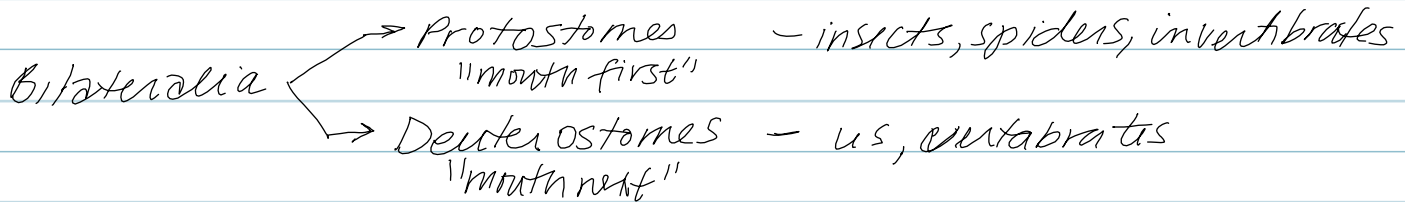


# Brain Evolution

ARASH

cortical channinism

brain is similar for all bilateria



variability of nervous systems

eye evolution

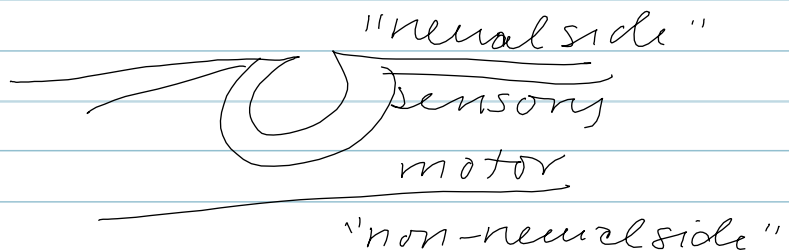
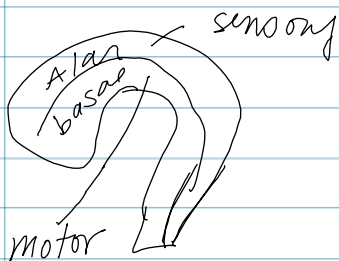
3rd eye

chordata larvae

embryology

"patterning"

\* All major divisions of the nervous system  
exist really early on. cortex is not "added later"



Q: autonomic ner  
dorsal-ventral inversion

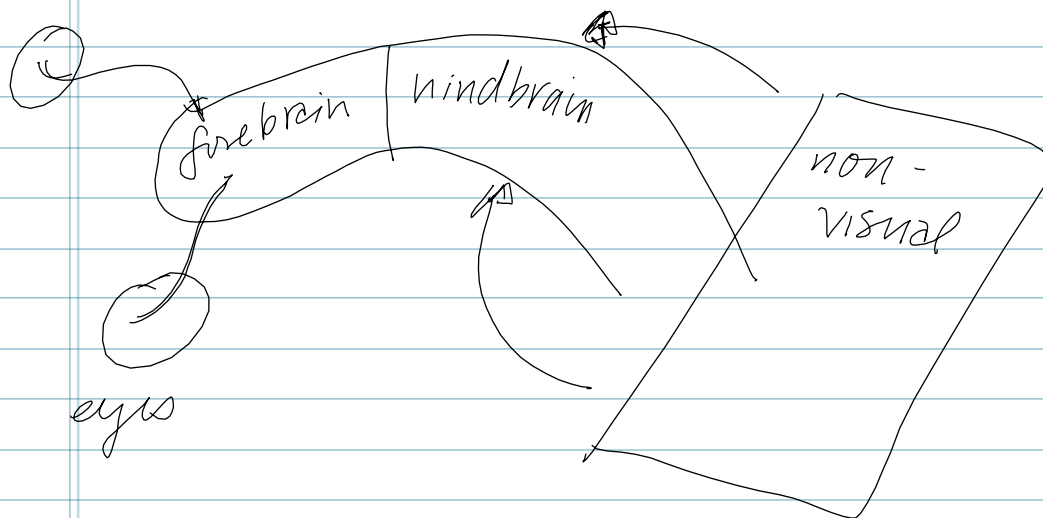
Sam: large-bilateral eyes

Q: contralaterally controlled  
protozoans

Sam: evolutionary pressure

Q: vision vs gustatory sense

Q: enteric nervous system is the  
FIRST nervous system



Craniates: (animals w/ skull bones)

CRANIAL NERVES (22)

3 motor

10 sensory

Rest mixed

→ 2 visual (optic, epiphasial)

"pineal light sensors"

→ huge variation  
across animals

(e.g. infrared,  
electrical...)

her claim:

chordate → craniate

has LARGE bilateral eyes

→ same motif is followed by all  
other senses (but ~~see~~ smell?)

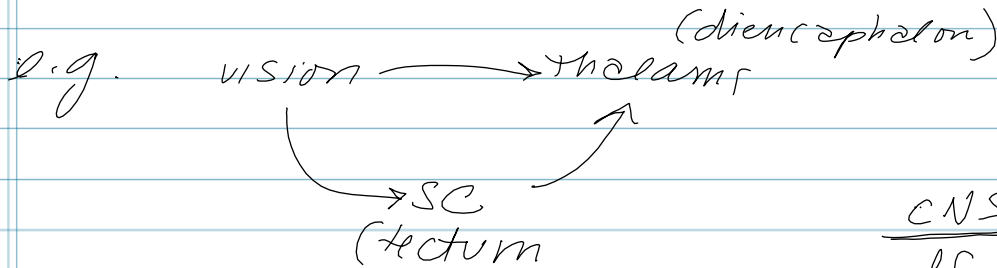
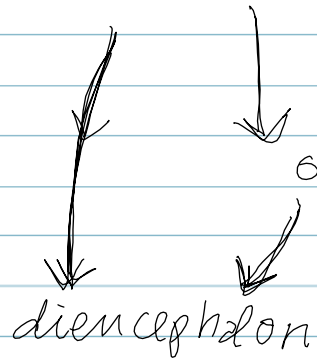
# Basic Motif of CRANIATE brain

neural crest → bipolar cells

basic sensor cell for all sensory modalities

multipolar cell in CNS

FOM  
first-order multi-polar cells



| CNS    |              |
|--------|--------------|
| olf    | neural crest |
| vision | other senses |

