SNS COLLEGE OF PHARMACY AND HEALTH SCIENCES

Affiliated To The Tamil Nadu Dr. MGR Medical University, Chennai
Approved by Pharmacy Council of India, New Delhi.
Coimbatore -641035

COURSE NAME : NOVEL DRUG DELIVERY SYSTEM (BP 706 T)

VII SEM / IV YEAR

UNIT -2

TOPIC 2 :IMPLANTS AND OSMOTIC PUMPS

Advanced Drug Delivery Systems: Implants and Osmotic Pumps

Implants

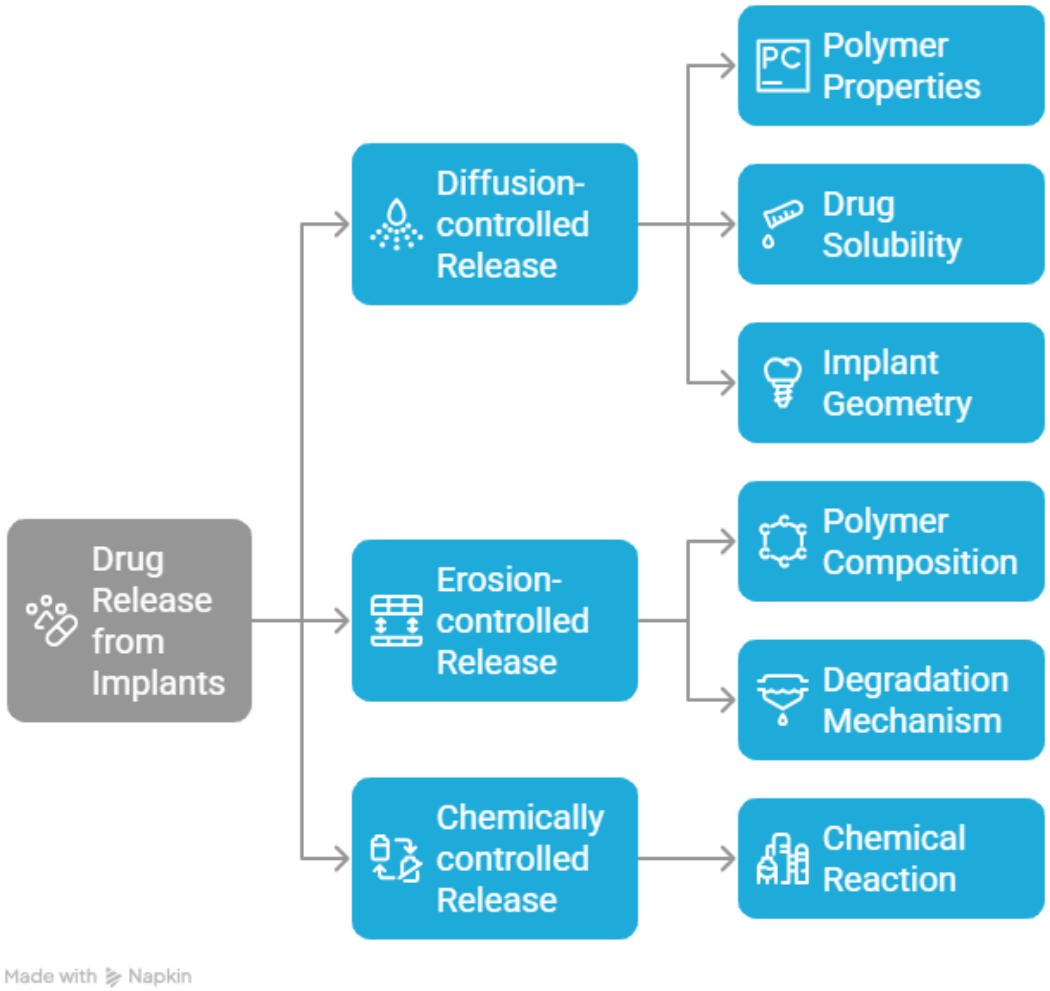
Solid or semi-solid devices for drug release

Osmotic Pumps

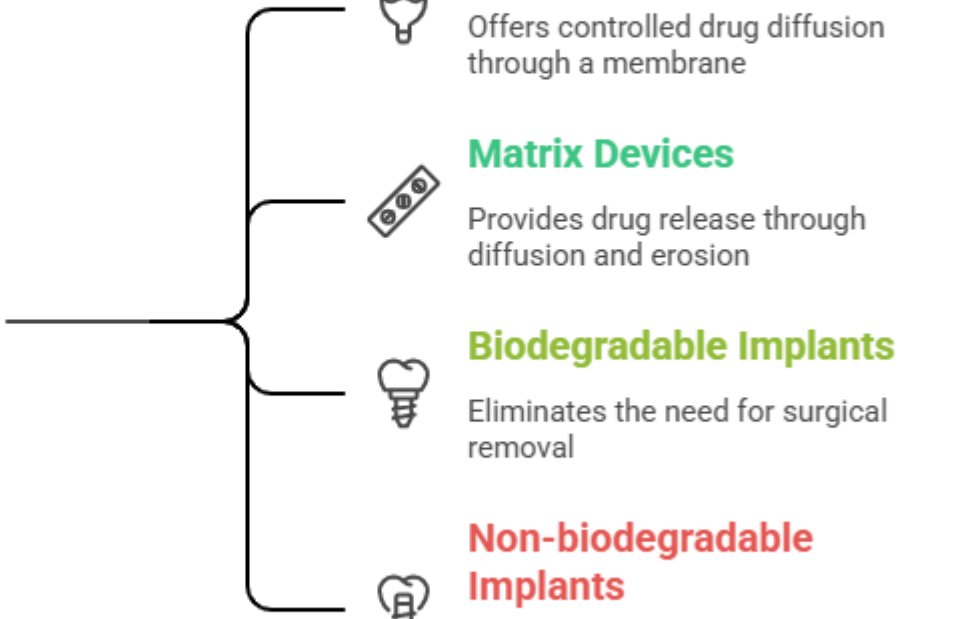
Osmotic pressure-driven drug delivery

Made with Napkin

Drug Release Mechanisms from Implants



Which type of implant should be used for drug delivery?



Osmotic Pump Drug Delivery Cycle

Drug Release

Drug solution is expelled at a controlled rate

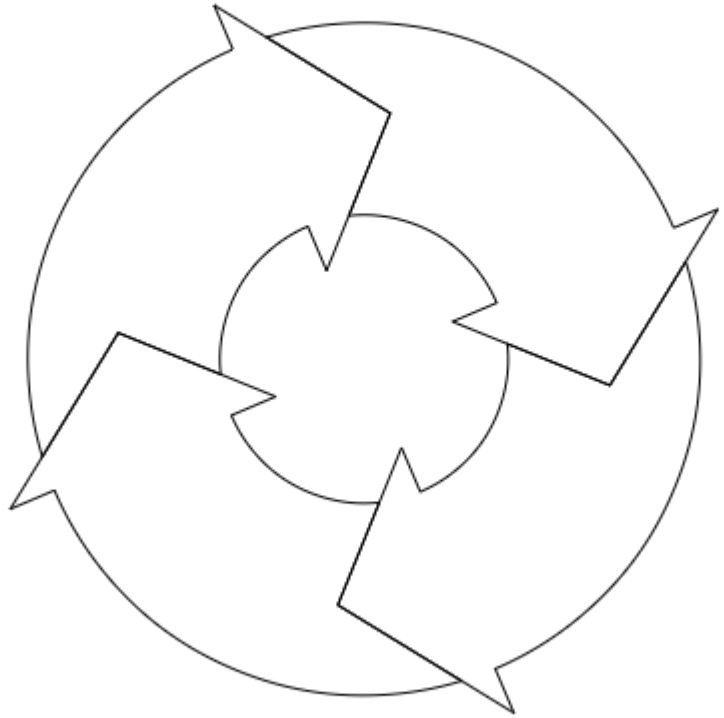
Water Permeation

Water enters through the membrane

Pressure Buildup

Pressure increases in the osmotic compartment

Osmotic Pump Cycle



Osmotic Agent Dissolution

Osmotic agent dissolves, maintaining pressure.

Drug Release

Drug solution is pushed out of the orifice.

Water Influx

Water enters the osmotic compartment.

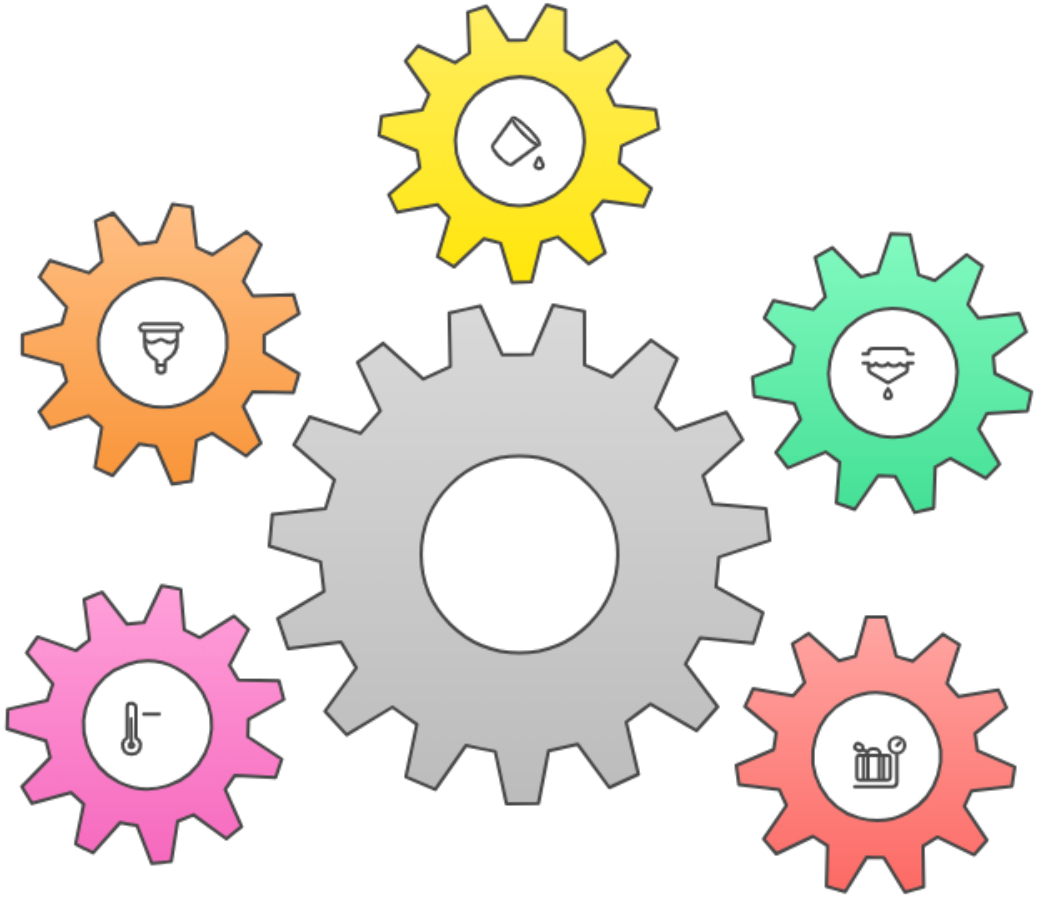
Pressure Buildup

Pressure increases in the osmotic compartment.

Factors Affecting Drug Release

Drug Solubility

The drug must be soluble for effective delivery.



Orifice Size

The size affects the flow rate of the drug solution.

Membrane Permeability

Higher permeability allows faster water influx.

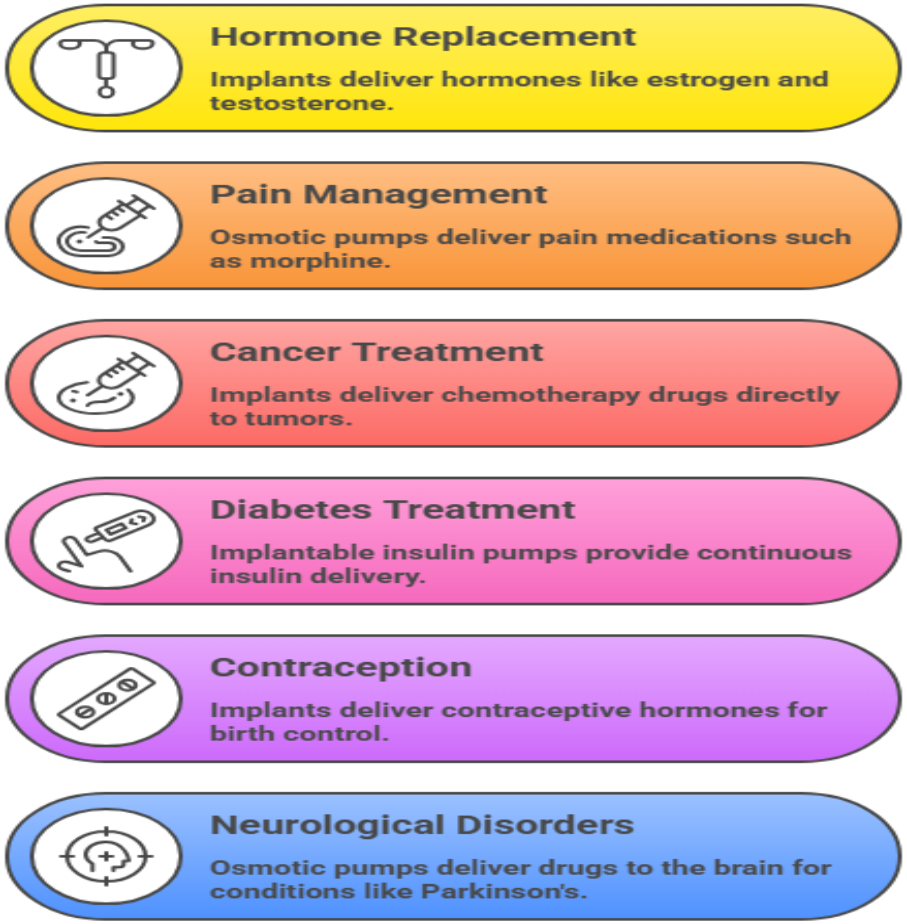
Temperature

Temperature affects osmotic pressure and membrane permeability.

Osmotic Pressure

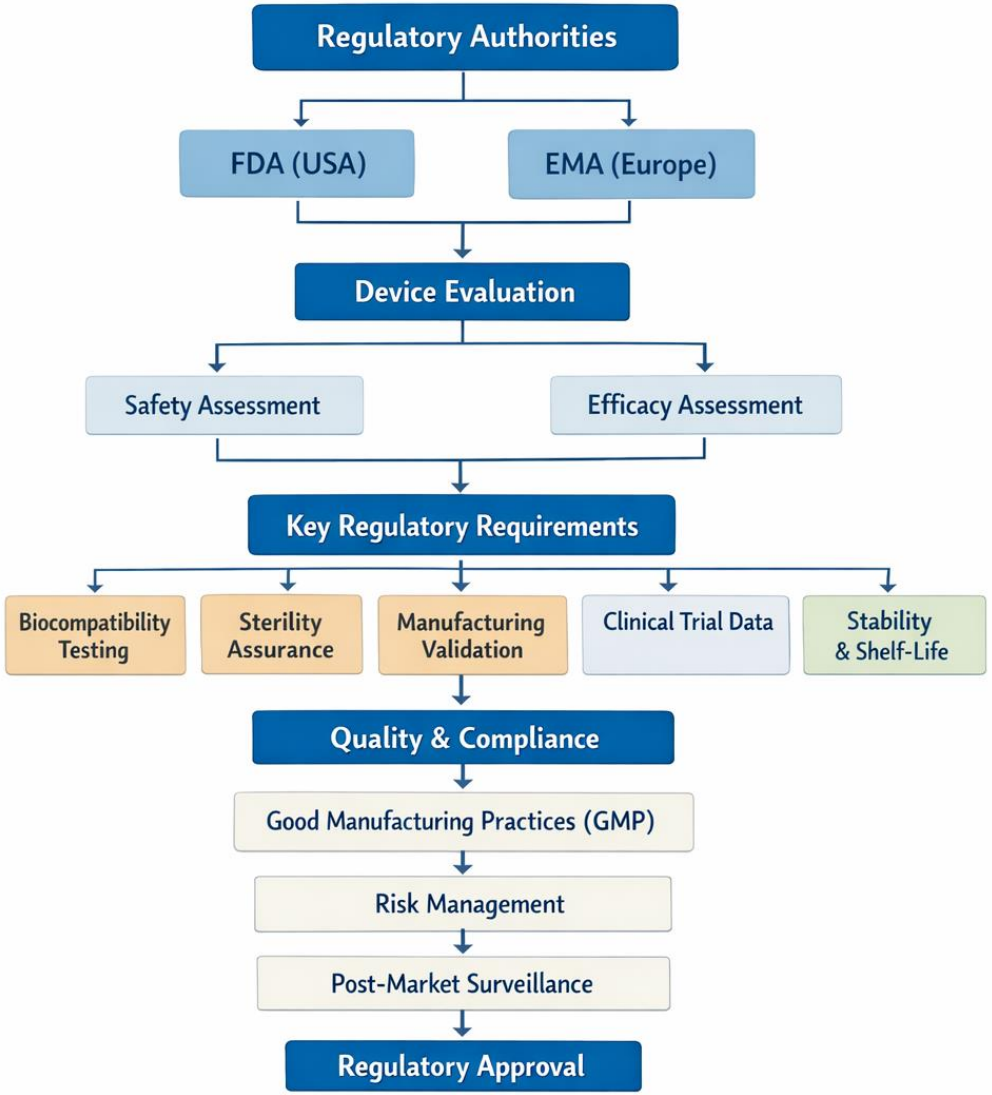
Higher pressure leads to faster drug release.

Applications of Implants and Osmotic Pumps

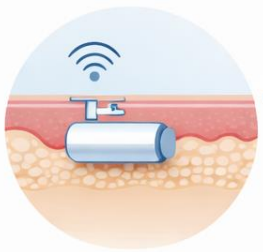


Regulatory Considerations

— *for* Implants & Osmotic Pumps —



Future Trends & Innovations in Implant and Osmotic Pump Technology



Smart Implants

Implants that sense and adjust drug release

3D-Printed Implants

Customized, patient-specific implants

Micro- & Nano-Implants

Smaller implants with minimal invasiveness

Biodegradable Polymers

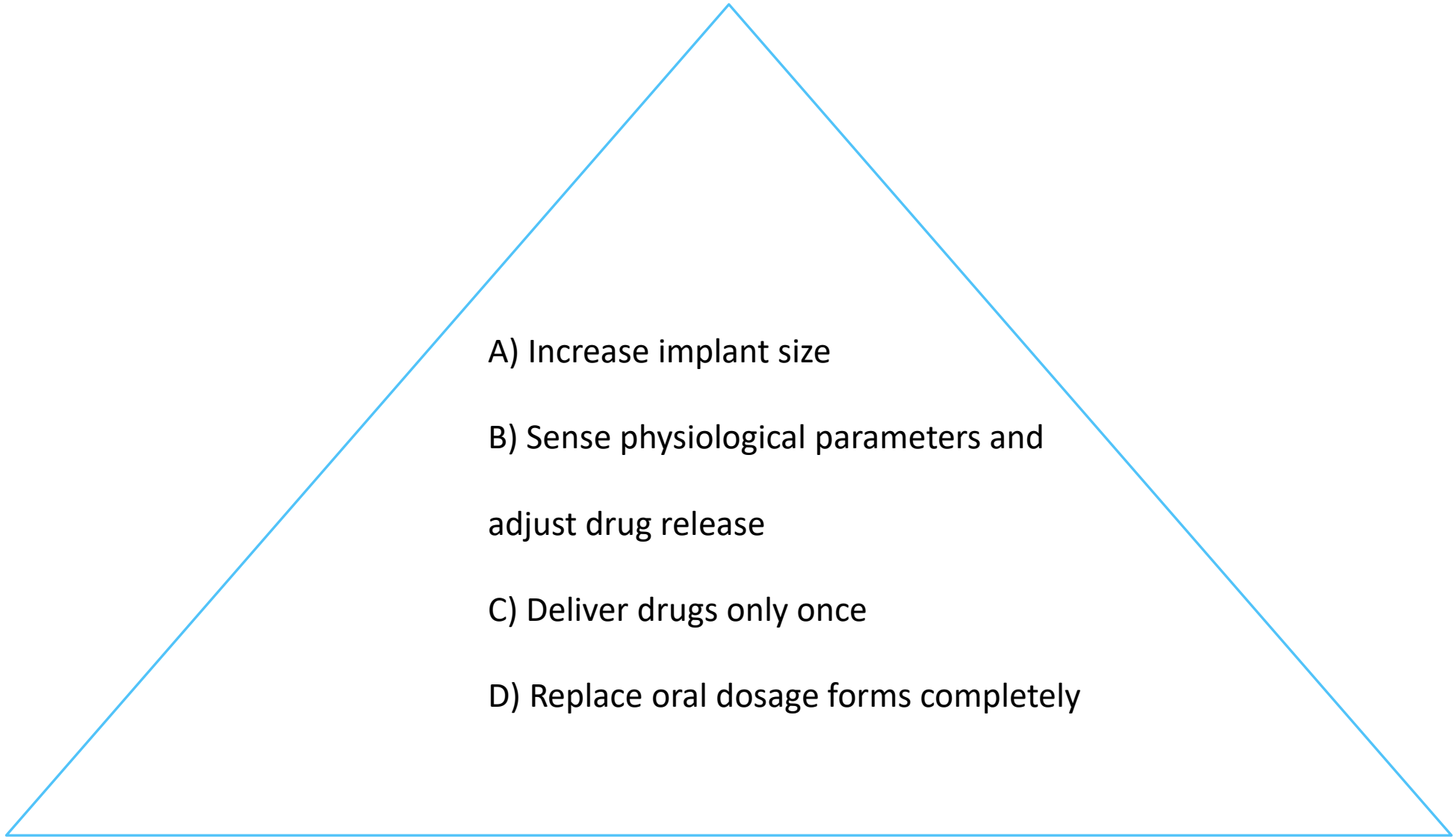
Controlled degradation rates

Biodegradable Polymers

Controlled degradation rates

ASSESMENTS

1. Smart implants are primarily designed to:



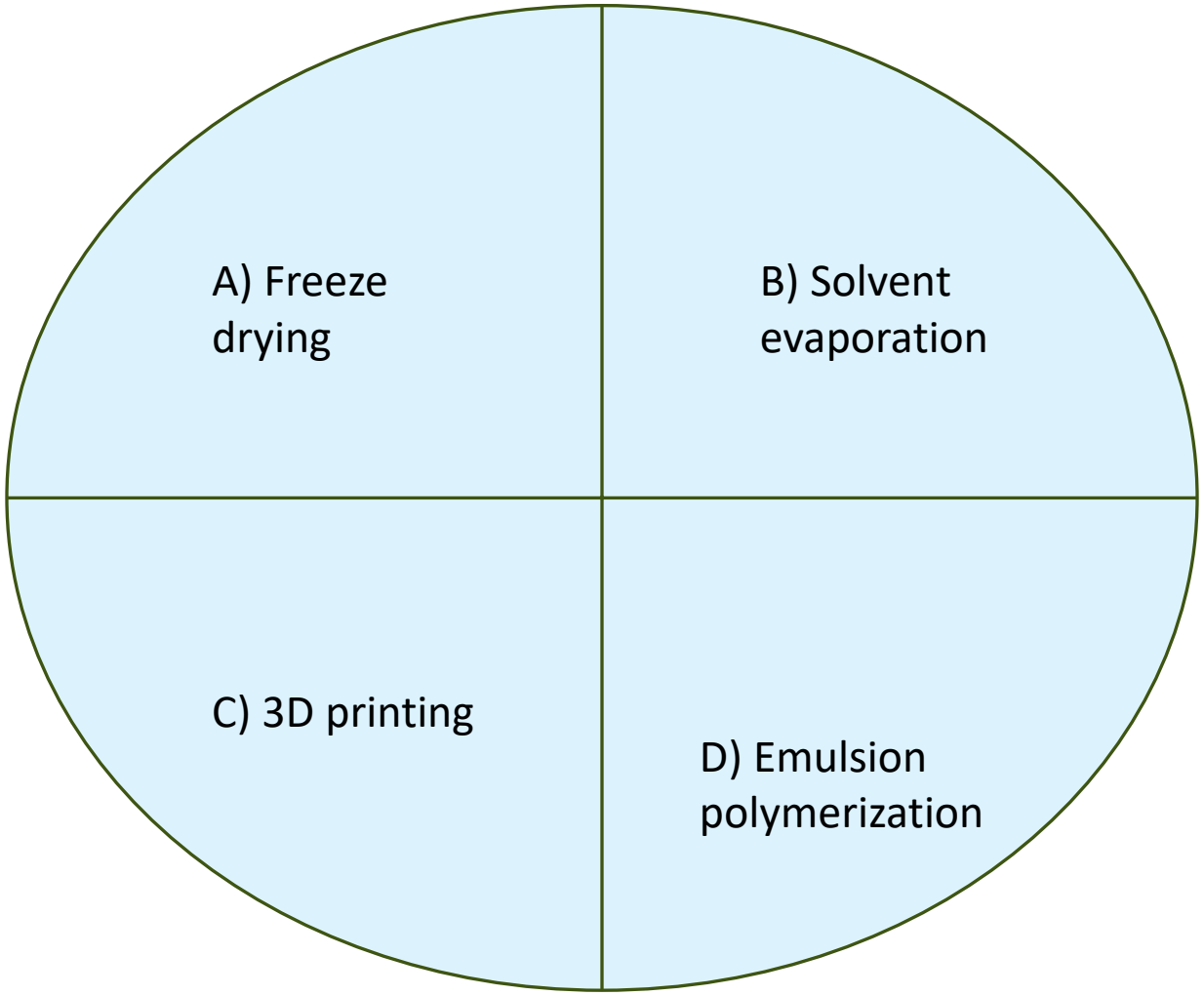
A) Increase implant size

B) Sense physiological parameters and adjust drug release

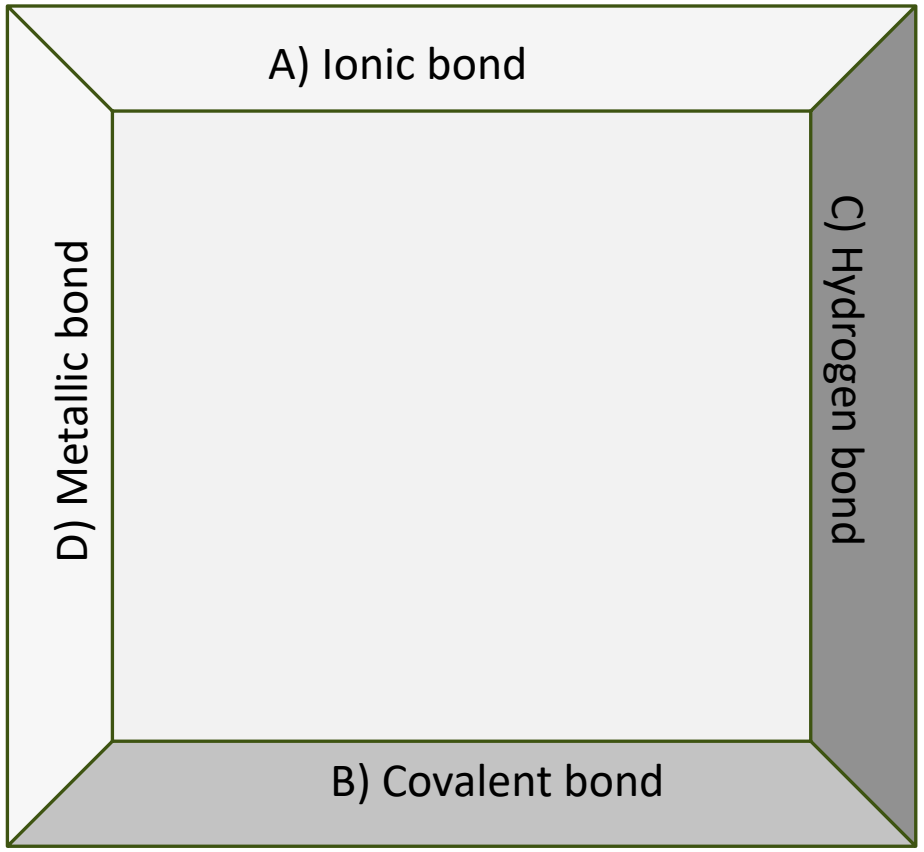
C) Deliver drugs only once

D) Replace oral dosage forms completely

2. Which technology enables the fabrication of patient-specific implants?


A) Freeze drying
B) Solvent evaporation
C) 3D printing
D) Emulsion polymerization

Biodegradable polymers used in implants are designed to:


A) Ionic bond
C) Hydrogen bond
D) Metallic bond
B) Covalent bond

REFERENCES

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2. Joseph R. Robinson: Sustained and Controlled Release Drug Delivery Systems, First edition, Volume 6, Marcel Dekker, Inc,1986,pg.618.

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5. https://www.scribd.com/document/668313752/Controlled-and-Novel-Drug-Delivery-by-N-K-Jain-1st-Editn-Reprint

THANK YOU