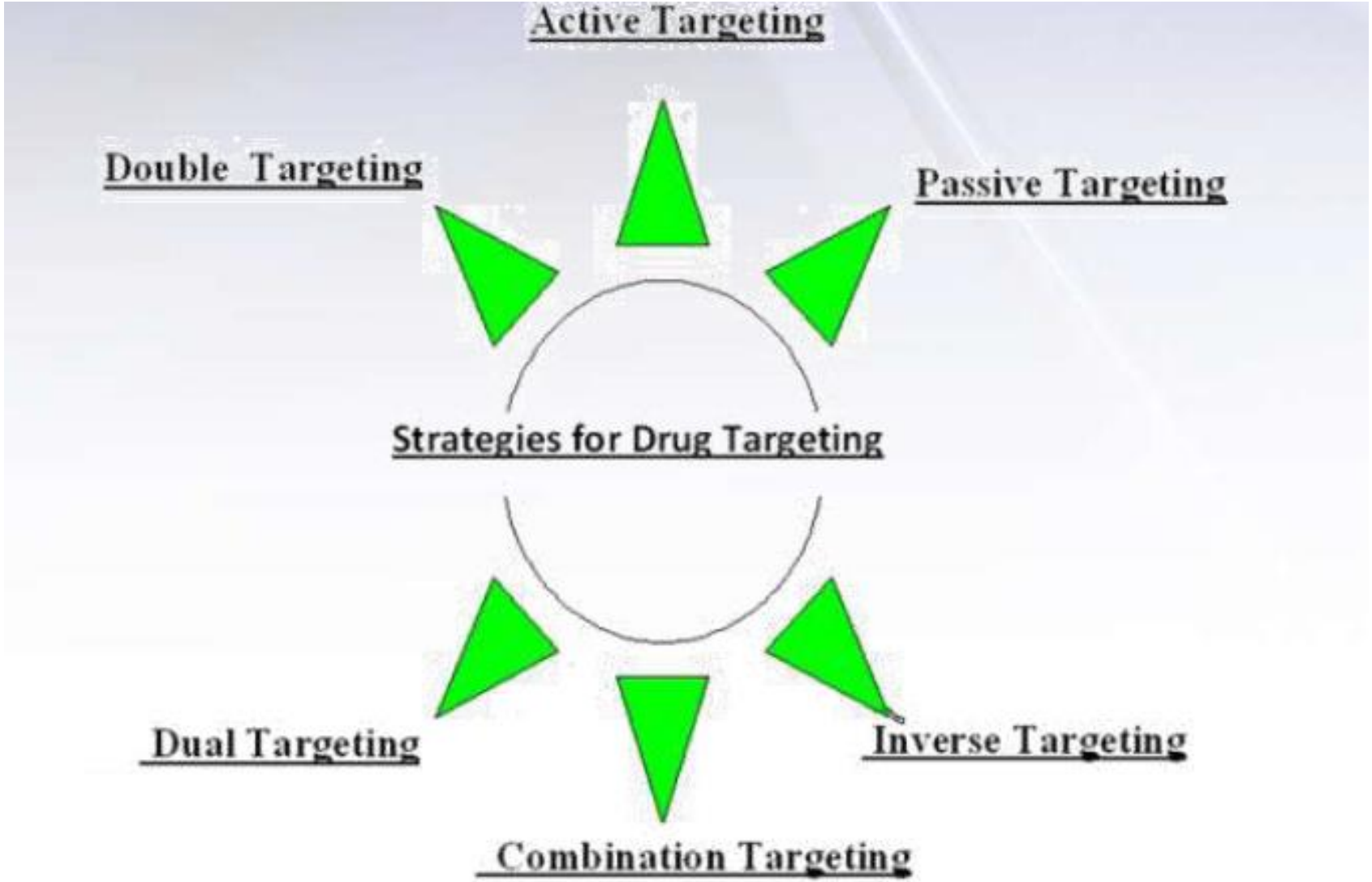
Strategies of Targeting



Passive Targeting

- It utilizes the natural course of biodistribution of the carrier.
- The colloids which are taken up by the reticulo-endothelial system (RES) can be ideal vectors for passive targeting of drugs to RES predominant compartments.
- Passive capture of colloidal carriers by macrophages offers therapeutic opportunities for the delivery of anti-infective agents.

Inverse Targeting

- It is a result of the avoidance of passive uptake of colloidal carrier by the RES.
- It can be achieved by suppressing the function of RES by pre- junction of a large amount of blank colloidal carriers o macromolecules like dextran sulphate.
- Other strategies include modification and defined manipulation o the size, surface charge, composition, surface rigidity & hydrophilicity characteristics of carriers for desirable biofate.

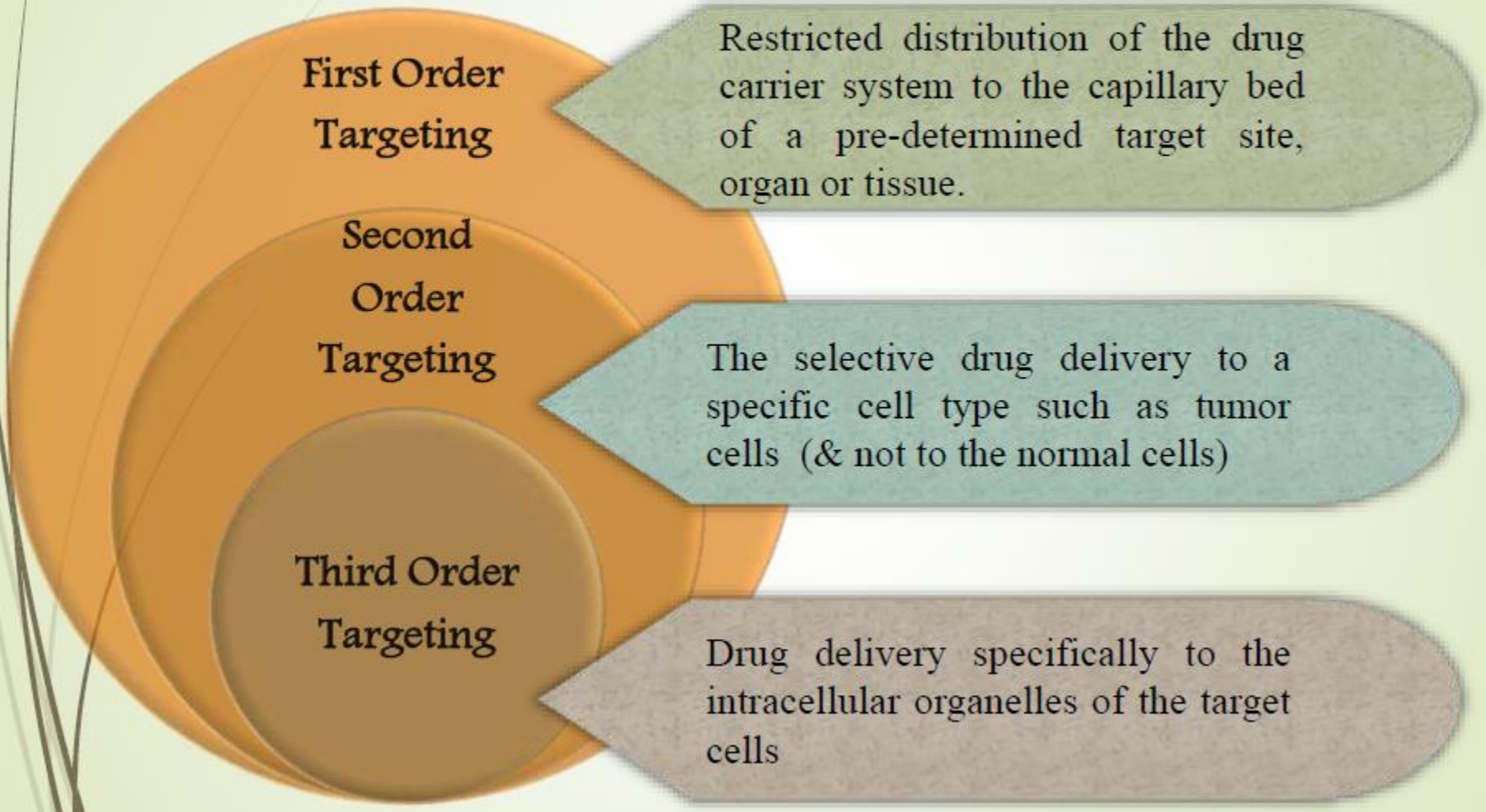
Active Targeting

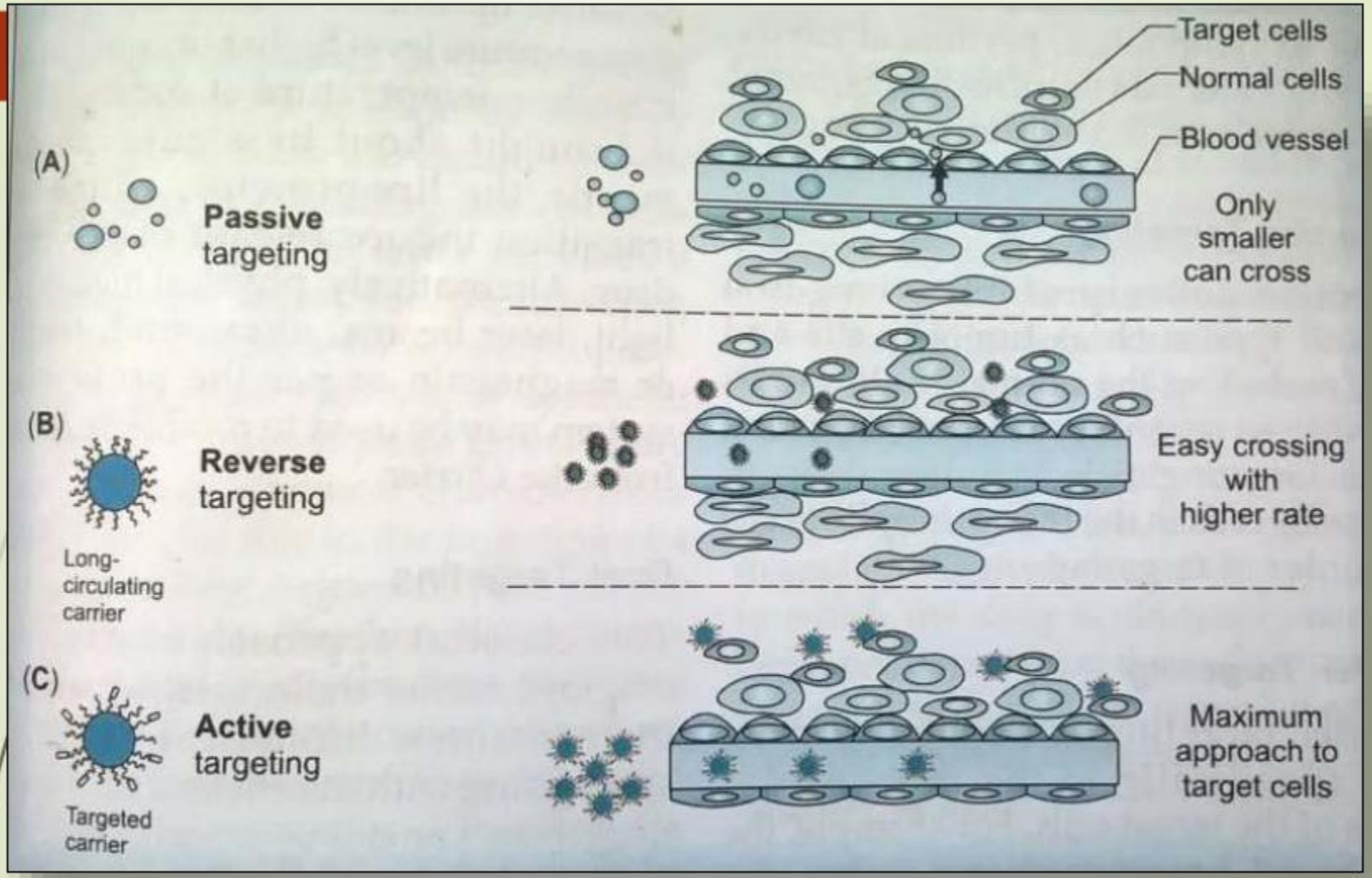
- It involves the modification or functionalization of the drug carriers so that the contents are delivered exclusively to the site corresponding to which the carrier is architected.

- Active targeting can be affected at different levels –

1.	First order targeting (organ compartmentalization)
2.	Second order targeting (cellular targeting)
3.	Third order targeting (intercellular organelles targeting)

Active Targeting





Strategies for Drug Targeting

Ligand-mediated Targeting

- Ligands are carrier surface group(s), which can selectively direct the carrier to the pre-specified site(s) housing the appropriate receptor units to serve as 'homimg device' to the carrier/drug.

- Most of the carrier systems are colloidal in nature & can be specifically functionalized using various biologically-relevant molecular ligands including antibodies, polypeptides, oligosaccharides, viral proteins & fusogenic residues.

- The ligands confer recognition & specificity upon drug carrier & endow them with an ability to approach the respective target selectivity & deliver the drug

Examples of Ligands

Ligands	Target	Tumor target
Folate	Folate receptor	Overexpression of folate receptor
Transferrin	Transferrin receptor	Overexpression of transferrin receptor
Galactosamine	Galactosamine receptors on hepatocytes	Hepatoma

Physical Targeting

- Characteristics of environment changes like pH, temperature, light intensity, electric field, and ionic strength.

- This approach was found exceptional for tumor targeting as well as cytosolic delivery of entrapped drug or genetic material.

Physical Targeting

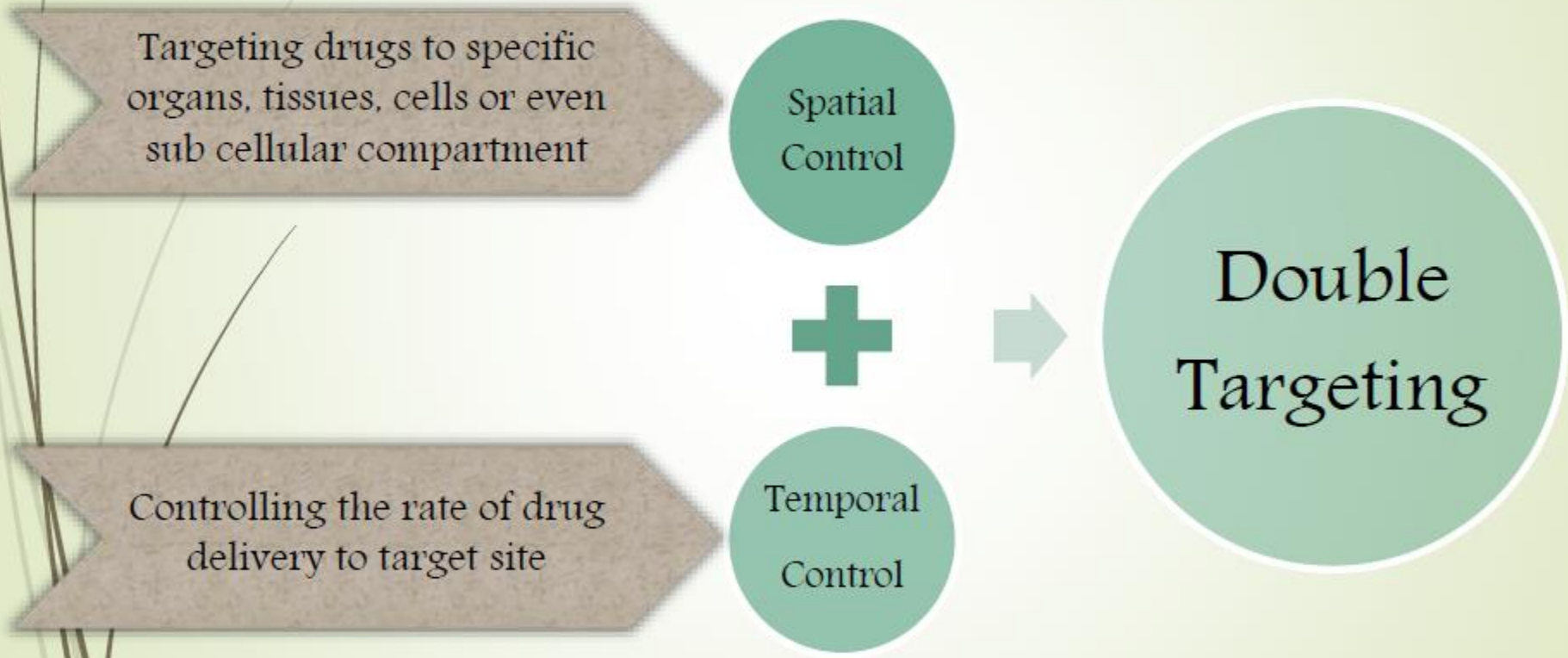
Physical Targeting	Formulation System	Mechanism for Drug Delivery
Heat	Liposome	Change in Permeability
Magnetic Modulation	Magnetically Responsive Microspheres Containing Iron oxide	Magnetic Field can retard fluid Flow of particles.
Ultrasound	Polymers	Change in Permeability
Electrical Pulse	Gels	Change in Permeability
Light	Photo responsive Hydro gels Containing Azo-Derivatives	Change in Diffusion Channels, Activated by Specific Wavelength

Dual Targeting

- In this targeting approach, carrier molecule, itself have their own therapeutic activity and thus increase the therapeutic effect of drug.

- A carrier molecule having its own antiviral activity can be loaded with antiviral drug and for the synergistic effect of drug conjugate.

Double Targeting



Combination Targeting

- These targeting systems are equipped with carriers, polymers and homing devices of molecular specificity that could provide a direct approach to target site.

Components for Drug Targeting

Target

- Specific organ or a cell or group of cells, which in chronic or acute condition need treatment.

Carrier

- Special molecules or system essentially required for effective transportation of loaded drug up to the pre selected sites