

OSMOREGULATION

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THE CONTROL OF WATER BALANCE

Osmoregulation

A combination of three factors:

- **Concentration**

The concentration of the solutes dissolved in the body fluid will influence osmosis

- **Volume**

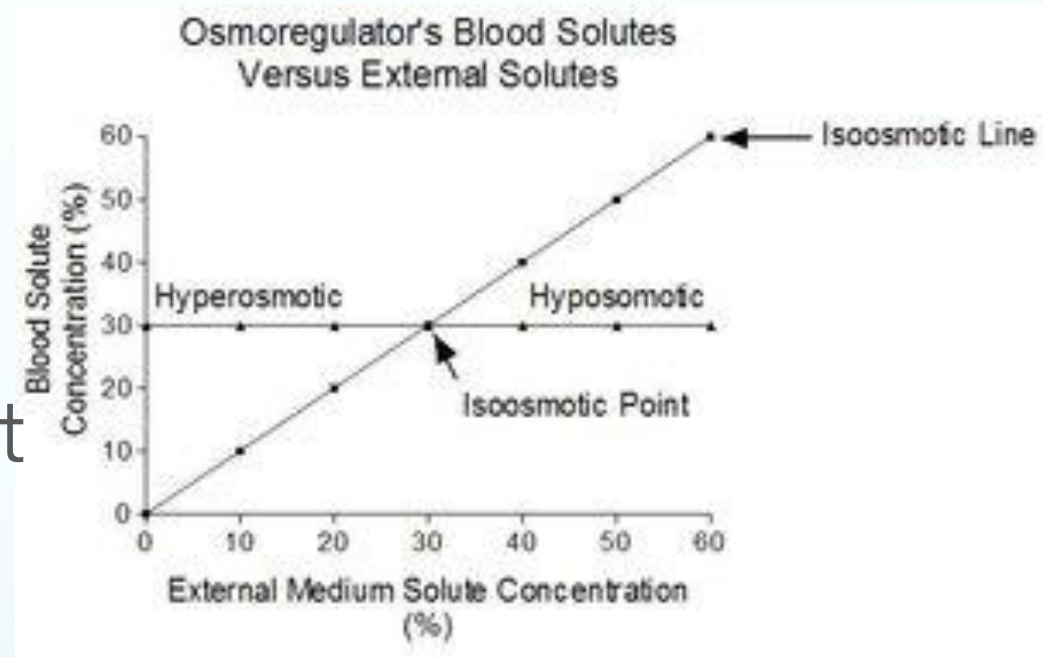
The volume of the body fluids will influence the pressure they exert

- **Composition**

The different types of dissolved solutes will influence body function.

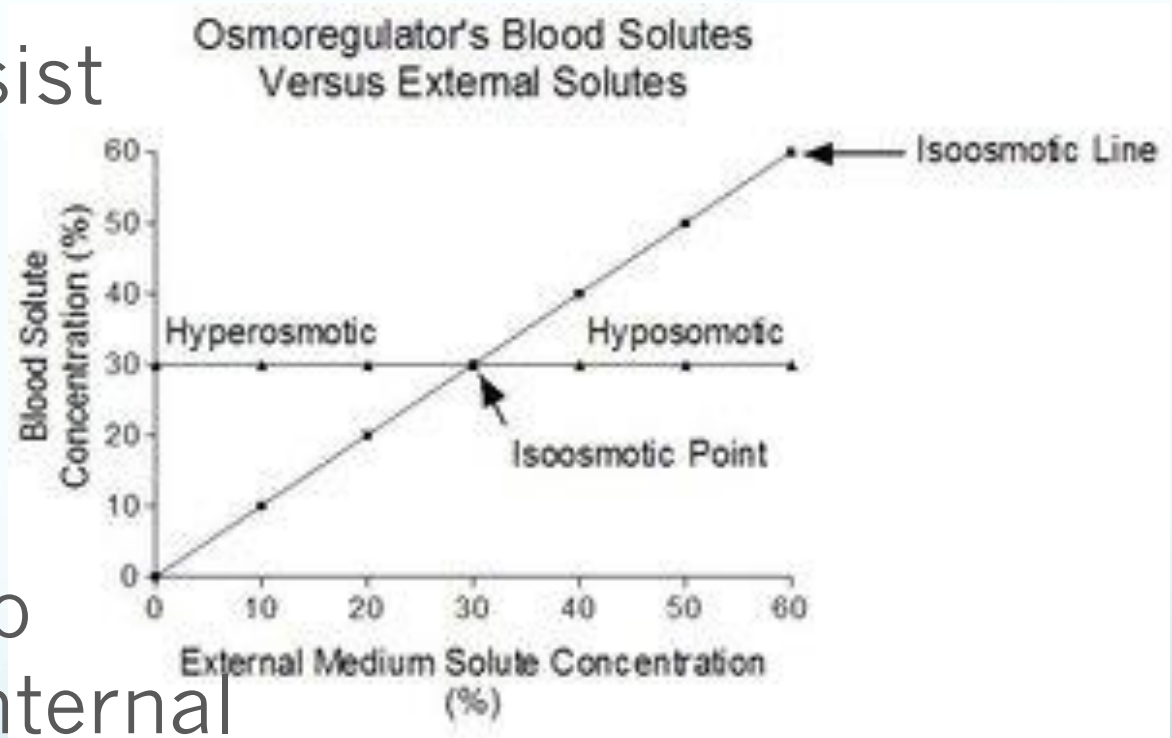
Conformers and Regulators

- **Conformers** change with their environment
- Their tissues must tolerate changes in solute concentration



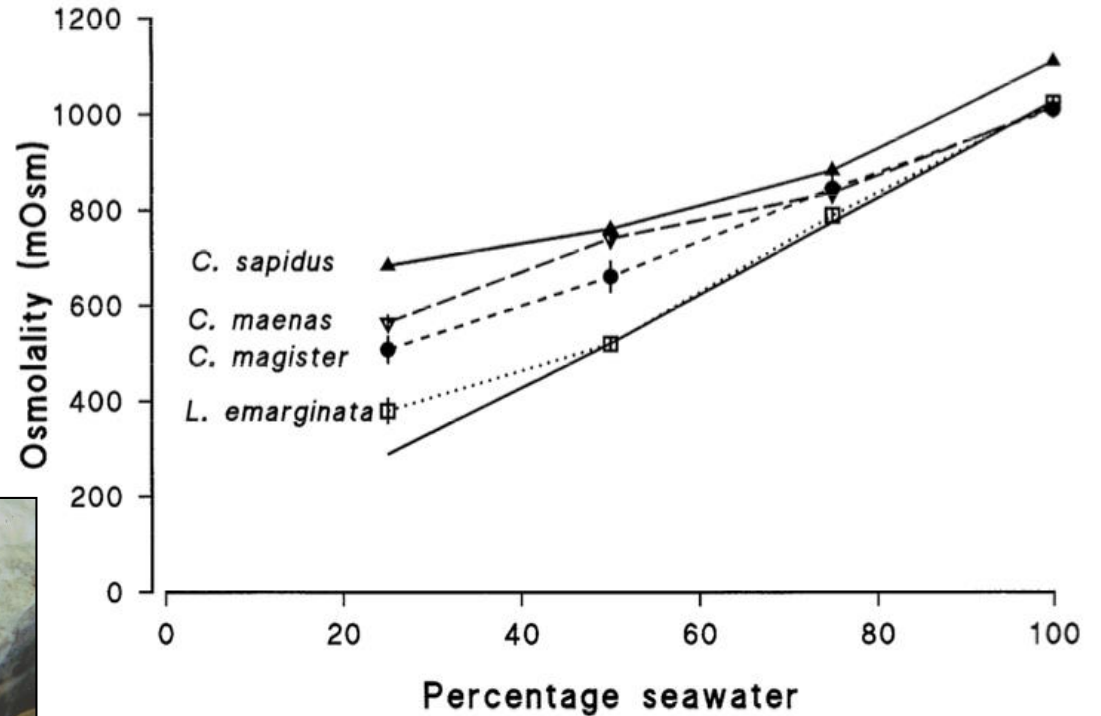
Conformers and Regulators

- **Regulators** resist changes in the environment
- They possess homeostatic mechanisms to control their internal concentration



Estuarine invertebrates

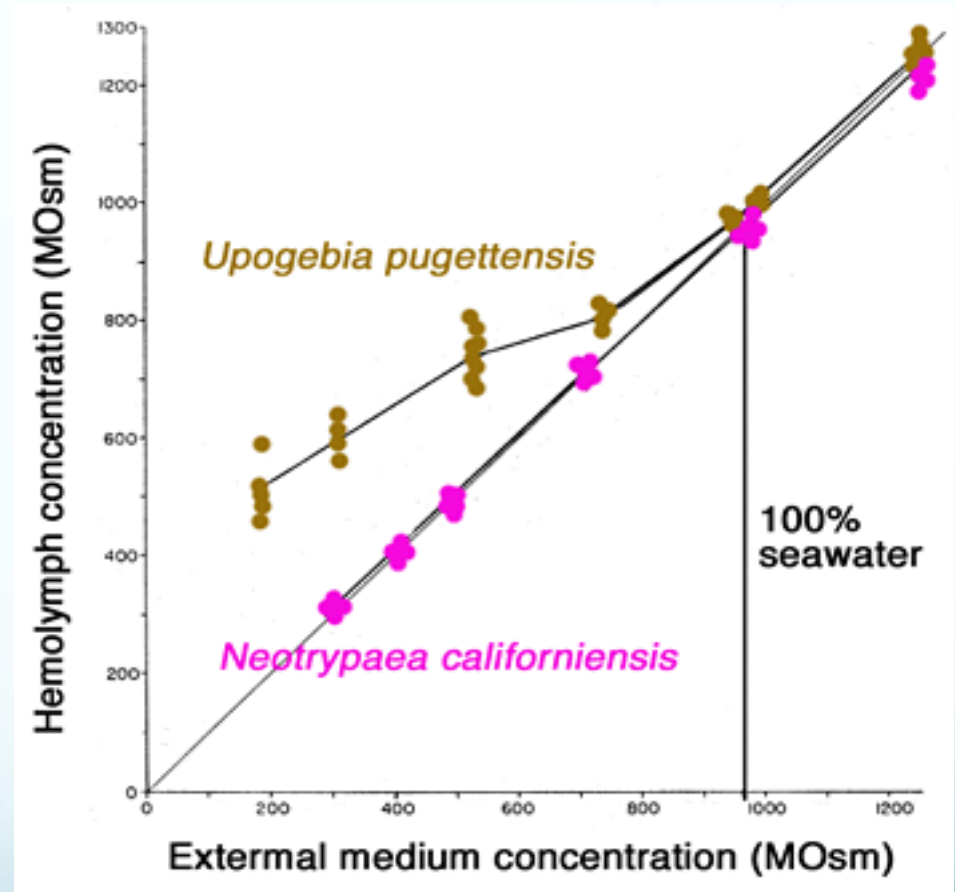
In estuaries the salt levels are always changing



Shore crab (*Carcinus maenas*) © P Billiet

Estuarine invertebrates

Upogebia pugettensis



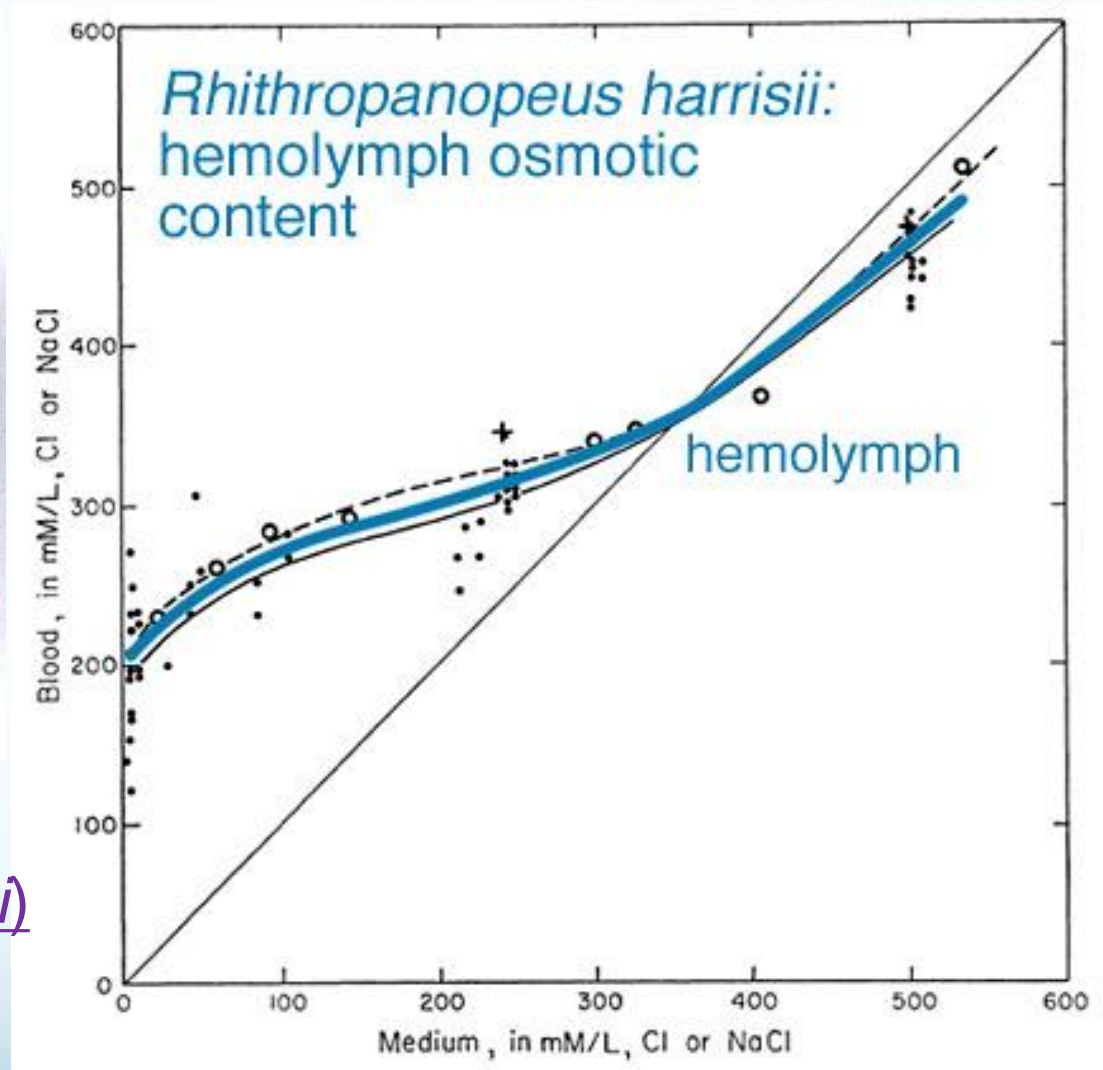
Neotrypaea californiensis

© Photo by D.E. Koth
Tarleton State University



Rhithropanopeus harrisi

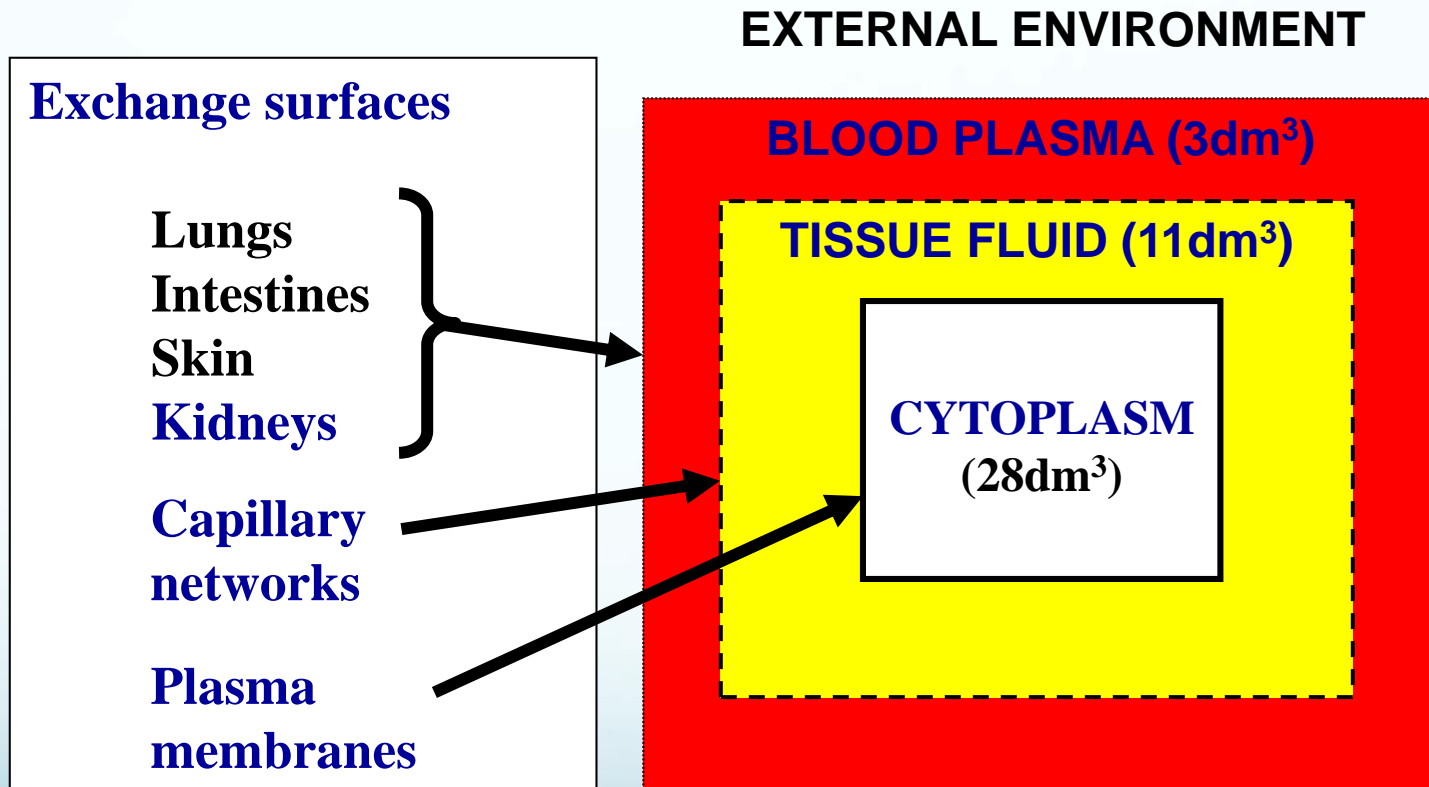
Mud Crab
(*Rhithropanopeus harrisi*)



REGULATORS

REGULATORS

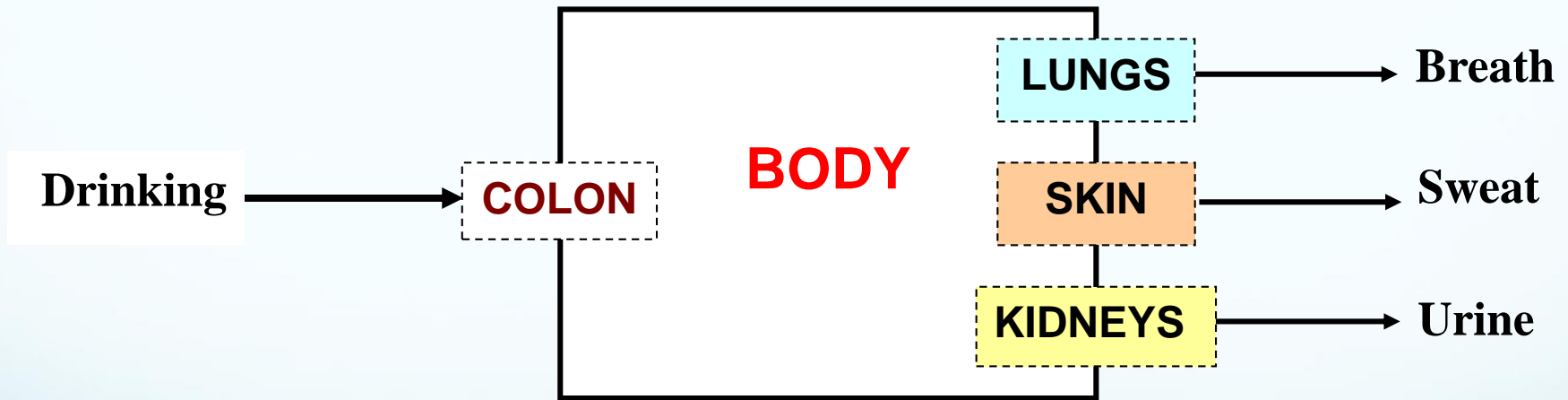
Fluid compartments and exchange surfaces



NB volumes for a 70kg male

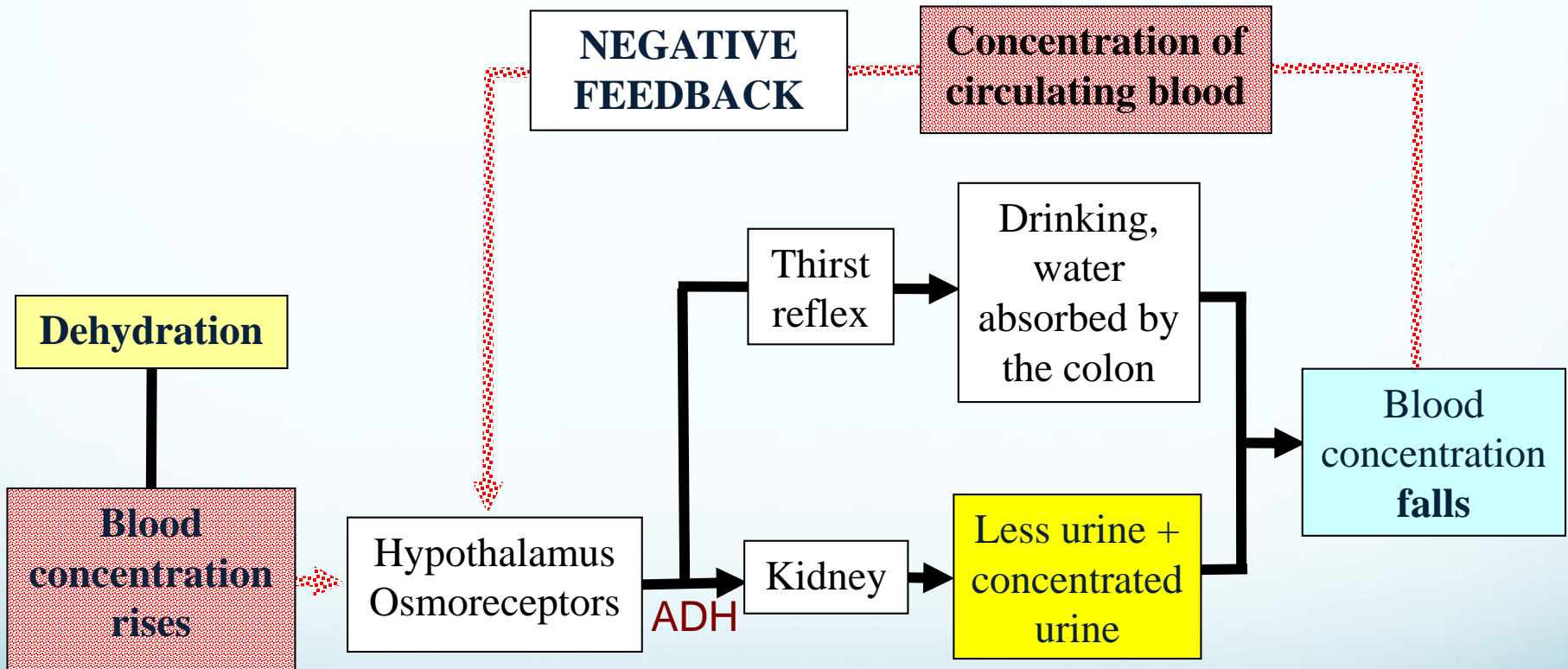
BODY FLUID BALANCE

INPUT AND OUTPUT

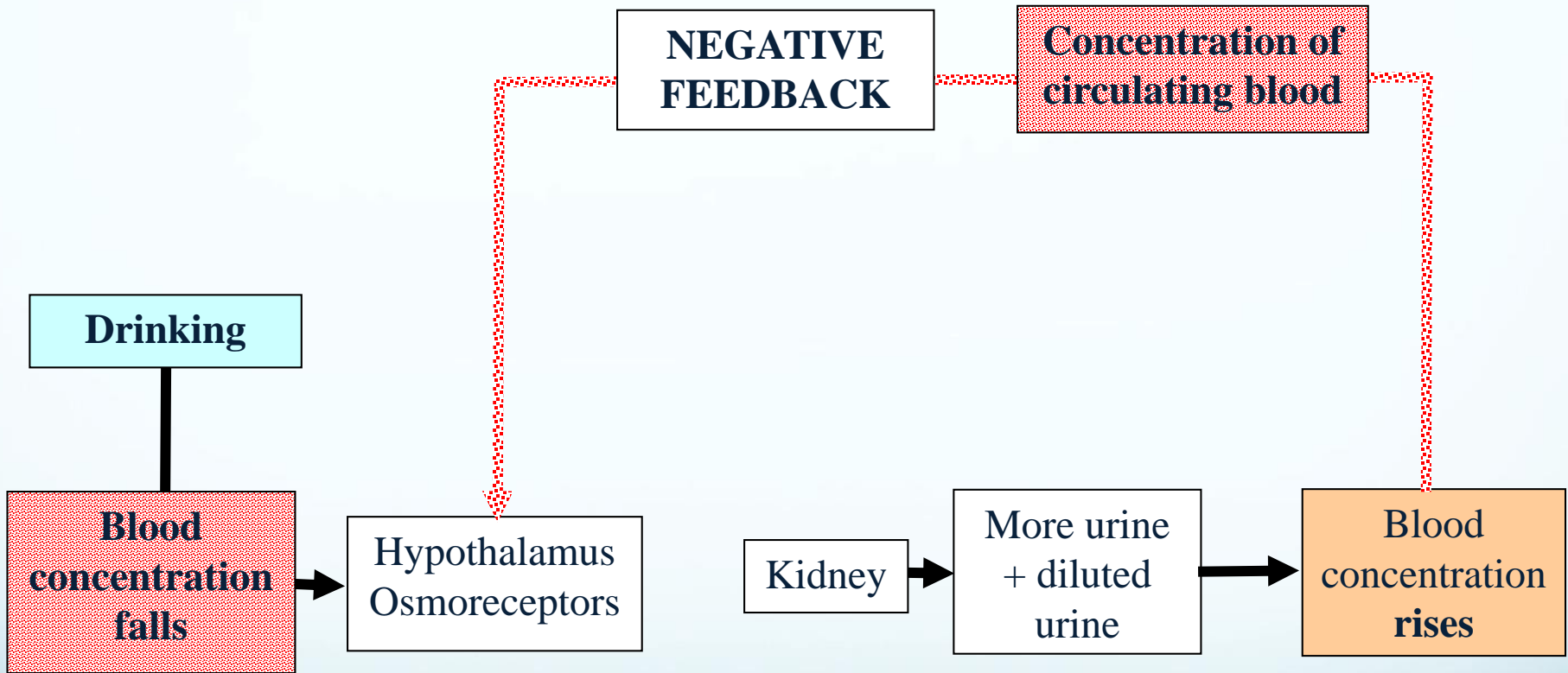


- A mammal cannot stop breathing because it would suffocate
- A mammal cannot stop sweating because it would over heat
- It can reduce water loss by the kidneys
- It can add water to the body by drinking

Dehydration



Hyperhydration



Note: for a terrestrial animal this is a less likely situation and it is easy to lose water

Dehydration is more likely so the control system has evolved to saving or getting water