

Emergent Properties of the Leech

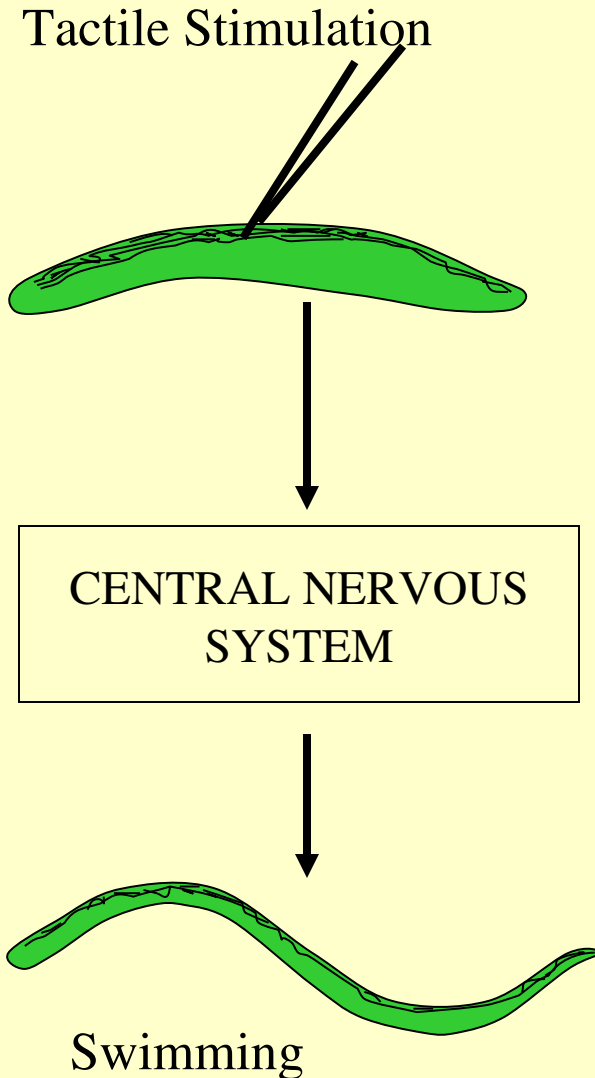
- Neuroscientist interested in how the nervous system enables us to interact with our environment.
 - examine this problem at multiple levels
 - one level of analysis - how networks of neurons produce behavior?
 - invertebrate preparations particularly amenable to this type of analysis

Hirudo medicinalis



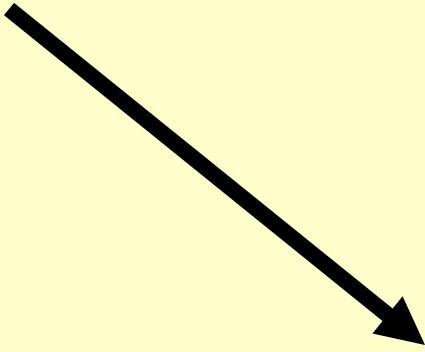
Medicinal use of leeches today- [Leeches USA](#)

The leech as a model organism



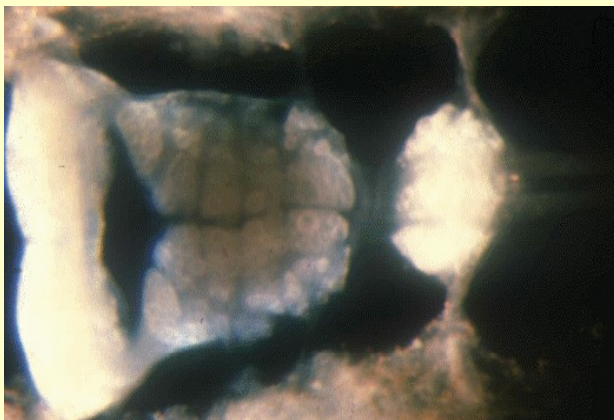
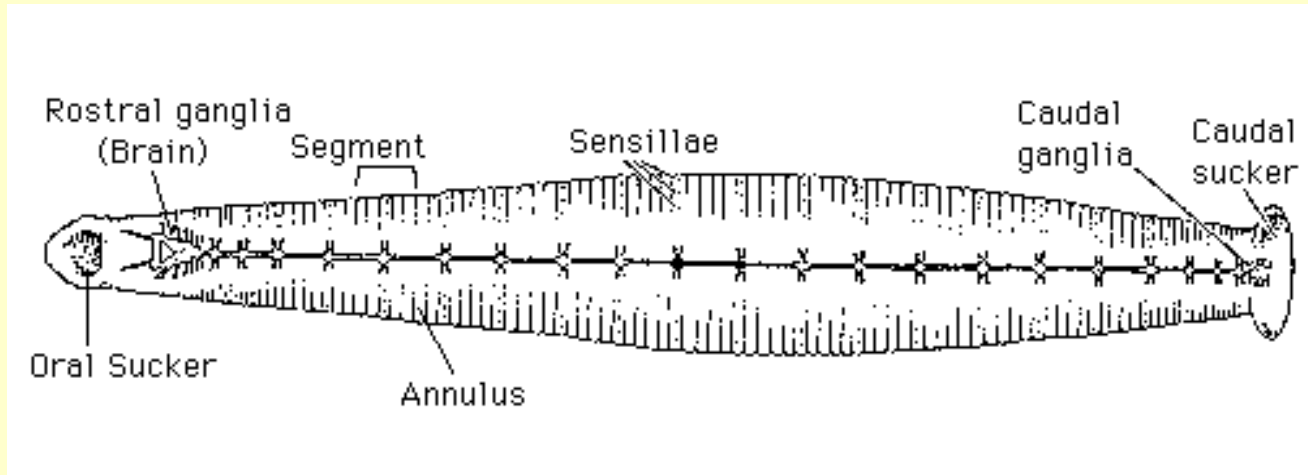
- Simple and manipulatable behavioral system
- Swimming: rhythmic behavior

Stimulus

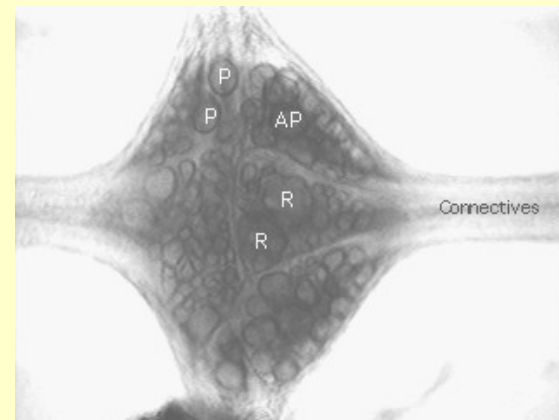


QuickTime™ and a
Sorenson Video decompressor
are needed to see this picture.

Leech Central Nervous System

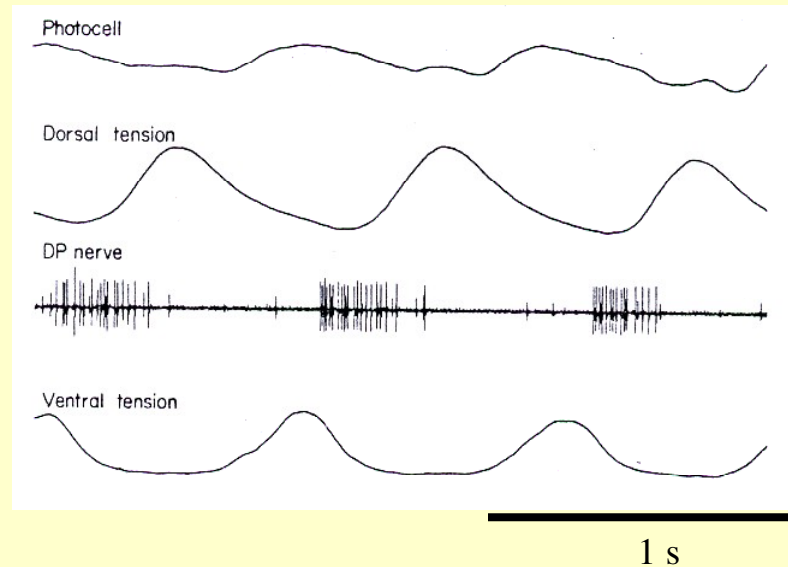


Head Ganglion



Segmental Ganglion

Physiological Indications of Swimming



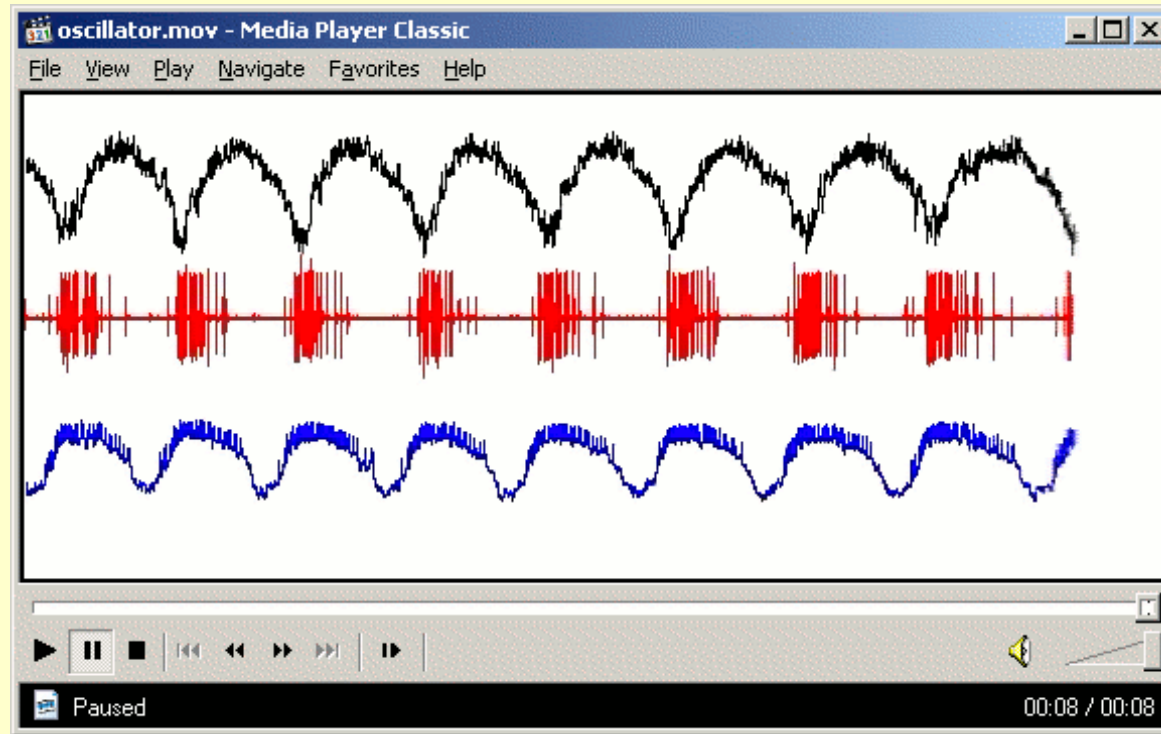
Fictive swimming indicated by rhythmic bursts in DP nerve

'Fictive Swimming' in the isolated nerve cord

Cell 28(10)

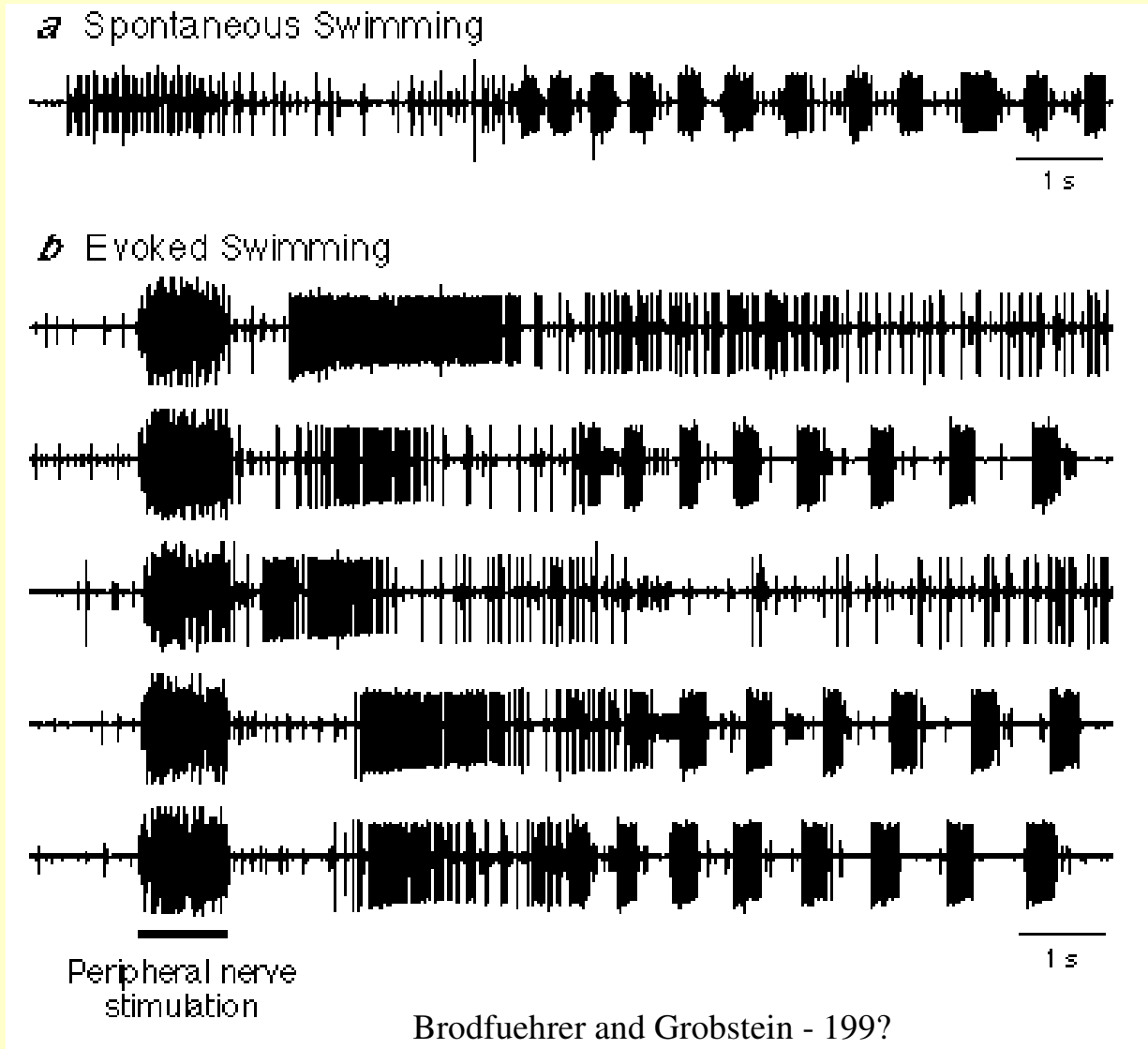
DP(8)

Cell 208(4)



Fictive swimming indicated by rhythmic bursts in DP nerve

Identical stimuli can yield a variety of behavioral responses



Factors affecting swim behavior

- Network function
 - Reducing the size of cord reduced likelihood/quality to swimming.
- External environment (sensory input)
- Internal environment
 - Cellular feedback mechanisms
 - Internal state
 - Adding drugs can make leech more likely to swim.