

# CRAYFISH DISSECTION

Crayfish



Image from: <http://www.mackers.com/crayfish/>

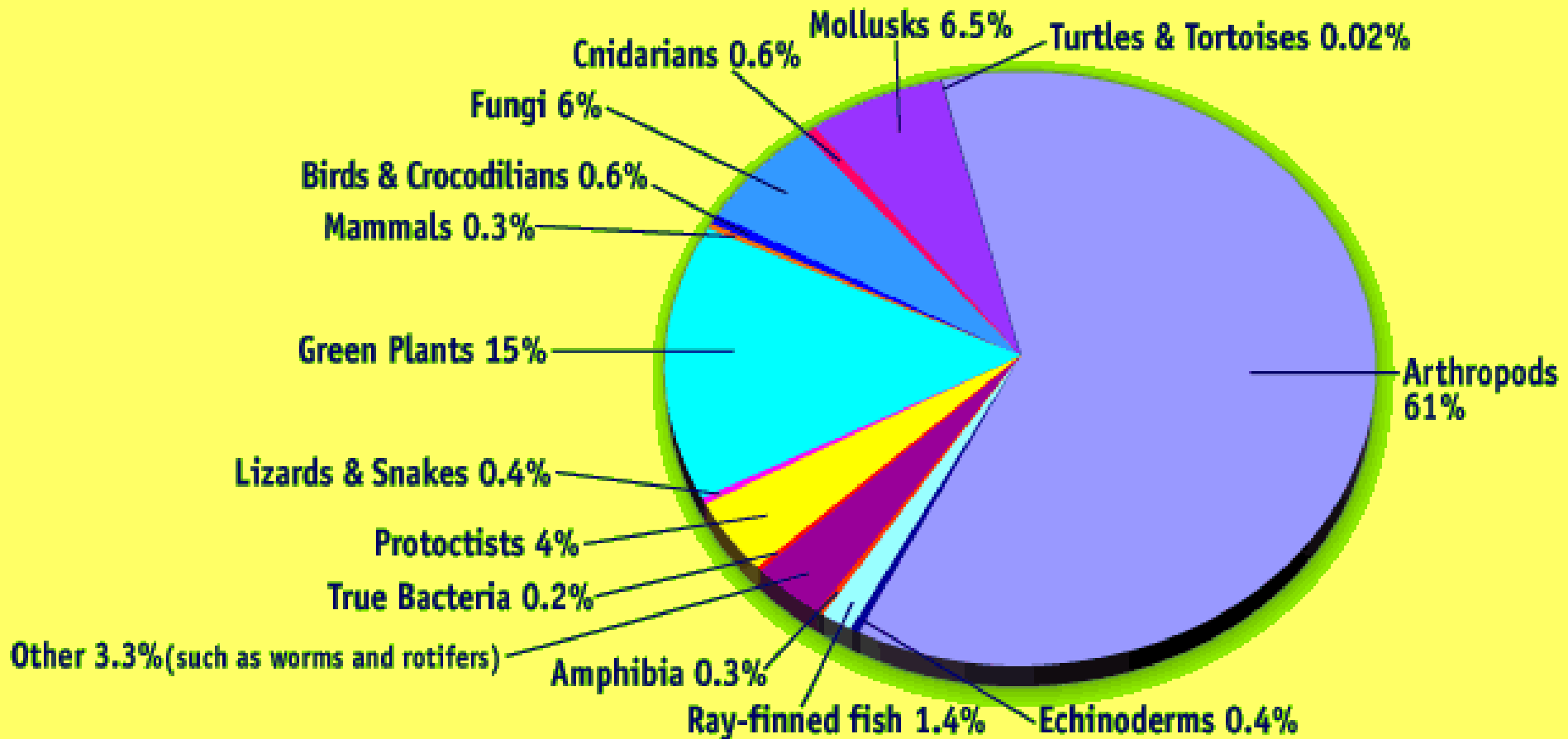
# ARTHROPODA

“jointed foot”

“Arthro” = joint

“pod” = foot

# Animal Groups





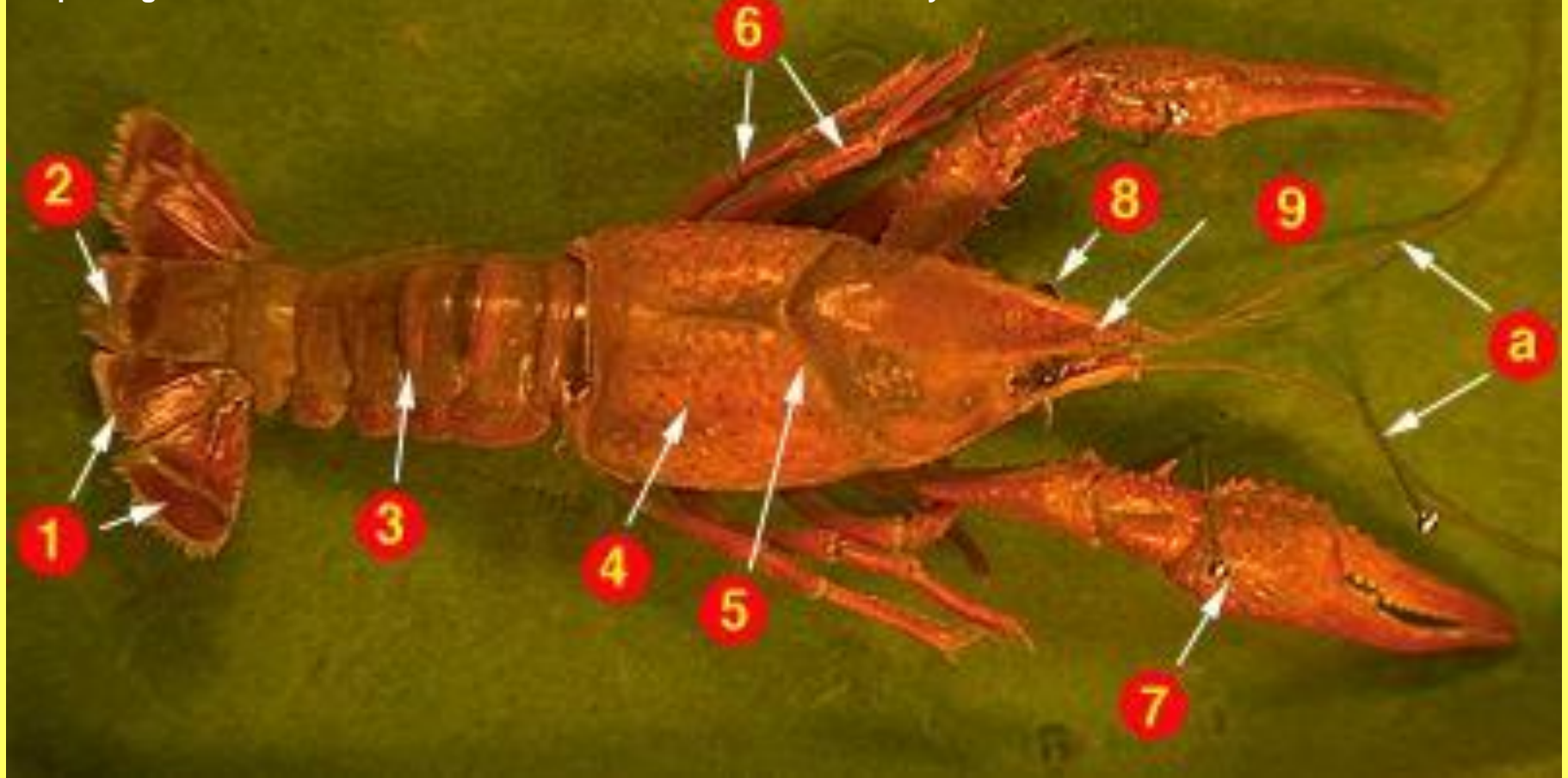
# **NAMING    CRAYFISH**

**Kingdom:**            **ANIMALIA**

**Phylum:**            **Arthropoda**  
                              **“jointed foot”**

**CLASS:**              **CRUSTACEA**

**crusta = “flexible shell”**



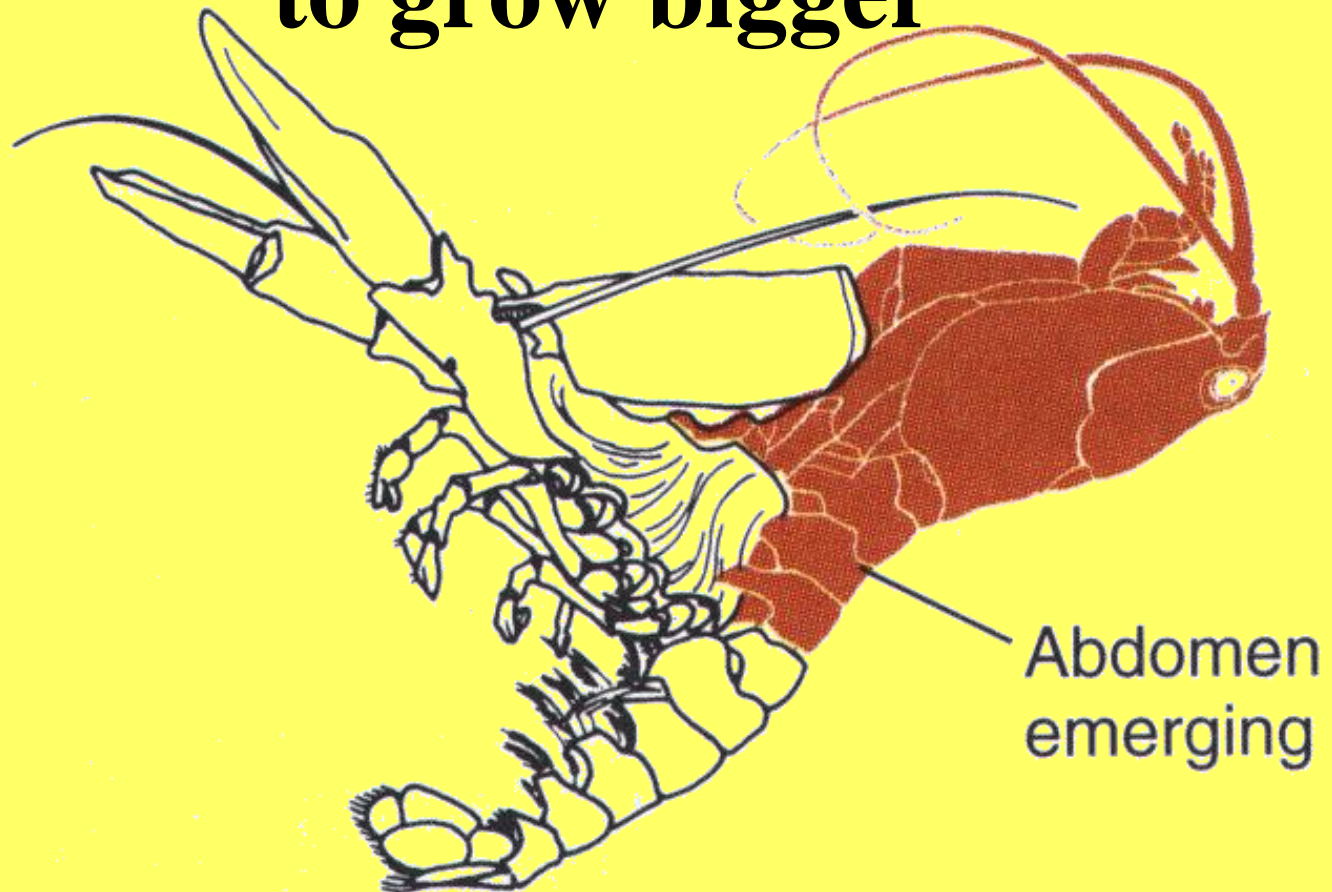
**EXOSKELETON- Outside body; NON-LIVING**

**Made of CHITIN (polysaccharide)**

**PROTEINS, LIPIDS, CALCIUM CARBONATE**



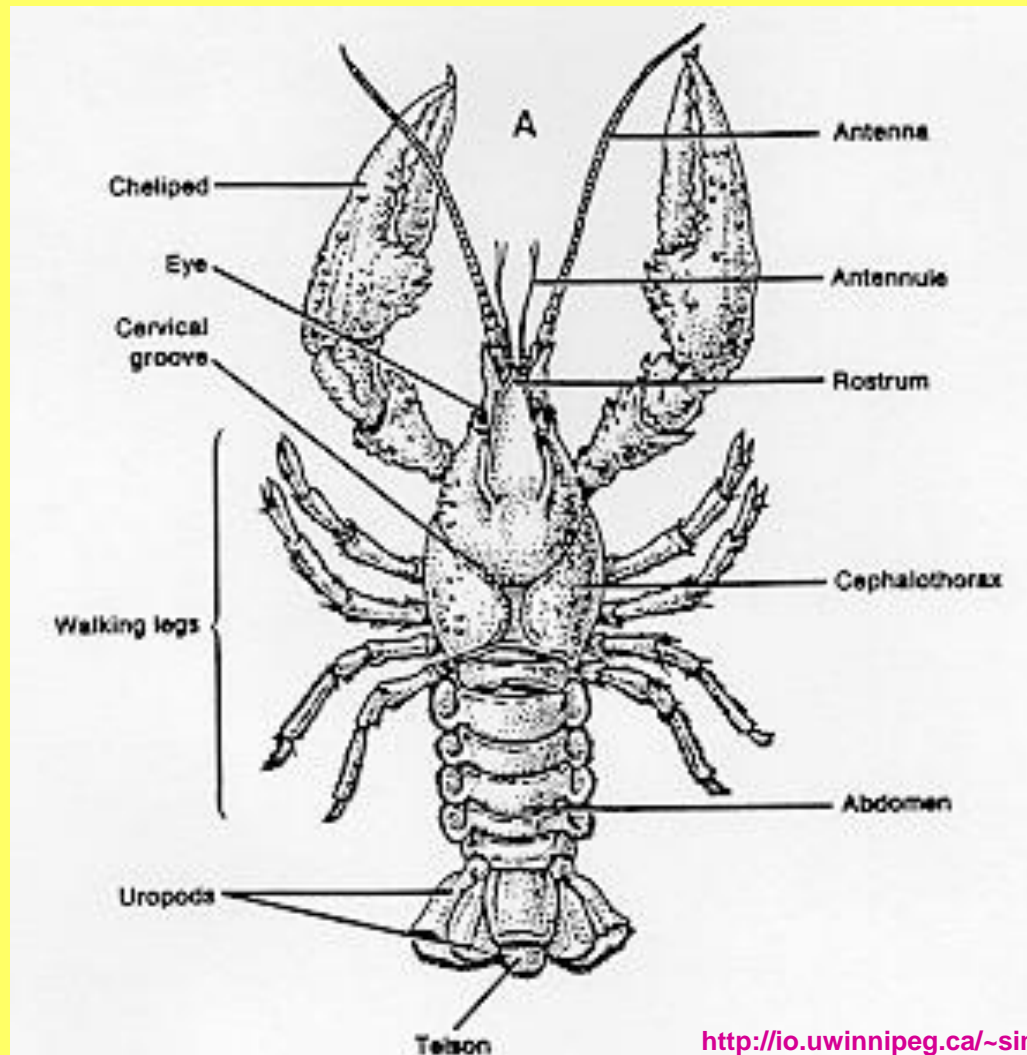
**All animals with an EXOSKELETON  
must MOLT (shed their exoskeleton)  
to grow bigger**



**C**

# SEGMENTED BODY

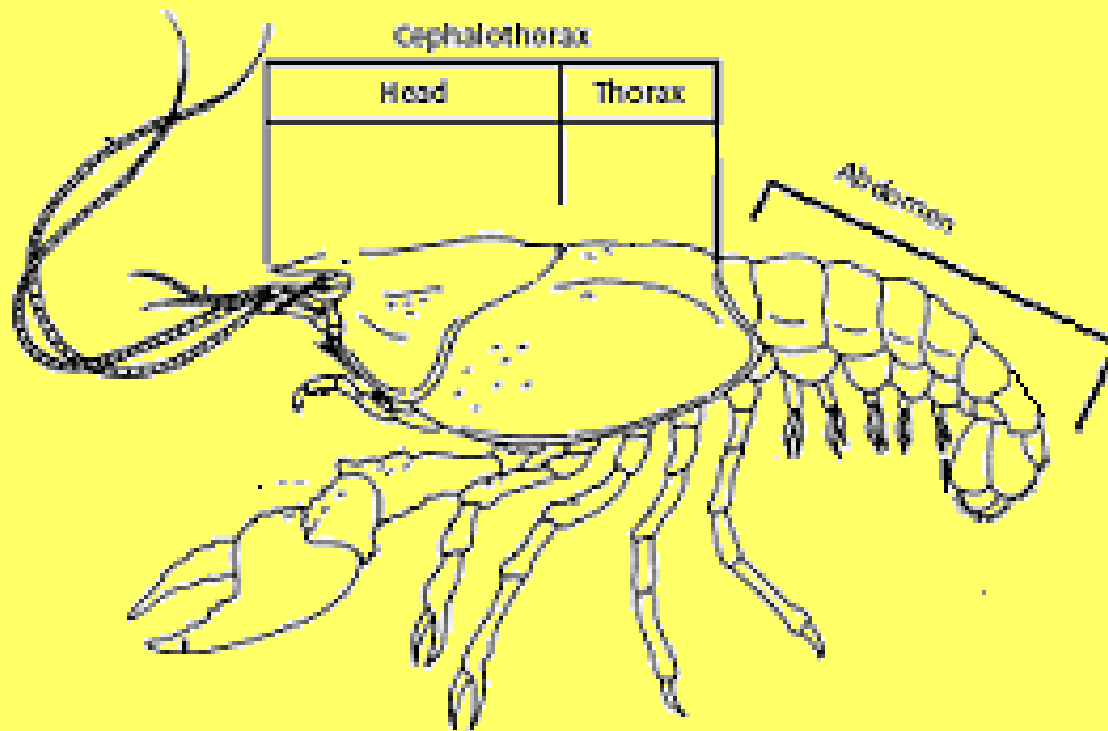
## like earthworms





# **TAGMA- *pl* TAGMATA**

## **Fusion of smaller segments to make one bigger section**



**Head + thorax = cephalothorax**

# CARAPACE

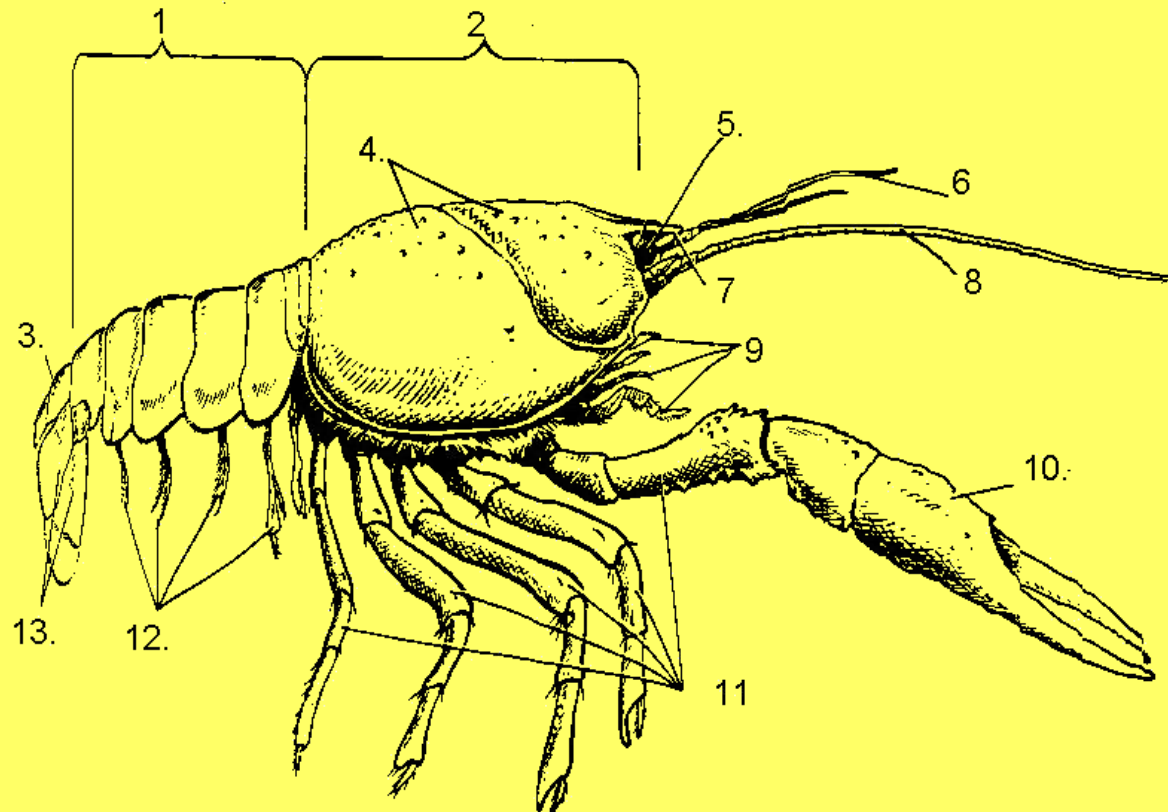


Image from: <http://rcs.rome.ga.us/hargett/biology/arthpod/craydia.htm>

**Part of exoskeleton that  
covers the cephalothorax**

Image by Riedell/VanderWal©2005

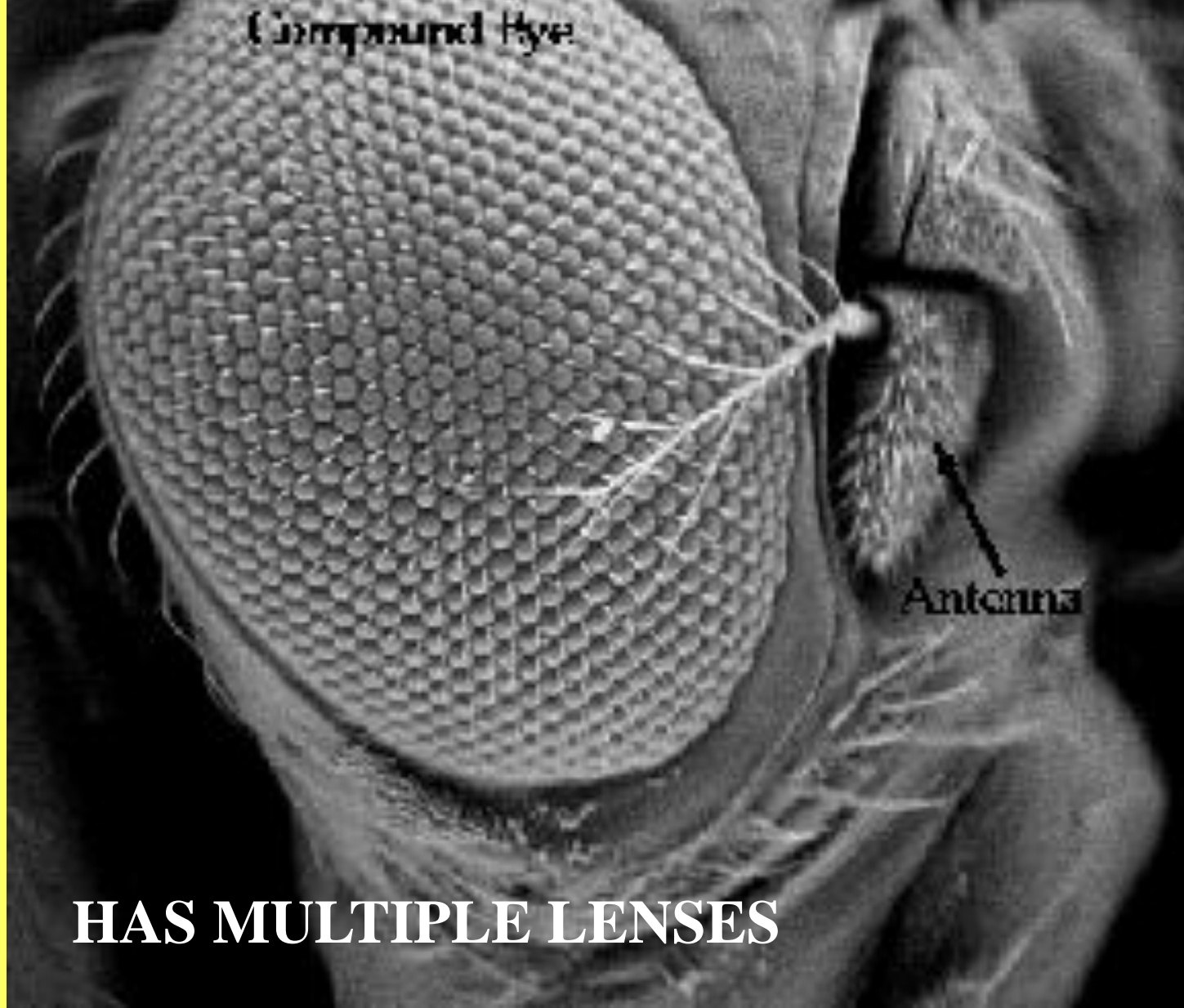


**CHELIPED = Pincher (defense; capture food)**

**ROSTRUM = “visor” protects eyes**



# COMPOUND EYE



**HAS MULTIPLE LENSES**

Image by Riedell/VanderWal©2005



**ANTENNAE- touch, taste**

**ANTENNULES- touch, taste,  
& EQUILIBRIUM**





Image by Riedell/VanderWal©2005

**DECAPODS (10 legs)**  
**(4 pair walking legs + 2 chelipeds)**



# SWIMMERETS (5 pair)



Image by Riedell/VanderWal©2005

# **SWIMMERS**

**HELP with  
REPRODUCTION**

**Males – transfer sperm**

**Females – carry eggs/young  
Create water currents**



Image by Riedell/VanderWal©2005



**Telson**

**Uropods**

# Maxillipeds

## Touch, taste, manipulate food





# MAXILLA – Manipulate food



<http://www.flushing.k12.mi.us/srhigh/tippettl/biology/cray/maxventral.html>

**LAST PAIR of MAXILLA = “BAILERS”**  
**Keep water moving over gills**



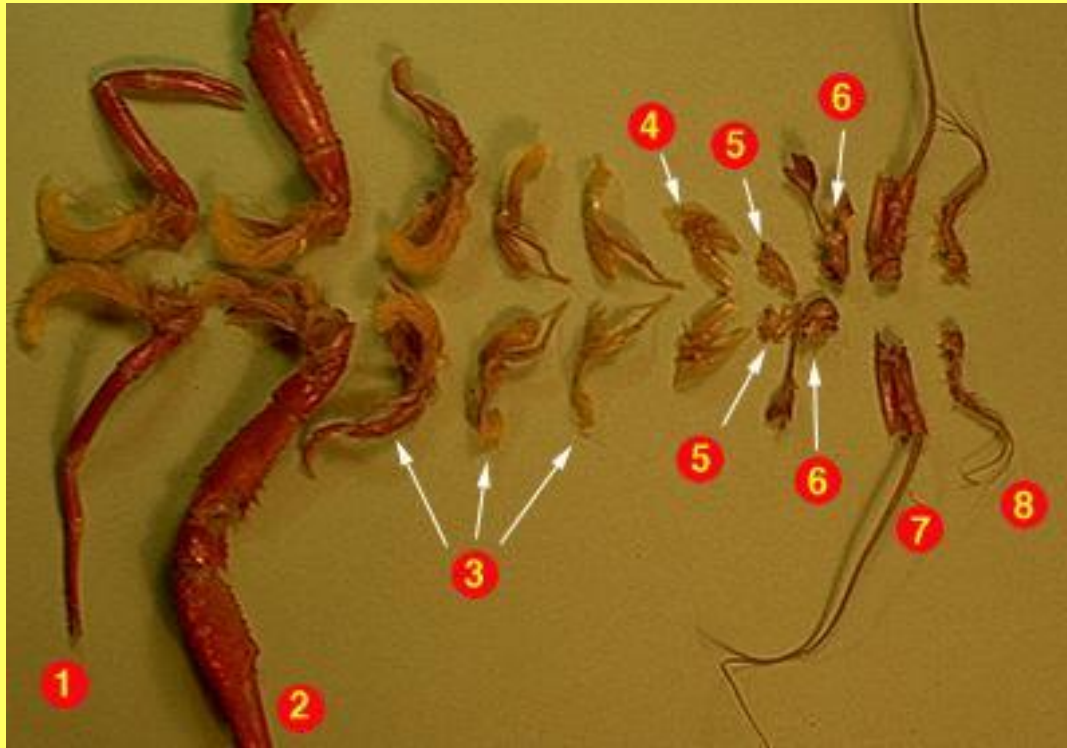
<http://www.flushing.k12.mi.us/srhigh/tippettl/biology/cray/maxventral.html>



# MANDIBLE



<http://www.flushing.k12.mi.us/srhigh/tippettl/biology/cray/mandible.html>



# Appendages

1. Walking legs
2. Cheliped
3. Maxillipeds
4. 2<sup>nd</sup> maxilla  
(gill bailer)
5. 1<sup>st</sup> maxilla
6. Mandible
7. Antenna
8. Antennule

# APPENDAGES

<b>ANTENNA</b>	<b>Touch, taste</b>
<b>ANTENNULE</b>	<b>Touch, taste, equilibrium</b>
<b>MANDIBLE</b>	<b>Chew food</b>
<b>MAXILLA</b>	<b>Manipulate food</b> <b>Last pair “bailers”-</b> <b>Move water over gills</b>
<b>MAXILLIPEDS</b>	<b>Touch, taste, manipulate food</b>
<b>CHELIPED</b>	<b>Capture food, defense</b>
<b>WALKING LEGS</b>	<b>Locomotion,</b> <b>move water over gills</b>
<b>SWIMMERETS</b>	<b>Move water over EGGS,</b> <b>transfer sperm (males)</b> <b>carry young/eggs (females)</b>
<b>UROPOD</b>	<b>Propulsion during tailflips</b>

# Is it a MALE OR FEMALE?

## MALES:

first two pair  
of swimmerets  
form a channel  
to transfer  
sperm to female  
seminal receptacle





# SWIMMERETS

Images by Riedell/VanderWal©2005



**MALES**  
**Top pair**  
**make a**  
**“V”**

# Females “*in berry*” carry developing embryos on swimmerets





# **REPRODUCTIVE**

**SEPARATE SEXES**

**Male and Female**

**EXTERNAL FERTILIZATION**

**sperm & eggs join outside body**

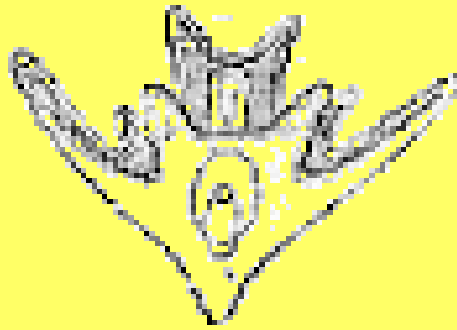
**INDIRECT DEVELOPMENT**

**Starts as a LARVA**

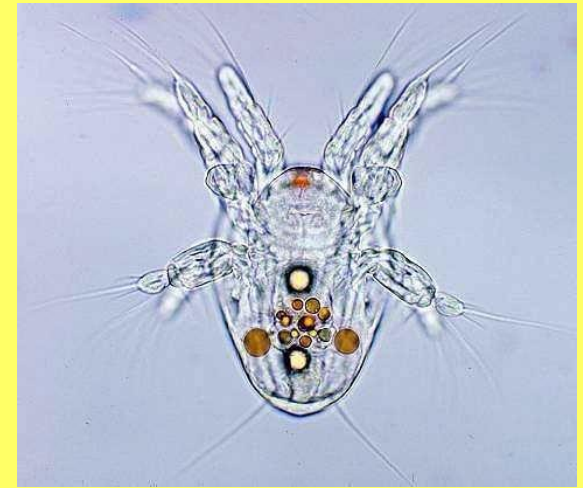
# INDIRECT DEVELOPMENT



**MOLLUSKS**



**ECHINODERMS**



**CRUSTACEANS**

**TROCHOPHORE**

**BIPINNARIA**

**NAUPLIUS**

Trochophore image: [http://www.okc.cc.ok.us/biologylabs/Documents/Evolution/Trochophore\\_larva.htm](http://www.okc.cc.ok.us/biologylabs/Documents/Evolution/Trochophore_larva.htm)

Nauplius image: <http://www.micrographia.com/specbiol/crustac/copepo/cope0100/cycnaup1.htm>

Bipinnaria image:

**Examine the inside  
of your crayfish**

# RESPIRATORY



Image by Riedell/VanderWal©2005

## GILLS

**Exchange gases**

**Remove nitrogen waste (AMMONIA)**



Image by Riedell/VanderWal©2005





# What keeps water moving over gills?

**“BAILERS”**

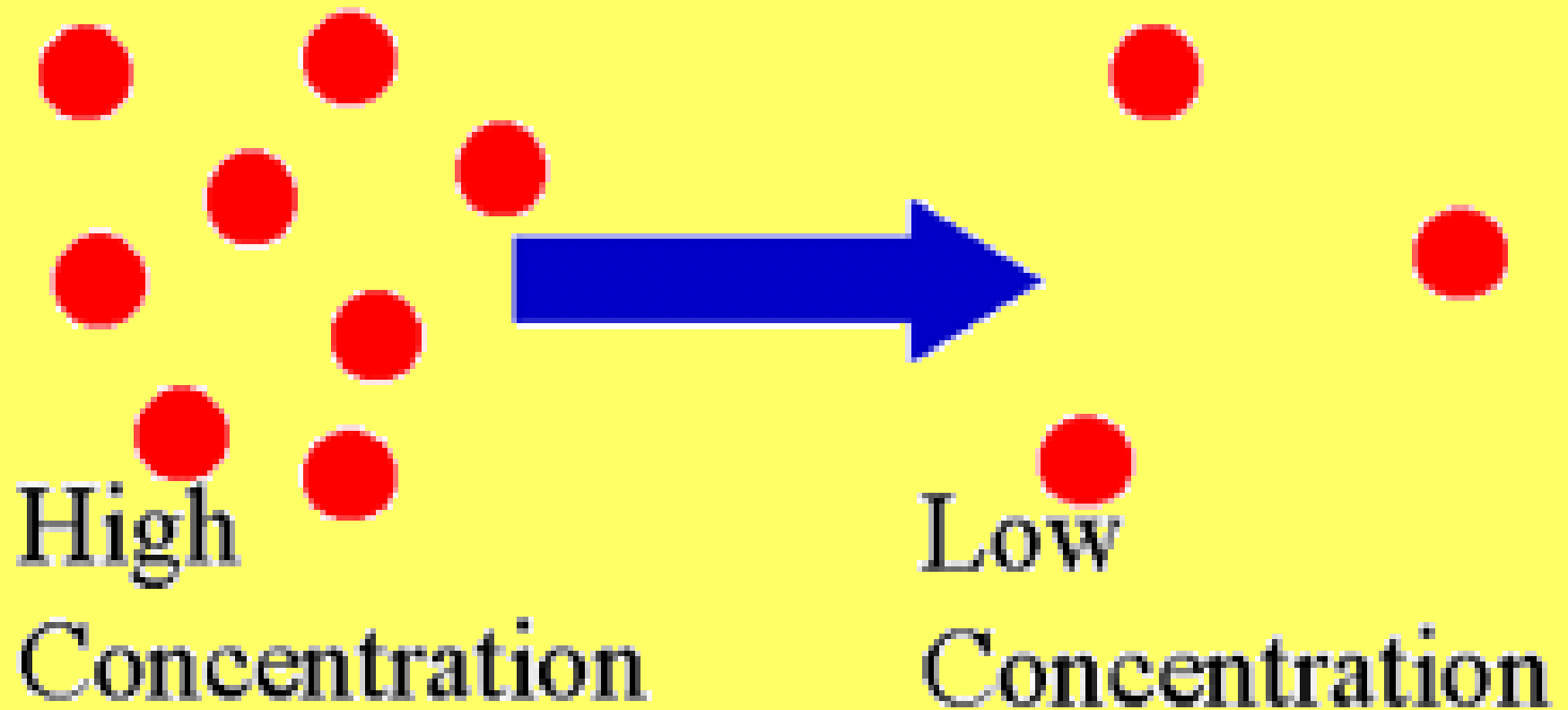
Image by Riedell/VanderWal©2005



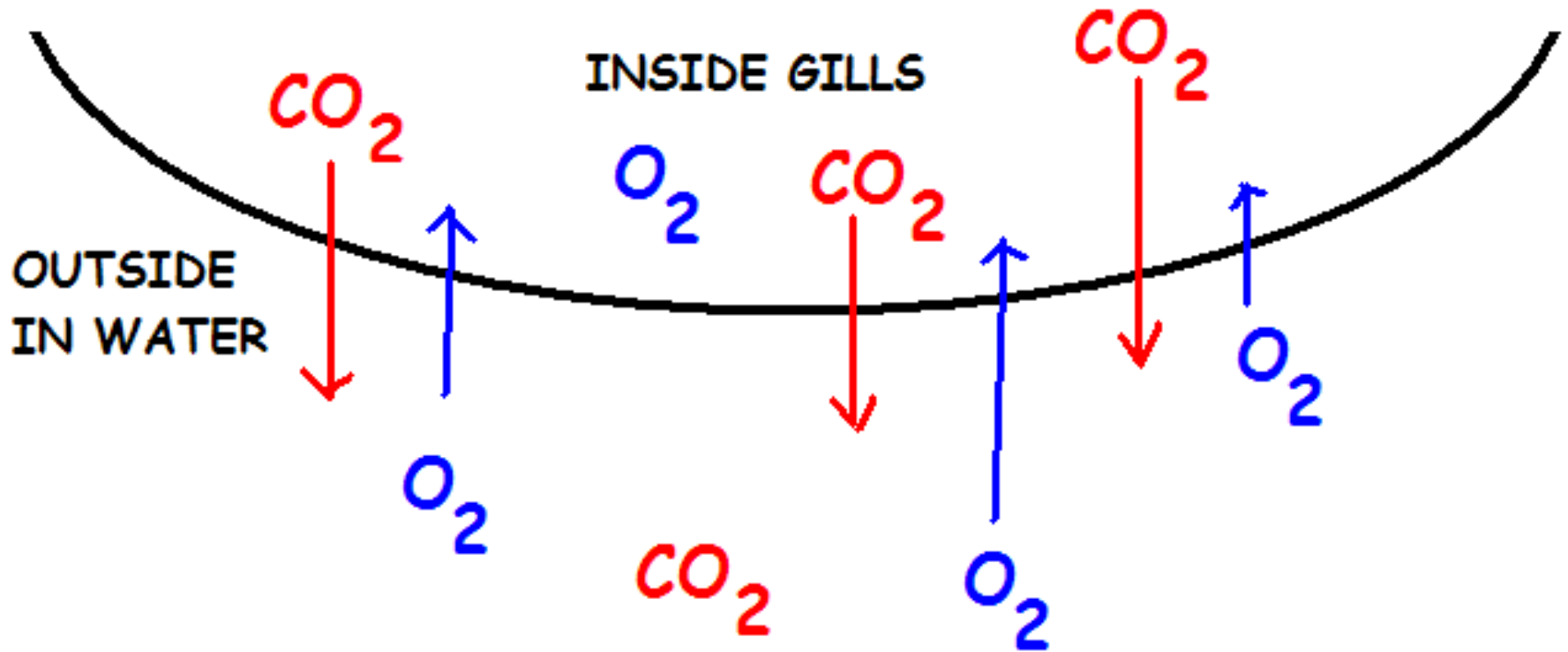
**WALKING LEGS:**  
are attached to gills so walking  
moves water



# Diffusion

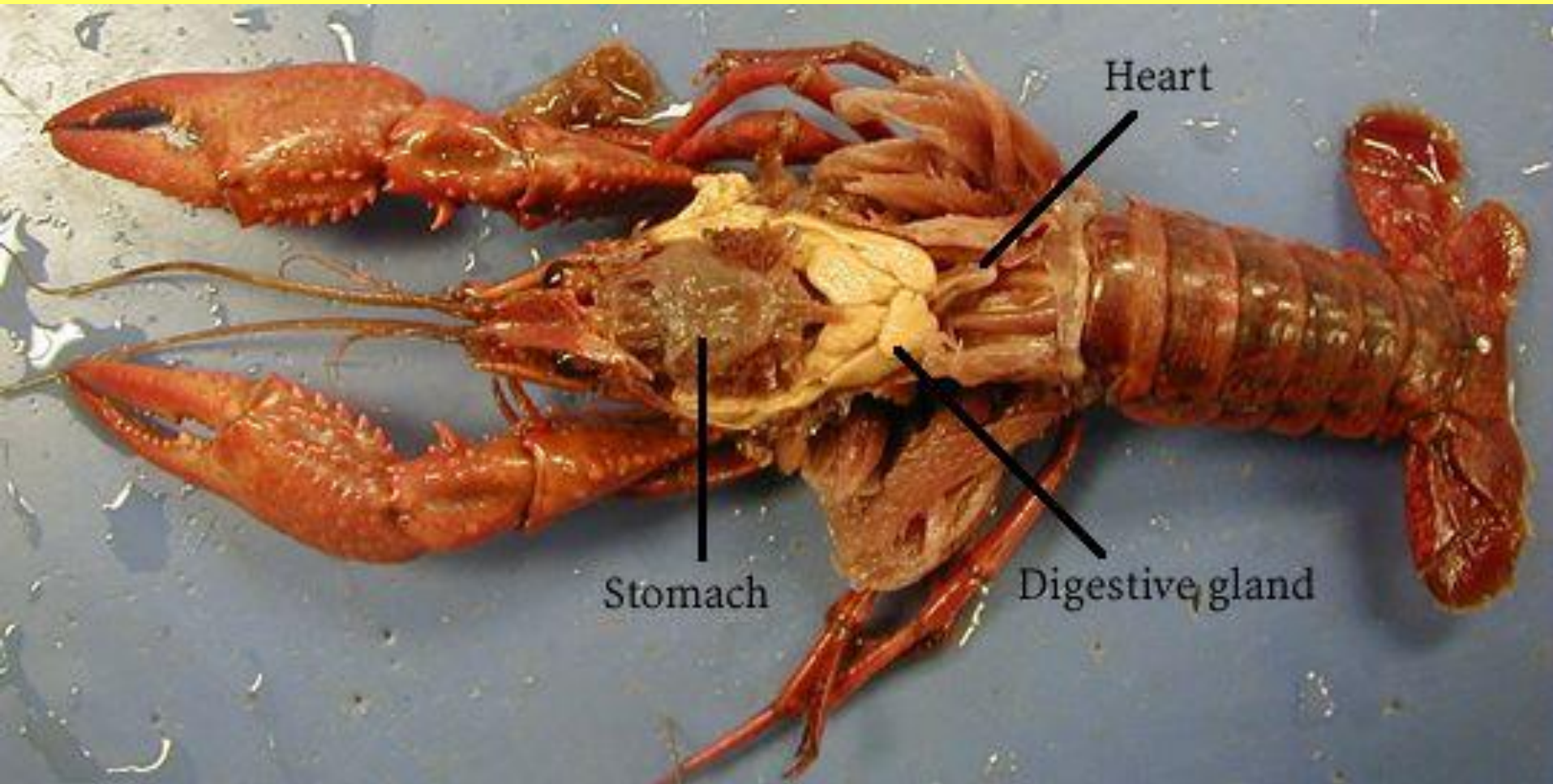


# GAS EXCHANGE IN GILLS



**DIFFUSION MOVES HIGH  $\rightarrow$  LOW**

# INTERNAL





# OPEN CIRCULATORY SYSTEM

Image by Riedell/VanderWal©2005



**HEART with openings (OSTIA)**

**ARTERIES leaving heart but NO VEINS to  
return hemolymph**

# OSTIA

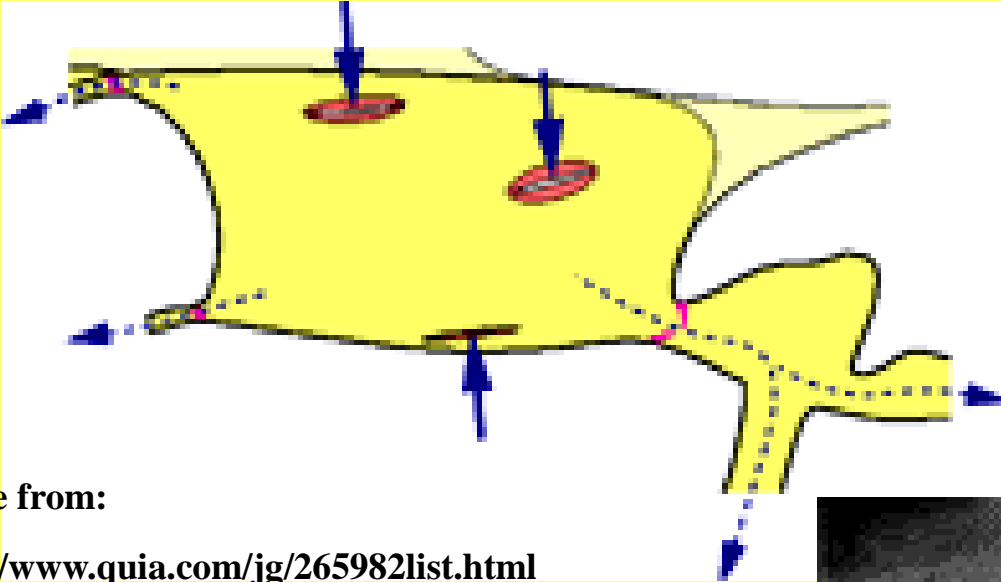


Image from:

<http://www.quia.com/jg/265982list.html>



Movie from: <http://www.gsu.edu/~bioasx/heartbeat.html>



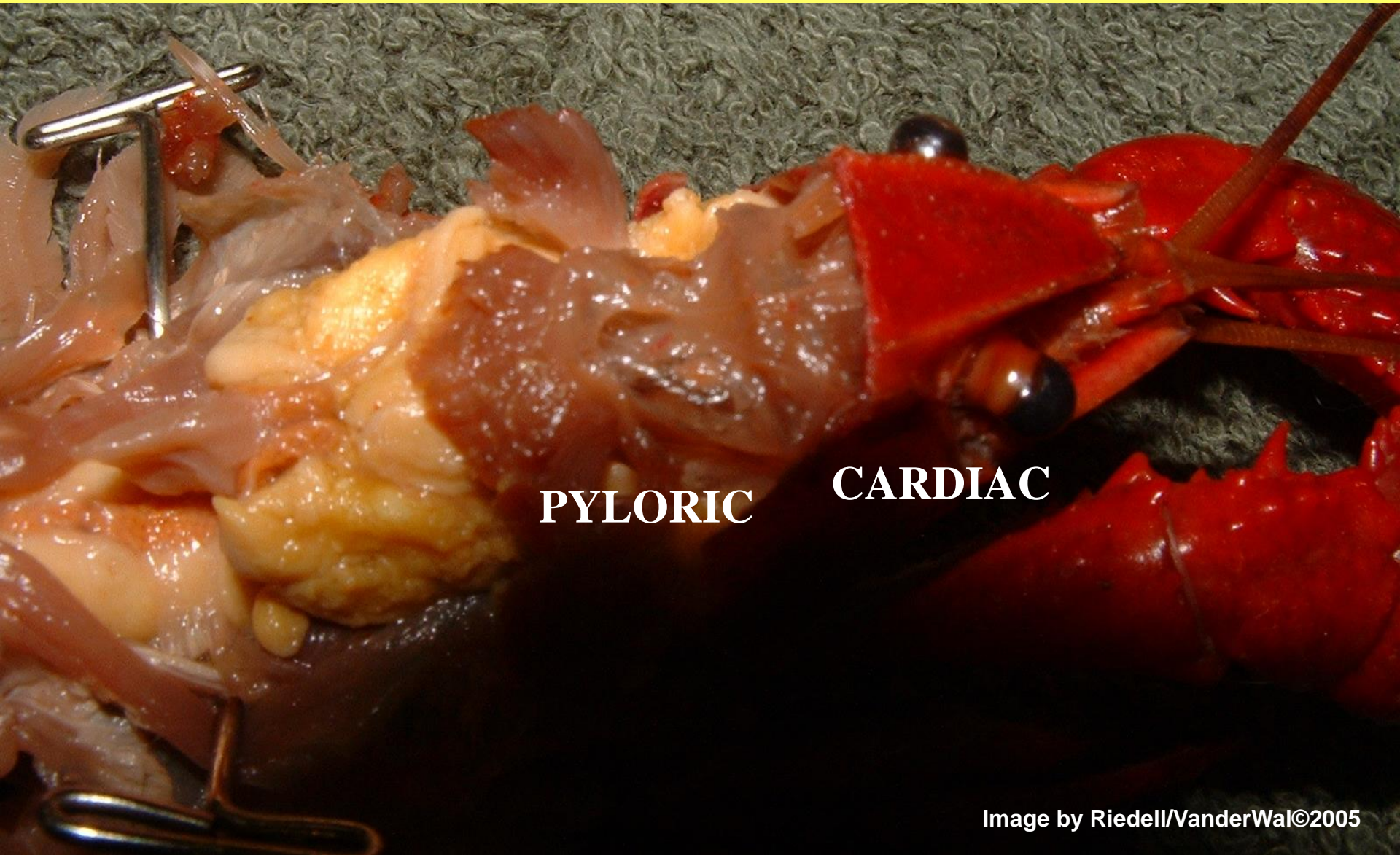
# ADDUCTOR MUSCLES

## run mouthparts





# STOMACH



**PYLORIC**

**CARDIAC**

# GASTRIC MILL

## “teeth” inside stomach



Copyright 2003 Bryan Yang

<http://www.occ.cccd.edu/faculty/mperkins/zoo-review/crayfish/crayfish4.html>



# DIGESTIVE GLAND



**Makes bile; finishes digestion; absorbs nutrients**



# GONADS



<http://www.flushing.k12.mi.us/srhigh/tippettl/biology/cray/gonad.html>

## **Females:**

**OVARIES – make eggs**

**SEMINAL RECEPTACLES-store received sperm**

## **Males:**

**TESTES – make sperm**

**VAS DEFERENS- tubules inside that carry sperm  
from testes to exit opening**

## **ENDOCRINE SYSTEM:**

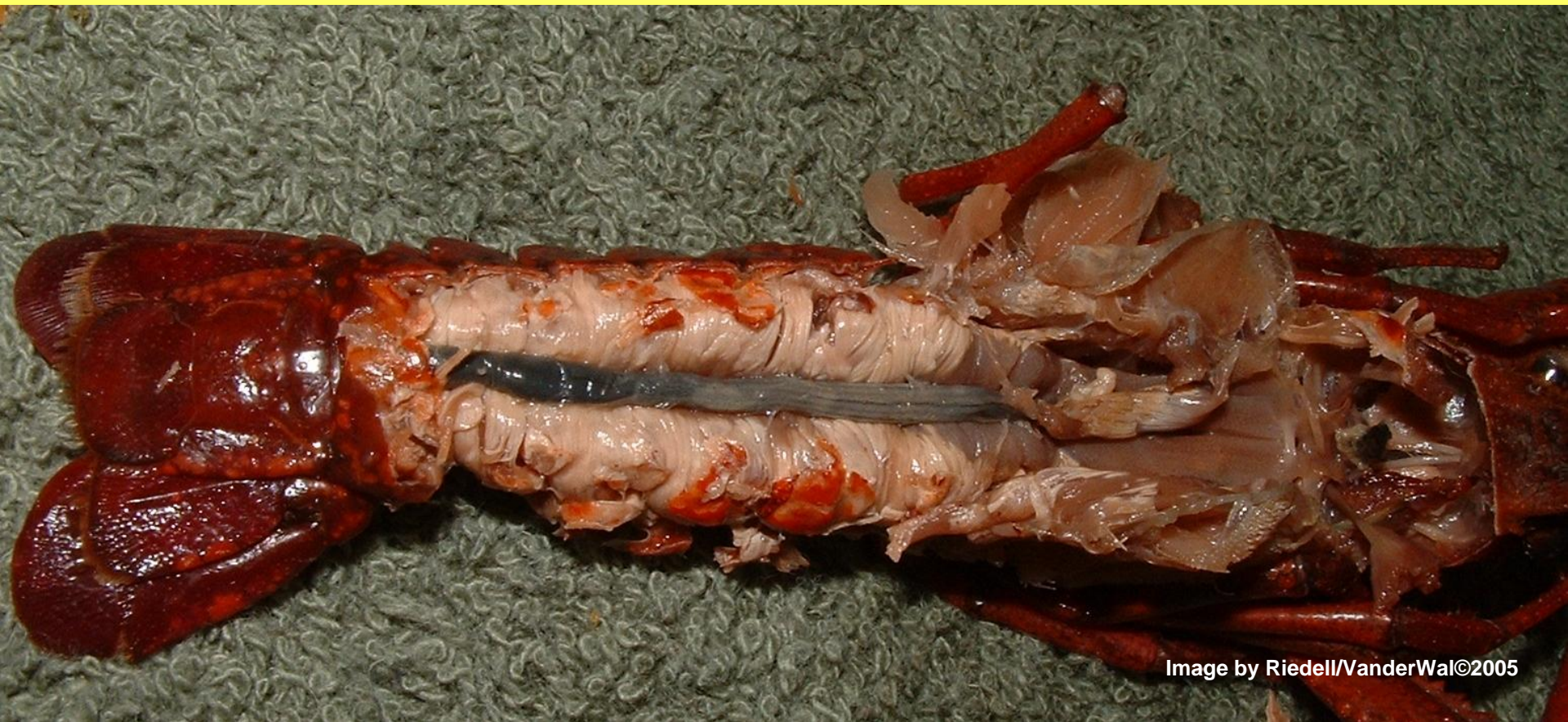
**controls sexual development**

**Also: molting, heart rate**



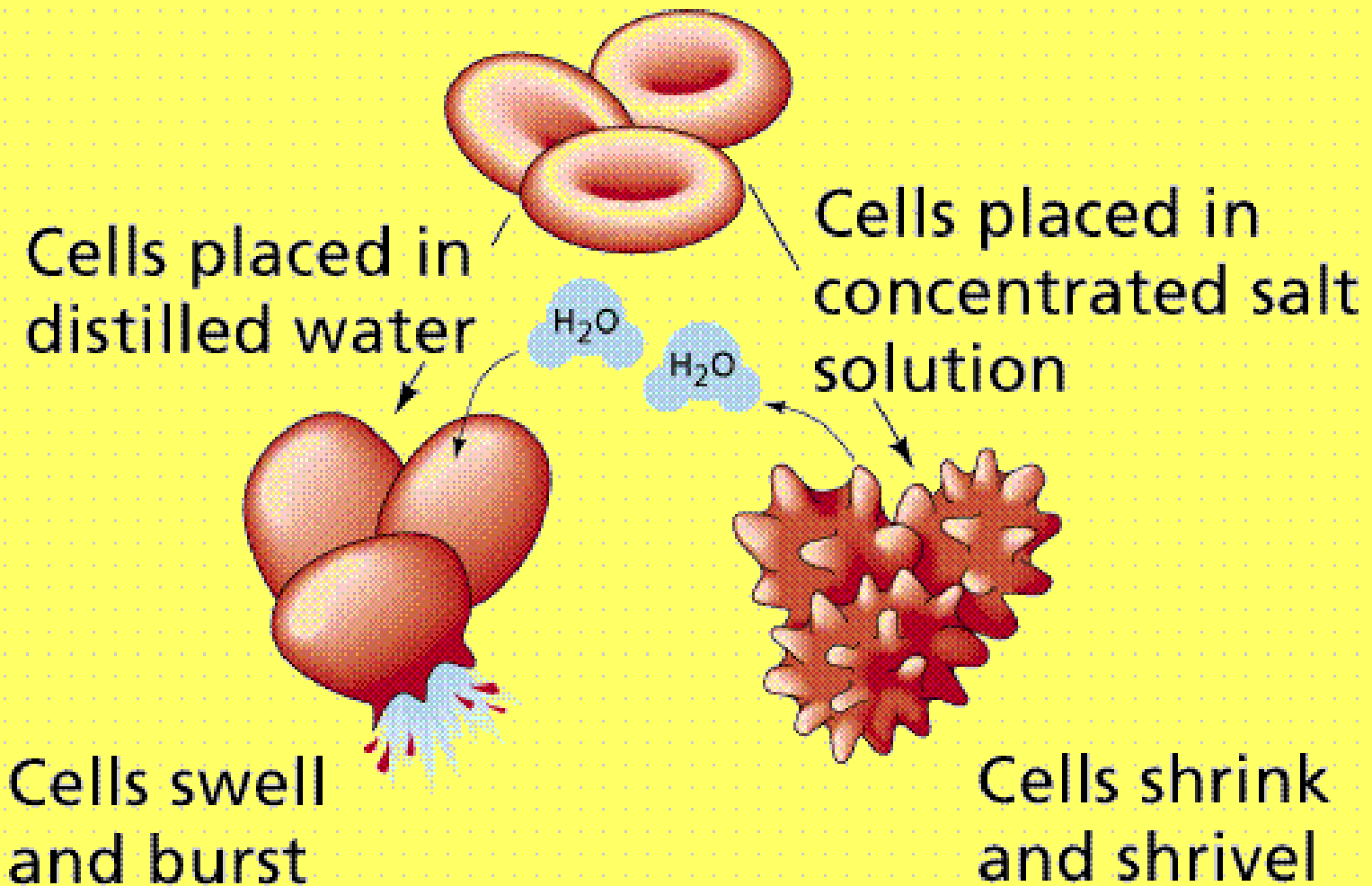
# ABDOMEN

**INTESTINE** – finish digestion; absorb nutrients;  
collect & remove feces



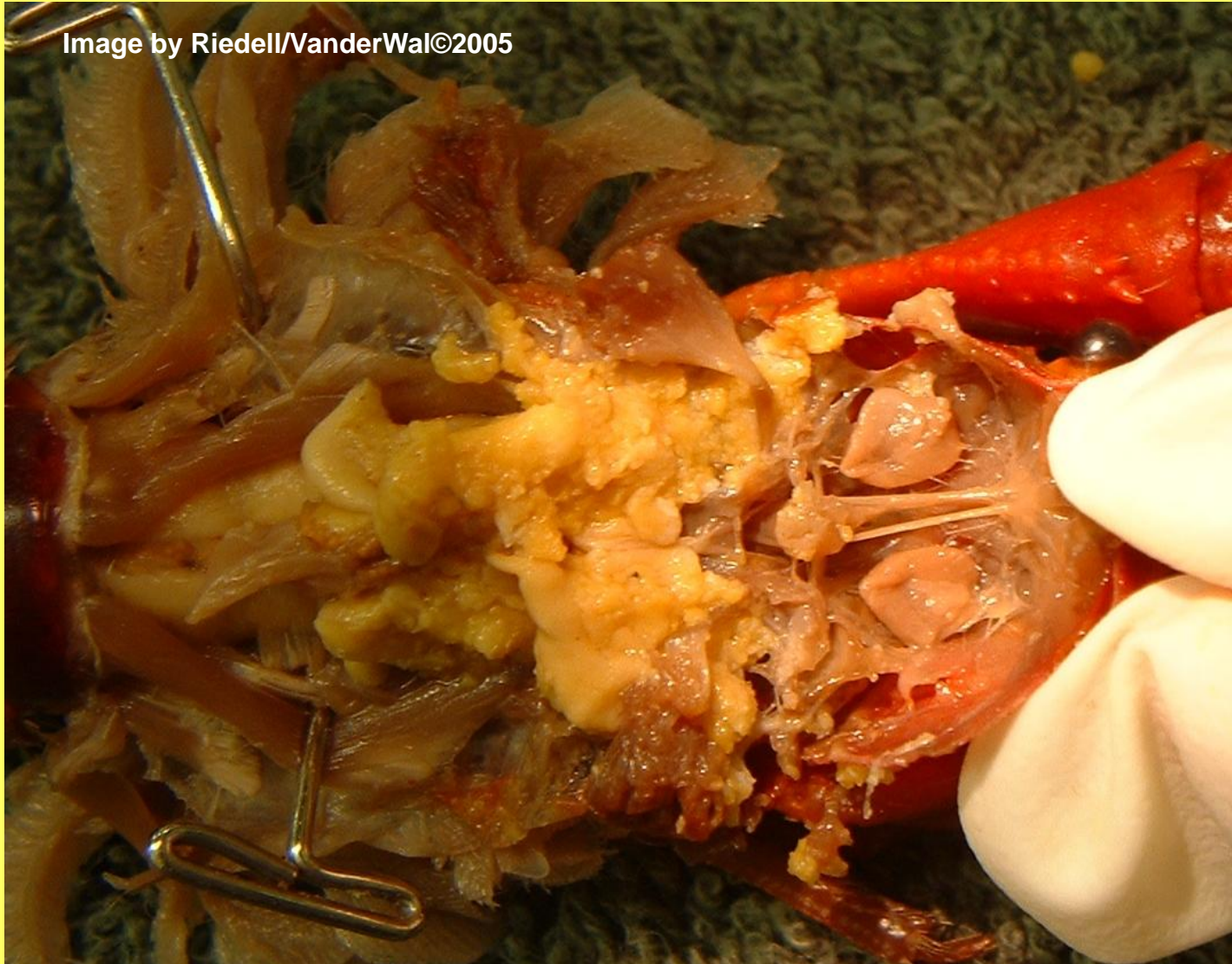


# Freshwater critters live in a **HYPOTONIC** environment



# GREEN GLANDS - collect and remove excess water & nitrogen waste (AMMONIA)

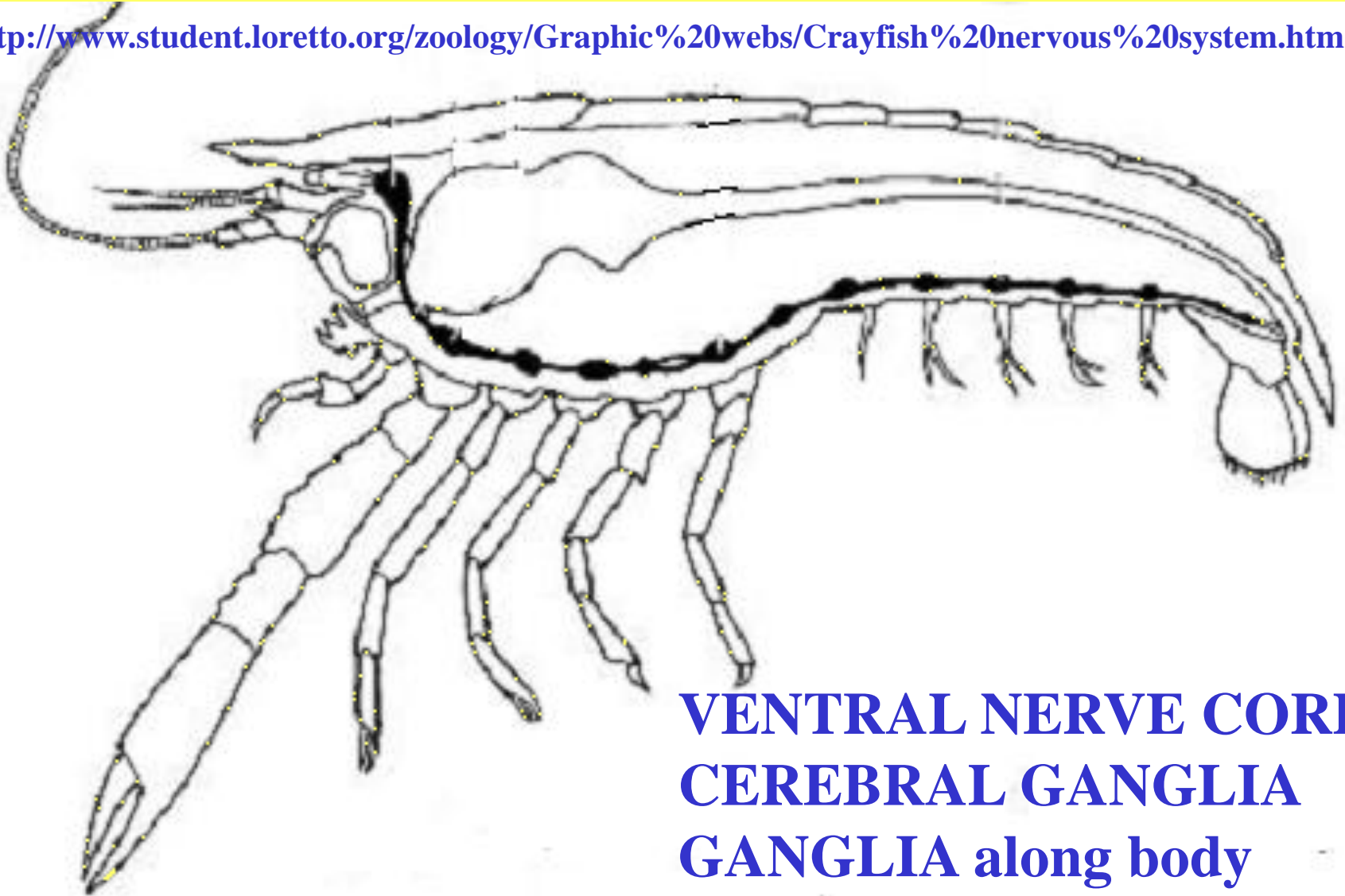
Image by Riedell/VanderWal©2005



# NERVOUS SYSTEM

## like earthworms

<http://www.student.loretto.org/zoology/Graphic%20webs/Crayfish%20nervous%20system.htm>



**VENTRAL NERVE CORD**  
**CEREBRAL GANGLIA**  
**GANGLIA along body**



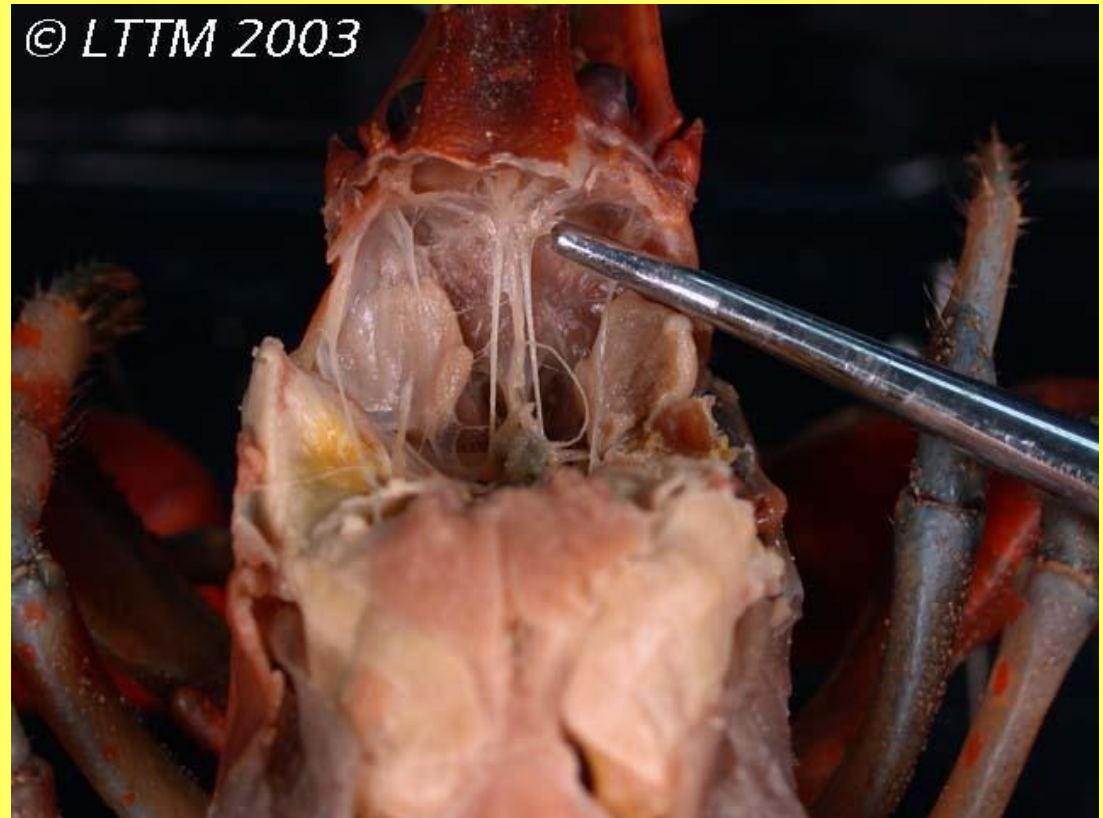
# VENTRAL NERVE CORD



Image by Riedell/Vanderwal © 2005

# CEREBRAL GANGLIA = BRAIN

**Nerves connect  
the eyes, antennae,  
and antennules  
to the brain.**



<http://www.flushing.k12.mi.us/srhigh/tippetl/biology/cray/ganganterior.html>

# COMPOUND EYE

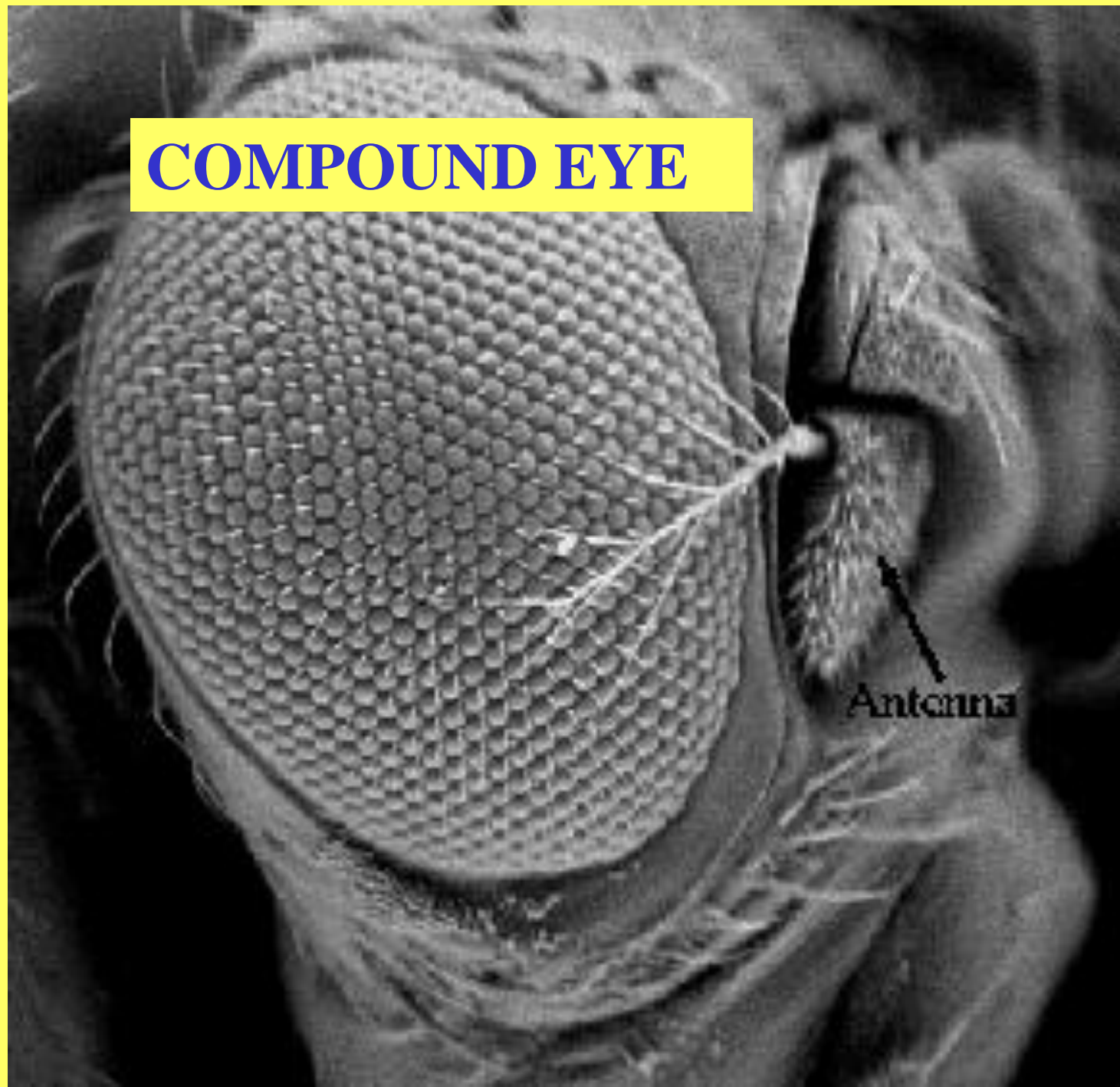






Image by Riedell/VanderWal©2005

**Thousands of SENSORY HAIRS project from  
exoskeleton over entire body sense vibrations &  
chemicals**



# **AUTOTOMY & REGENERATION**



Image by Riedell/VanderWal©2005

**Crayfish have  
the ability to  
“self amputate”  
parts to escape  
predators and  
regenerate to  
repair injuries**