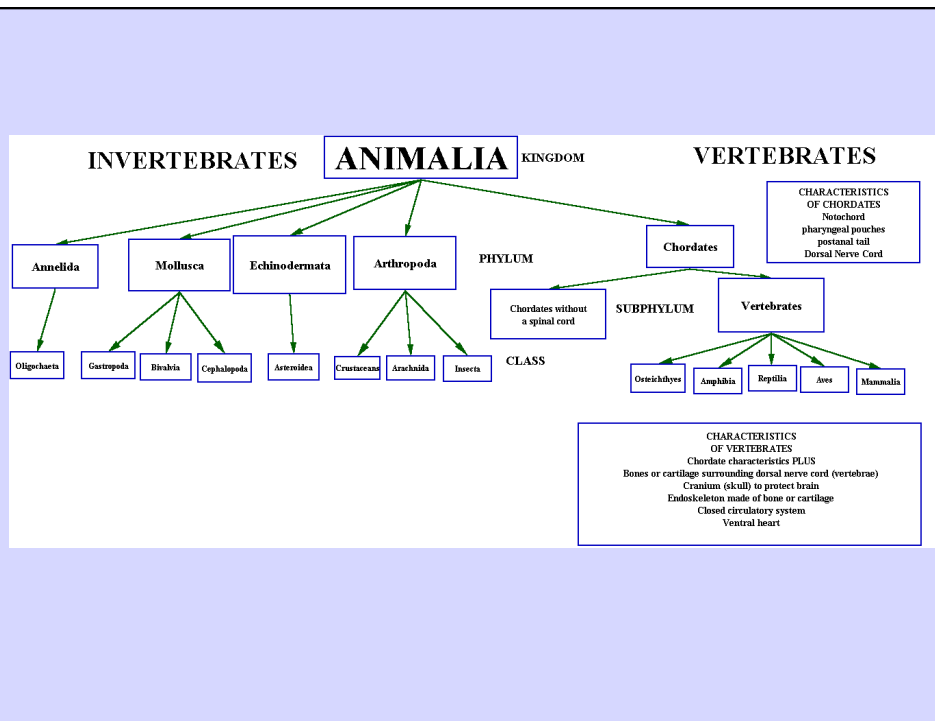
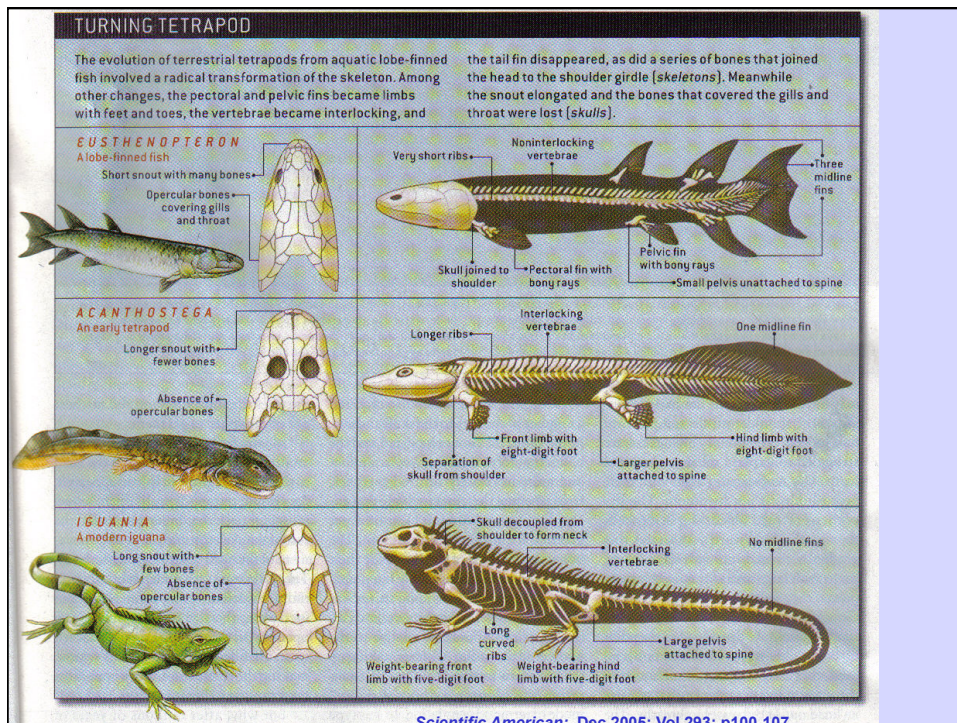
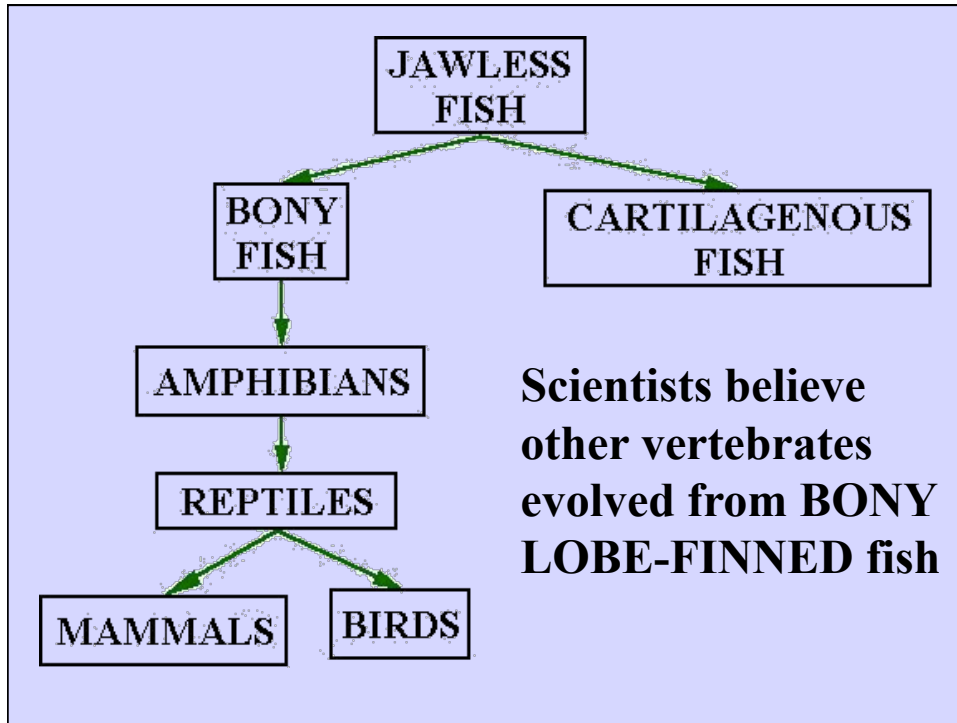


Frog Dissection





AMPHIBIAN CHARACTERISTICS

Moist, thin skin without scales

Aquatic larva changes to terrestrial adult

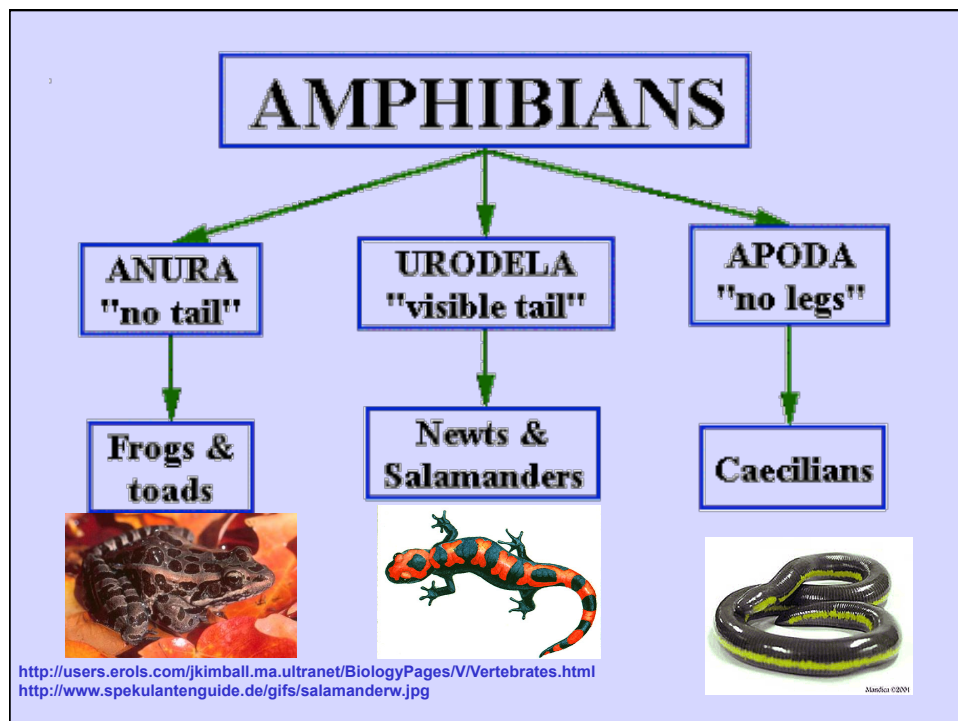
Feet without claws

Respiration with gills, lungs, skin, mouth

Closed 2 loop circulation

Ectothermic (cold blooded)

Eggs without shells or multicellular membranes



FROG

LATIN meaning

KINGDOM ANIMALIA

PHYLUM CHORDATA

SUBPHYLUM VERTEBRATA “backbone”

CLASS AMPHIBIA “double life”

ORDER ANURA “without a tail”

Thin, moist skin – no scales

**Mucous glands make it
“slimy”**

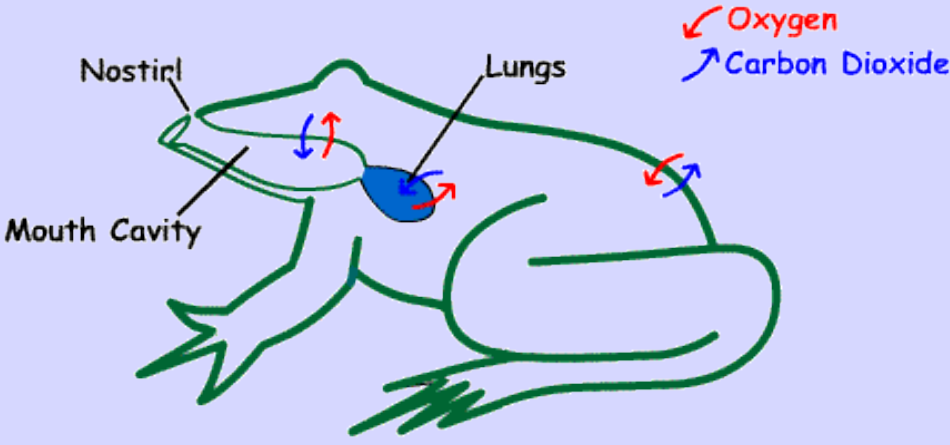
Camouflage- for protection

Some have poison glands



<http://www-binf.bio.uu.nl/dutilh/hall/kickers.html>


<http://www.tvdsb.on.ca/westmin/science/snc2g1/frogresp.htm>



BREATHING THROUGH SKIN is called CUTANEOUS RESPIRATION

ECTOTHERMIC
“cold blooded”

Body temperature is dependent on surrounding environment



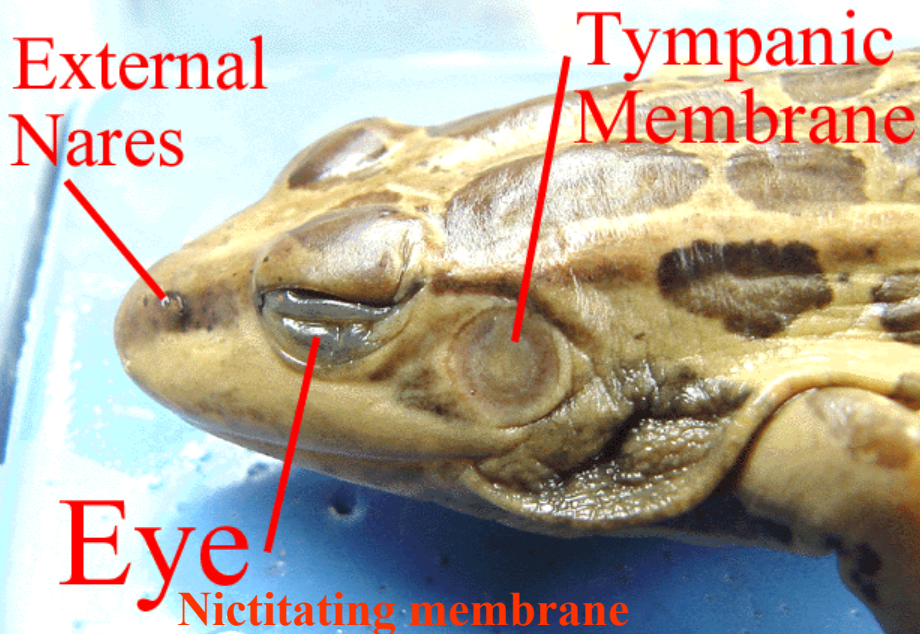
<http://www.vanscyoc.net/randy/garden/wildlife/image4.htm>

HIBERNATION/ ESTIVATION



FAT stored in FAT BODIES provides energy

Images from:
http://www.enc.org/Classroom_Calendar/CC_Units/Unit_Images/185.jpg
<http://www.reptilis.org/pyxi/image5.htm>

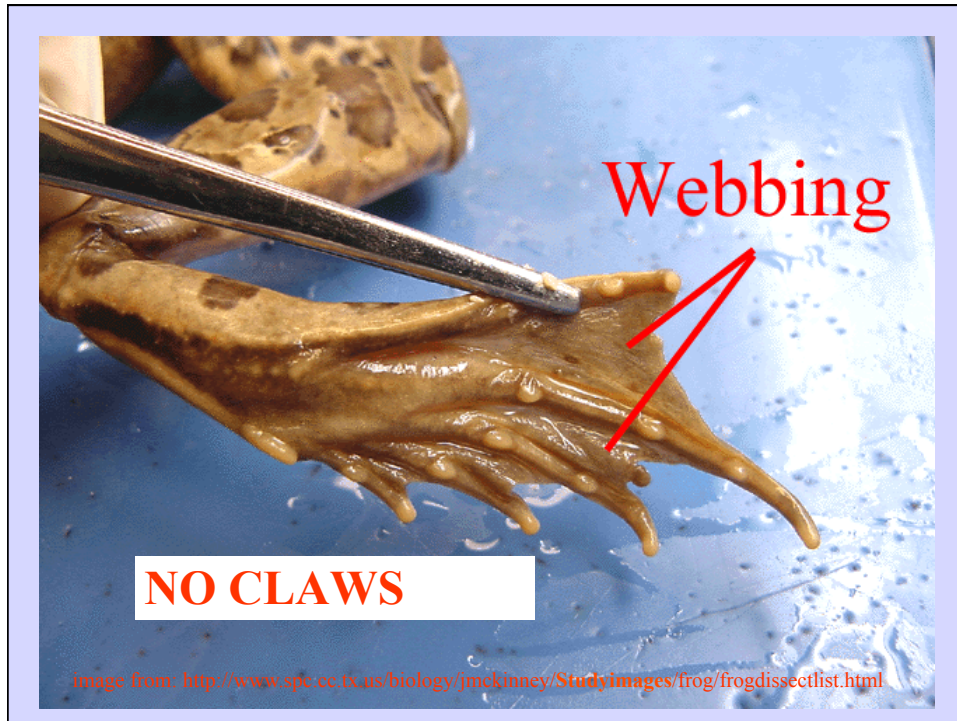


**External
Nares**

**Tympanic
Membrane**

Eye
Nictitating membrane

image from: <http://www.spc.cc.tx.us/biology/jmckinney/Studyimages/frog/frogdissect1a.html>



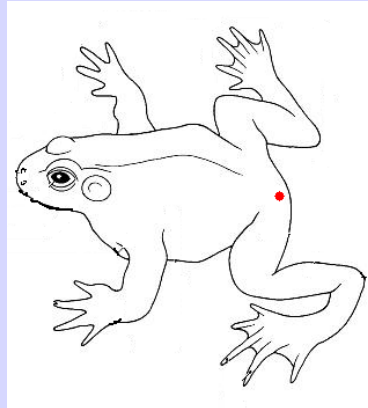
EXIT OPENINGS

DIGESTIVE WASTE (feces) =
ANUS

**Shared EXCRETORY &
REPRODUCTIVE EXIT =**
UROGENITAL PORE
(Urine & eggs or Urine & sperm)

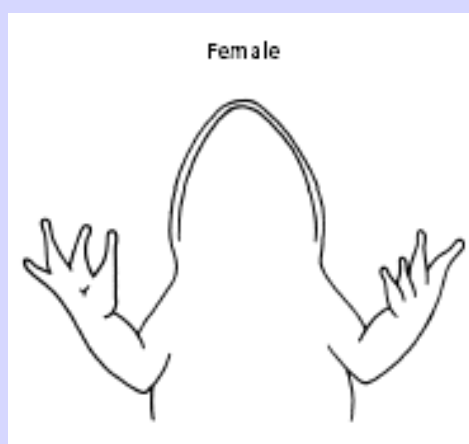
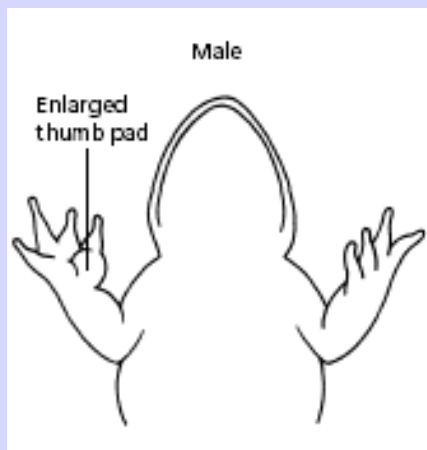
EXIT OPENINGS

OPENING SHARED BY
EXCRETORY,
REPRODUCTIVE,
& DIGESTIVE =
VENT



<http://www.student.loretto.org/zoology/Amphibians.htm>

What sex is it?



Images from:
http://sps.k12.ar.us/massengale/frog_dissection.htm

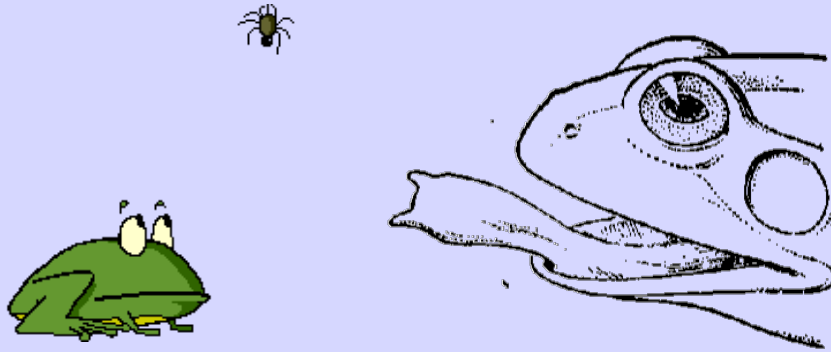


AMPLEXUS “firm embrace”

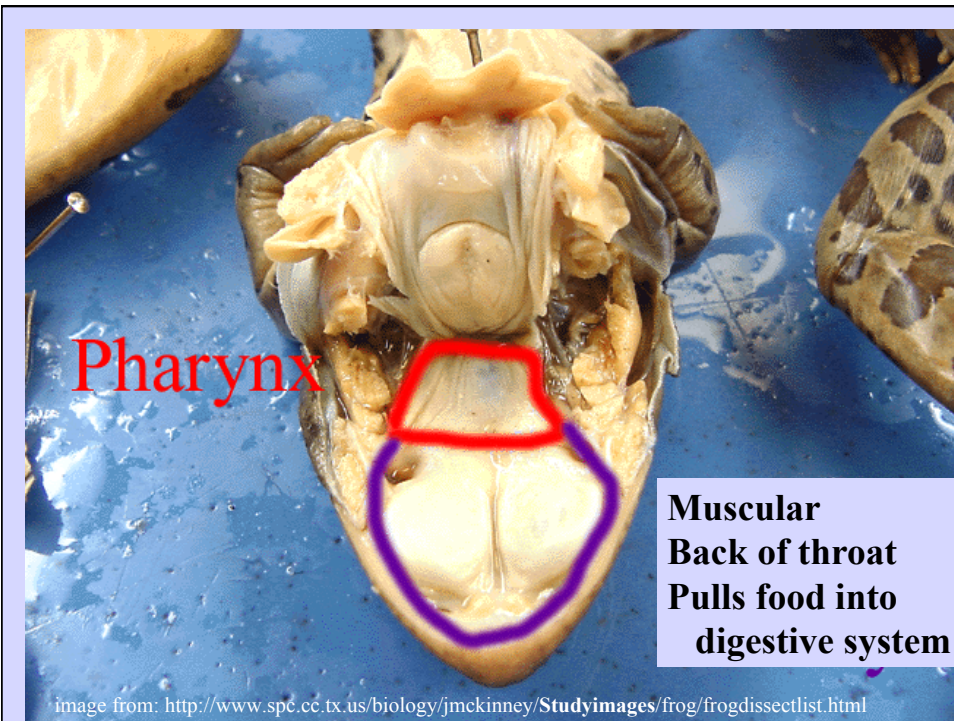


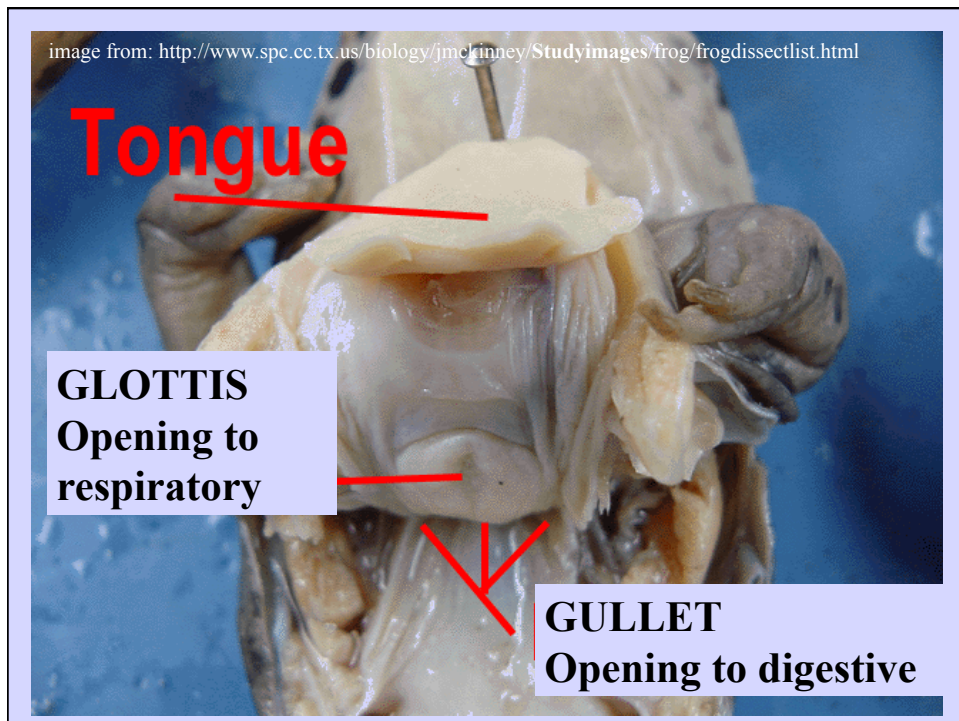
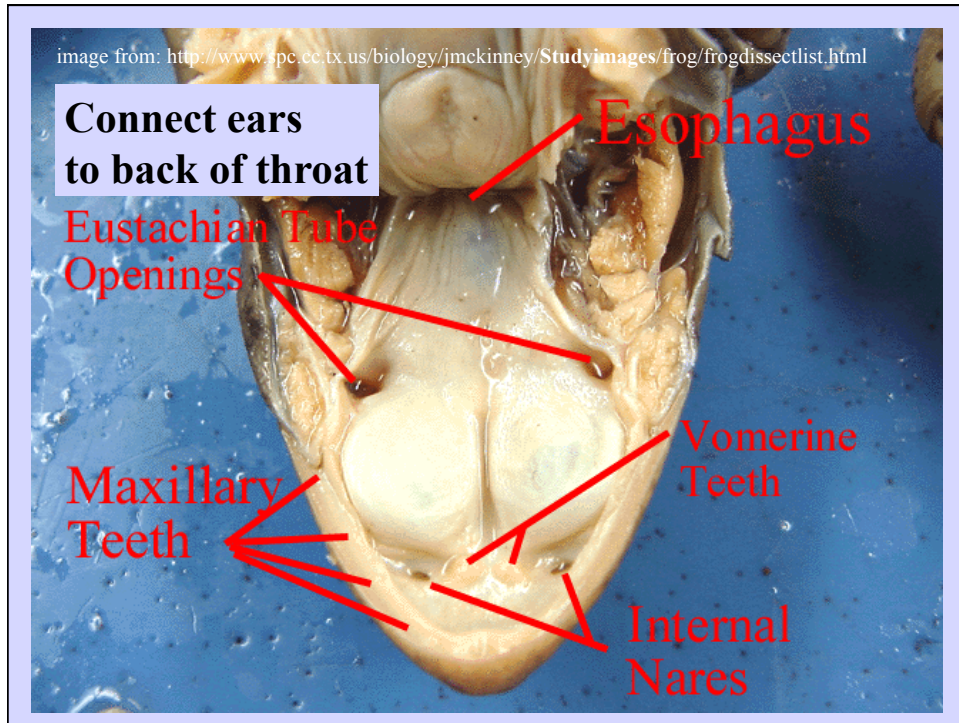
Sperm and egg released @ same time and place
Increases chances of fertilization

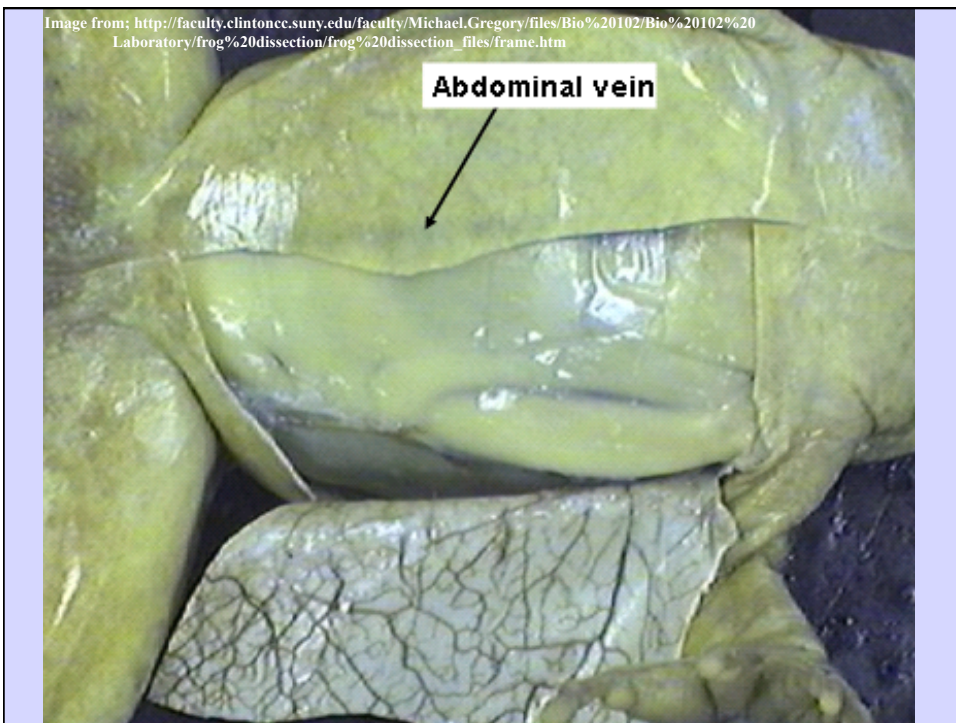
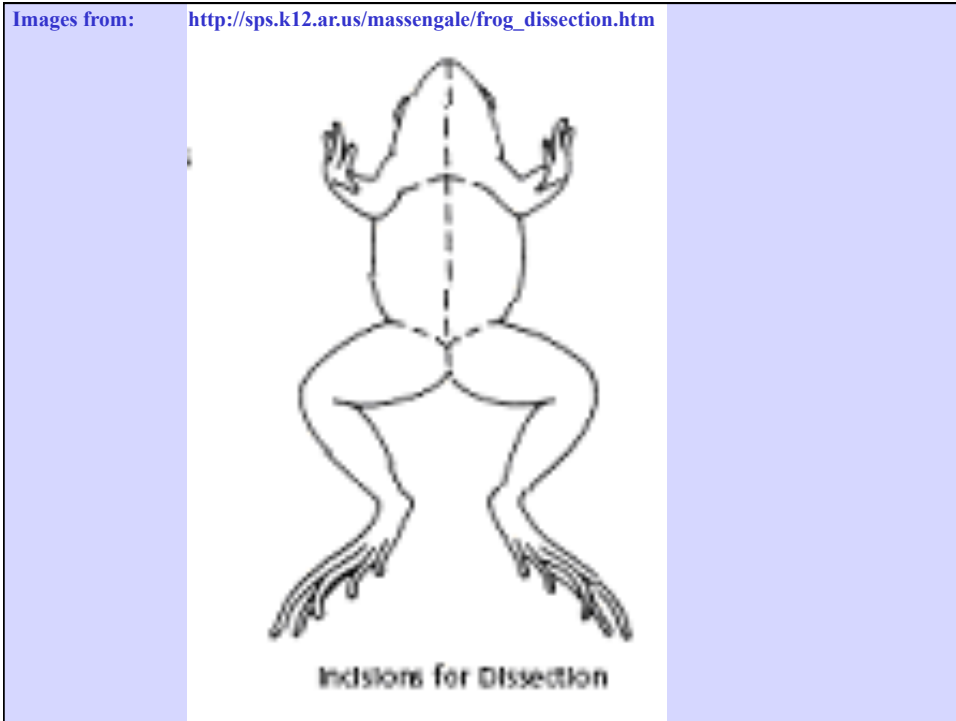
Image from:
<http://www.animationlibrary.com>
<http://www.geocities.com/animalbio/biology.htm>



TONGUE attached at front not back like yours!







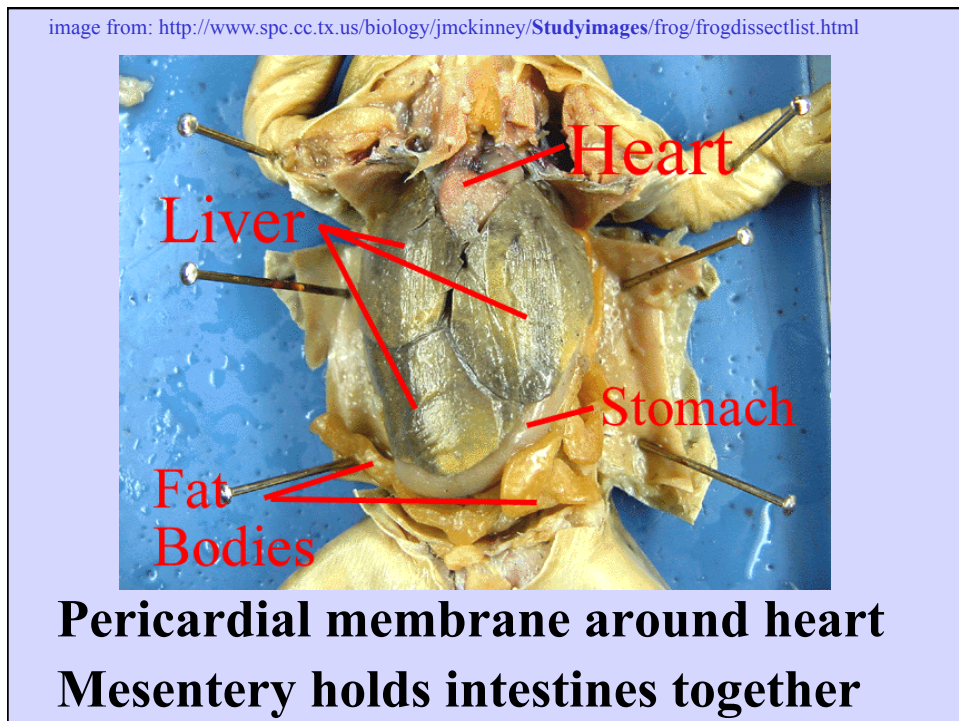
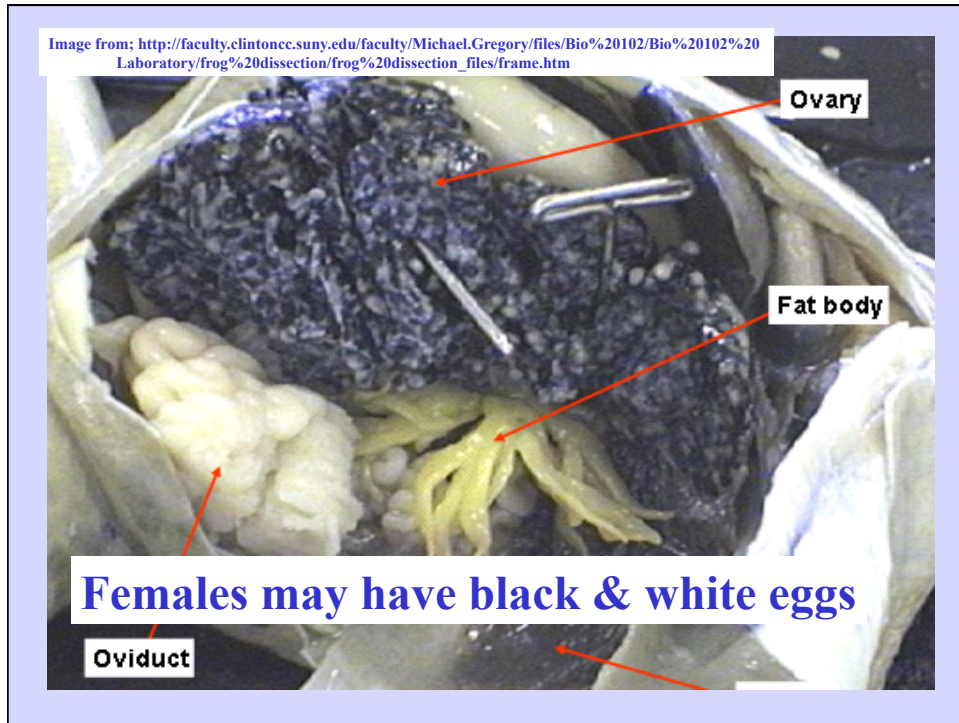
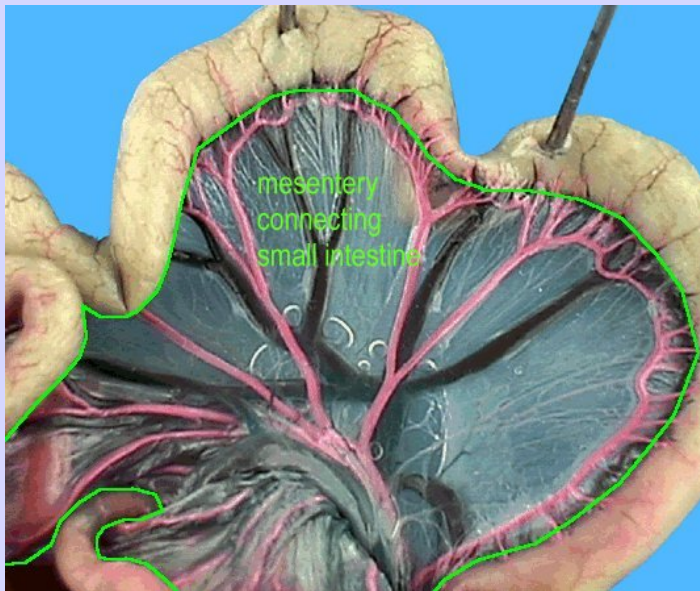


image from: <http://www.manheimcentral.org/~tw005690/Frog/frog.htm>



Mesentery holds intestines together

FAT BODIES

**Store fat for
energy during**

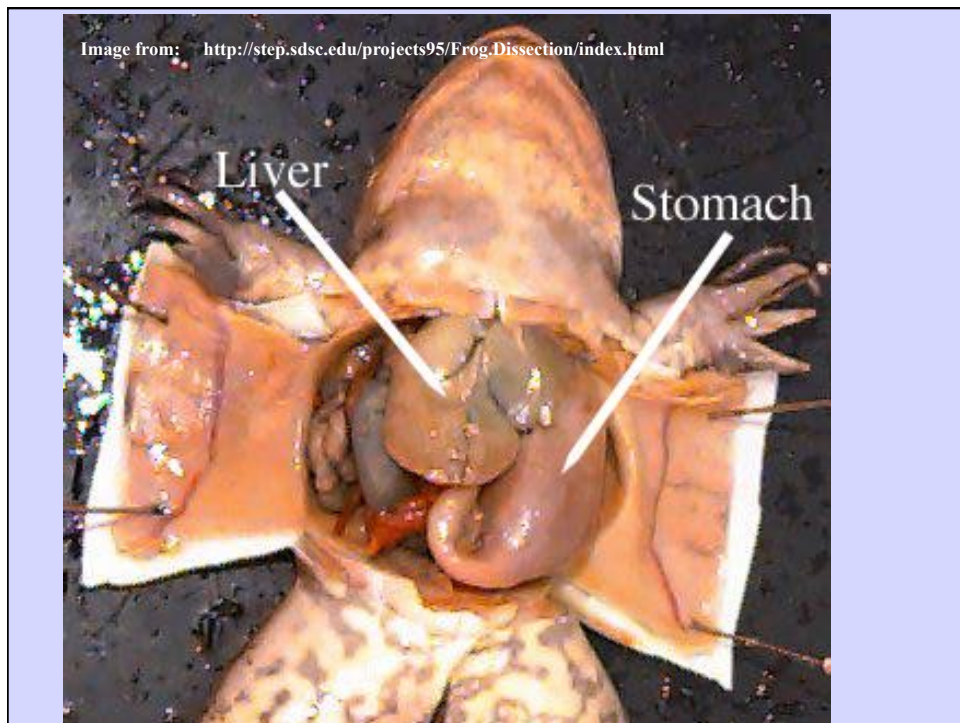
Hibernation

Estivation

Breeding



Image from: <http://step.sdsc.edu/projects95/Frog.Dissection/index.html>



http://www.health.auckland.ac.nz/departments/neurophysiology/public/teaching/alimentary_lectures/datashow/1-overview/gfx/pylorus.jpg



PYLORIC SPHINCTER
CONTROLS passage of food from stomach
into duodenum (intestine)

Gall Bladder

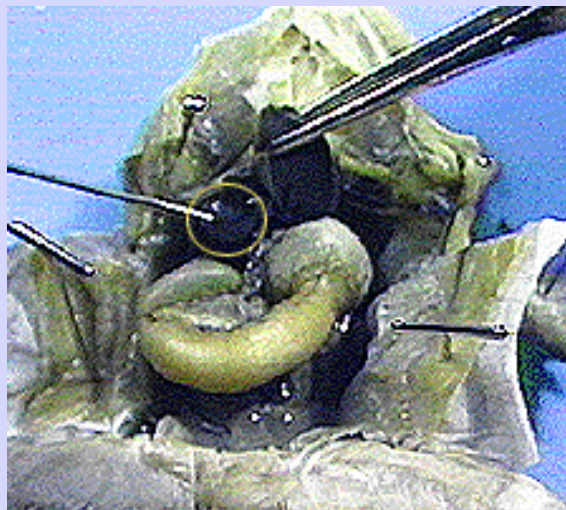


Image from: <http://school.discovery.com/quizzes6/muskopf/frog.html>

STOMACH:

Make acid and digestive enzymes
Start digestion (grind up food)

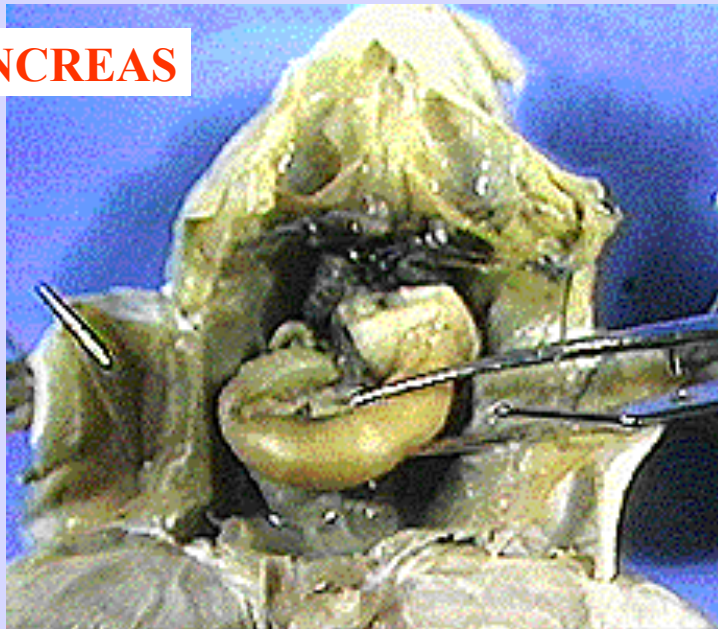
LIVER:

Make bile
Store glycogen
Store vitamins
Process toxins (including
nitrogen waste) for kidneys

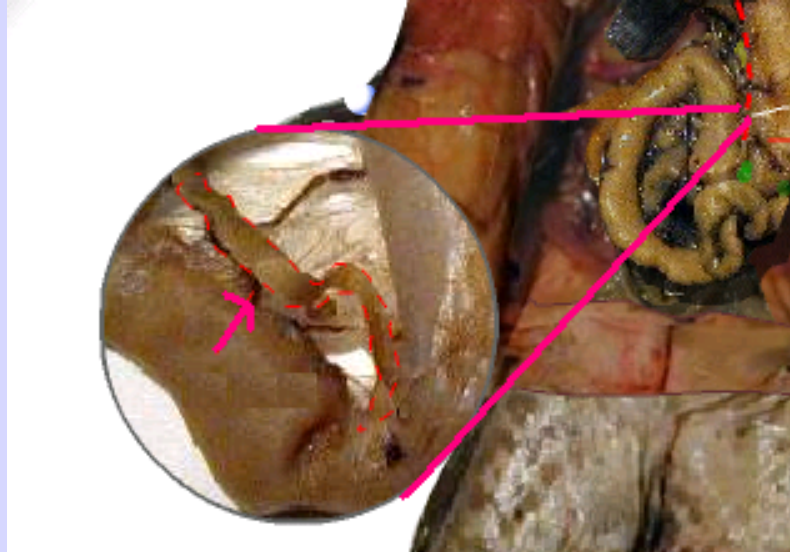
GALL BLADDER

Store bile

PANCREAS



Pancreas (enlarged)



PANCREAS:

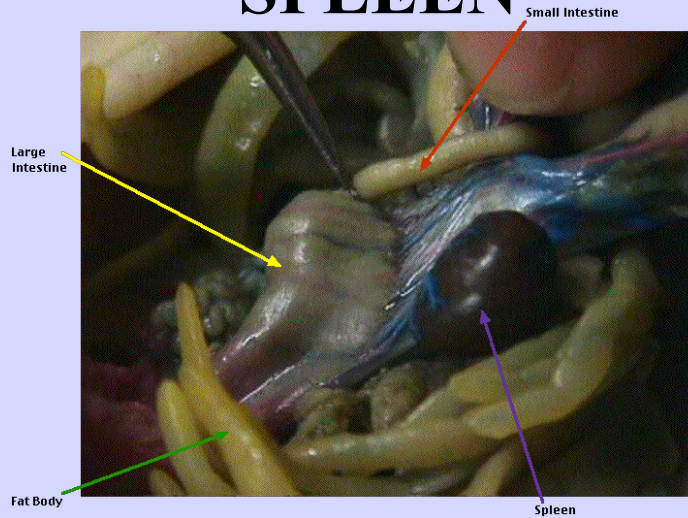
Makes TRYPSIN, INSULIN, GLUCAGON

TRYPSIN- breaks down proteins

INSULIN- tells cells to store glucose from
bloodstream as glycogen

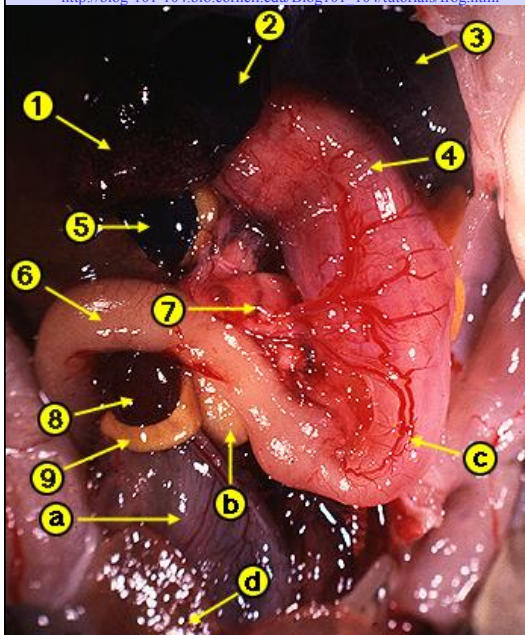
GLUCAGON- tells cells to release stored
glucose to blood stream

SPLEEN



Produces and stores new RBC's and processes old worn out ones

http://biog-101-104.bio.cornell.edu/Biog101_104/tutorials/frog.html



SMALL INTESTINE

DUODENUM

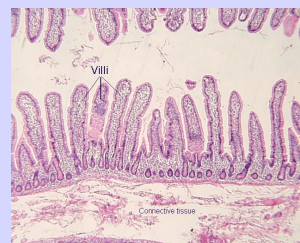
Receives trypsin and bile;
finishes digestion

ILEUM

Absorbs nutrients

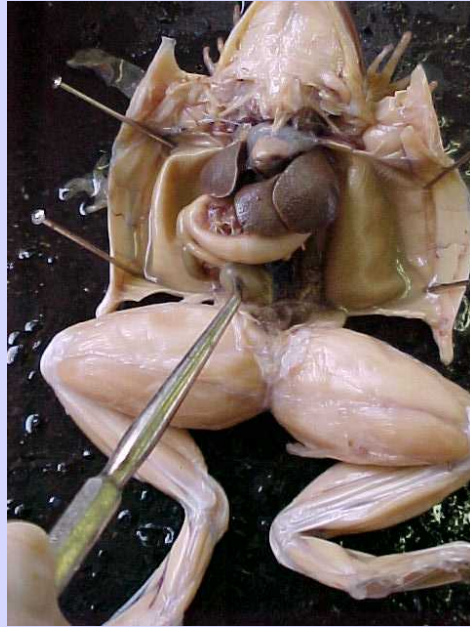
VILLI

Increase surface area



http://neuromedia.neurobio.ucla.edu/campbell/epithelium/wp_images/107%20villi.jpg

<http://www.flushing.k12.mi.us/srhigh/tippettl/biology/frog/largeintestine.html>



LARGE INTESTINE

**Removes water from
digestive waste;
concentrates feces**

10 Body Systems :

EXCRETORY

Get rid of nitrogen waste made by cells

Nitrogen waste has different chemical forms:

AMMONIA

MOST TOXIC

FISH

UREA

**made from
ammonia by
liver**

**HUMANS
AMPHIBIANS**

URIC ACID

**LEAST TOXIC
needs the least
water to dilute
BIRDS, REPTILES**

ALL WASTE is NOT THE SAME!

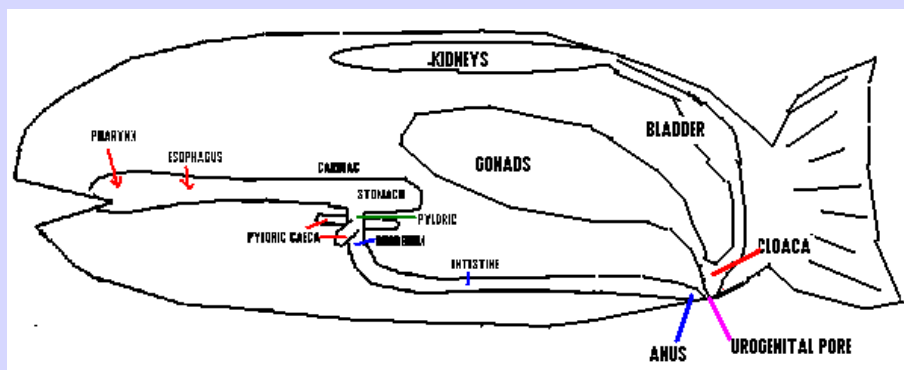
DIGESTIVE waste-

left over from undigested food
travels through digestive system
leaves through digestive system as feces

EXCRETORY waste-

(Also called NITROGEN WASTE)
made by cells from break down of proteins
travels through blood stream
leaves through excretory system as
ammonia, urea, or uric acid

Diagram by: Riedell



KIDNEYS- Remove nitrogen waste from blood and dilute it with water to make urine; osmoregulation

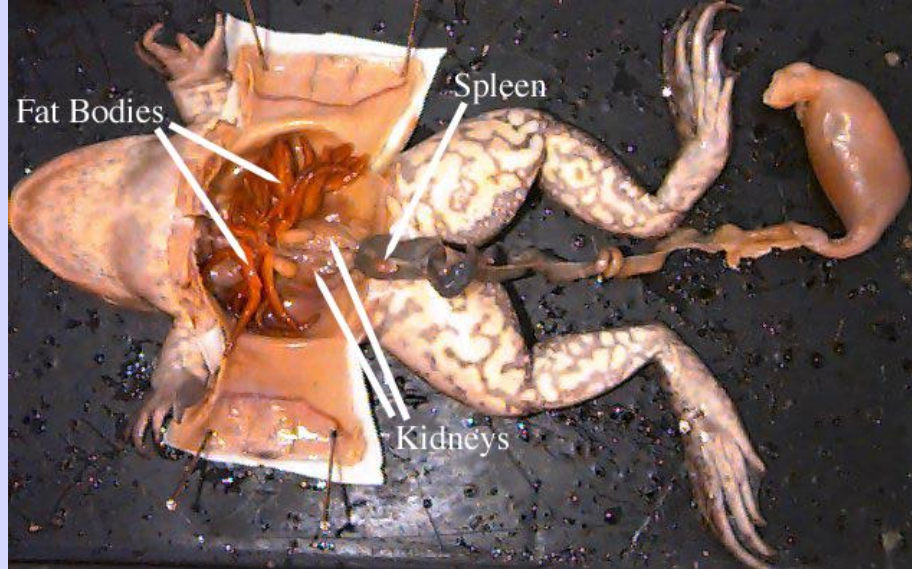
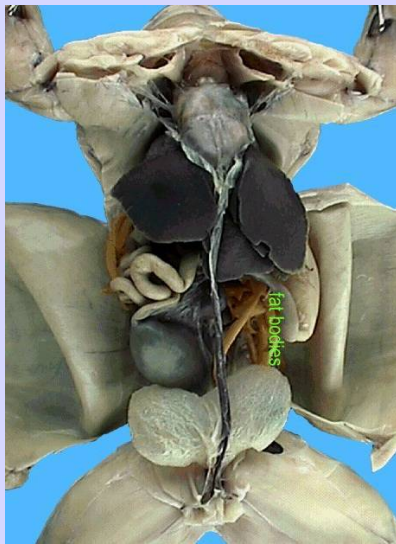


Image from: <http://step.sdsc.edu/projects95/Frog.Dissection/index.html>

URINARY BLADDER

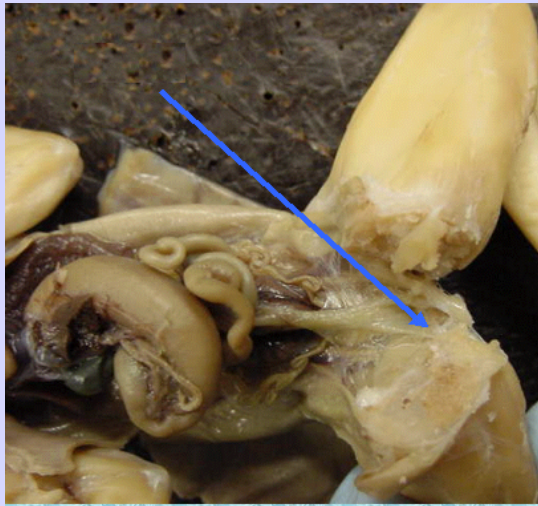


**STORES URINE
MADE BY KIDNEYS**

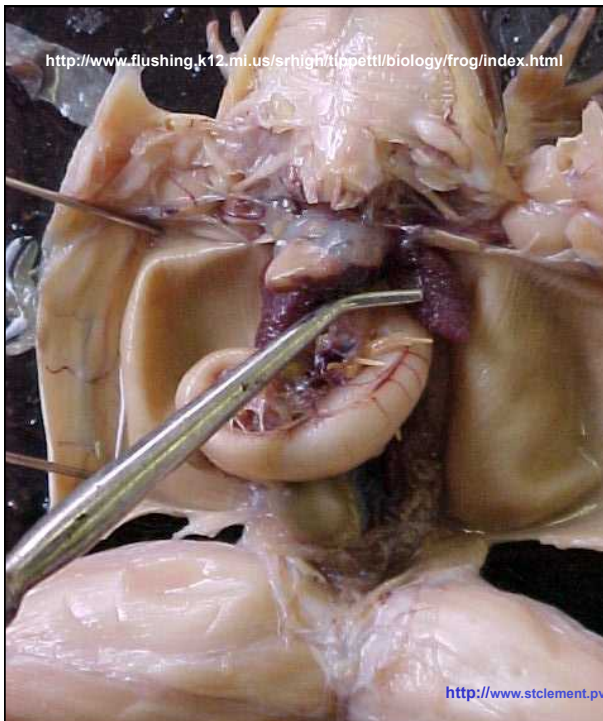
**LARVAE (Tadpoles)
Excrete AMMONIA like fish**

**Adult frogs excrete
UREA to conserve water**

<http://www.manheimcentral.org/~tw005690/Frog/frog.htm>



CLOACA
DIGESTIVE
EXCRETORY
REPRODUCTIVE



LUNGS:
GAS
EXCHANGE



<http://www.stclement.pvt.k12.il.us/studentWeb/science98/GarrittPatM/alveoli.gif>

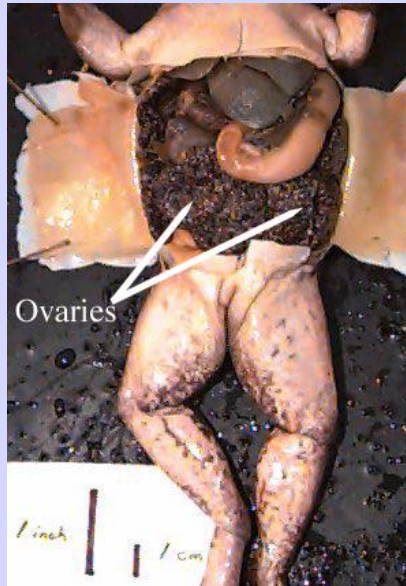
<http://www.tvdsb.on.ca/westmin/science/snc2g1/frogresp.htm>

The diagram illustrates the respiratory system of a frog. It shows the nostrils, mouth cavity, and lungs. Red arrows indicate the intake of oxygen, and blue arrows indicate the release of carbon dioxide. The frog is shown in a side profile, with the respiratory pathway highlighted in blue and red.

BREATHING WITH LUNGS is called PULMONARY RESPIRATION

Larvae breathe with GILLS

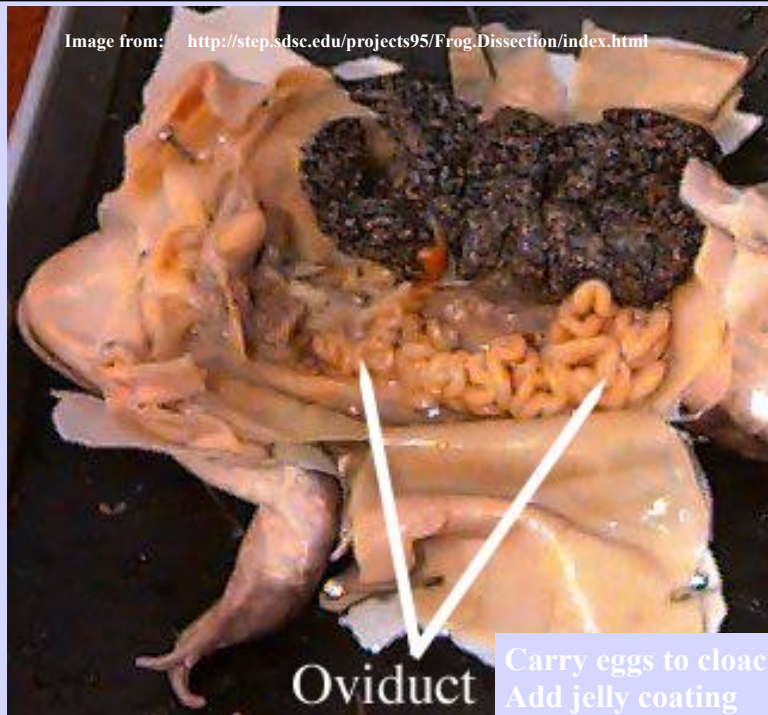
A photograph of a dark tadpole swimming in water. The tadpole has a long tail and is surrounded by green and yellow plants. The background is dark, suggesting an underwater environment.



OVARIES

Make eggs

Image from: <http://step.sdsc.edu/projects95/Frog.Dissection/index.html>

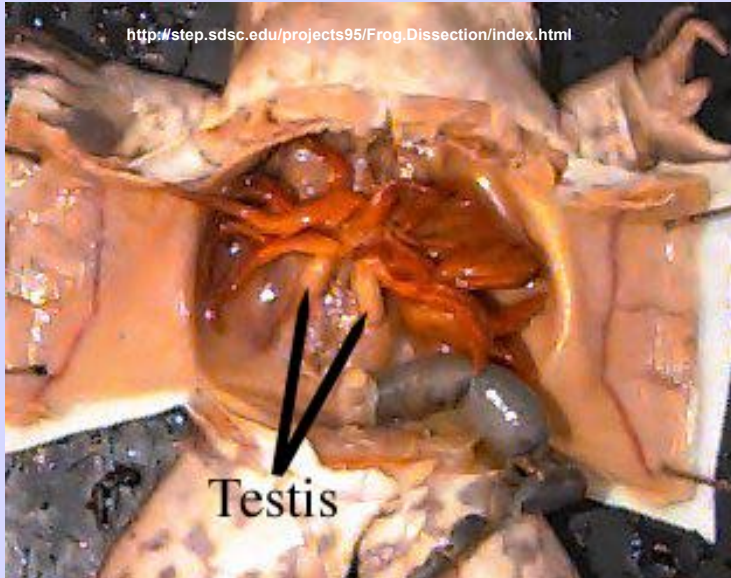


Oviduct

Carry eggs to cloaca
Add jelly coating

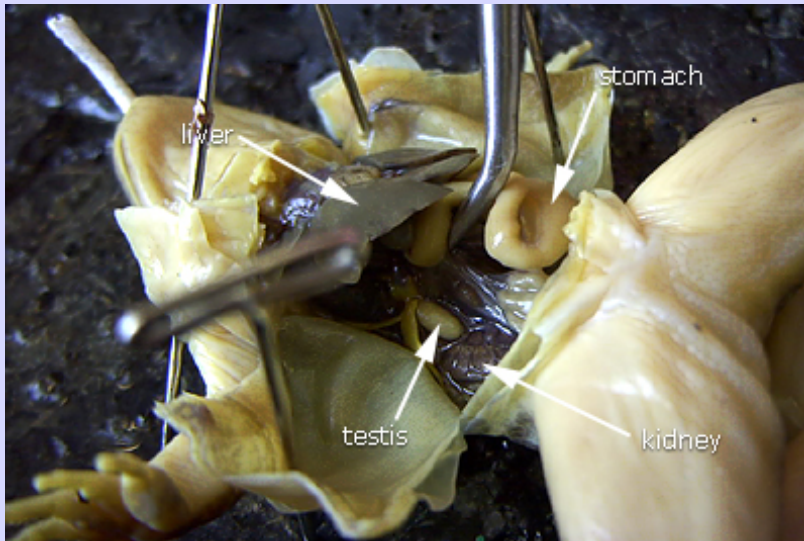
TESTES

MAKE SPERM



TESTES

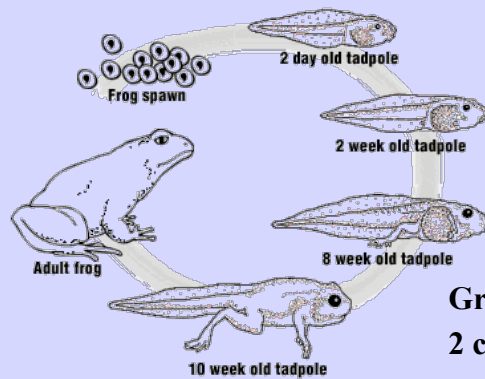
KIDNEY



AMPLEXUS “firm embrace”



INDIRECT DEVELOPMENT



Grow legs; Lose tail
2 chambers → 3 chambers
1 loop → 2 loops
Breathe w/ gills → lungs & skin
Excrete ammonia → excrete urea
(gills & kidneys) (kidneys)

http://saczoo.com/3_kids/images

Ways tadpoles are like fish

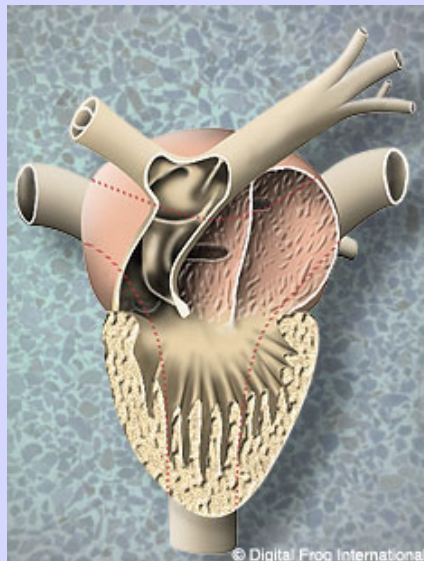
Have a **LATERAL LINE**

Breathe with gills

Excrete nitrogen waste as **AMMONIA**
(with gills & kidneys)

Have a **2 chamber heart**

Have a **1 loop**
circulatory system



HEART

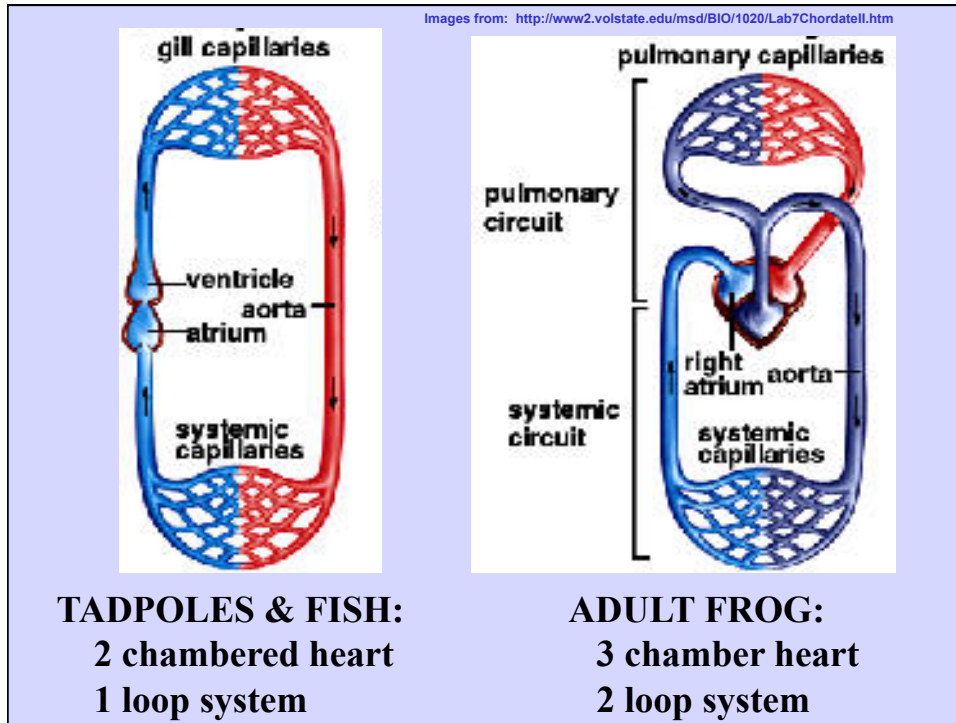
3 chambered heart

Right atrium

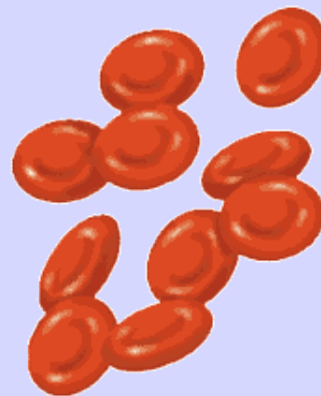
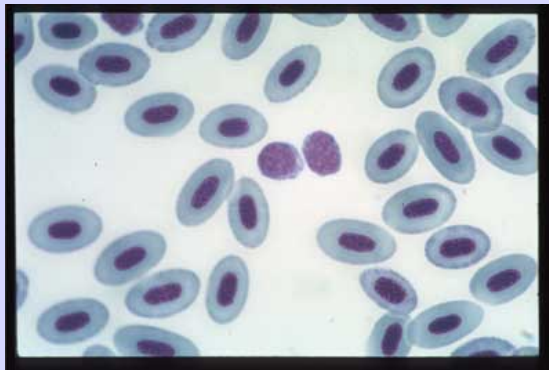
Left atrium

Ventricle

Image from: <http://www.digitalfrog.com/resources/froggallery.html>



**MOST vertebrates have nuclei
in their RBC's**



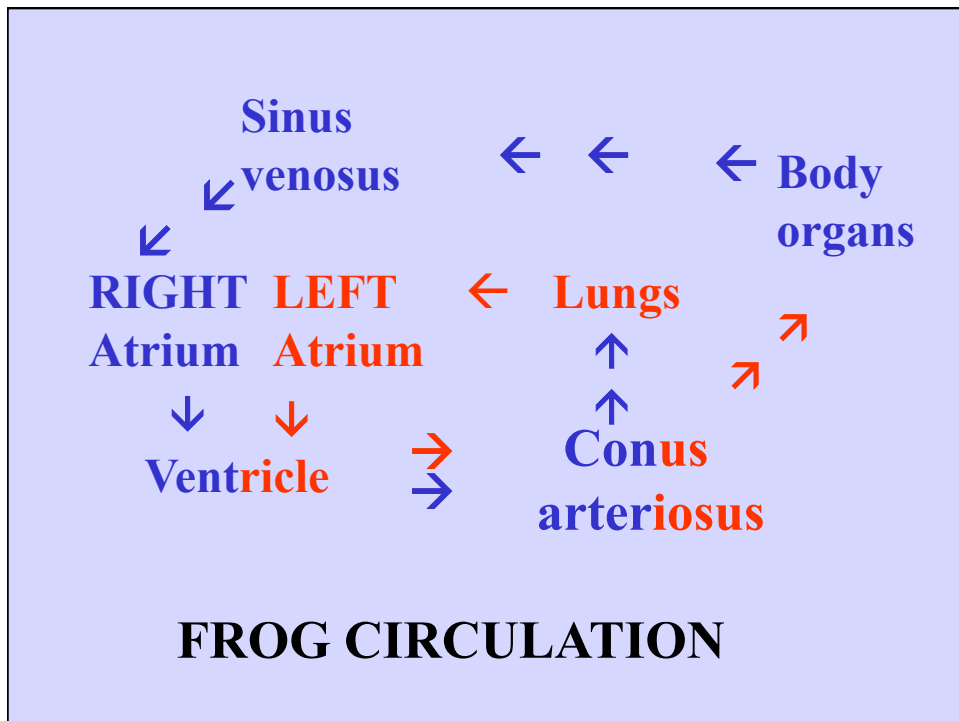
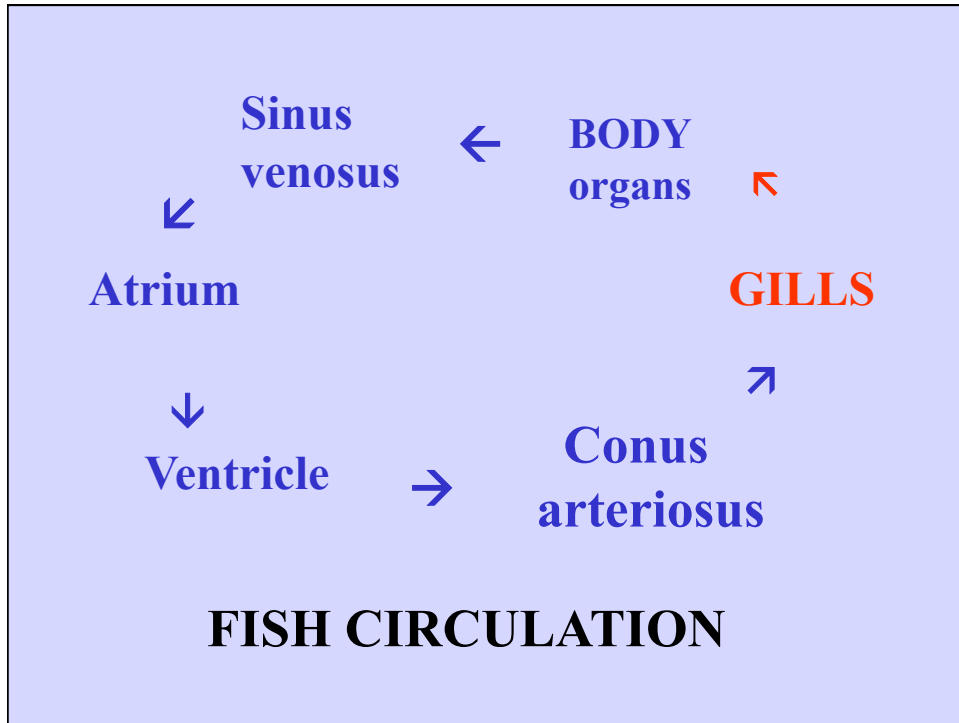
MAMMALS DON'T

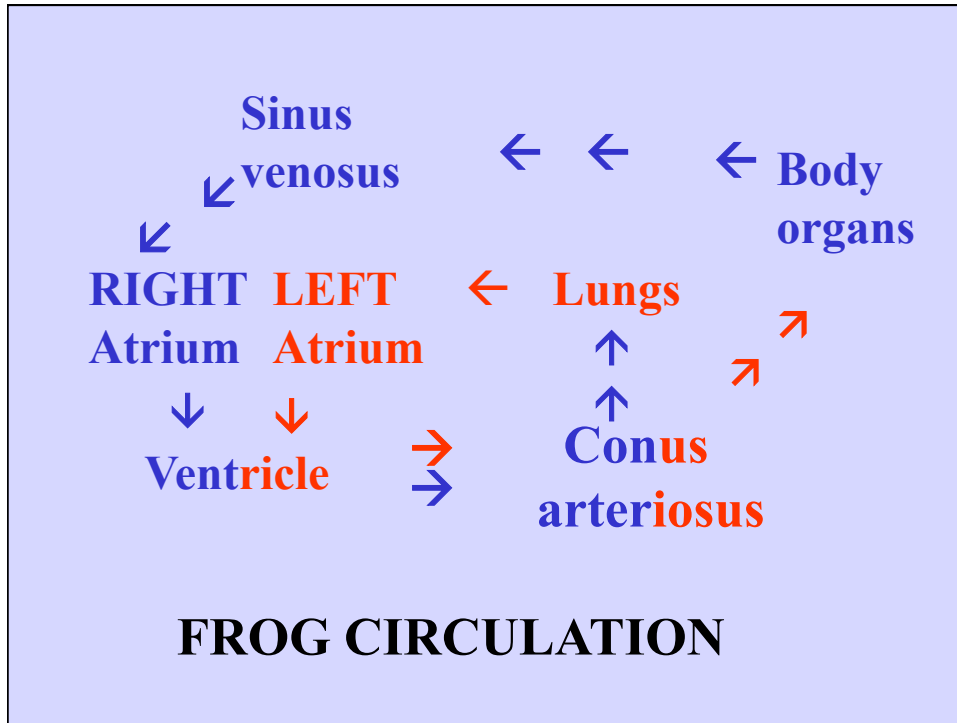
RBCs' image from:

<http://www.fish-news.com/RG4001.jpg>

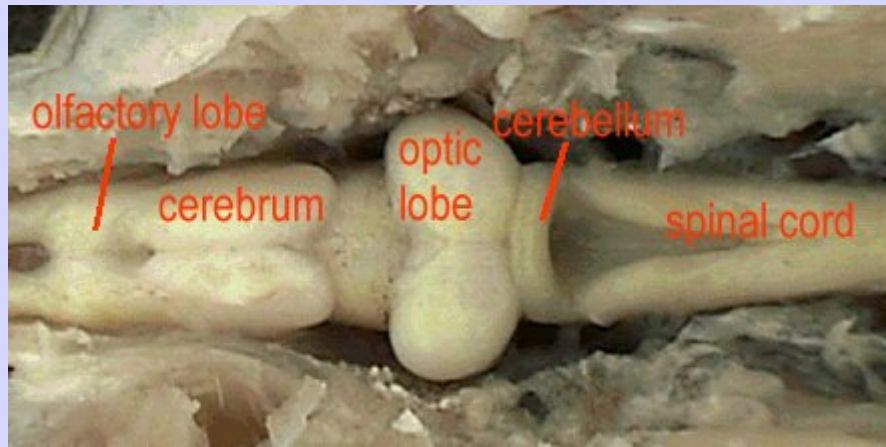
Human RBC image from:

<http://www.nigms.nih.gov/moleculstomeds/images/bloodcells.gif>





BRAIN



<http://www.manheimcentral.org/~tw005690/Frog/frog.htm>