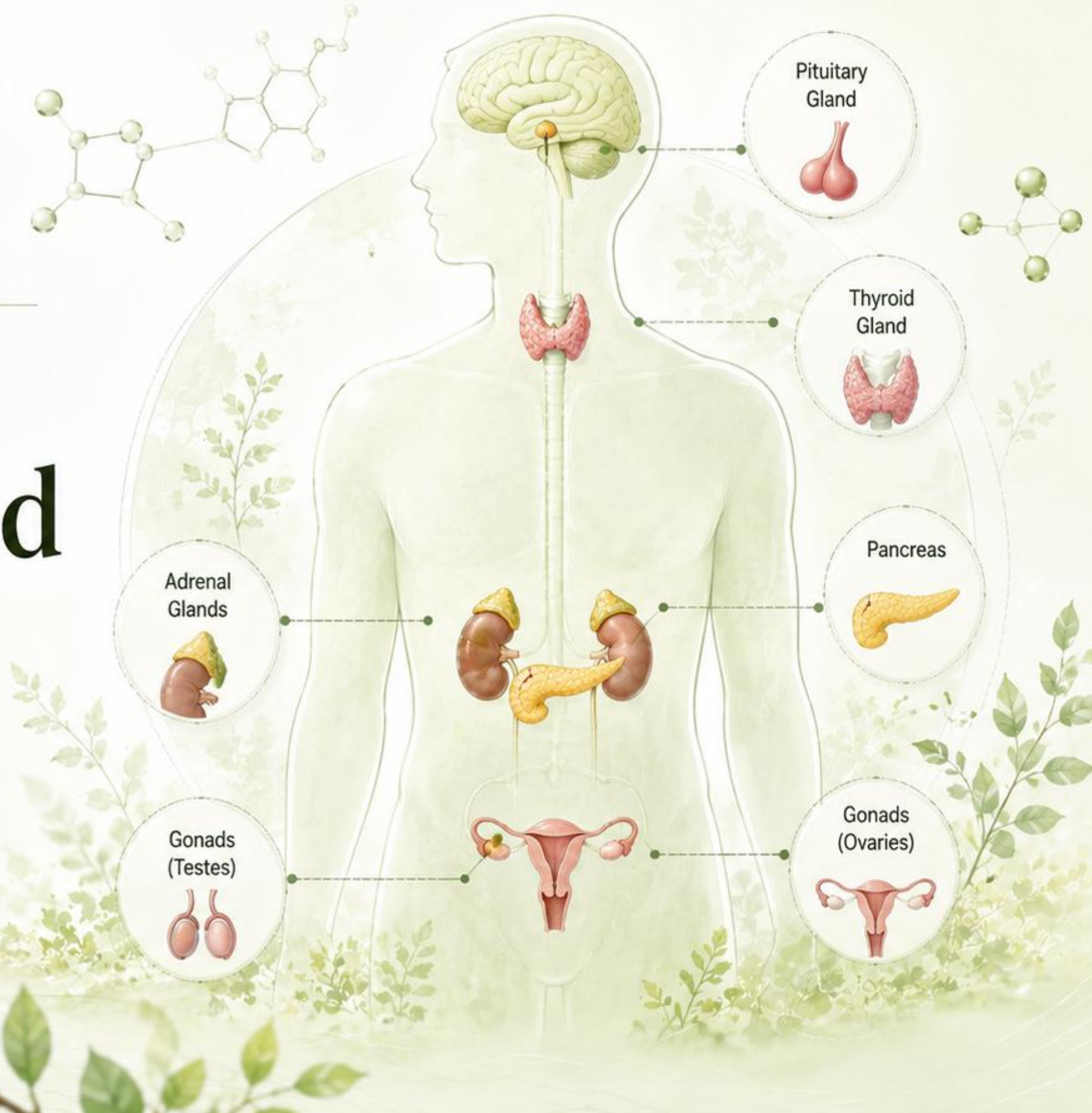


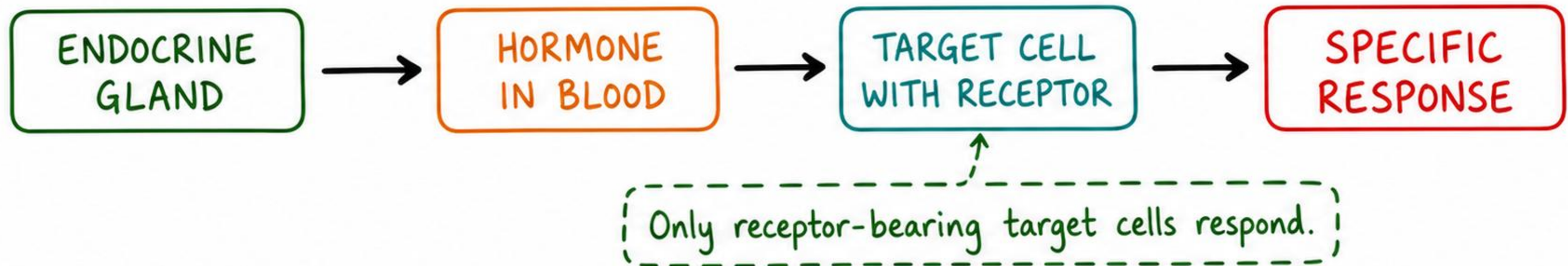
Chapter 19 : Chemical Coordination and Integration

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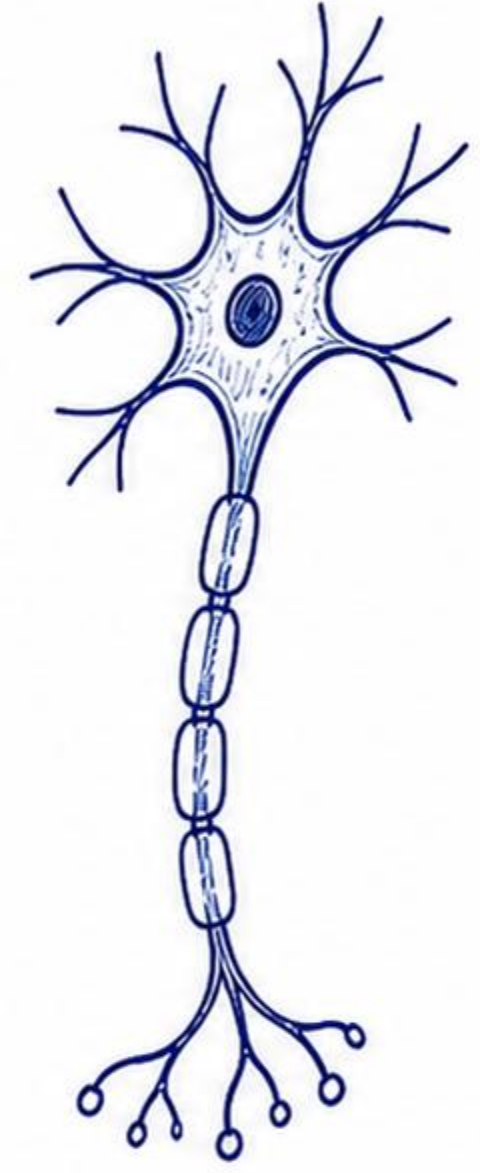


CHEMICAL COORDINATION & HORMONES

- Neural control is fast and point-to-point, but every body cell is not directly innervated.
- Many functions need chemical coordination over wider areas and longer periods.
- Endocrine glands release hormones directly into body fluids and blood.
- HORMONES are non-nutrient chemical messengers produced in trace amounts.
- Hormones coordinate metabolism, growth, development, reproduction and homeostasis.



NEURAL & ENDOCRINE COORDINATION

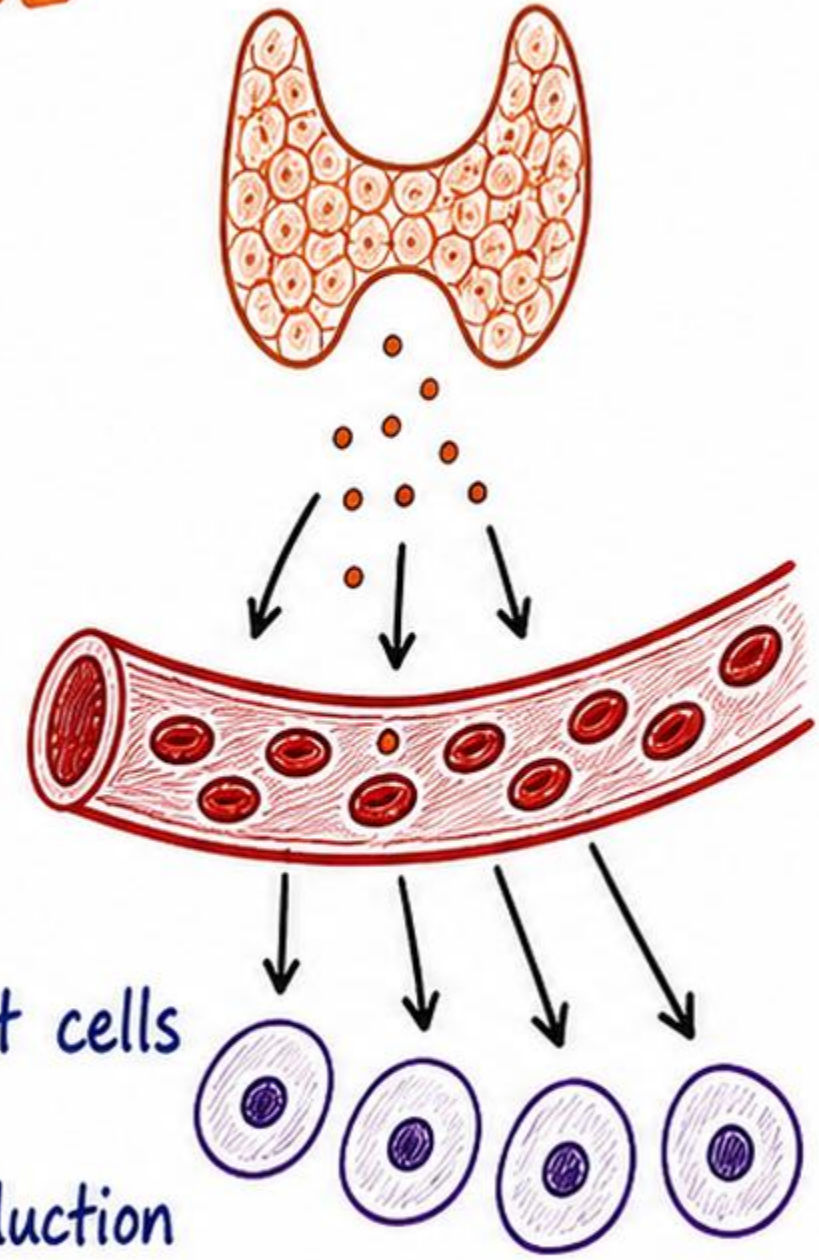


NEURAL CONTROL

- Signal: → electrical impulses + neurotransmitters
- Route: → neurons and synapses
- Speed: → very fast
- Duration: → short-lived
- Reach: → precise, localised target
- Best suited for: → rapid actions

ENDOCRINE CONTROL

- hormones
- blood circulation
- usually slower
- often longer-lasting
- may reach distant target cells
- growth, metabolism, reproduction and long-term regulation



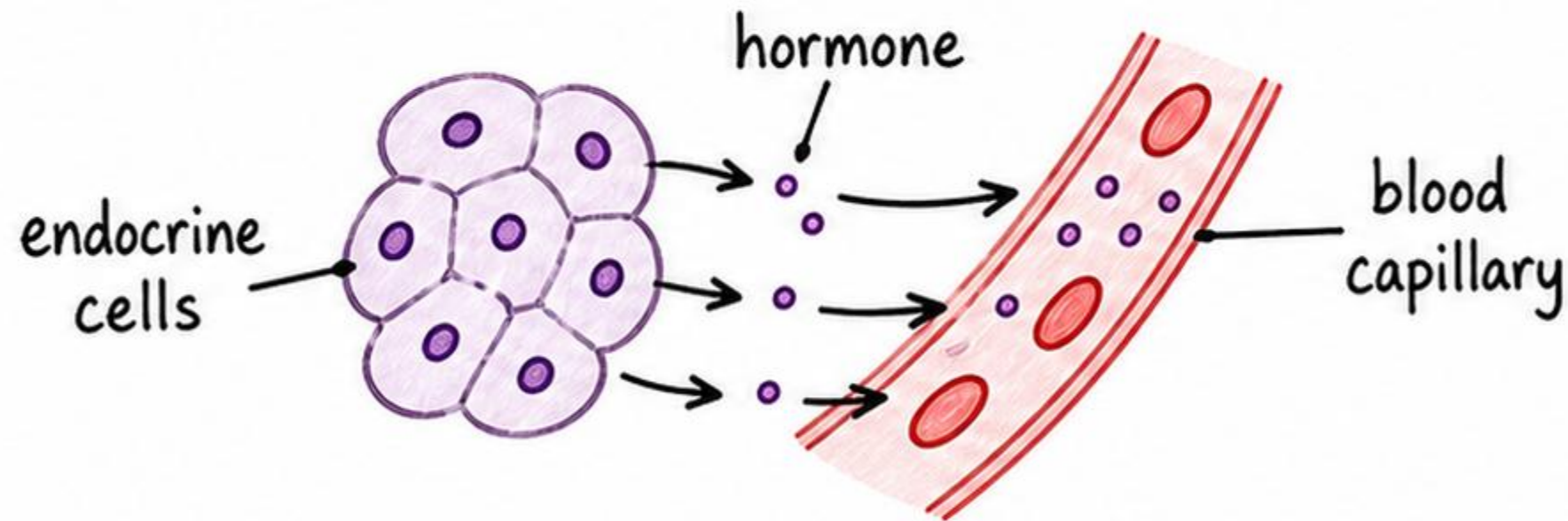
☆ Both systems coordinate body functions and often work together.

ENDOCRINE & EXOCRINE GLANDS

ENDOCRINE (DUCTLESS):

- No ducts.
- Secretions are called hormones.
- Hormones enter interstitial fluid, then blood.
- They act on receptor-bearing target cells.

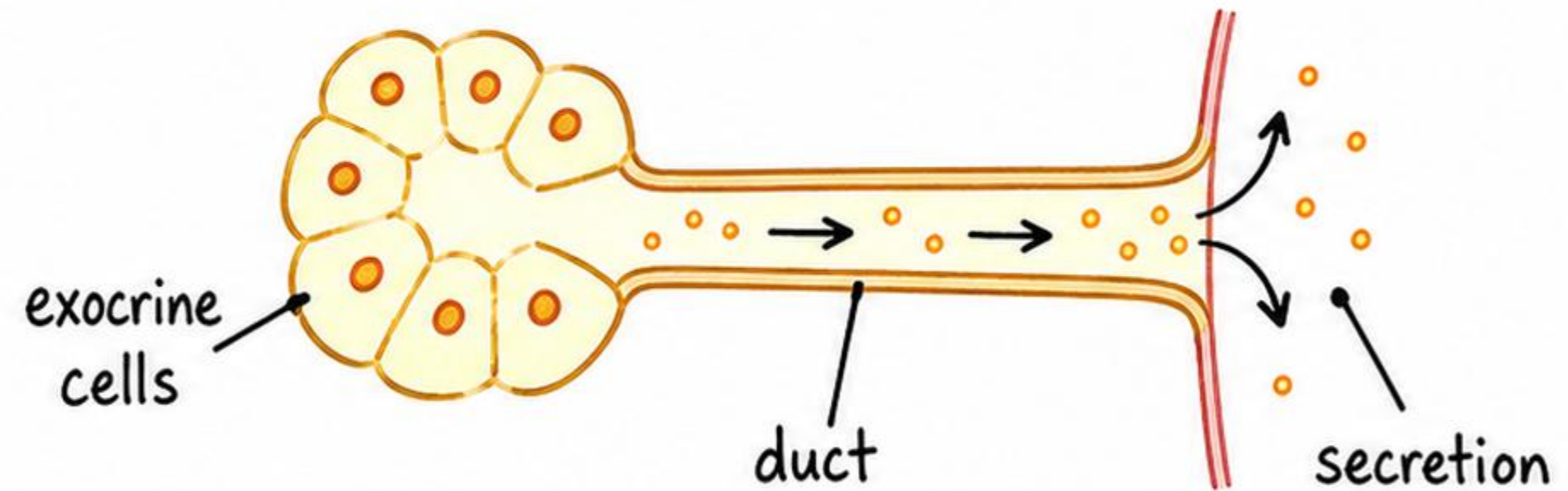
Examples: pituitary, thyroid, adrenal.



EXOCRINE (WITH DUCT):

- Secretions travel through ducts.
- Secretions are released onto a body surface or into a cavity.

Examples: salivary gland, sweat gland, pancreatic acini.

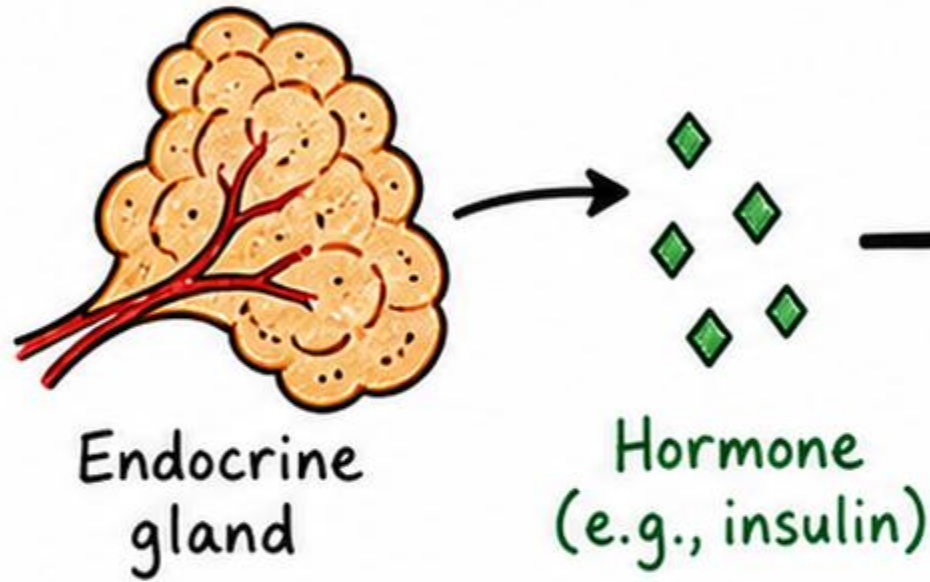


KEY DIFFERENCE: endocrine → blood; exocrine → duct.

HORMONE JOURNEY & TARGET CELLS

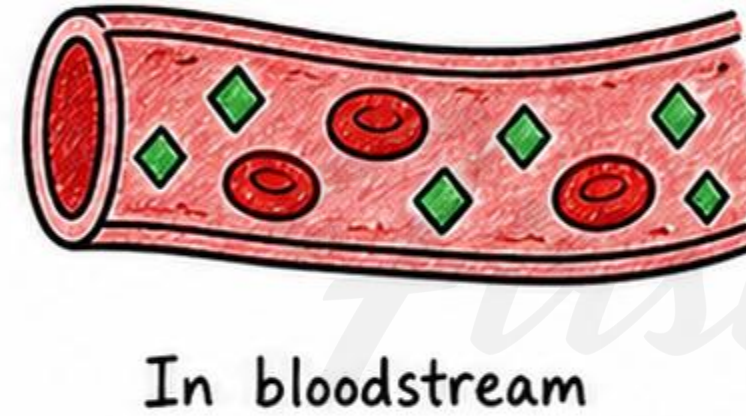
① SECRETION

An endocrine gland releases a hormone.



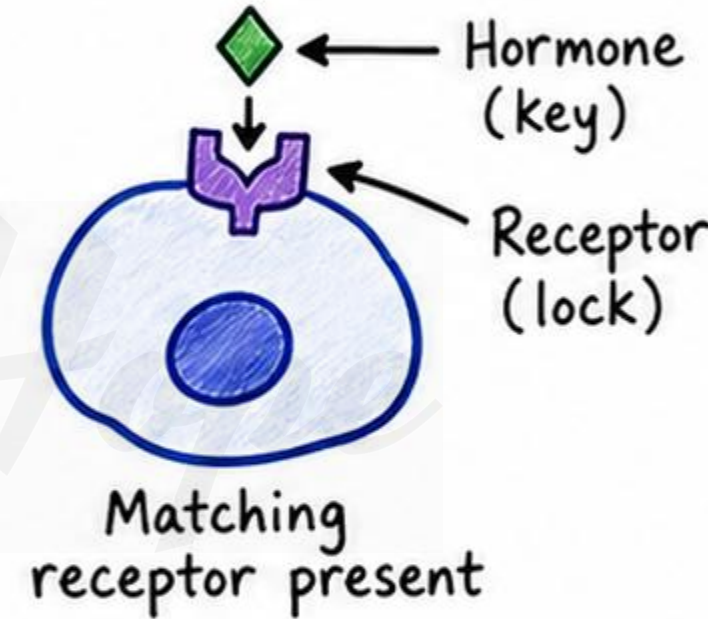
② TRANSPORT

The hormone enters blood and circulates through the body.



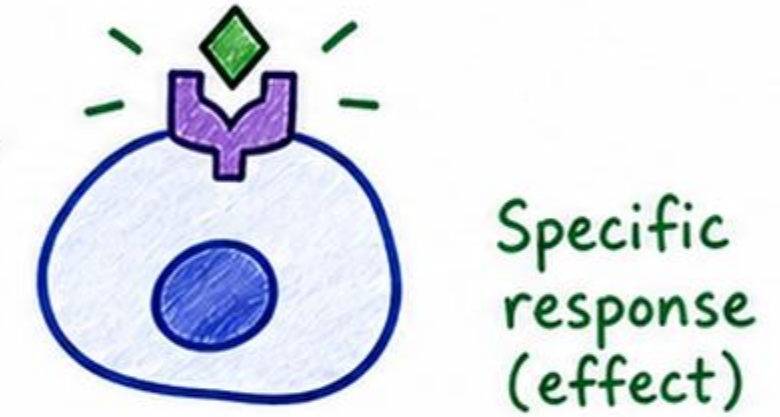
③ RECOGNITION

Only a cell with the matching receptor binds the hormone.

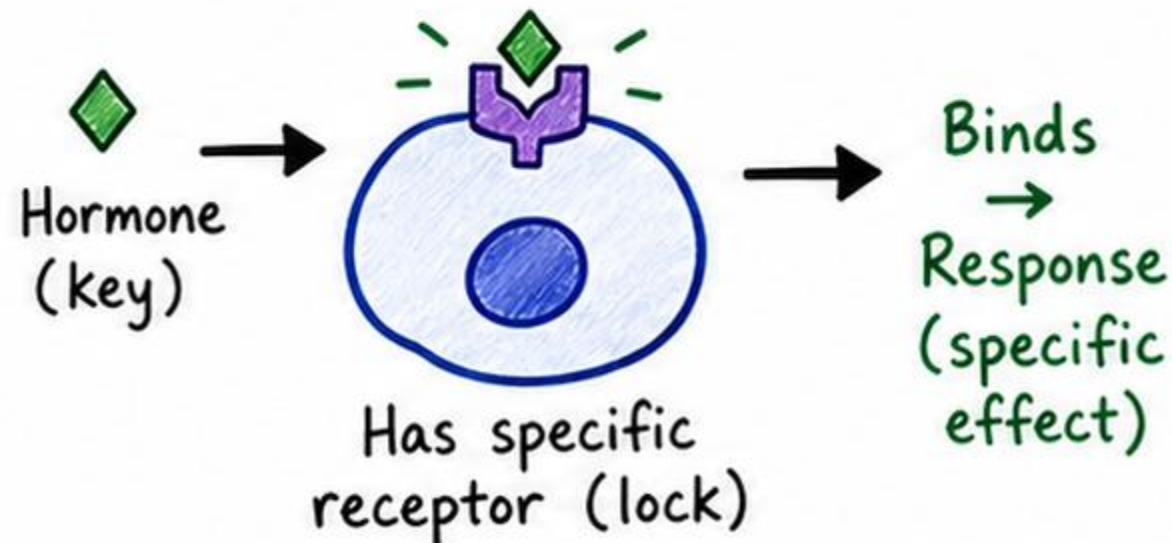


④ RESPONSE

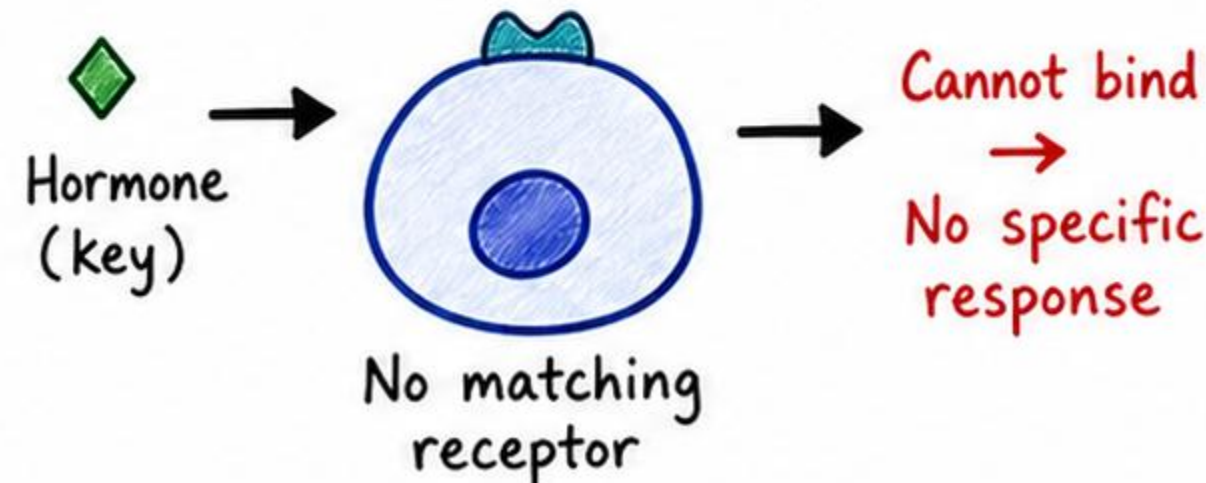
The hormone-receptor interaction produces a specific effect.



TARGET CELL



NON-TARGET CELL



- ① Hormones act in very small amounts.
- ② Blood may carry a hormone widely, but receptor distribution determines its effect.
- ③ One hormone may act on several tissues if they carry its receptor.



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