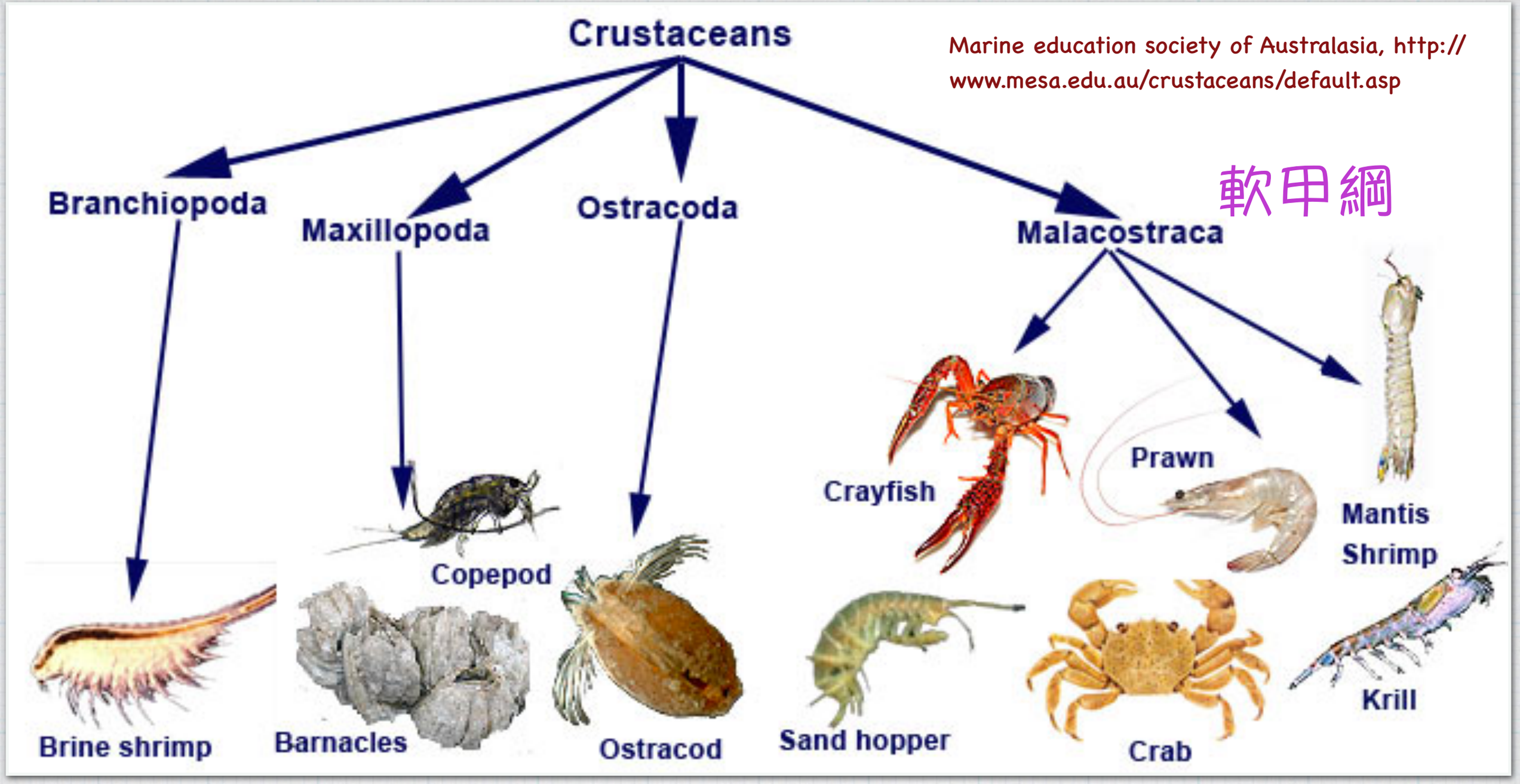
Pathological examination protocol of the Crustacean

Hao-Kai, Chang

346th CSVP, 2016, 05, 13



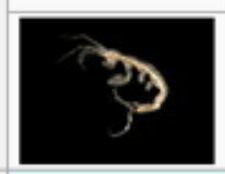
Marine education society of Australasia, http://www.mesa.edu.au/crustaceans/default.asp

Crustaceans (甲殼亞門), form a very large group of arthropods, usually treated as a subphylum, which includes such familiar animals as crabs, lobsters, crayfish, shrimp, krill (磷蝦) and barnacles (藤壺).

Order	Suborder	Infraorder	Image	Extant species [28]
十足目 Decapoda	Dendrobranchiata 枝鰓亞目			533
	Pleocyemata 抱卵亞目	Caridea		3438
		Procaridoidea		6
		Stenopodidea		71

ex: 對蝦科，如草蝦、白蝦

ex: 其它多數的蝦、蟹

Class	Image	Group	Extant species
	Branchiopoda comes from the Greek *br*		
Branchiopoda		brine shrimp	8
		clam shrimp	150
		fairy shrimp	300
		tadpole shrimp	20
	Malacostraca comes from the Greek *ma* moulting.[48]		
Malacostraca		Lophogastrida	56
		mantis shrimp	400
		opossum shrimp	1,000
		skeleton shrimp	
	Ostracod comes from the Greek *óstrako*		
Ostracoda		seed shrimp	13,000

Crab

- typically have a very short projecting "tail" (abdomen)
- live in all the world's oceans, in fresh water, and on land
- make up 20% of all marine crustaceans caught, farmed, and consumed worldwide,
- amounting to 1.5 million tonnes annually.

科學分類	
界：	動物界 Animalia
門：	節肢動物門 Arthropoda
亞門：	甲殼亞門 Crustacea
綱：	軟甲綱 Malacostraca
目：	十足目 Decapoda
亞目：	腹胚亞目 Pleocyemata
下目：	短尾下目 Brachyura

Wikipedia

長得像crab,

名字也叫crab

卻不是"real crab"?

瓷蟹

Porcelain crab

細點海葵蟹

寄居蟹

Crab louse

Wikipedia

King crabs (帝王蟹), 體型巨大及肉質美味，很多物種都被廣泛捕捉來作為食物，當中最為普遍的是堪察加擬石蟹

過去分類上被分在寄居蟹總科

百萬帝王蟹「入侵」南極 或帶來生態浩劫

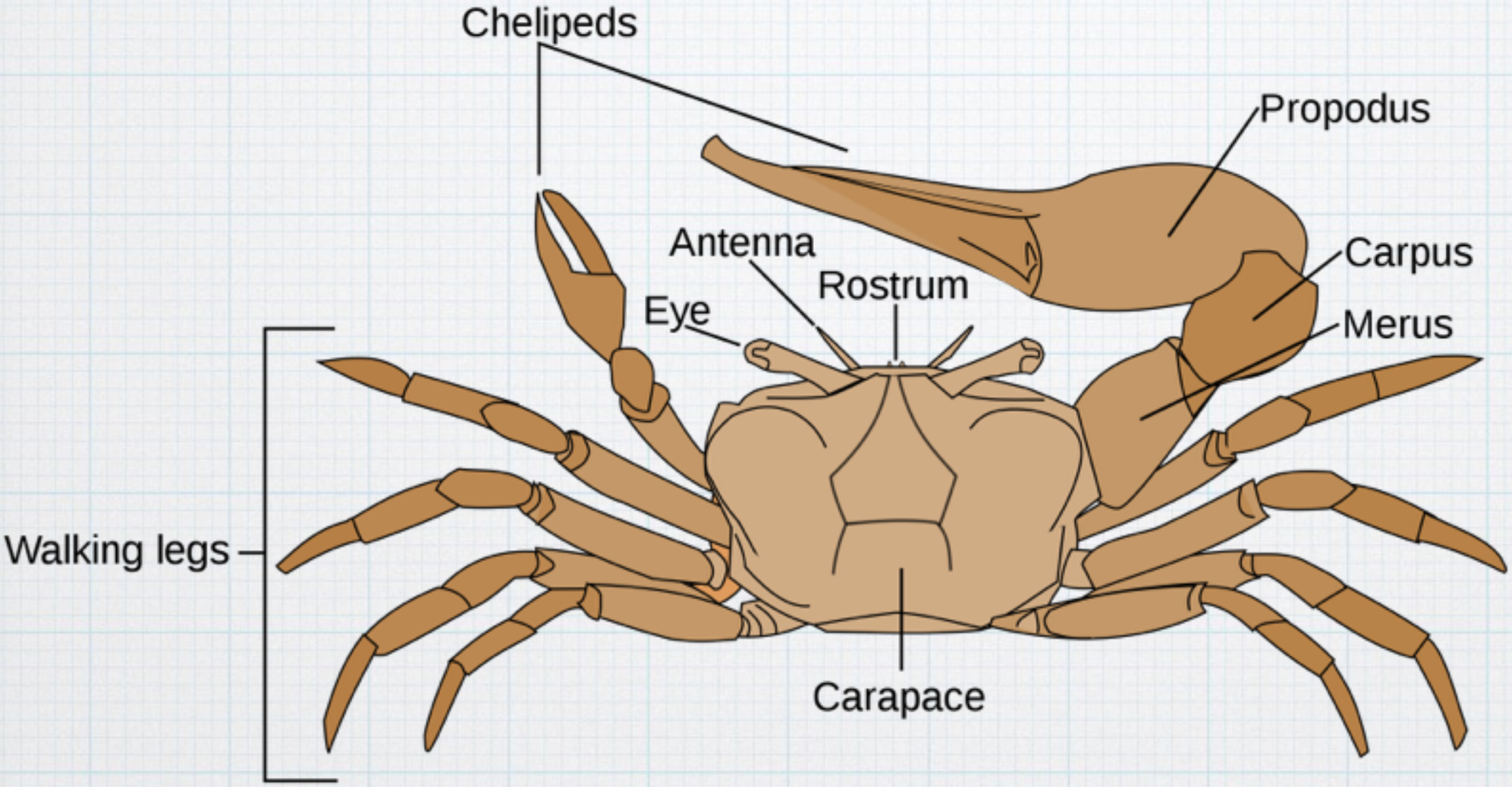
【阿波羅新聞網 2011-09-16 讯】 放大字◄ ►缩小字 打印版 圖片版 PDF

國外媒體報道，近日，美國海洋生物專家在南極地區發現上百萬隻巨型帝王蟹，而這一地區因為海水寒冷，在過去上百年時間裡並沒有出現過帝王蟹。數量如此多的帝王蟹突然出現到底什麼原因？出現在南極的帝王蟹和我們餐桌上吃到的一樣么？南極新移民會給當地生態帶來哪些影響？

King crabs

Paralithodes californiensis

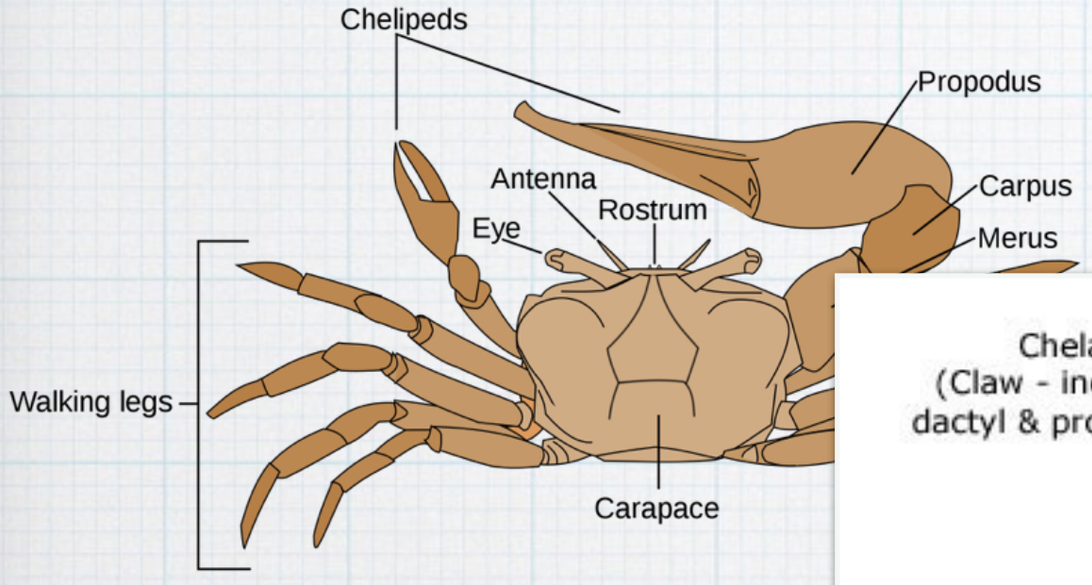
Anatomy of the crab



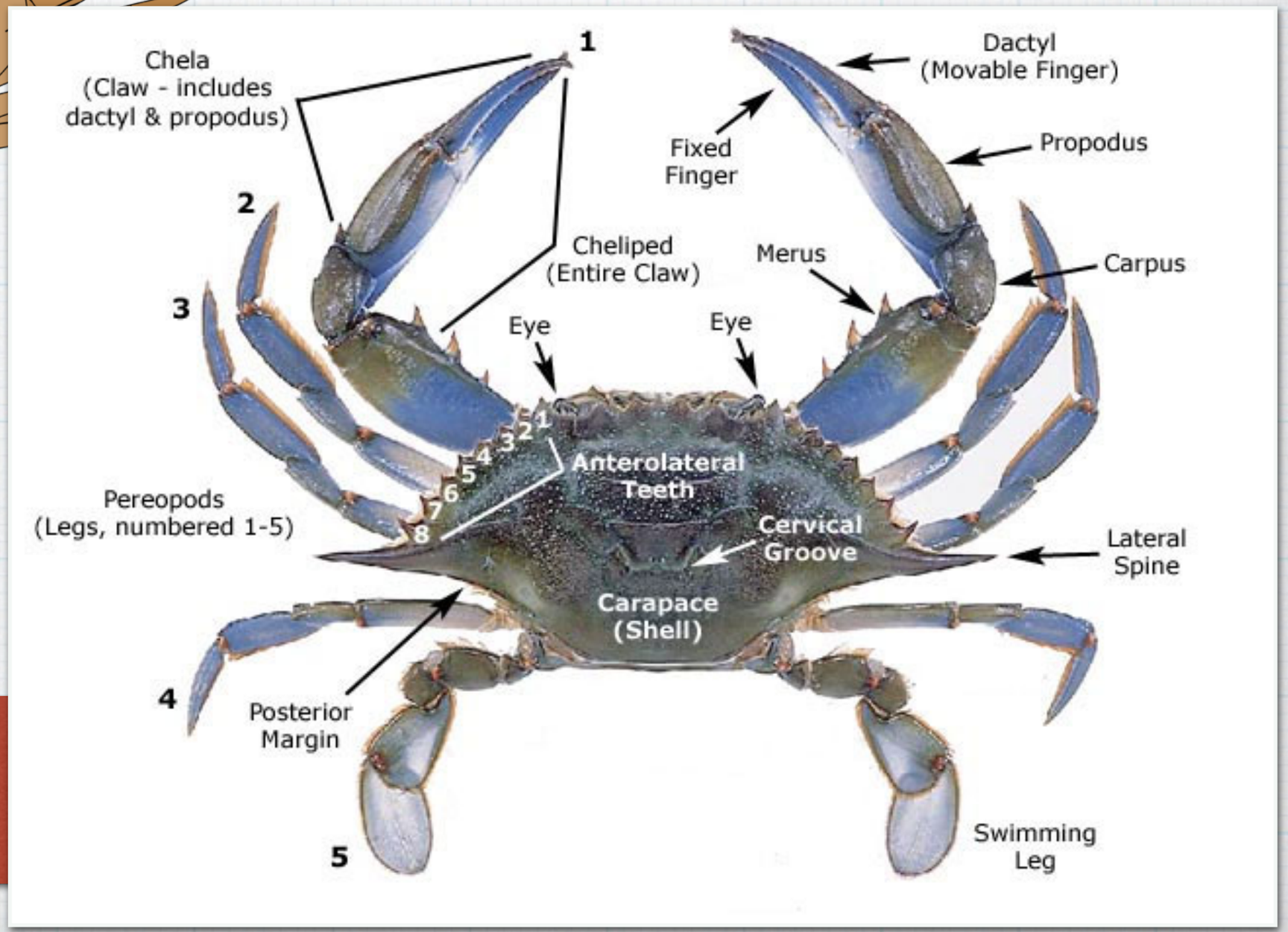
Dorsal View

https://simple.wikipedia.org/wiki/Crab

Anatomy of the crab

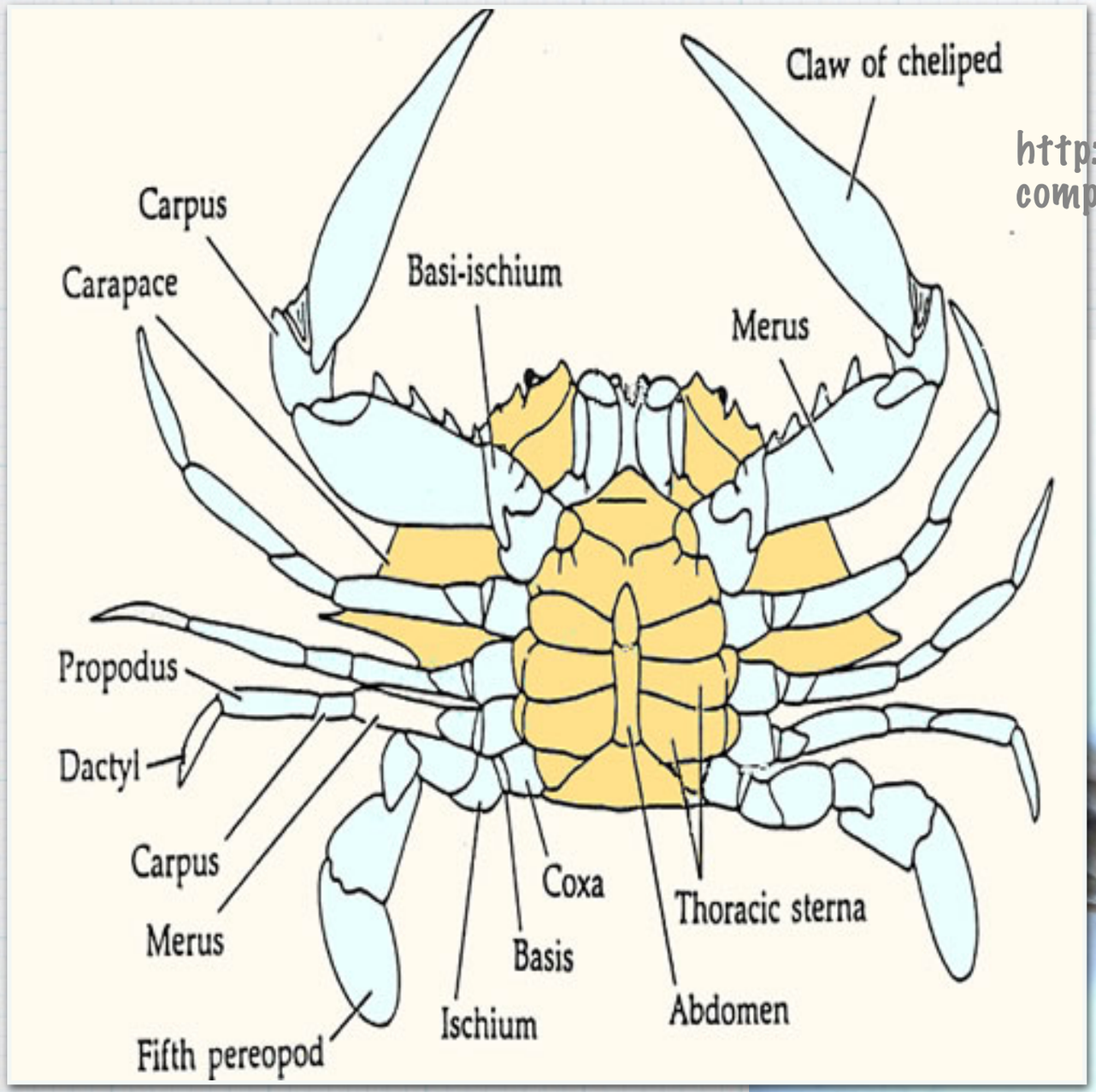


http://www.tclauset.org/16_StGuides/bluecrab.htm



Dorsal View

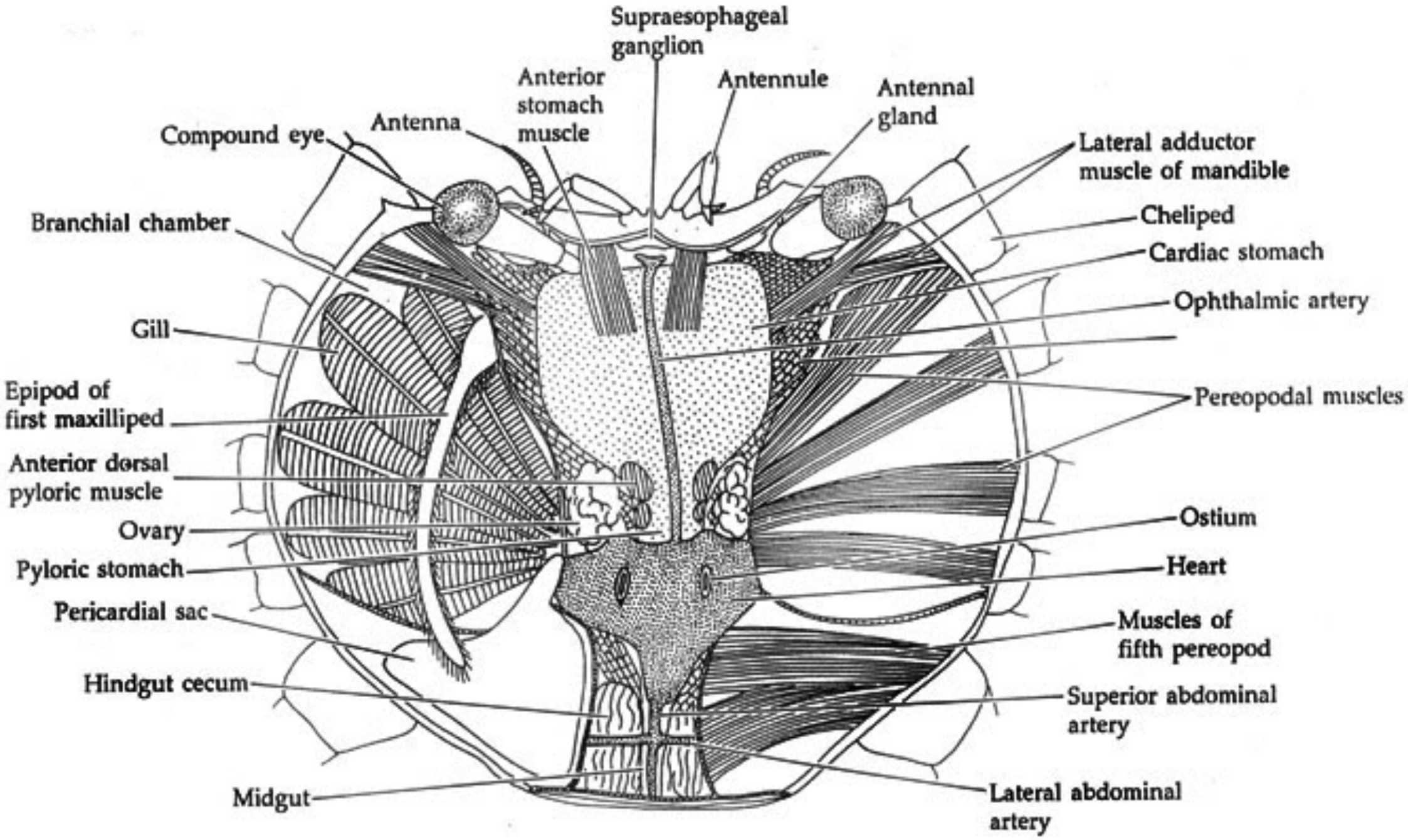
Anatomy of the crab



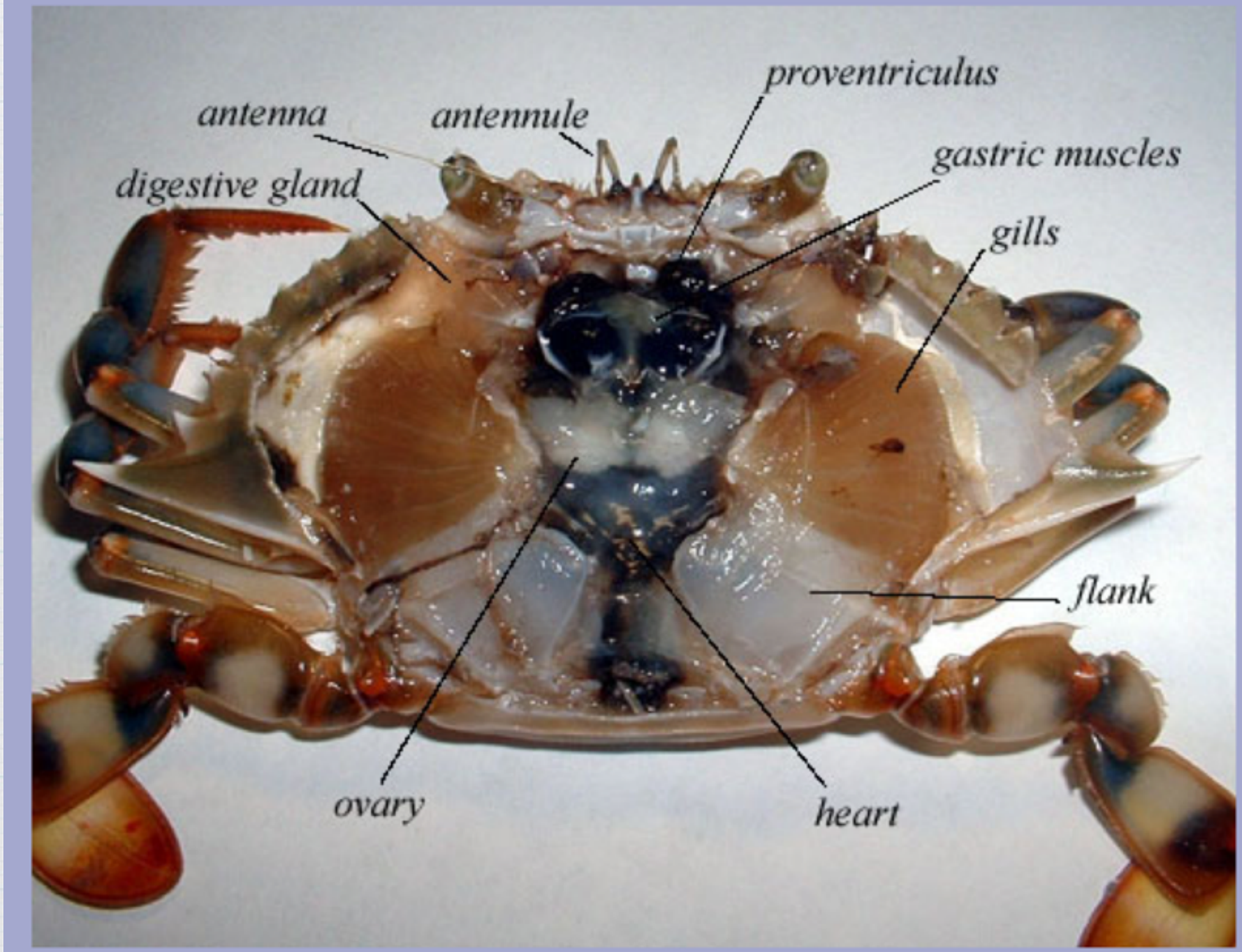
http://faculty.smcm.edu/wihatch/courses/436web/436labMan/compoundAPs.html

Ventral View

Anatomy of the crab

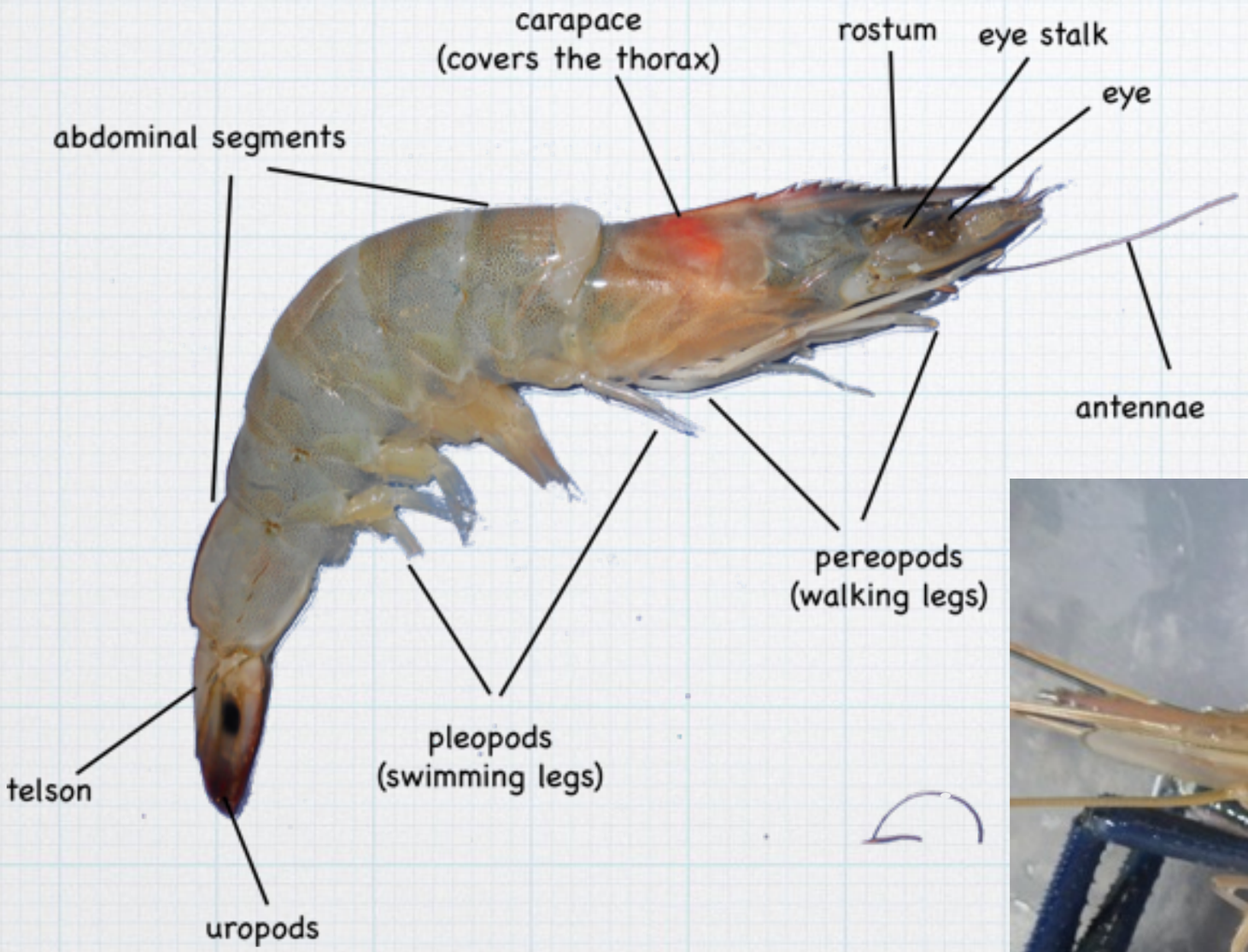


http://home.earthlink.net/~wweinkle/Crablab.htm



http://digestivephylums.weebly.com/arthropoda.html

Anatomy of the shrimp



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Assessment of the pressure–volume relationship of the single ventricle of the grass shrimp, *Palaemonetes pugio*

J. A. Guadagnoli[1,2,*], K. Tobita[3] and C. L. Reiber[2]

[1]College of Osteopathic Medicine, Touro University – Nevada, Henderson, NV 89014, USA, [2]Department of Biological Sciences, University of Nevada, Las Vegas, NV, USA and [3]Department of Pediatrics, Children's Hospital of Pittsburgh of UPMC, Pittsburgh, PA, USA

*Author for correspondence (e-mail: jguadagnoli@touro.edu)

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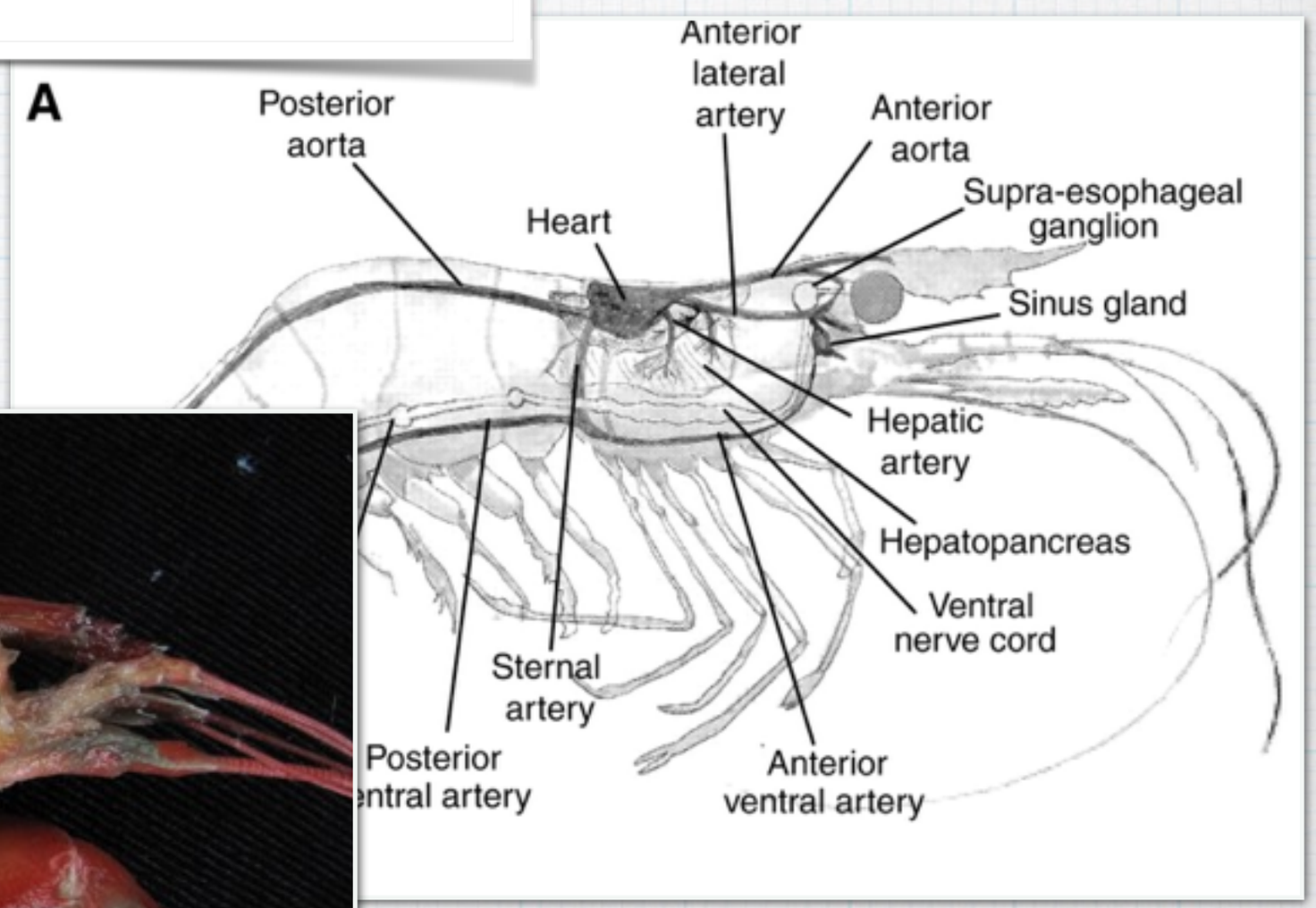
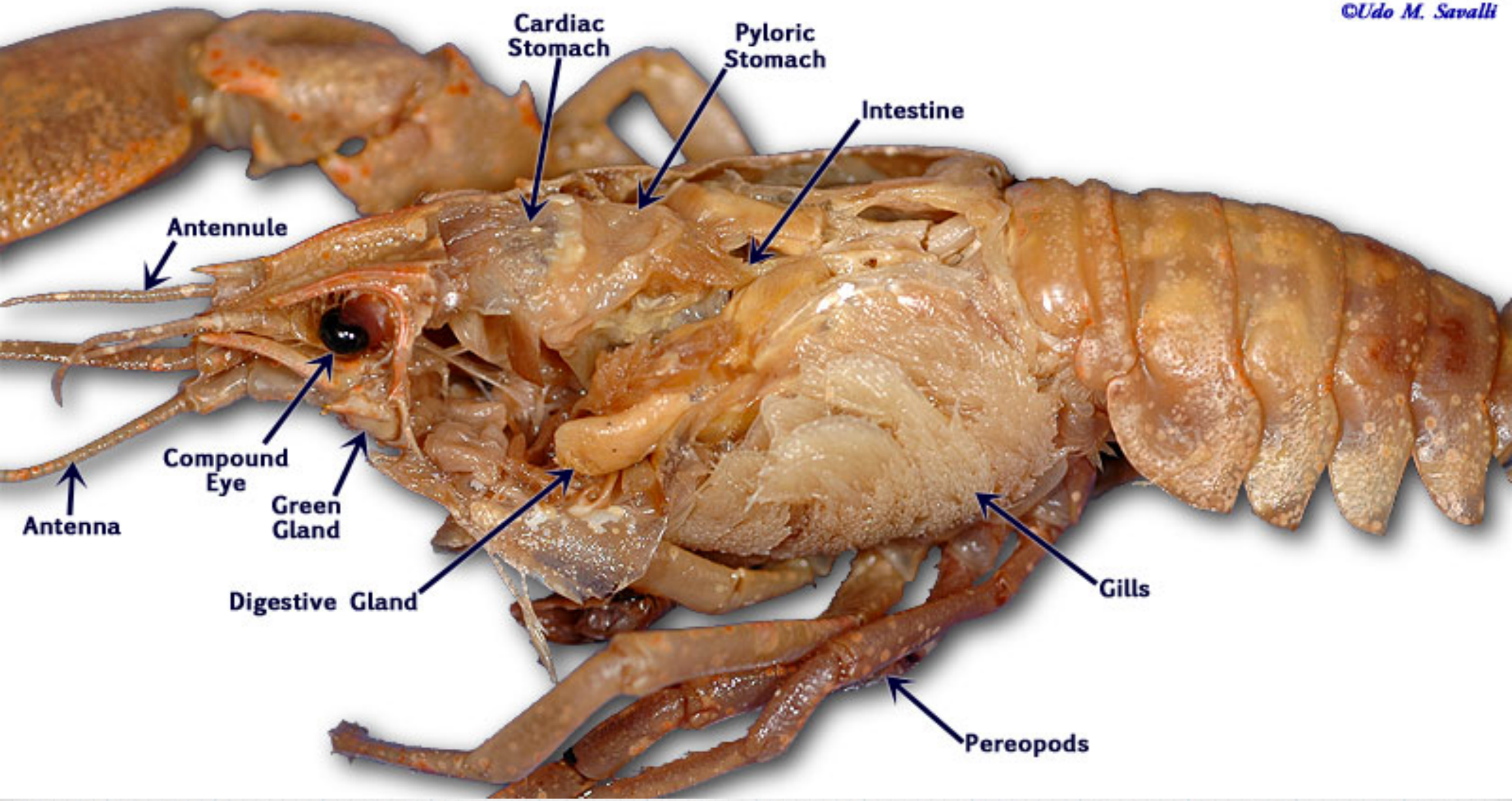
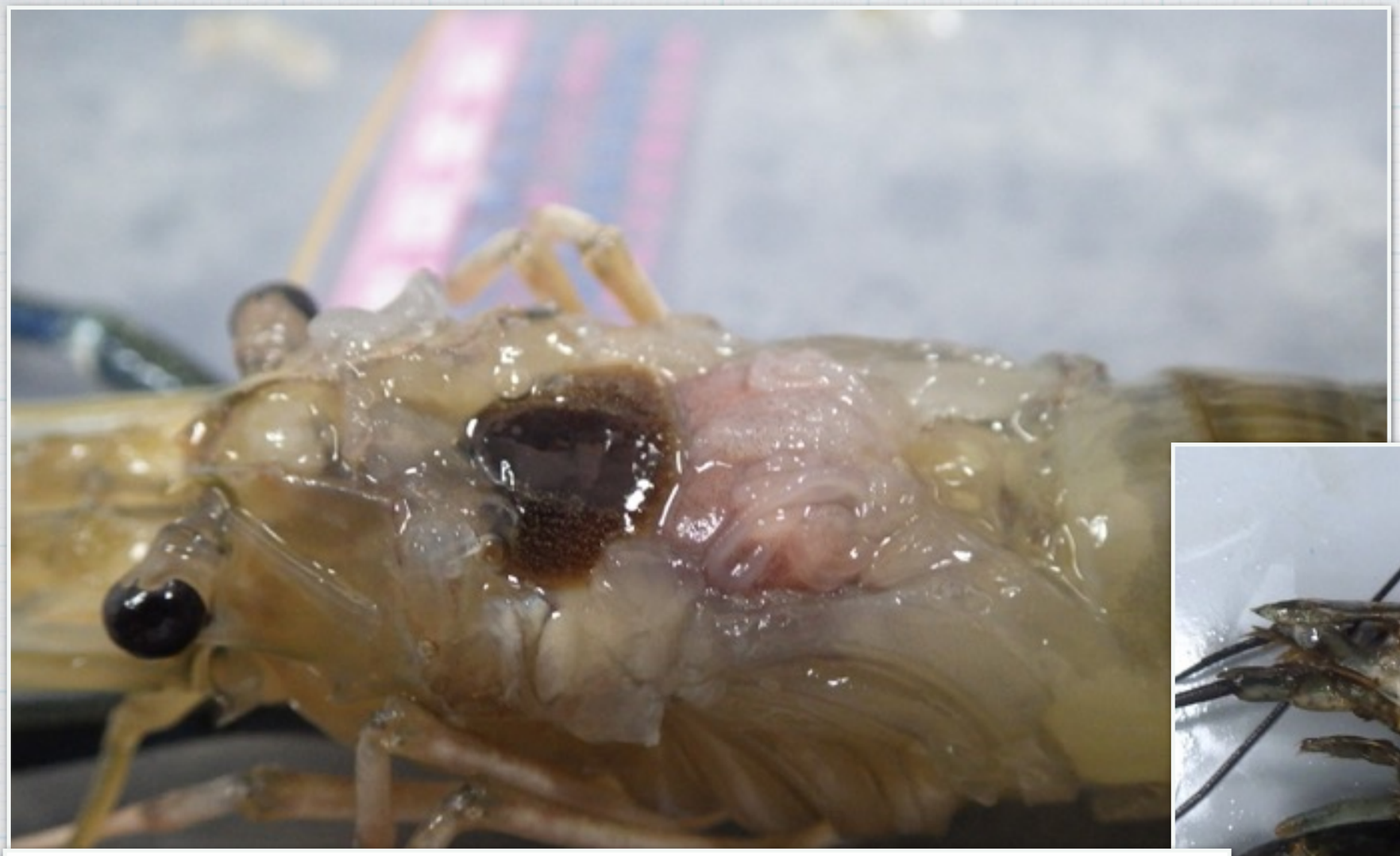



©Udo M. Savalli
Cardiac Stomach
Pyloric Stomach
Intestine
Antennule
Compound Eye
Antenna
Green Gland
Digestive Gland
Gills
Pereopods

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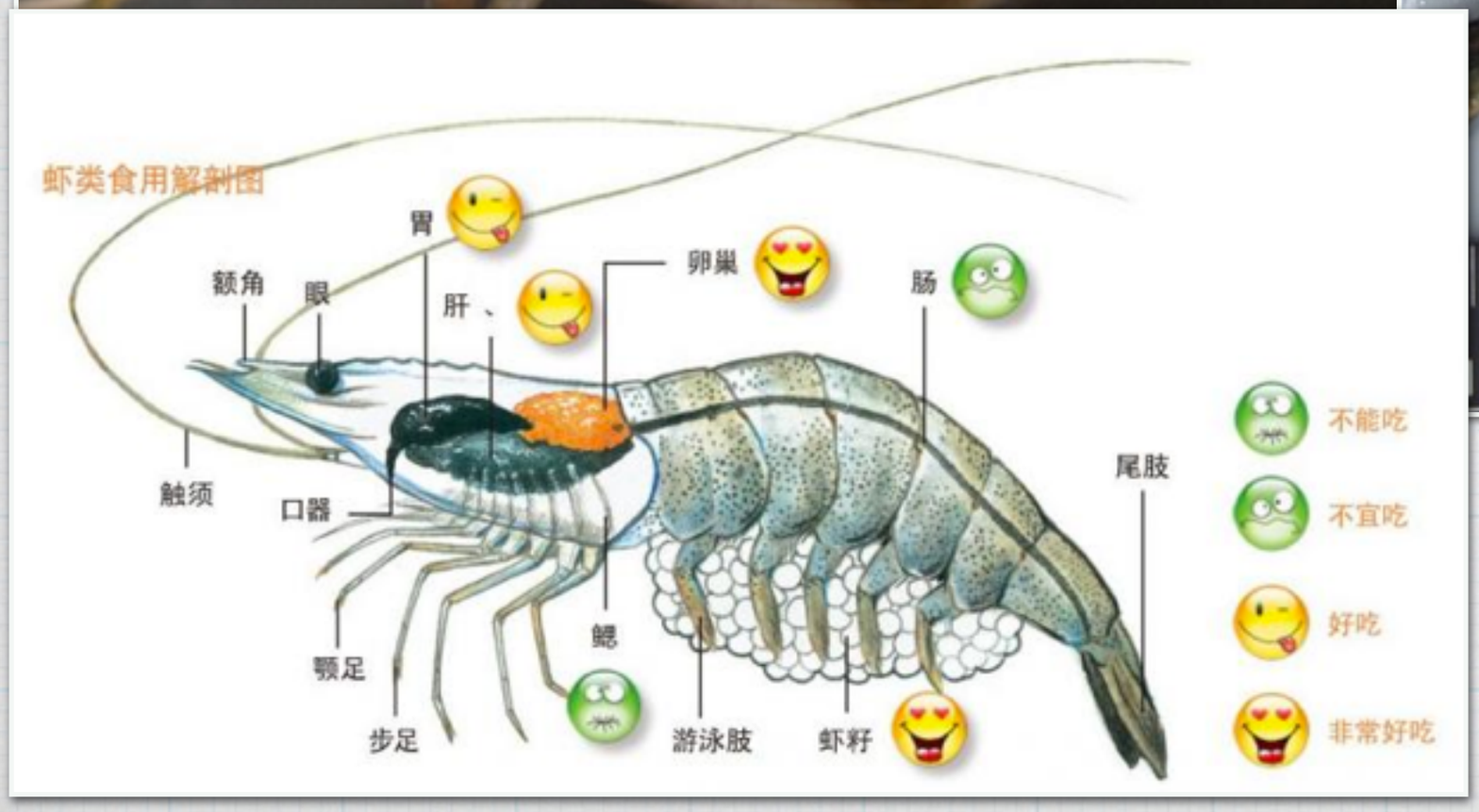
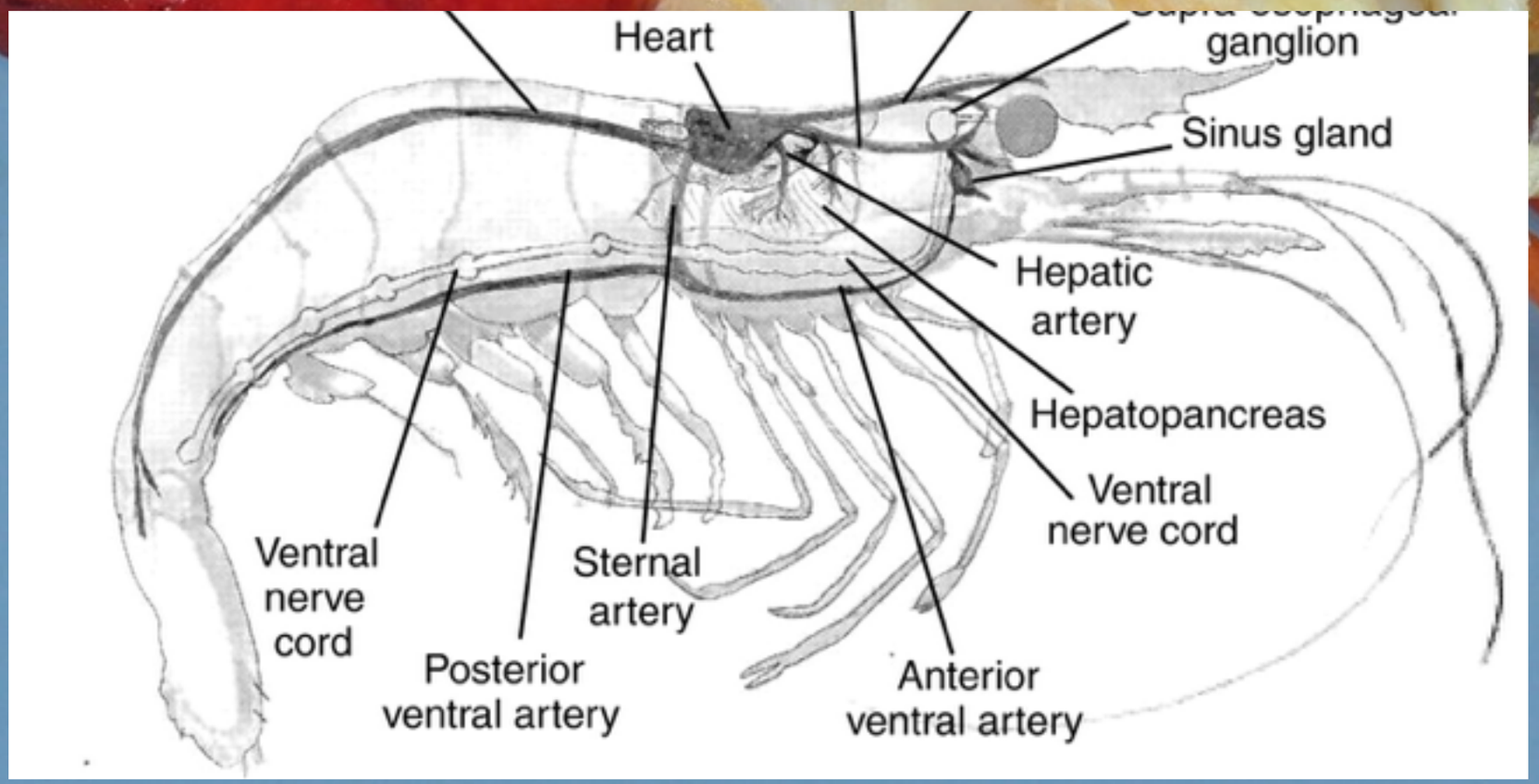

虾类食用解剖图
胃
额角
眼
肝、
卵巢
肠
触须
口器
鳃
颚足
步足
游泳肢
虾籽
尾肢
不能吃
不宜吃
好吃
非常好吃


Heart
ganglion
Sinus gland
Hepatic artery
Hepatopancreas
Ventral nerve cord
Ventral nerve cord
Sternal artery
Posterior ventral artery
Anterior ventral artery

FISH PATHOLOGY SECTION

LABORATORY MANUAL

Edited by

Theodore R. Meyers, Ph.D.

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Commercial Fisheries Division
P.O. Box 25526
Juneau, Alaska 99802-5526

How to sample the crustacean ?

How to sample the crustacean ?

- Only live or moribund crabs will be suitable for processing

  ☑ Do not collect and process dead crustacean

- Do not over-ice animals such that tissues freeze while in transit

  ☑ Frozen tissues are worthless for histological examination

  ☑ do not allow meltwater to contact sea crustacean

- Animals are anesthetized first by placing at 4℃ for 35-40 min

smear

remember to sample the water and examine it

Parameter	Unit	Test Remarks	Requirement	Methods
Physical & Chemical *):				
· Colour	Pt. Co scale	3	15	Colorimetric
· Odour	Pt. Co scale	negative	odourless	Organoleptic
· pH	Pt. Co scale	6.50	6.5-8.5	Electrometric
· Taste	Pt. Co scale	normal	tasteless	Organoleptic
· Turbity	FTU	1	5	Turbidity
· Aluminum	mg/l	below 0.20	0.2	AAS
· Copper	mg/l	below 0.03	1.0	AAS
· Iron Total	mg/l	below 0.04	0.3	AAS
· Manganese	mg/l	0.06	0.1	AAS
· Sodium	mg/l	96.93	200	AAS
· Zinc	mg/l	0.047	5	AAS
· Chloride	mg/l	140.41	250	Argentometric
· Flouride	mg/l	0.09	1.5	Colorimetric
· Nitrate	mg/l	below 0.11	10	Colorimetric
· Nitrite	mg/l	0.96	1	Colorimetric
· Sulphate	mg/l	below 0.94	400	Turbidimetric
· Arsenic	mg/l	below 0.001	0.05	AAS
· Barium	mg/l	below 0.10	1	AAS
· Cadmium	mg/l	below 0.005	0.005	AAS
· Cyanide	mg/l	below 0.01	0.1	Colorimetric
· Chrom Hexavalent	mg/l	below 0.006	0.05	Colorimetric
· Lead	mg/l	below 0.01	0.05	AAS
· Mercury	mg/l	below 0.001	0.001	AAS
· Selenium	mg/l	below 0.007	0.01	AAS
· Organic Matter by $KMnO_4$	mg/l	3.06	10	Permanganantometric
· Dissolved Solid	mg/l	431	1000	Gravimetric
· Hydrogen Sulphide as H_2S	mg/l	below 0.01	0.05	Colorimetric
· Total Hardness	mg $CaCO_3$	95.49	500	AAS

water quality

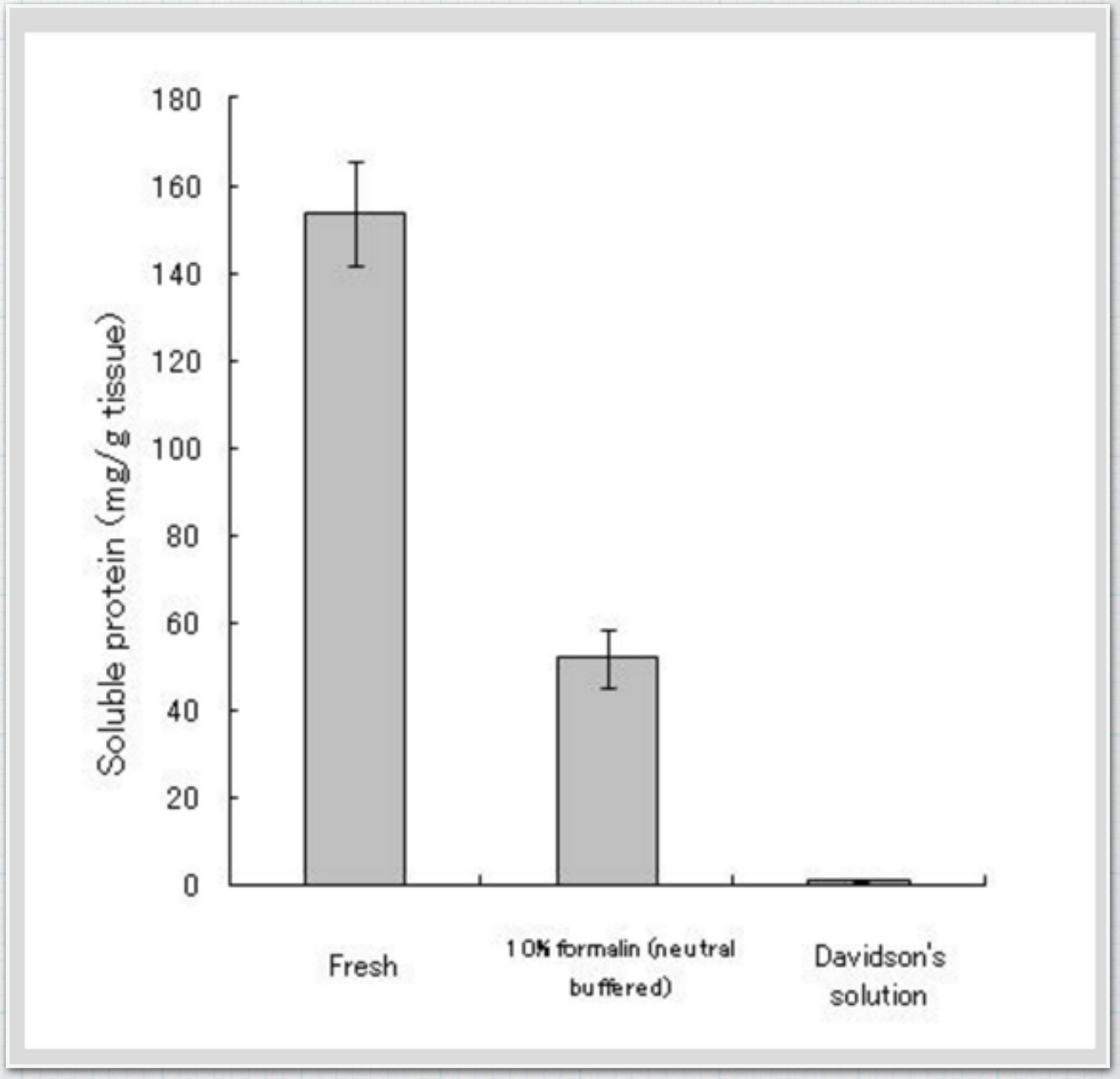
How to sample the crustacean ?

- Soft tissues should be preserved in **Helly's** or **Bouin's fixative** (Fish pathology section laboratory manual, Alaska Department of Fish and Game, 2000)
  - ☑ After **48 hours**, the fixative should be poured off and **replaced** with **70% ethyl alcohol** for transport and storage.
  - ☑ **Modified Davidson's solution**
- The **sample size** for a disease history per site or species will be **30 crustacean,** live or moribund.

National Research Institute of Aquaculture

Fixative solution

When the liver of trout is fixed in either 10% neutral buffered formalin or Davidson's solution for 35 minutes, a substantial amount of soluble protein still remains in the tissue fixed in 10% formalin, whereas virtually no soluble protein remains in the tissue fixed in Davidson's fixative

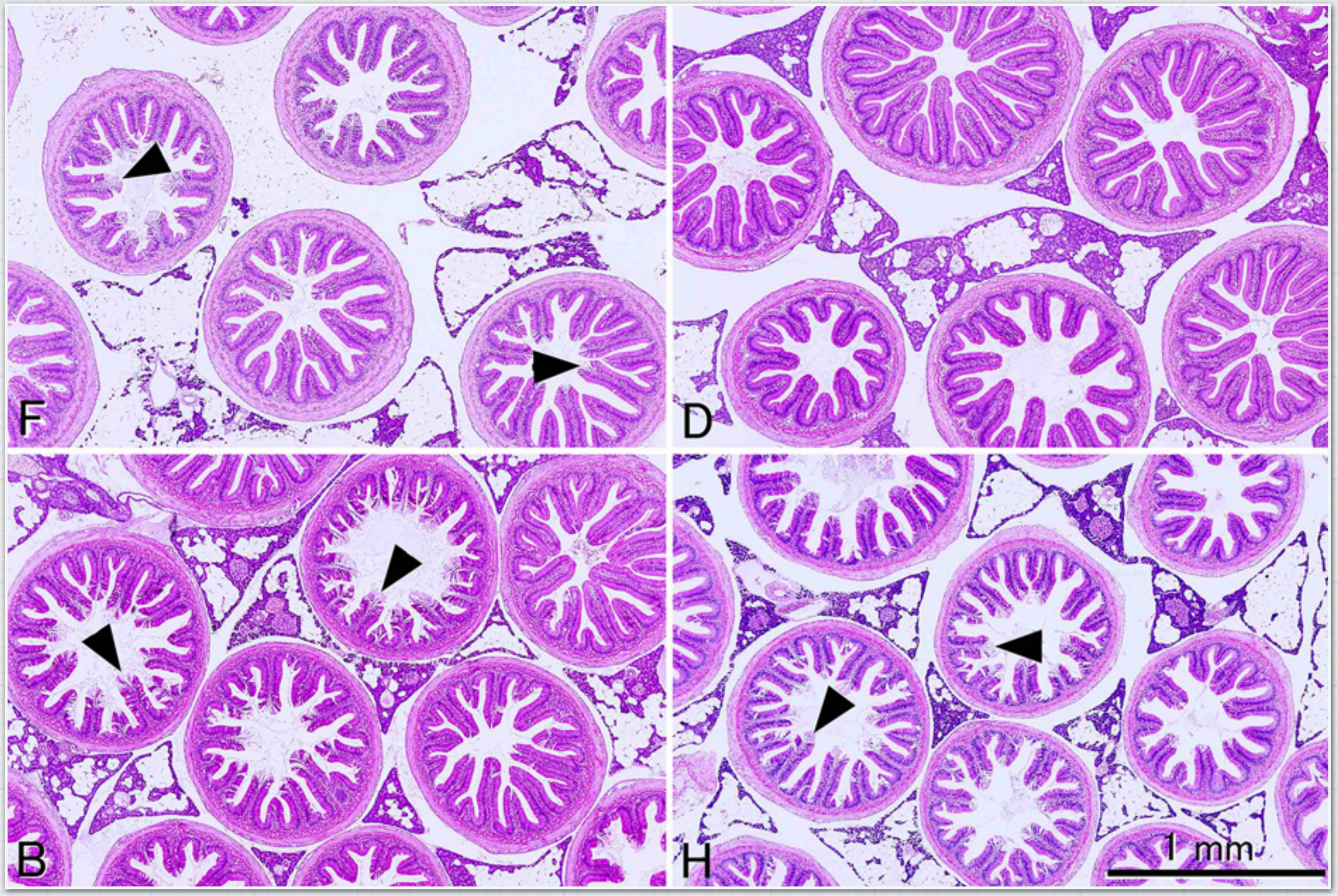


Fixed in Davidson's solution

Fixed in 10% Natured Buffered Formalin

Inject more of the fixative into the hepatopancreas than the other sites but overall use about 5%-10% of the shrimp's body weight.

Inject the fixative solution into the shrimp



F, 10% neutral buffered formalin (NBF); D, Davidson's solution; B, Bouin's fluid; H, Helly's fluid.