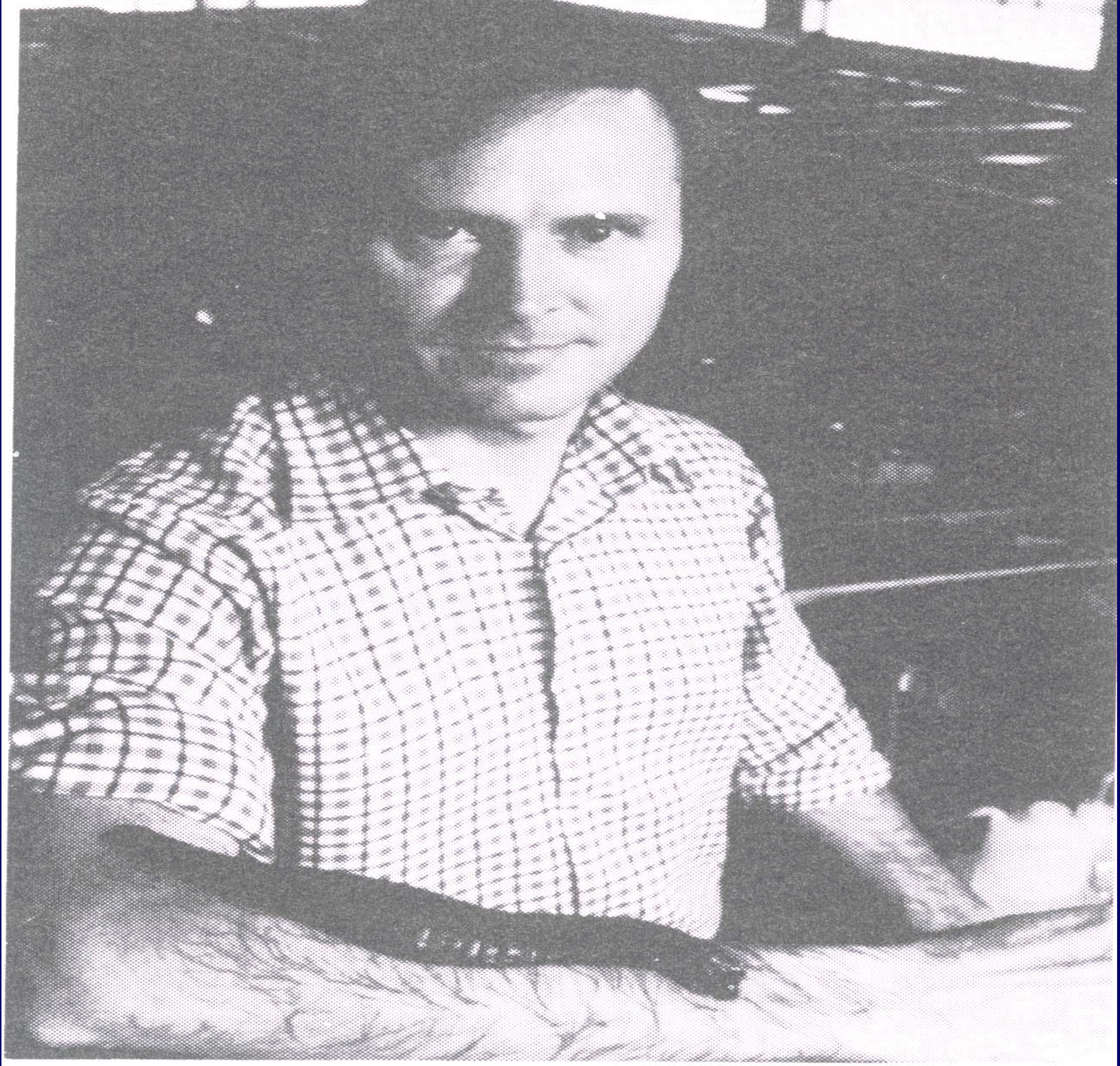
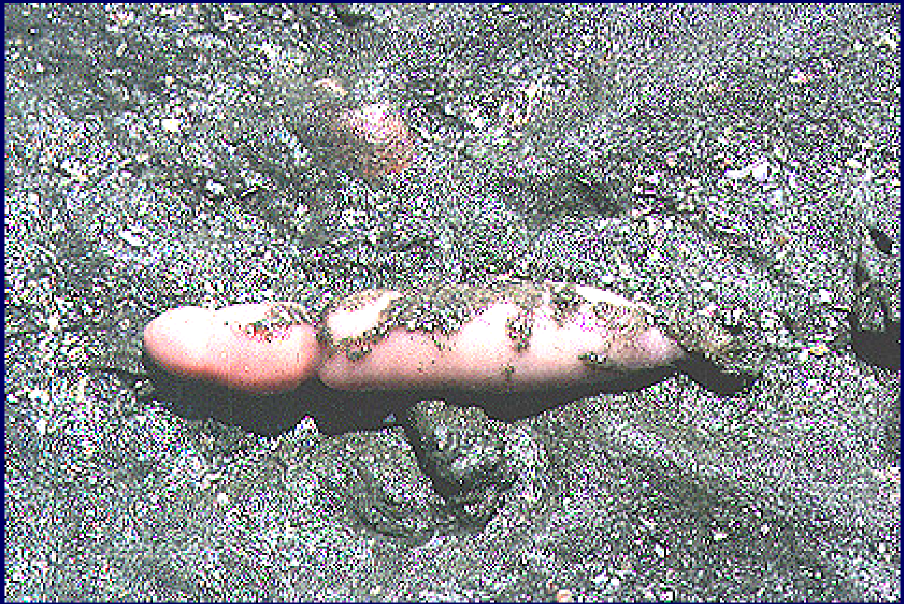
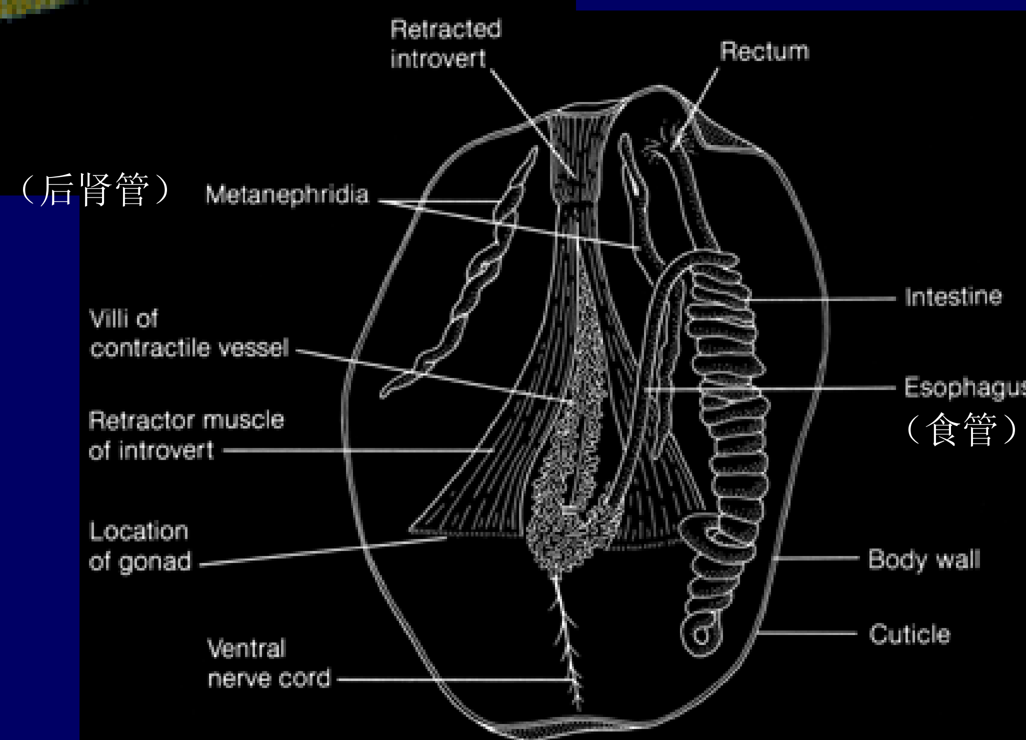


FIGURE The world's largest leech, *Haementeria ghilianii,* on the arm of Dr. Roy K. Sawyer, who found it in French Guiana, South America.
Photograph by T. Branning.

螠 纲




星虫纲


Retracted
introvert
Rectum
（后肾管） Metanephridia
Intestine
Villi of
contractile vessel
Esophagus
（食管）
Retractor muscle
of introvert
Location
of gonad
Body wall
Cuticle
Ventral
nerve cord

环节动物的起源和演化

1、起源于扁形动物的涡虫纲：

某些成虫和担轮幼虫有管细胞的原肾管，与扁形动物的焰细胞本质上相同

有些环节动物和有些涡虫，受精卵均进行螺旋式卵裂

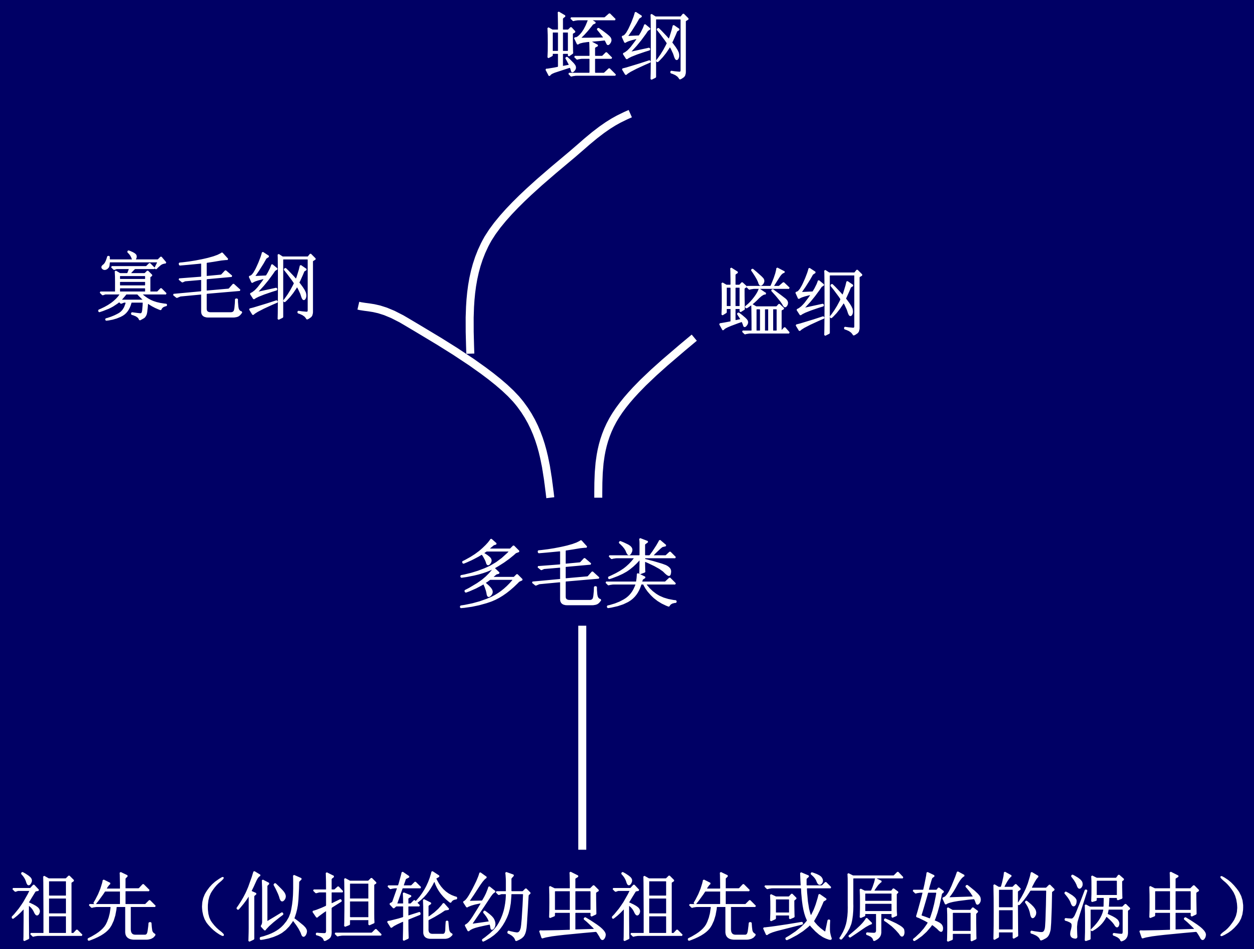
担轮幼虫与扁形动物的牟勒氏幼虫基本上相似。

海产的三肠目涡虫的内部器官显示出原始的分节现象。

- 2、起源于担轮幼虫的假想祖先“担轮动物”：

海产的环节动物都有担轮幼虫

软体动物、苔藓动物和腕足动物等在发生过程中都有担轮幼虫式动物


蛭纲
寡毛纲
蠕纲
多毛类
祖先（似担轮幼虫祖先或原始的涡虫）

review article

Confronting the coral reef crisis

D. Bellwood1, T. Hughes1, C. Folke & M. Nystrom

NATURE |VOL 429 | 24 JUNE 2004 |

Although there have been some local successes, current anagement of reefs has failed to achieve this goal at a regional or global scale.

over-harvesting, pollution, disease and climate change,

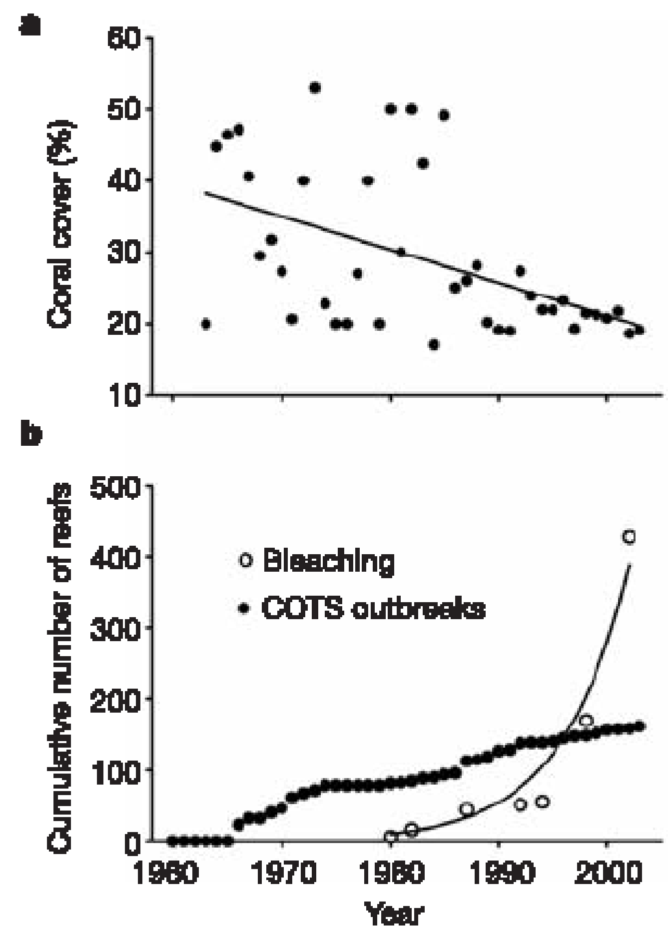


Figure 1 Degradation of coral reefs. **a**, Results of a meta-analysis of the literature, showing a decline in coral cover on the Great Barrier Reef. Each point represents the mean cover of up to 241 reefs sampled in each year. **b**, The recorded number of reefs on the Great Barrier Reef, Australia, substantially damaged over the past 40 yr by outbreaks of crown-of-thorns starfish (COTS) and episodes of coral bleaching.

Loss of resilience

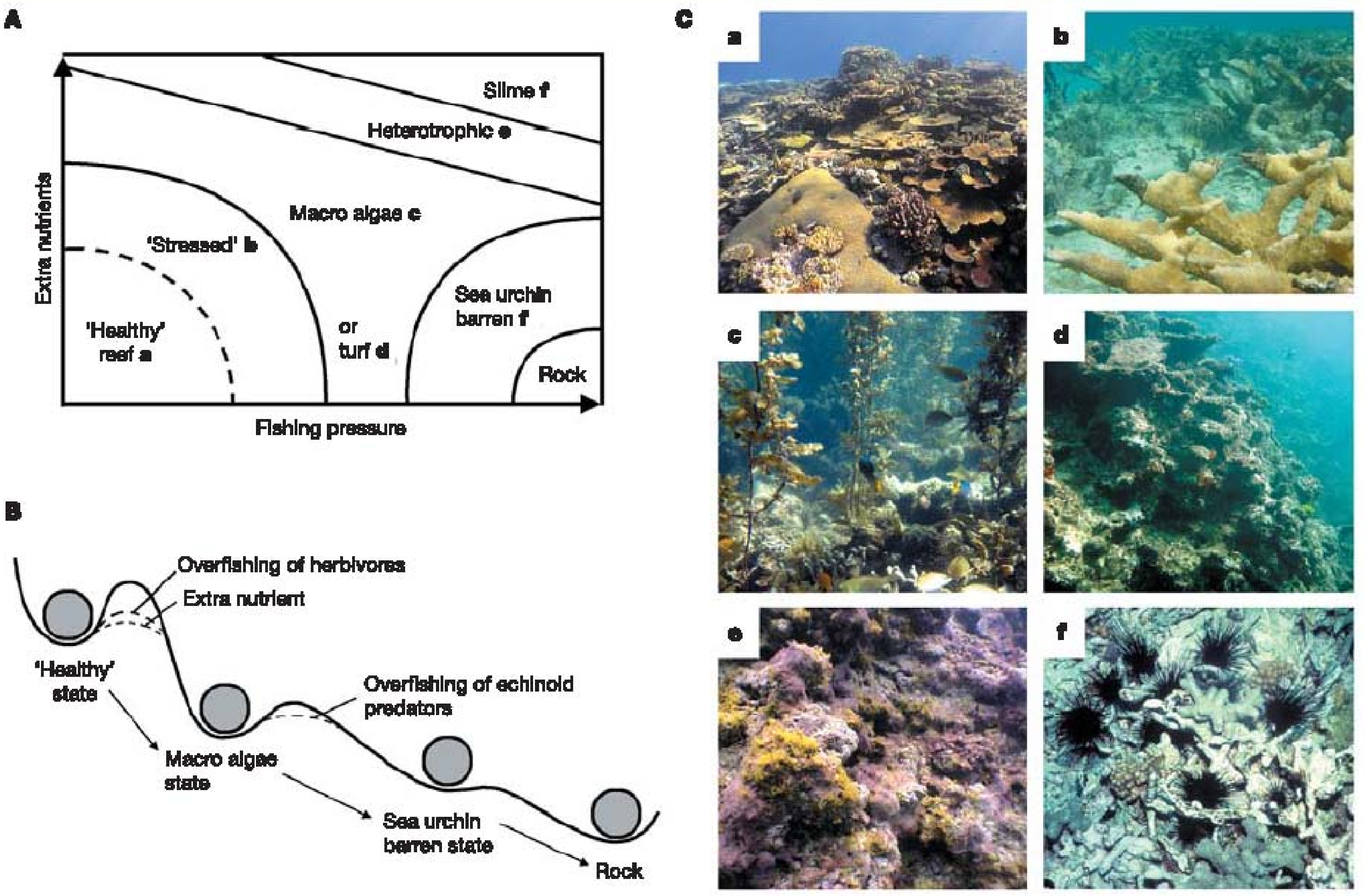


Figure 2 Alternate states in coral reef ecosystems. **A**, A conceptual model showing human-induced transitions between alternate ecosystem states based on empirical evidence of the effects from fishing and excess nutrients[15–17]. The 'stressed' state illustrates loss of resilience and increased vulnerability to phase-shifts. **B**, A graphic model depicting transitions between ecosystem states. 'Healthy' resilient coral-dominated reefs become progressively more vulnerable owing to fishing pressure, pollution, disease and coral bleaching. The dotted lines illustrate the loss of resilience that becomes evident when reefs fail to recover from disturbance and slide into less desirable states. **C**, Six characteristic reef states (as in **A**) from sites on the Great Barrier Reef (**a**, **c**, **d**, **e**) and in the Caribbean (**b**, **f**).

A functional group approach to coral reef dynamics

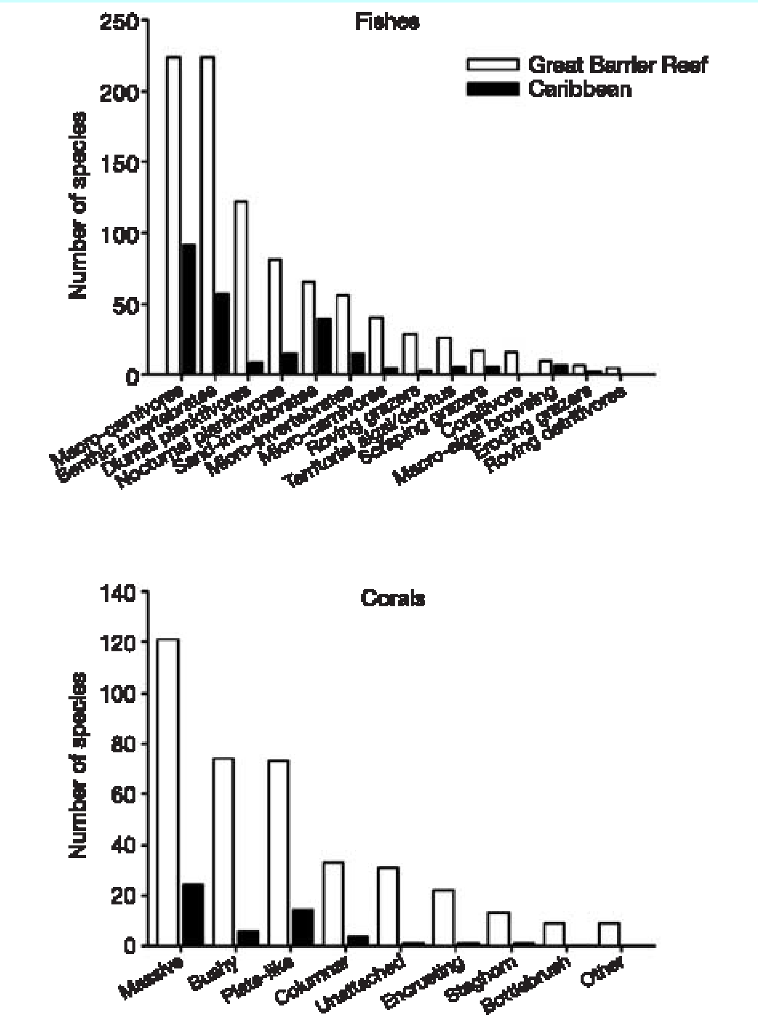


Figure 3 Functional composition of Caribbean and Great Barrier Reef assemblages of fishes and corals. The fourteen fish and eleven coral functional groups are identified by their roles in ecosystem processes.

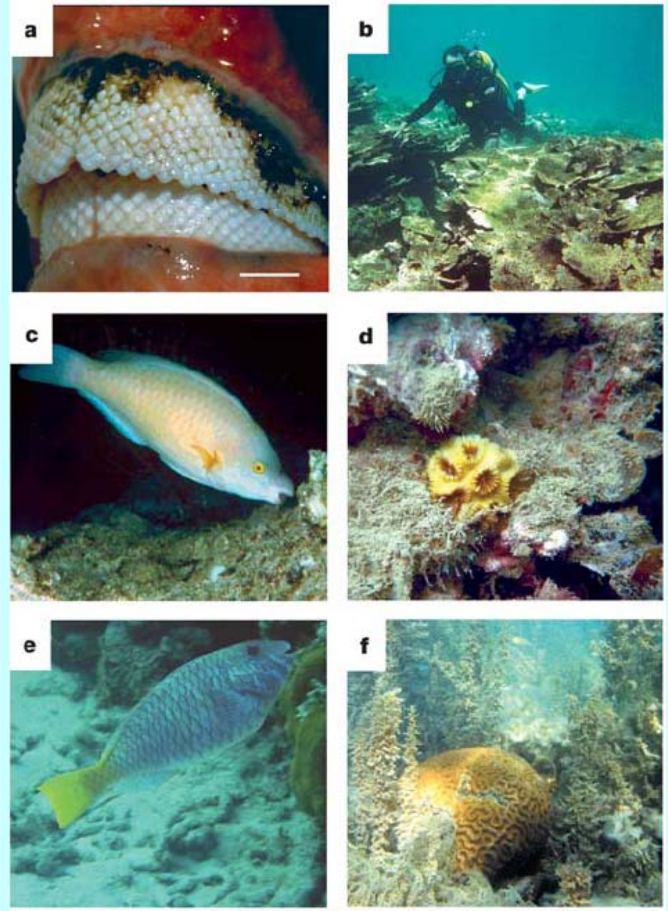
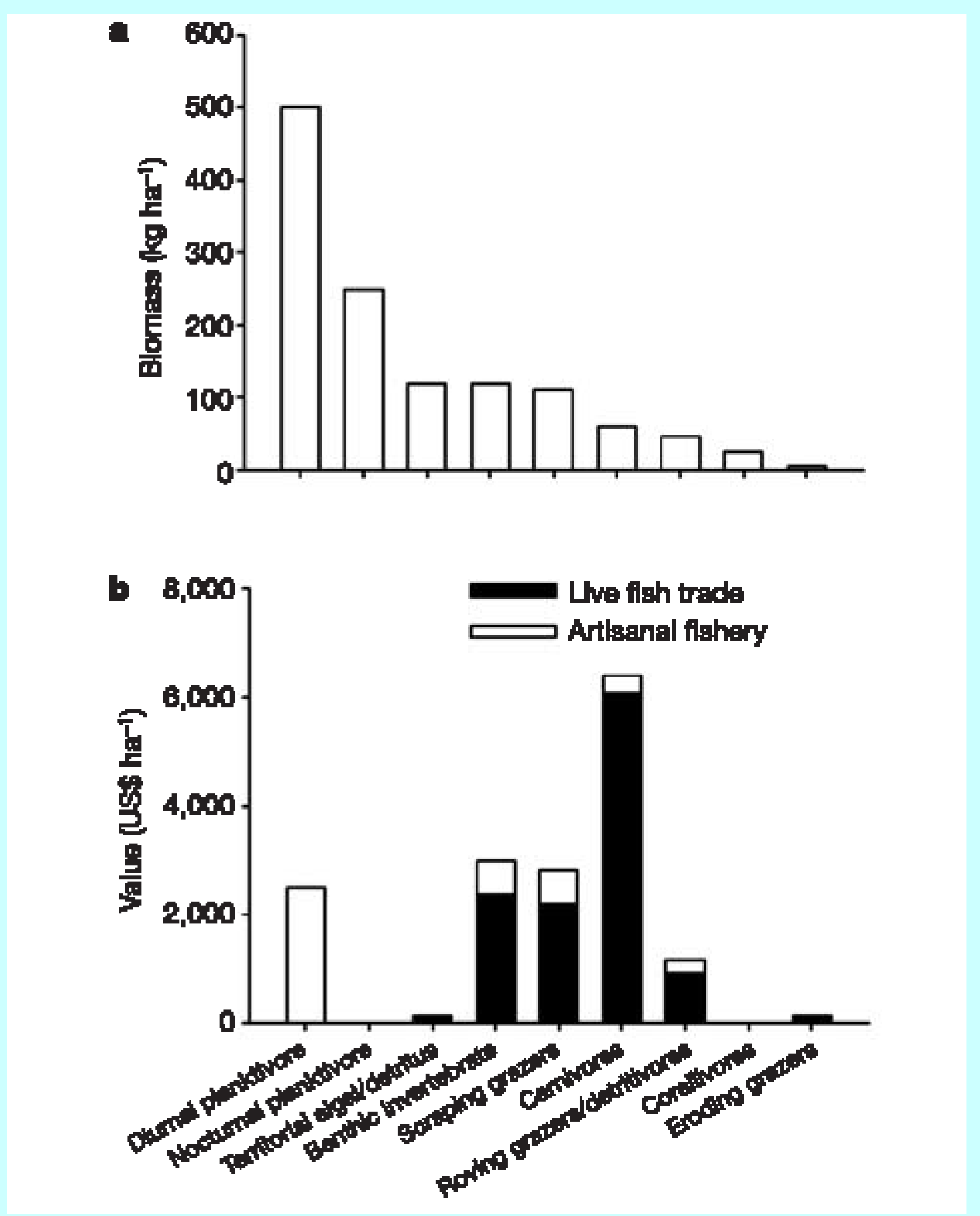


Figure 4 Three critical functional groups and their roles in facilitating reef recovery. **a**, The jaws of a bioeroding parrotfish (*Bolbometopon muricatum*); each individual ingests five tonnes of coral annually. Scale 1 cm. **b**, An extensive stand of dead coral in Samoa, killed by coral bleaching, remains intact because of reduced bioerosion by depleted fish populations. **c**, A scraping herbivore, the parrotfish (*Scarus flavipectoralis*) removes epilithic algae and sediment. **d**, A juvenile coral overwhelmed by algae and trapped sediment. **e**, A grazing parrotfish (*Sparisoma rubripinne*) reduces overgrowth of corals by competing macroalgae. **f**, An adult coral shaded and overgrown by fleshy macro-algae.

Resilience
and functional
groups



Shifting baselines and adaptive management

- ‘no-take’ areas (NTAs),
- ‘cool spots’ areas: minor changes in biodiversity can have a major impact on ecosystem

A blueprint for the future

- increased the size of NTAs
- focus on NTAs and hotspots is not enough
- management needs to be more inclusive, proactive and responsive.
- prevent exploitation of species in critical functional groups

Full paper (PDF)