Chemical messengers

Presented by –

Deepak Kumar Kashyap

D. P. Vipra college

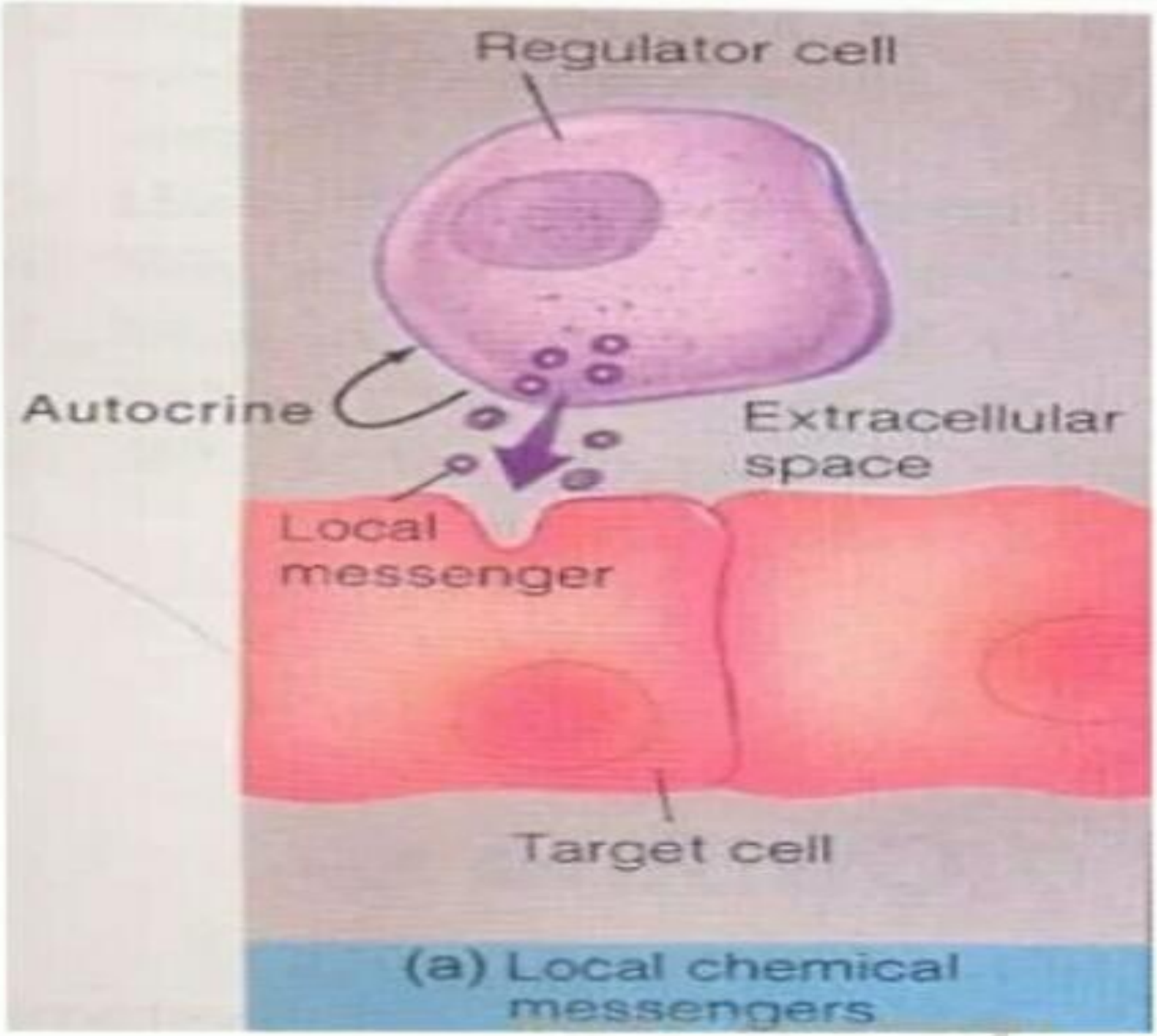
Bilaspur

Chemical Messengers

- **Definition:**
- **Chemical messengers are molecules that specialized cells synthesize and secrete.**

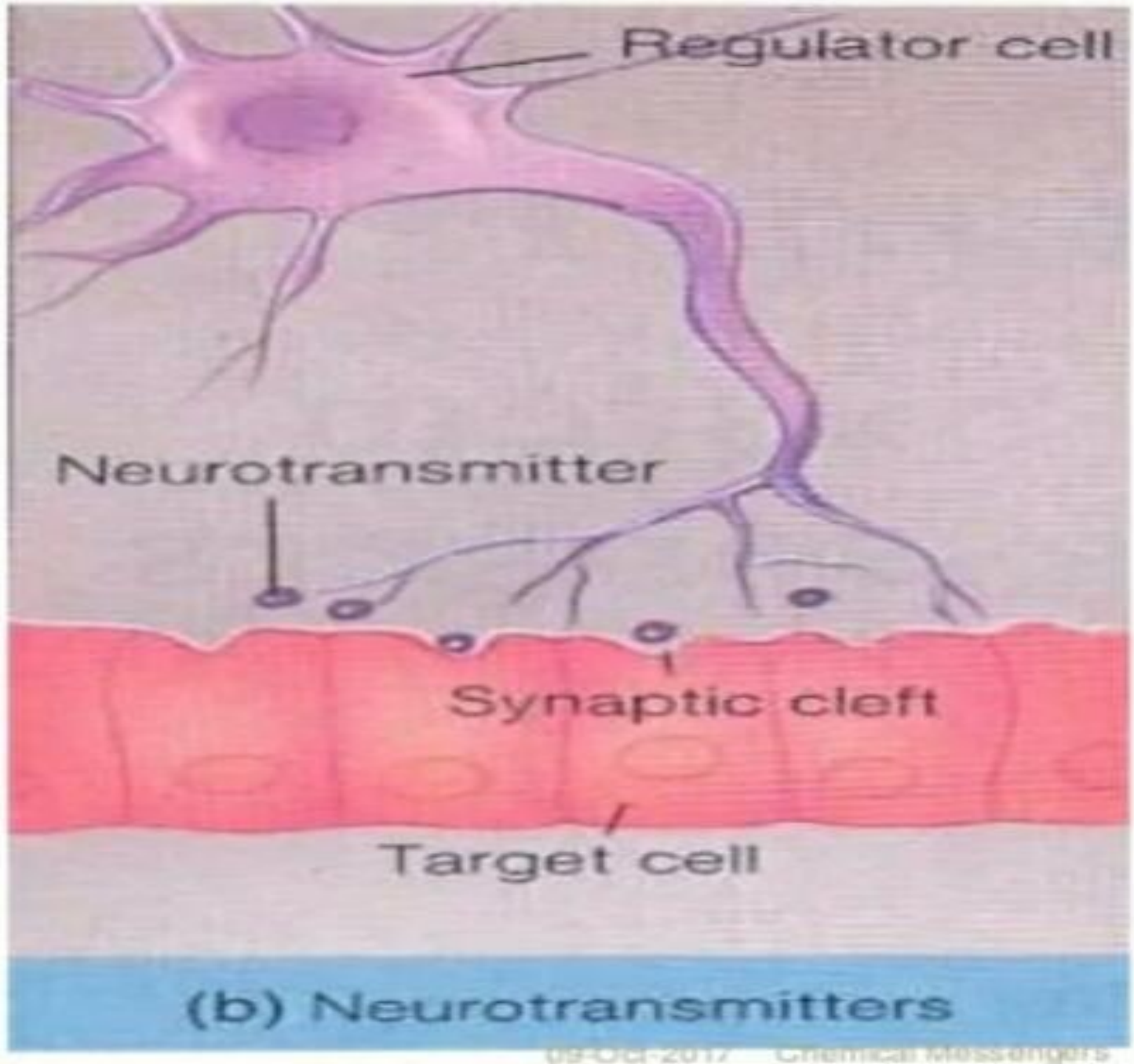
Local chemical messengers

- Many cells secrete chemicals that alter physiological conditions in the immediate vicinity.
- Most of these chemicals act on the same cell (autocrine agents) or adjacent cells (paracrine agents) and do not accumulate in the blood.
- Vertebrate examples include some of the chemicals called lumones that the gut produces and that help regulate digestion. In a wound, mast cells secrete a substance called histamine that participates in inflammatory response.


Regulator cell
Autocrine
Extracellular space
Local messenger
Target cell
(a) Local chemical messengers

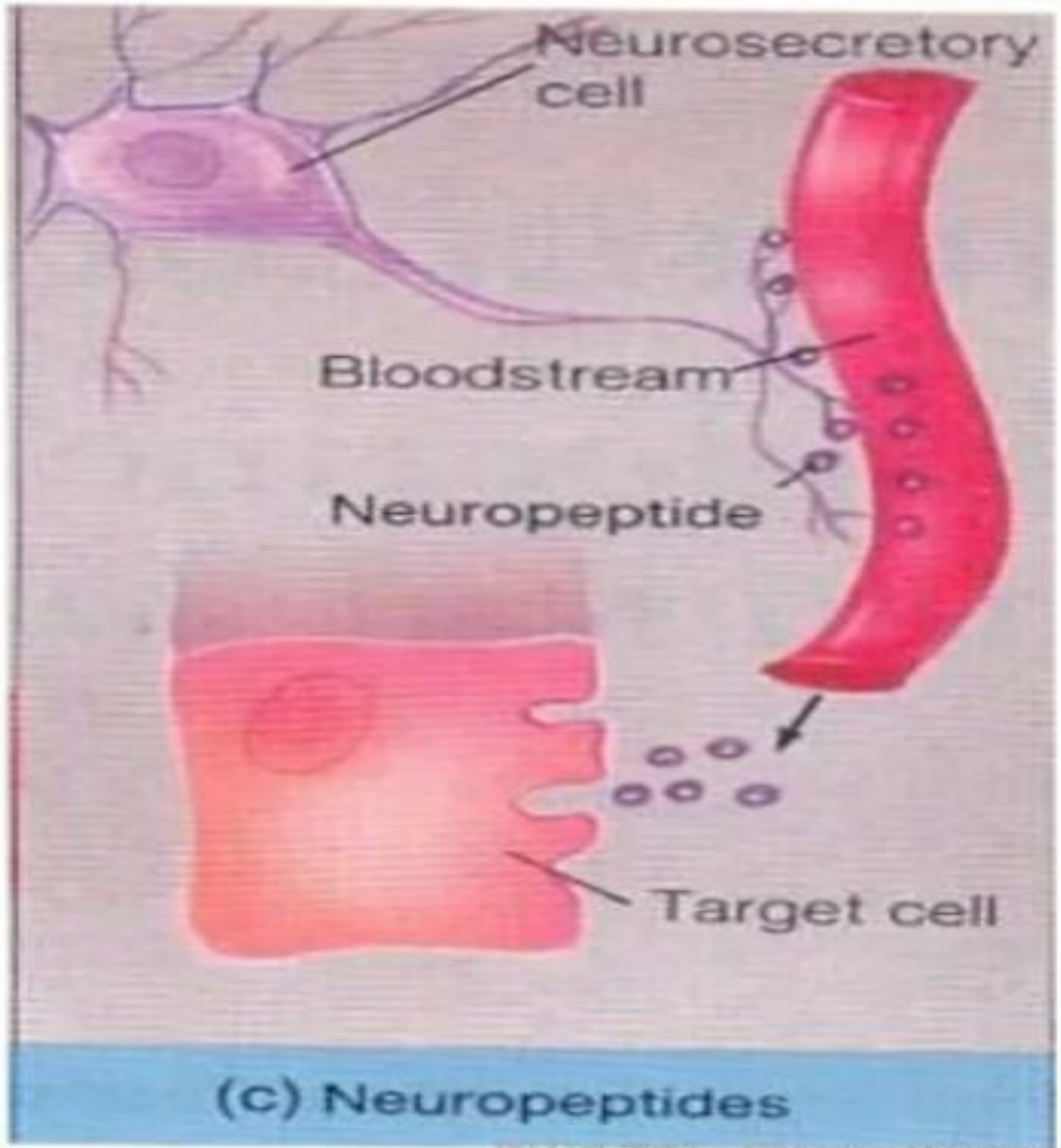
Neurotransmitters

- Neurons secrete chemicals called neurotransmitters (e.g., nitric oxide and acetylcholine) that act on immediately adjacent target cells.
- These chemical messengers reach high concentrations in the synaptic cleft, act quickly, and are actively degraded and recycled.
- Ex: Acetylcholine : causes contraction of skeletal muscles.


Regulator cell
Neurotransmitter
Synaptic cleft
Target cell
(b) Neurotransmitters

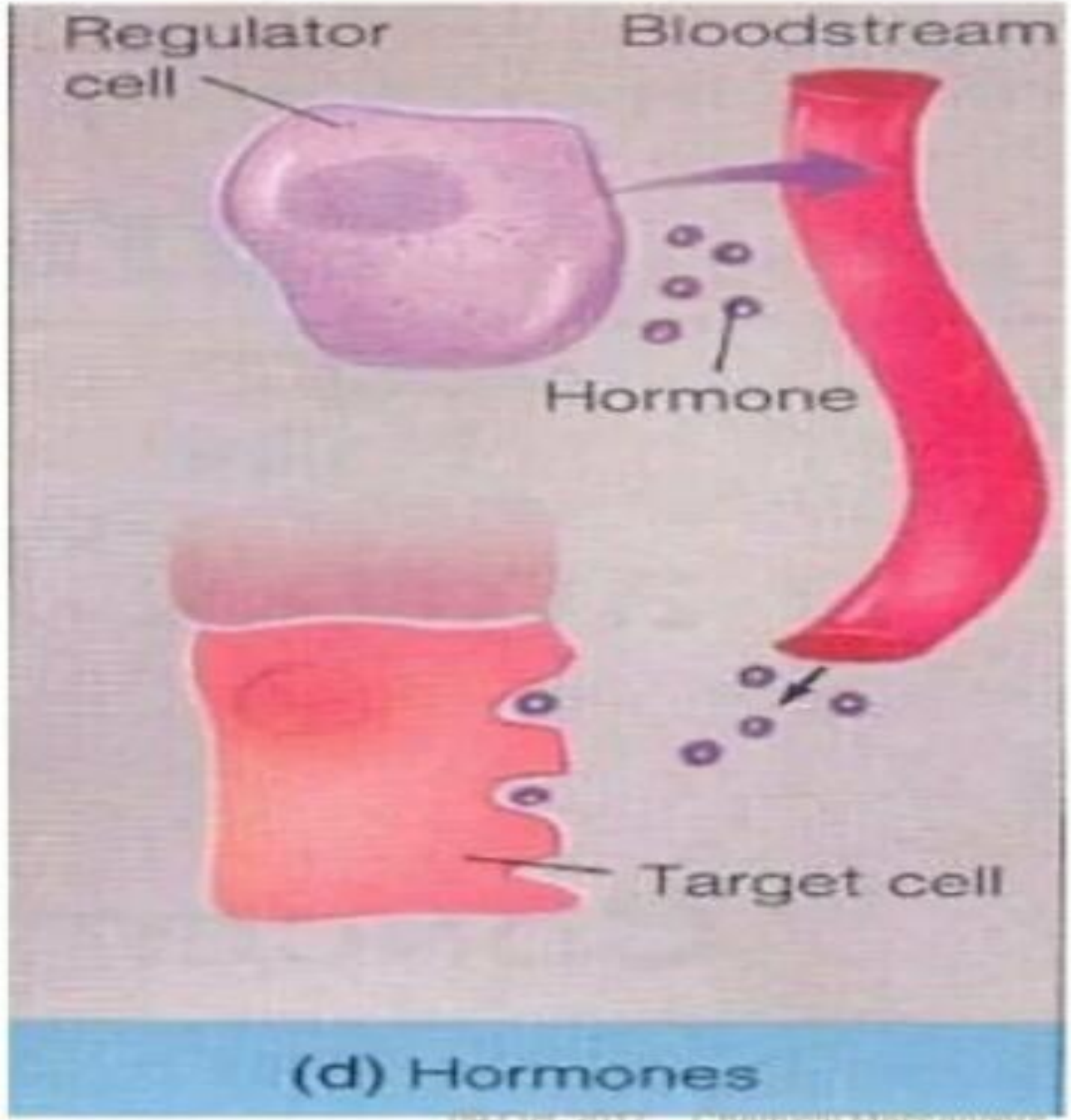
Neuropeptides

- Some specialized neurons (called neurosecretory cells) secrete neuropeptides (neurohormones).
- The blood or other body fluids transport neuropeptides to nonadjacent target cells, where neuropeptides exert their effects (figure).
- In mammals, for example, certain nerve cells in the hypothalamus release a neuropeptide that causes the pituitary gland to release the hormone oxytocin, which induces powerful uterine contractions during the delivery of offspring.


Neurosecretory cell
Bloodstream
Neuropeptide
Target cell
(c) Neuropeptides

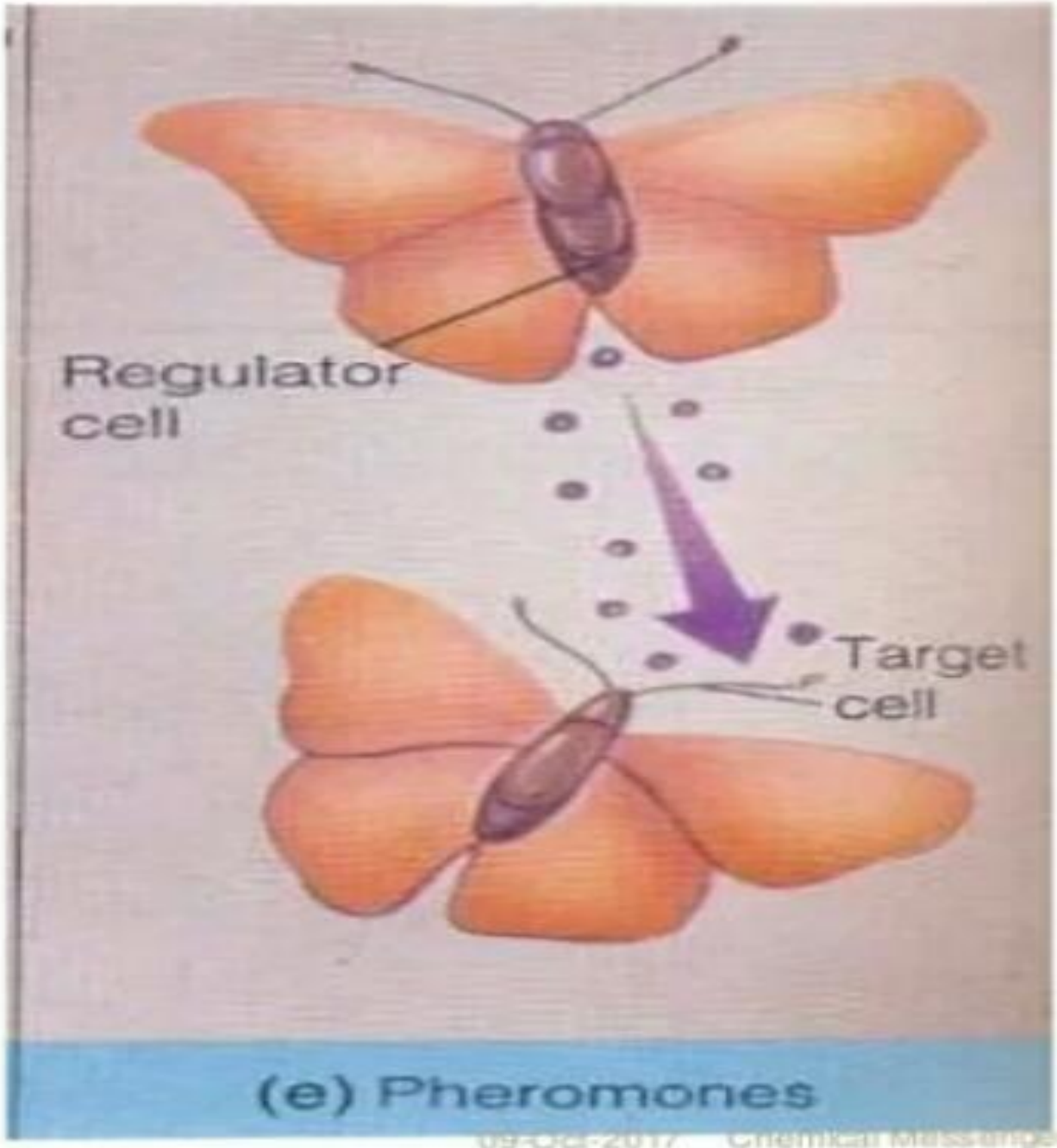
Hormones

- Endocrine glands or cells secrete hormones that the bloodstream transports to nonadjacent target cells (figure).
- Ex: Insulin is secreted by pancreas and regulates energy metabolism.


Regulator cell
Bloodstream
Hormone
Target cell
(d) Hormones

Pheromones

- Pheromones are chemical messengers released to the exterior of one animal that affect the behavior of another individual of the same species.


Regulator cell
Target cell
(e) Pheromones

Thank-you