

④

★ CONTROL SYSTEMS ARE NEEDED TO
REGULATE THE COMPOSITION OF
INTERNAL BODY FLUID

Tissues
↓
ORGAN
↓
ORGAN SYSTEMS

ODD SYSTEM
- INTEGUMENTARY ⇒ SKIN SCANS !!

MULTIPLE SYSTEMS

- pancreas — digestive
- endocrine
- heart — muscular
- circulator)

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ANIMAL TISSUE

- be able
to
IDENTIFY.

- Nervous

- Muscle

filaments containing
ACTIN and MYOSIN (proteins)

Connective Tissue - E.C.M. (fibroblast, macrophage)

- vertebrate
C.T.

REGULATOR

- * - animal uses internal mechanisms to control internal change in face of EXTERNAL FLUCTUATION

CONFORMER

- it allows its internal condition to change along with EXTERNAL CHANGES.

↳ organisms can regulate some and conform to others.

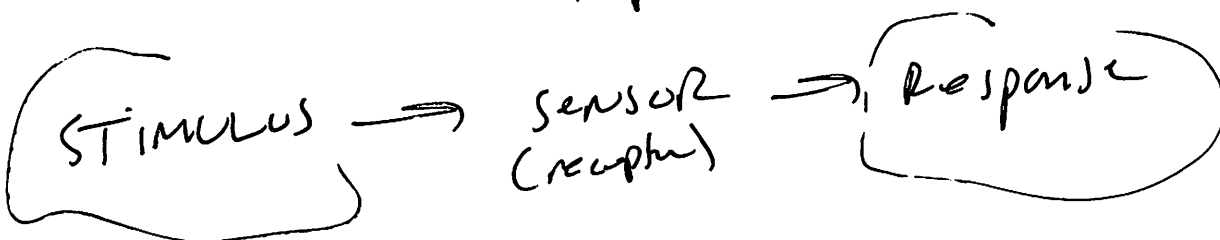
VOCAB - "interstitial" - fluid that surrounds cells.

HOMEOSTASIS

- "steady state"

- maintenance of internal balance

"SET POINT" - a particular value
- i.e. pH = 7.4 or "NORMAL RANGE"
temp = 98.6°F i.e. 19-21°C



NEGATIVE FEEDBACK

control mechanism reduces the stimulus.

THERMOREGULATION - example of Homeostasis (4)

↳ temps can:

- ① reduce efficiency of enzymes
- ② alter fluidity of cell membranes.
- ③ affect biochemical processes.

Endothermic - warmed by metabolic heat

Ectothermic - heat from external sources.

↳ fish, reptiles, amphibians

↳ ADJUST by Behavioral Means

↳ need less food

↳ successful strategy in resource-depleted area

Exchange of Heat

(1) RADIATION

(2) CONVECTION

(3) CONDUCTION

(4) EVAPORATION

⑤

ADAPTATIONS

- insulation - fat, fur, feathers, hair (goose bumps)

- circulatory

1) vasodilation - cools

2) vasoconstriction - warms

- counter current exchange
arteries (warm) and veins (cold) running
next to each other in opposite direction

ACCLIMATIZATION

- adjusting insulation.

- cellular adjustments

• ENZYME LEVELS

• RATIO of SATURATED / UNSATURATED LIPIDS

• ANTI FREEZE proteins

SENSORS

- hypothalamus (in brain) → thermostat

FEVER - increase in the set point

(endotherms)

- ectotherms will seek out a warmer
environment when INFECTED !!

Animal's Response to Stimuli

(6)

(1) Nervous System - limited to cells that connect

(2) ENDOCRINE SYSTEM - limited to cells that have receptors for the hormone

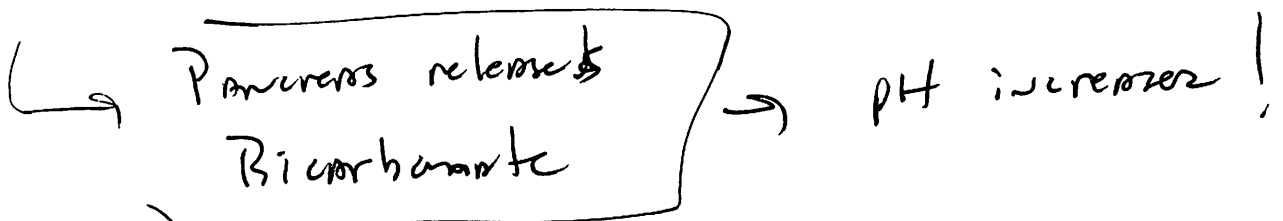
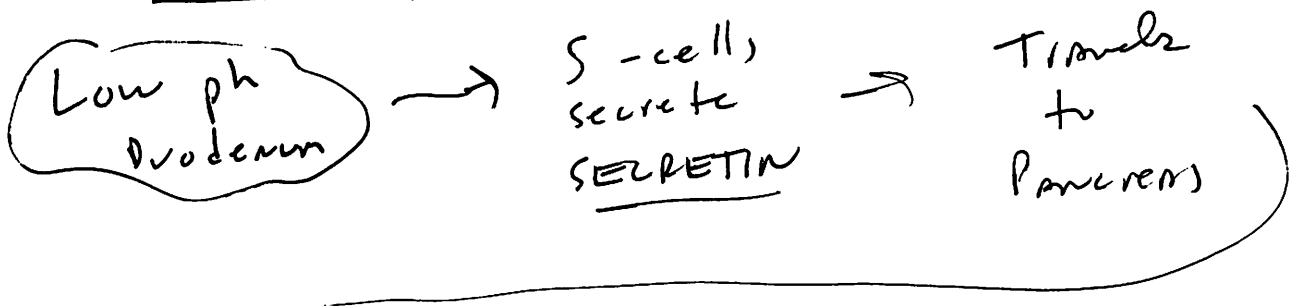
HORMONES

- single location or multiple sites
- act in seconds - remain for minutes/hours.

COORDINATES GRADUAL CHANGES THAT AFFECT ENTIRE BODY

- Growth
- Development
- reproduction
- METABOLIC PROCESSES
- DIGESTION

SIMPLE ENDOCRINE Pathway



(2)

Neuroendocrine Pathway

- rely on a sensor in the nervous system

NERVES → Hypothalamus → pituitary gland

→ hormones released → regulate other glands

→ SUCKLING by infants → OXYTOCIN
(posterior pituitary hormone)

Positive feedback
until stimulus
stops

WATER SOLUBLE HORMONES must bind
to cell-surface receptors because they
cannot pass membrane

⇓
SIGNAL TRANSDUCTION PATHWAY

LIPID SOLUBLE hormones bind to receptors
in cytosol - form a hormone-receptor
complex - and move into nucleus

Testosterone & Estradiol

→ affect Transcription !!

Multiple Effects - same hormone

- Epinephrine (Adrenaline)
 - Adrenal glands (on kidney)
 - fight or flight

Hormone Evolution

- Thyroid Hormone Thyroxine (T_4)
feathers, tadpoles' tails.
- Prolactin - multiple functions
↳ old hormone