

# Overview

<b>Stimulus</b>	<b>-&gt;</b>	<b>Response</b>
- fire/heat	->	perspiration (-)
- food/excess food	->	release insulin (-)
- stress	->	dilate blood vessel (-)
- continual stress	->	increase HR (+)
- labor	->	release oxytocin (+)

**What happens between stimulus & response?**

**What is the homeostatic mechanism?**

**How is the balance restored?**

# Homeostasis - 9 steps

- 1. stimulus**
- 2. stimulus effect on body**
- 3. receptor: receives specific signal**
- 4. afferent transmission: sends signal**
- 5. integration center: processes signal**
- 6. efferent transmission: sends signal**
- 7. effector: effects action**
- 8. response**
- 9. response effect on body**

# 3 Examples

1	heat (-)	food (-)	delivery(+)
2	↑body temp	↑glucose level	↑uterine contractions
3	heat sensors	glucose sensors	uterine sensors
4	sensory nerves	via blood	sensory nerves
5	CNS	CNS	CNS
6	motor nerves	via blood	via blood
7	sweat glands	pancreas	pituitary
8	perspiration	release insulin	release oxytocin
9	↓body temp	↓glucose level	↑uterine contractions

# Body Temp. Homeostasis

4, 5

3

1, 2

8, 9

6, 7

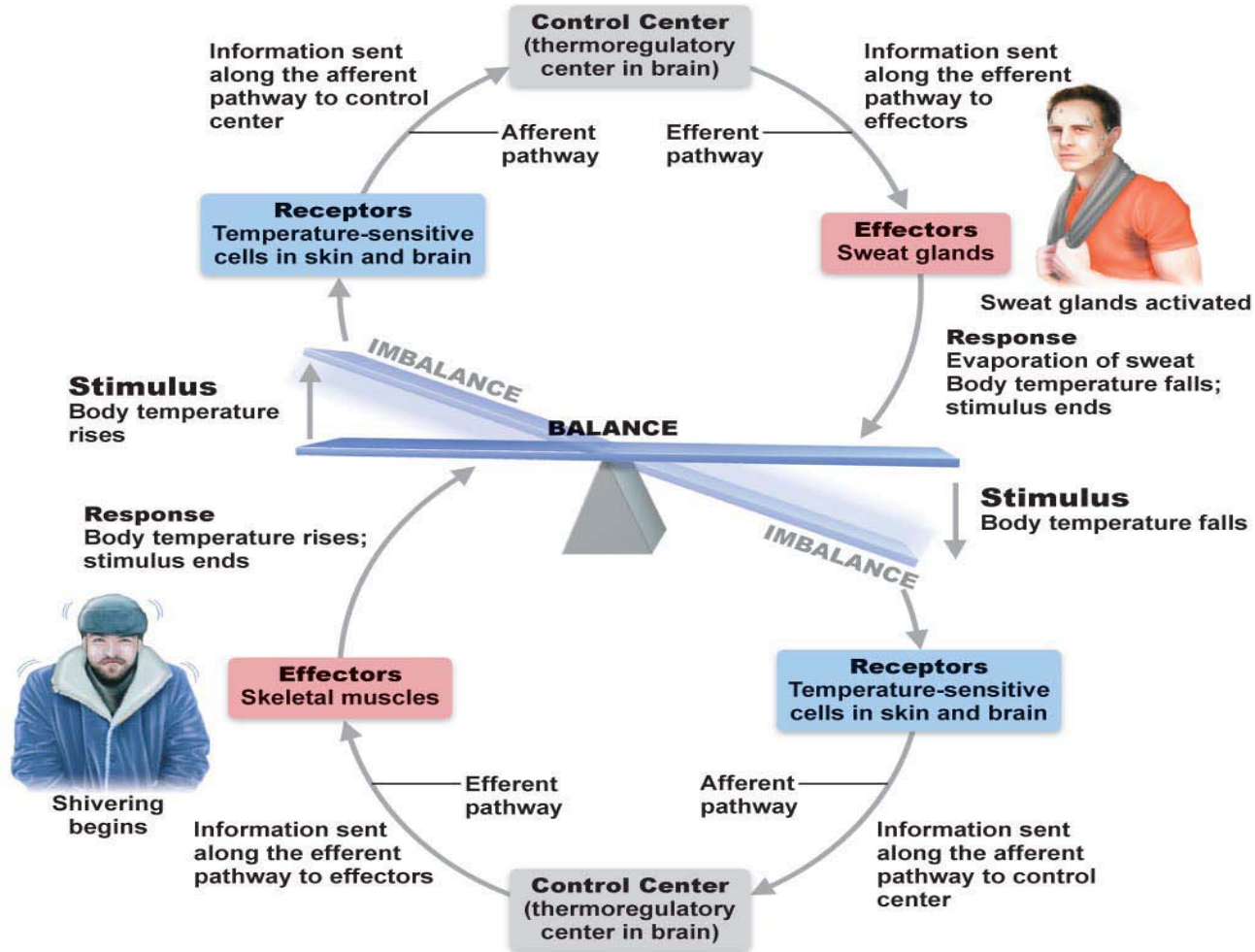
6, 7

8, 9

1, 2

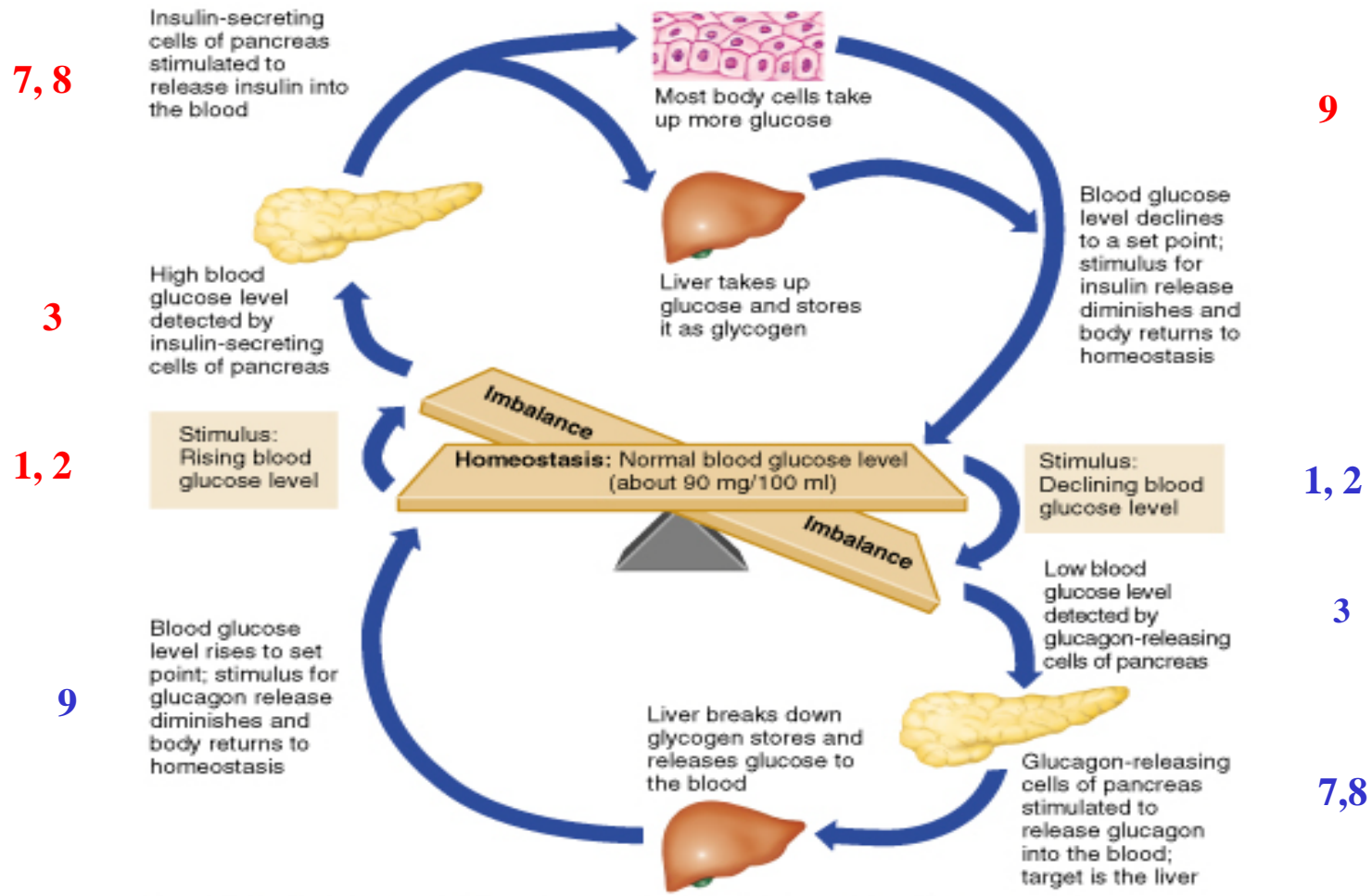
3

4, 5



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# Blood Sugar Homeostasis



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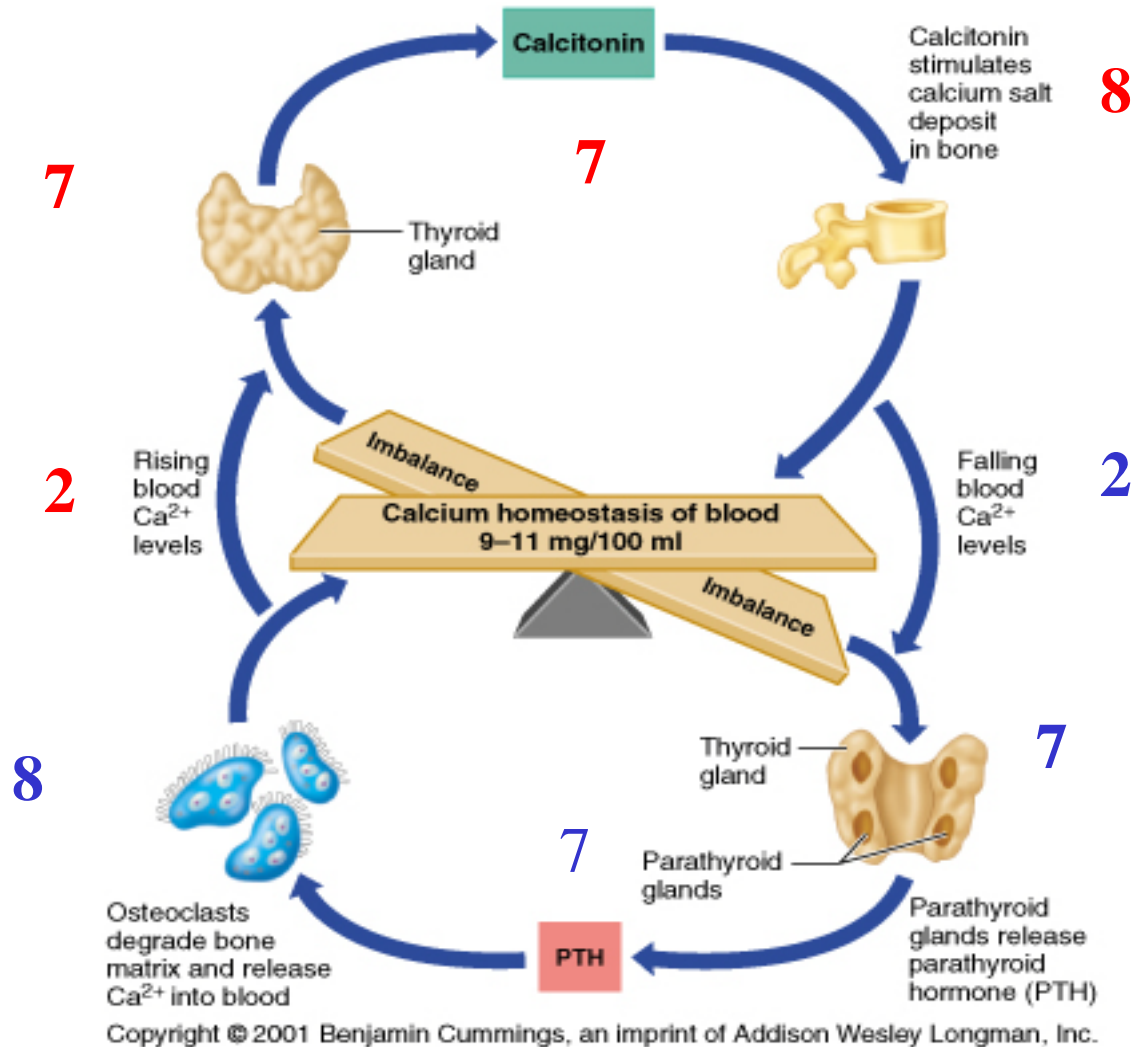
# Bone Homeostasis

**function: maint. 9-11 mg Ca/100 ml blood**

**components:**

- 1) organs: thyroid, parathyroid, pancreas, sex organs**
- 2) cells: osteo-blast, -cyte, clast**
- 3) minerals: Ca, P, Mg, Mn**
- 4) vitamins: D, C, A**
- 5) hormones:**
  - 1) hGH - human growth hormone**
  - 2) estrogen**
  - 3) testosterone**
  - 4) insulin**
  - 5) TH - thyroid hormone**
  - 6) PTH - parathyroid hormone**
  - 7) CT - calcitonin (thyroid)**

# Calcium Homeostasis Diagram



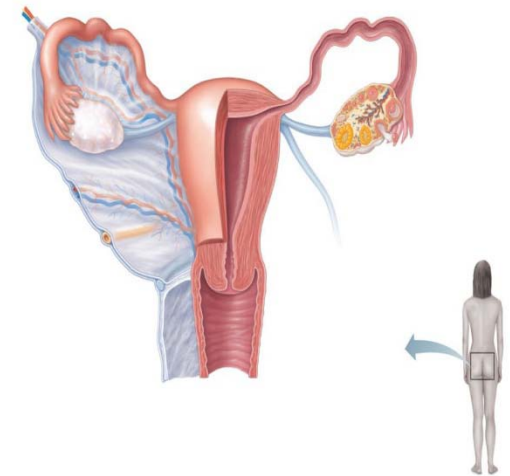
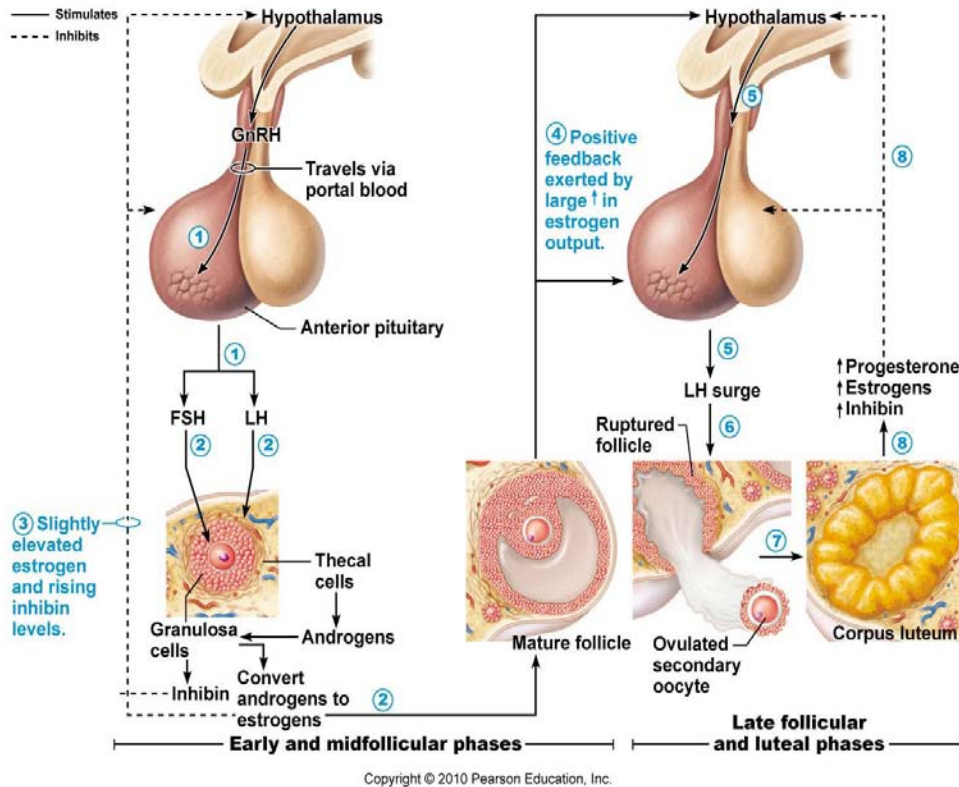
# Calcium Homeostasis Steps

- |    |   |  |
|----|---|--|
| 1. | ↓ Ca diet   | ↑ CA diet  |
| 2. | ↓ Ca in blood   | ↑ Ca in blood  |
| 3. | parathyroid receptors                                   | thyroid receptors                                      |
| 4. | via blood   | via blood  |
| 5. | CNS   | CNS  |
| 6. | via blood   | via blood  |
| 7. | parathyroid → PTH                                       | thyroid → calcitonin                                   |
| 8. | ↑ osteoclast remove Ca<br>(remove Ca → decalcification) | ↓ osteoclast; ↑ osteoblast<br>(add Ca → calcification) |
| 9. | ↑ Ca in blood   | ↓ Ca in blood  |



# Reprod. Homeostasis Diagram

**function: monthly reproductive readiness**



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**4 organs: hypothalamus, pituitary, ovary, uterus**

# Reprod. Homeostasis Steps

<b>1.</b>	<b>poor diet; stress</b>	<b>rich diet; safe environ.</b>
<b>2.</b>	<b>↑ inhibin &amp; ↓ estrogen</b>	<b>↓ inhibin &amp; ↑ estrogen</b>
<b>3.</b>	<b>? receptors</b>	<b>? receptors</b>
<b>4.</b>	<b>via blood</b>	<b>via blood</b>
<b>5.</b>	<b>CNS (hypothal. → ↓ GnRH)</b>	<b>CNS (hypothal. → ↑ GnRH)</b>
<b>6.</b>	<b>hypophyseal-hypothal. tract</b>	<b>hypophyseal-hypothal. tract</b>
<b>7.</b>	<b>pituitary → ↓ FSH &amp; LH</b>	<b>pituitary → ↑ FSH &amp; LH</b>
<b>8.</b>	<b>ovary → ↓ ↓ estrogen</b>	<b>ovary → ↑ ↑ estrogen</b>
<b>9.</b>	<b>↓ reprod. readiness (irregular monthly cycles)</b>	<b>↑ reprod. readiness (regular monthly cycles)</b>

# Effect of Environment on Menstruation

## **a) poor environment (eg poor diet, stress)**

- **ovary releases ↓ estrogen**
- **inhibit hypothalamus → ↓ GnRH**
- **inhibit pituitary → ↓ FSH & LH**
- **ovary → ↓ ↓ estrogen**
- **↓ reproductive ready (irregular cycle)**

## **b) rich environment (eg rich diet, stability)**

- **ovary releases ↑ estrogen**
- **stimulate hypothalamus → ↑ GnRH**
- **stimulate pituitary → ↑ FSH & LH**
- **ovary → ↑ ↑ estrogen**
- **↑ reproductive ready (regular cycle)**

# Individual Variation

**menstruation each month is different for each woman  
each cycle = balance of perceptual and actual factors**

**factors:**

**1) personal readiness**

**- mental, psych., biological state & drives**

**2) environmental readiness**

**- food, shelter, family/group, war, prosperity**

**3) perceptual factors**

**- events as perceived by individual**

**- personal history of each individual**