PHARM.D • YEAR 3

Pharmaceutical Formulations

CHAPTER 7

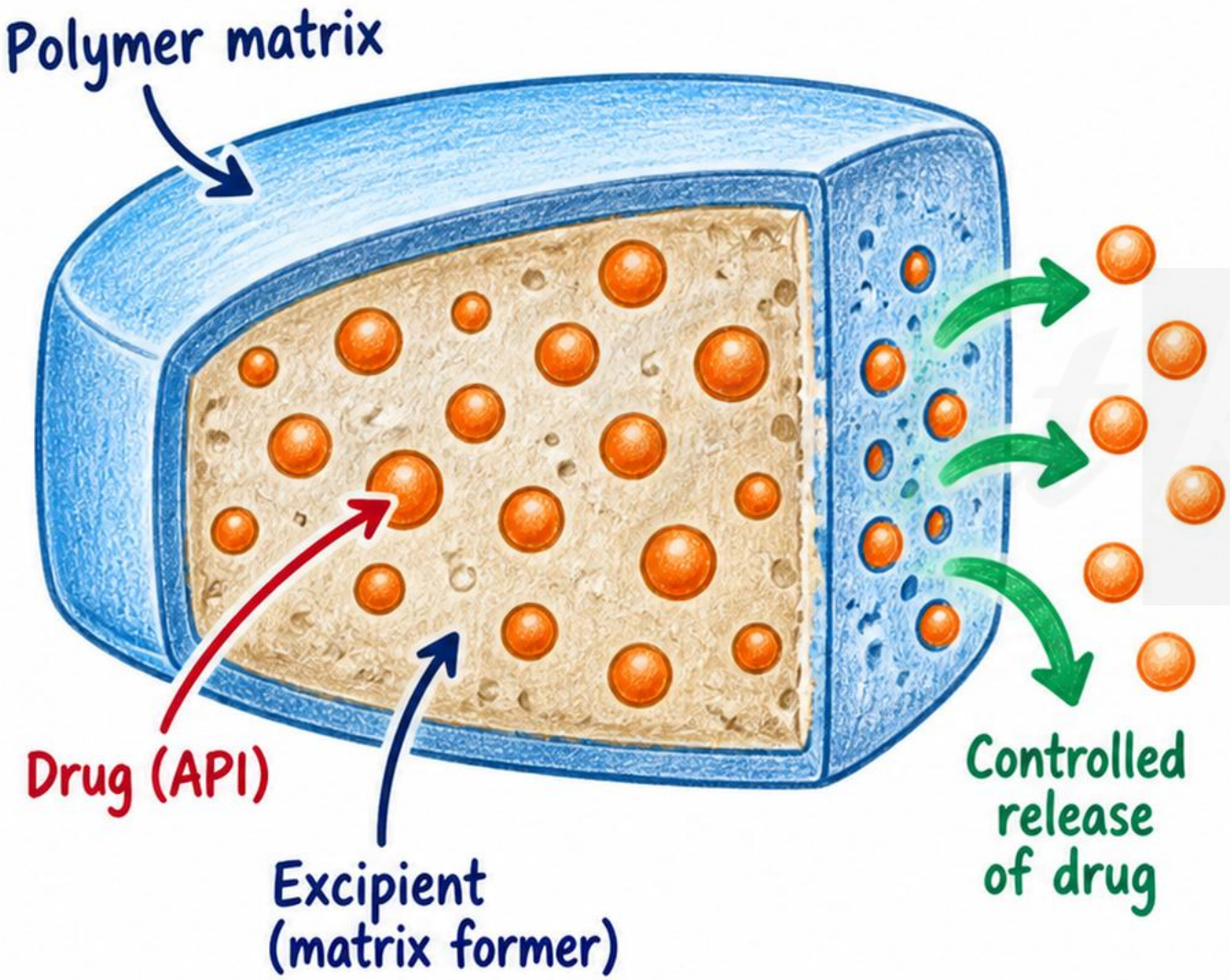
Controlled and Novel Drug Delivery Systems

PPT CHAPTER COVER

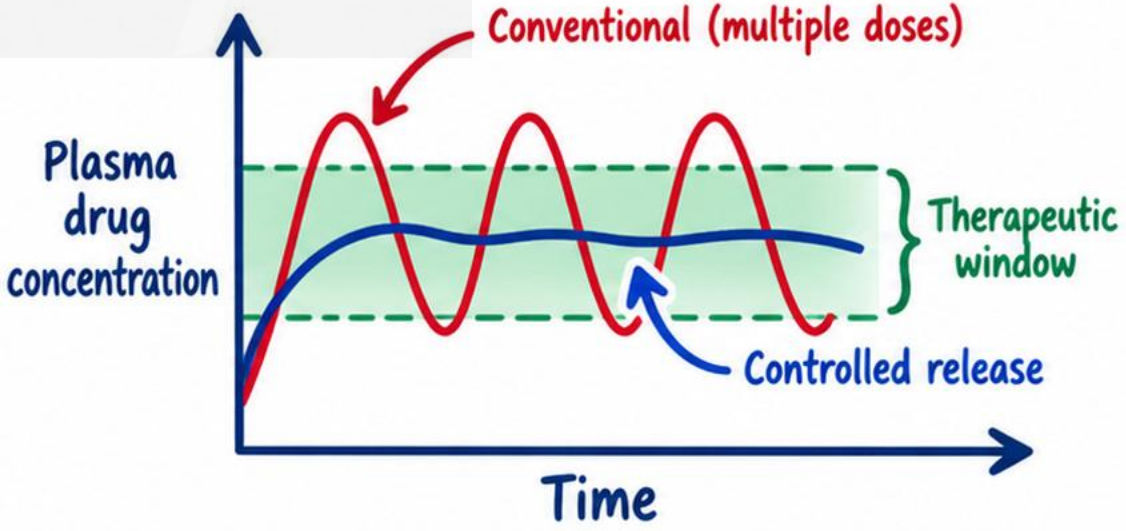


DOCTOR OF PHARMACY

CONTROLLED DRUG DELIVERY – CORE CONCEPT

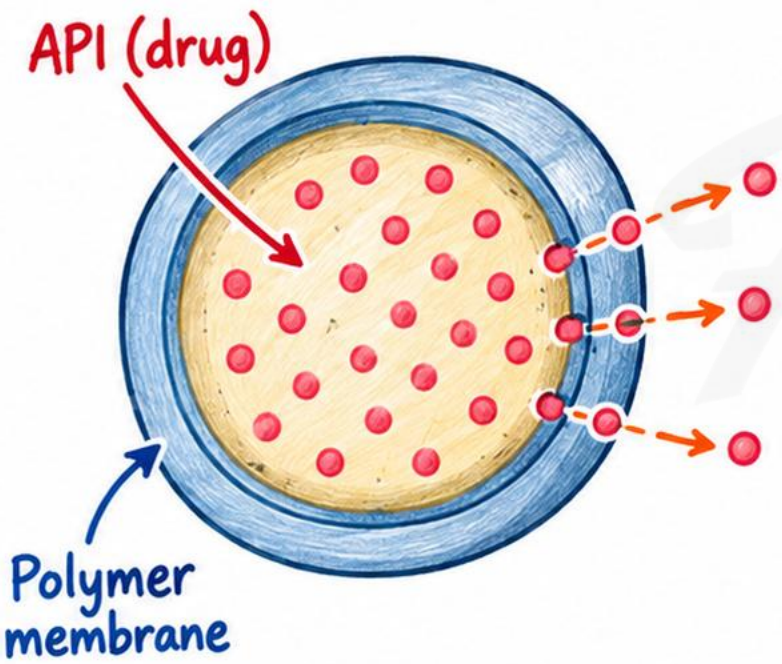


1. Delivers drug at a predetermined rate for a defined period.
2. Maintains plasma levels within therapeutic window.
3. Reduces peaks, troughs and dosing frequency.



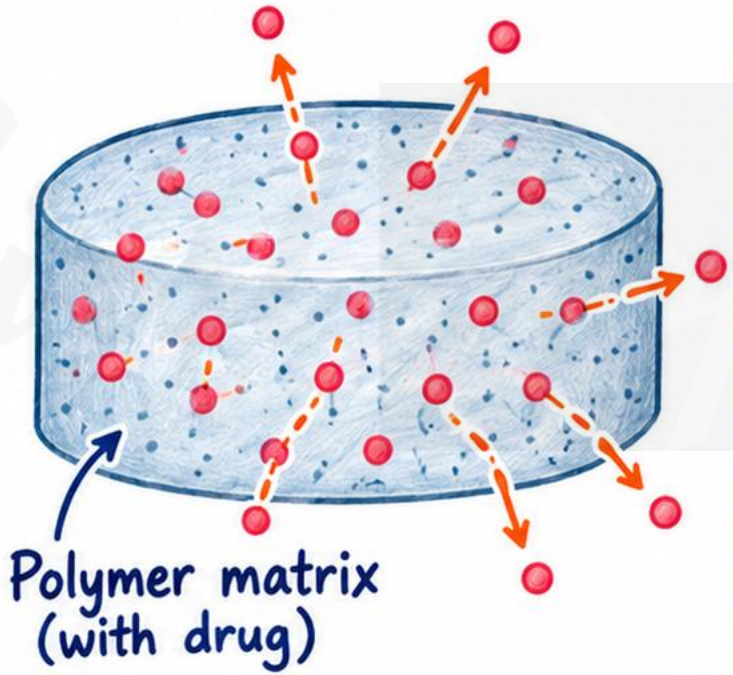
CONTROLLED-RELEASE MECHANISMS I

1. RESERVOIR
(Diffusion-controlled)



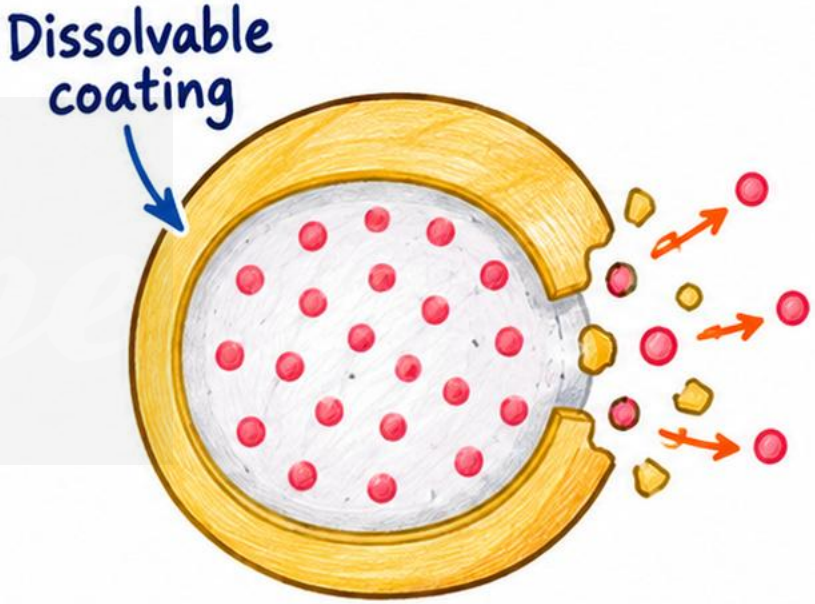
Drug diffuses through a rate-controlling polymer membrane from a core (reservoir).

2. MATRIX
(Diffusion-controlled)



Drug diffuses through a polymer matrix.

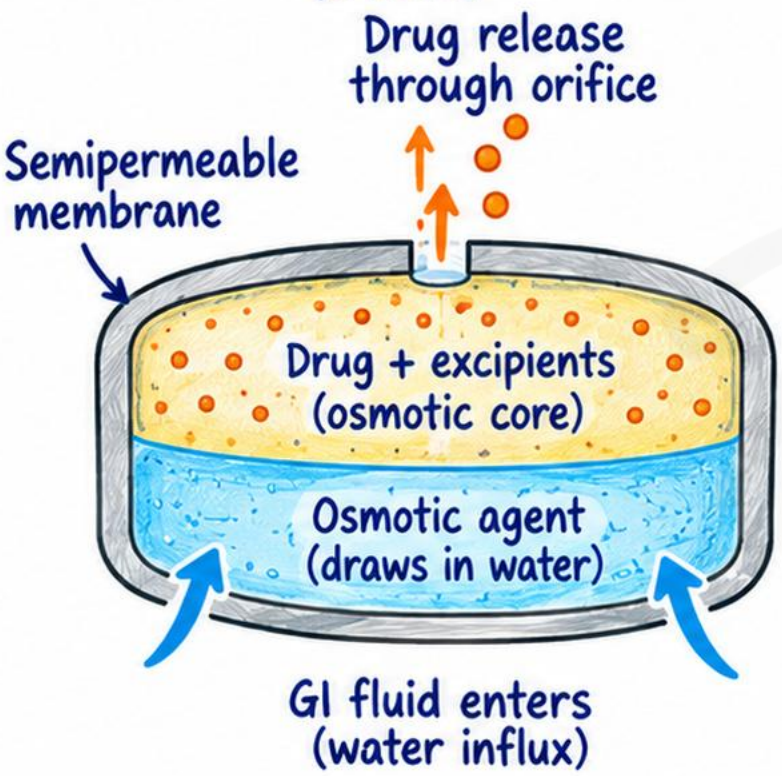
3. DISSOLUTION-CONTROLLED
(Coated system)



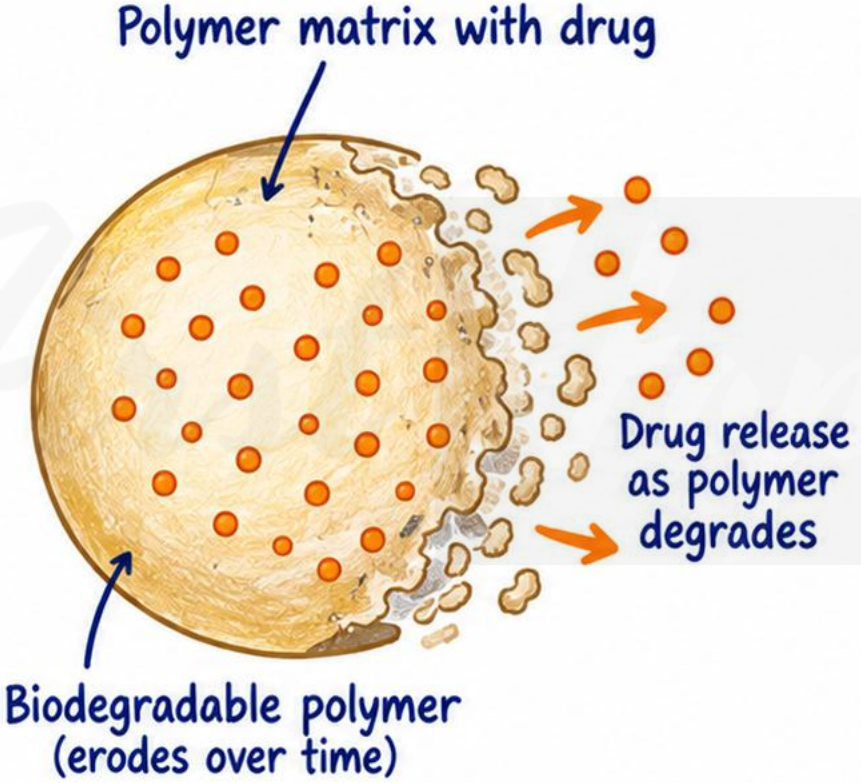
Drug release is controlled by dissolution of the drug or its coating.

CONTROLLED-RELEASE MECHANISMS II

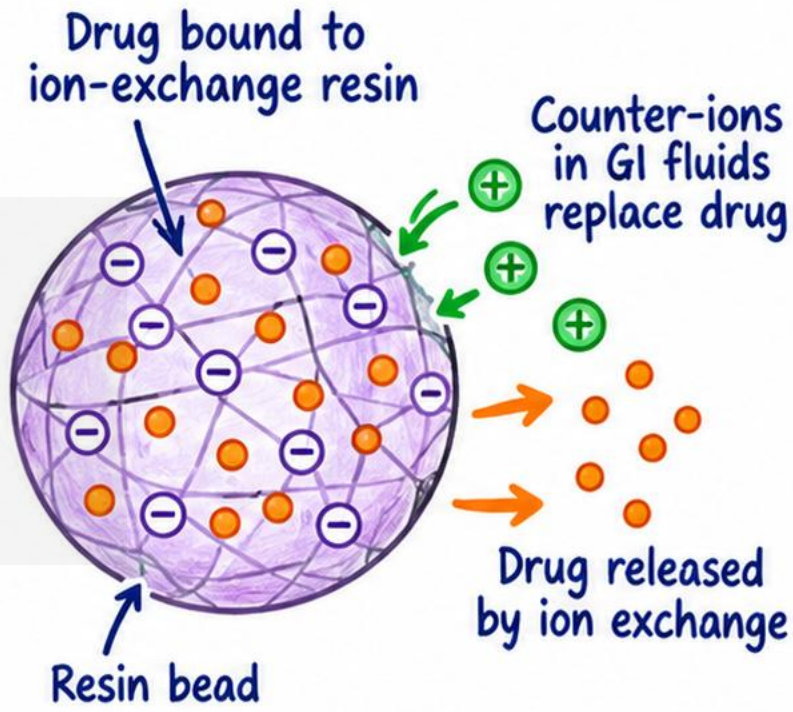
1. OSMOTIC PUMPING (OROS)



2. BIODEGRADABLE SYSTEMS



3. ION-EXCHANGE SYSTEMS



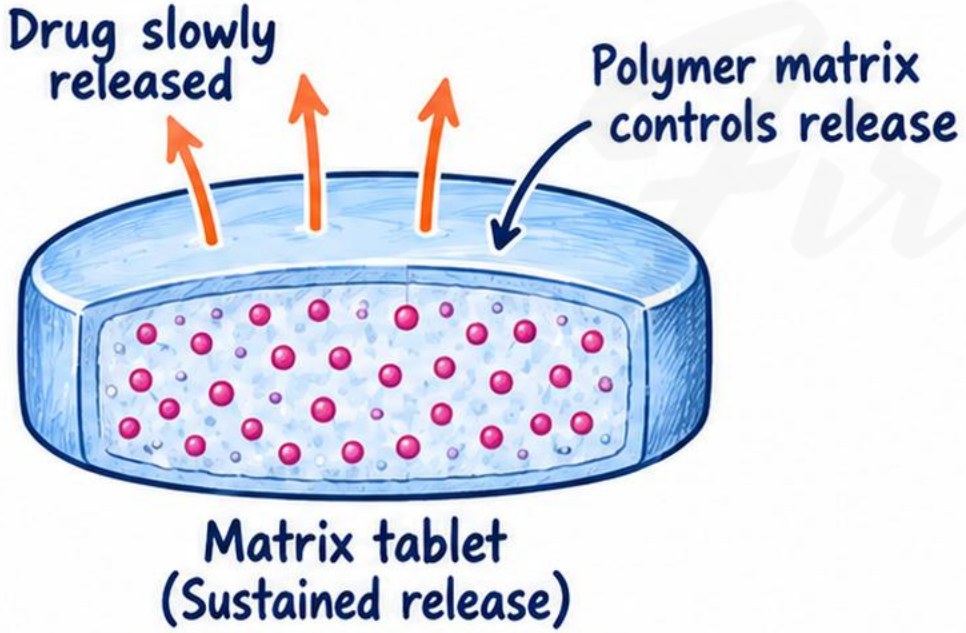
EXAM FOCUS:

- **Osmotic:** water influx drives release (e.g. OROS).
- **Biodegradable:** polymer erosion releases drug.
- **Ion exchange:** GI ions replace bound drug.

NOVEL DRUG DELIVERY SYSTEMS

CONTROLLED DDS (CDDS)

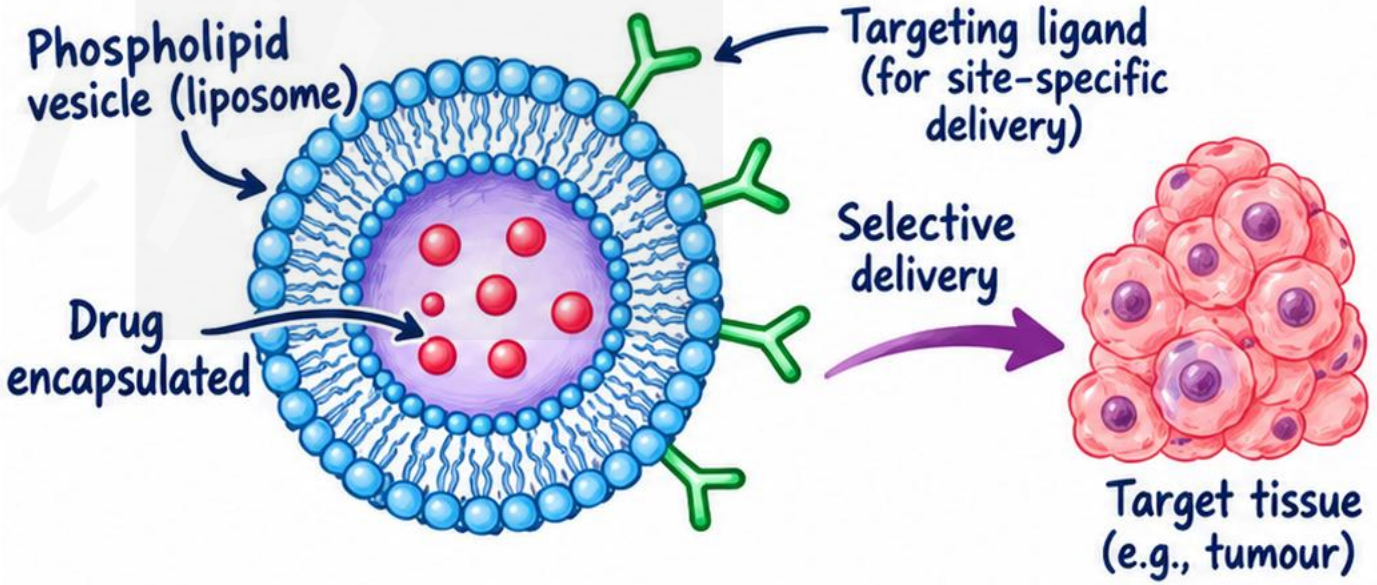
Controls rate and duration of drug release.



- Less route-specific
- Limited targeting

NOVEL DDS (NDDS)

Targeted, site-specific and stimulus-responsive delivery using vesicles, particles, implants and device–drug combinations.



- Specific targeting (e.g., anti-cancer drugs to tumours)
- Site-specific or environment-sensitive release (e.g., pH-sensitive polymers)
- Use of nanotechnology (liposomes, nanoparticles, etc.)

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