

Classification of NDDS with reference to release control

- 1. Matrix Diffusion Types** (In which rate of release is controlled by diffusion of dissolved drug in the matrix).
 - **Rigid Matrix Diffusion** (in which insoluble plastic materials like PVP & fatty acids are used).
 - **Swellable Matrix Diffusion** (in which Hydrophilic gums like guar gum, tragacanth, HPMC, CMC, Xanthan Gum & Polyacrilamides are used). These are also called Glassy Hydrogels and popular for sustaining/control the release of highly water soluble drugs.
 - **Reservoir System** (in which polymer content in coating, thickness of coating & hardness of micro-capsules control the release of the drug).

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2. **Dissolution Matrix Type** (in which drug is homogeneously dispersed throughout in a rate controlling medium waxes like bees wax, carnuba wax, hydrogenated castor oil, which control the drug dissolution by controlling the rate of dissolution).
 - **Encapsulation** (in which dissolution is controlled by dissolution controlling coating system like use of cellulose, Polyethylene Glycols, polymethylacrylates, and waxes. Dissolution rate also depend upon coating material stability and thickness of coating film.

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- 3. Dissolution & Diffusion Controlled Release System** (in which drug is encapsulated in partially soluble membrane, pores are created due to soluble parts of coating film which permits entry of aqueous medium into core and drug dissolution starts by diffusion of dissolved drug out of system. Mixture of water soluble PVP and water insoluble ethyl cellulose is used for this purpose).

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- 4. Water penetration/Osmotic Pressure Controlled NDDS** (in which drug may be osmotically active or drug may be combined with osmotically active salts like NaCl).
- 5. Chemically controlled NDDS** (in which systems change their chemical nature/structure when exposed to biological fluids)

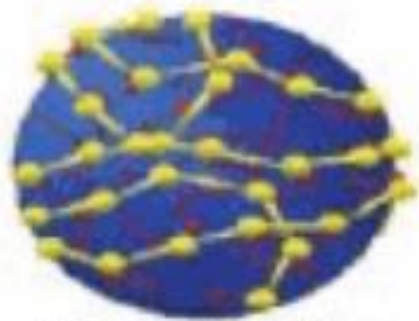
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- 6. Hydrogels** (in which three dimensional structures of hydrophilic polymers having chemical and physical cross links provide a network structure to hydrogels. These are insoluble due to network structure and provide desirable protection of liable drugs, proteins and peptides).
- 7. Ion Exchange Resins Controlled Release Systems** (in these systems, ionisable drug is absorbed on ion-exchange resins granules then granules are coated with water permeable polymers using spray dryer technique).

List of drug carriers in NDDS

- Nanosomes
- Liposomes
- Niosomes
- Nanoparticle
- Nanosphere
- Microsphere
- Microparticle
- Microemulsion
- Nanosuspension
- Micelles

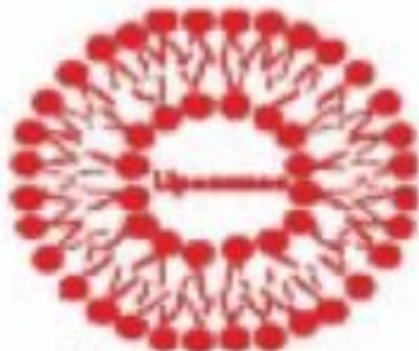
Novel Carriers for NDDS



Nanospheres



Nanocapsules

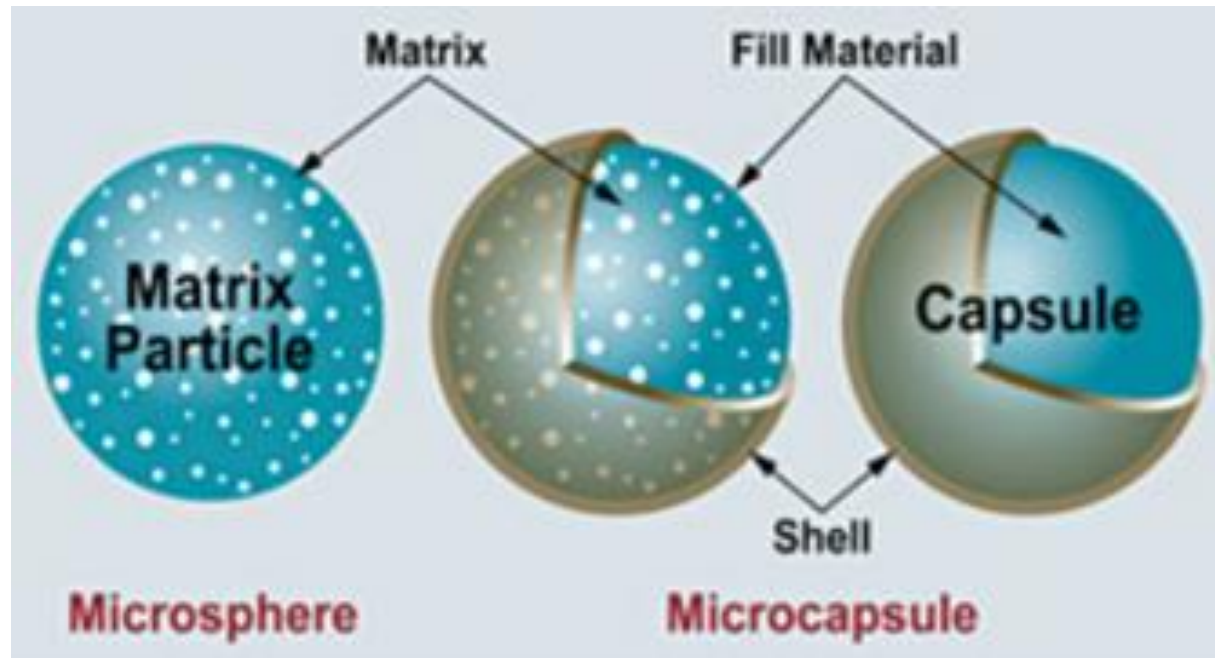


Liposomes



Micelles

Microsphere & Microcapsule



Polymeric Drug Delivery System

- Reservoir System (Microcapsule)
- Matrix System (Microspheres)

