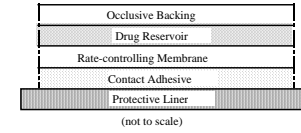


CHAPTER 7. DESIGN OF CONTROLLED RELEASE DEVICES

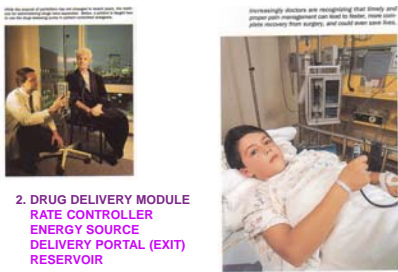
MAJOR COMPONENTS OF CONTROLLED RELEASE DOSAGE FORMS

1. DRUG
2. DRUG DELIVERY MODULE
RESERVOIR
DELIVERY PORTAL (EXIT)
ENERGY SOURCE
RATE CONTROLLER
3. PLATFORM

TRANSDERMAL PATCH



2. DRUG DELIVERY MODULE
RATE CONTROLLER
ENERGY SOURCE
DELIVERY PORTAL (EXIT)
RESERVOIR
3. PLATFORM



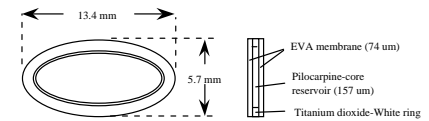
2. DRUG DELIVERY MODULE
RATE CONTROLLER
ENERGY SOURCE
DELIVERY PORTAL (EXIT)
RESERVOIR
3. PLATFORM



People using patient-controlled analgesia, such as the push-button Painsport (above), tend to give themselves smaller doses than they would receive in the every-four-hour system.

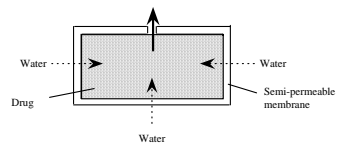
2. DRUG DELIVERY MODULE
RATE CONTROLLER
ENERGY SOURCE
DELIVERY PORTAL (EXIT)
RESERVOIR
3. PLATFORM

OCUSERT

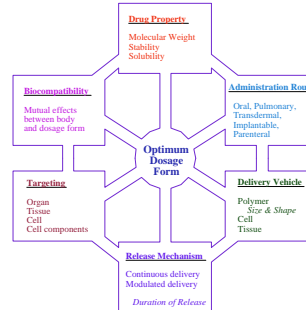


2. DRUG DELIVERY MODULE
RATE CONTROLLER
ENERGY SOURCE
DELIVERY PORTAL (EXIT)
RESERVOIR
3. PLATFORM

ORAL OSMOTIC (OROS) SYSTEM



2. DRUG DELIVERY MODULE
RATE CONTROLLER
ENERGY SOURCE
DELIVERY PORTAL (EXIT)
RESERVOIR
3. PLATFORM



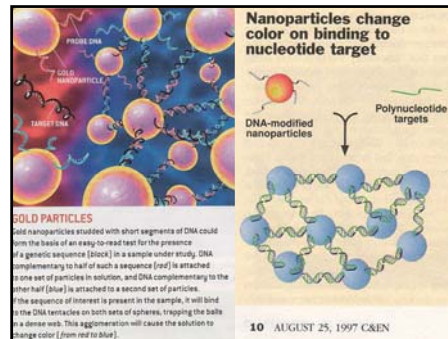
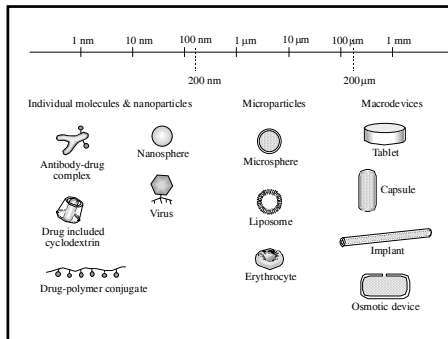
SIZE & SHAPE OF DDS

A. NANOPARTICLES

B. MICROPARTICLES

LIPOSOMES
RED BLOOD CELLS, PLATELETS
SYNTHETIC POLYMER MICROPARTICLES
PHARMAZOME, MICROSPONGE

C. MACRODEVICES



MICROENCAPSULATION

**A. COACERVATION (=PHASE SEPARATION)
SIMPLE & COMPLEX COACERVATION**

B. SOLVENT EVAPORATION & EXTRACTION

C. INTERFACIAL CROSSLINKING

D. INTERFACIAL POLYMERIZATION

E. HOT MELT MICROENCAPSULATION

F. SPRAY DRYING

G. SPARY COATING

MICROENCAPSULATION

**A. COACERVATION (=PHASE SEPARATION)
SIMPLE & COMPLEX COACERVATION**

B. SOLVENT EVAPORATION & EXTRACTION

C. INTERFACIAL CROSSLINKING

D. INTERFACIAL POLYMERIZATION

E. HOT MELT MICROENCAPSULATION

F. SPRAY DRYING

G. SPARY COATING

A. SIMPLE COACERVATION (=PHASE SEPARATION)

1. AQUEOUS POLYMER SOLUTION (GELATIN, ANY WATER-SOLUBLE POLYMER)
2. ADD STRONGLY HYDROPHILIC SUBSTANCE (NON-SOLVENTS TO GELATIN: ETHANOL, ACETONE. OR SALTS: SODIUM SULFATE → DEHYDRATION (DESOLVATION) OF GELATIN)

- FORMATION OF GELATIN-RICH PHASE IN WATER (SEPARATION OF GELATIN FROM WATER)

PROTEIN PURIFICATION: SALTING OUT (PURIFICATION OF FIBRINOGEN BY GLYCINE)

A. COMPLEX COACERVATION

1. AQUEOUS POLYMER SOLUTION (GELATIN, ANY WATER-SOLUBLE POLYMER)
2. ADD ANOTHER POLYMER OF OPPOSITE CHARGE (ELECTROSTATIC INTERACTIONS) GUM ARABIC OR GUM ACACIA (POLYANIONS)

- FORMATION OF COMPLEX COACERVATION (1-10 μm MICROPARTICLES)

1940-50: CARBONLESS CARBON PAPER:

SCRATCH-N-SNIFF SCENT STRIPS

MICROENCAPSULATION

**A. COACERVATION (=PHASE SEPARATION)
SIMPLE & COMPLEX COACERVATION**

B. SOLVENT EVAPORATION & EXTRACTION

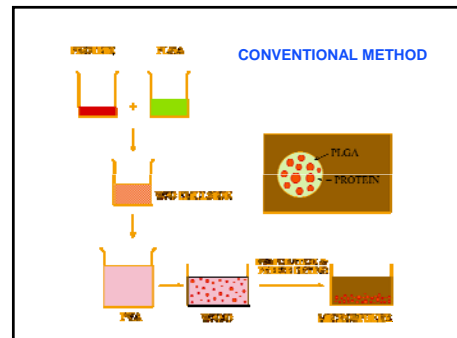
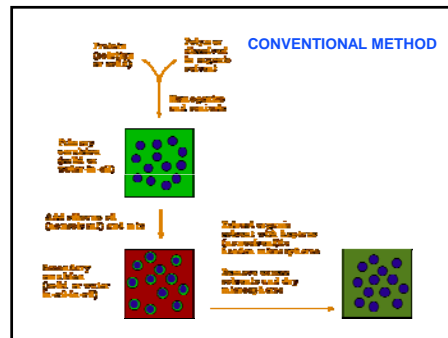
C. INTERFACIAL CROSSLINKING

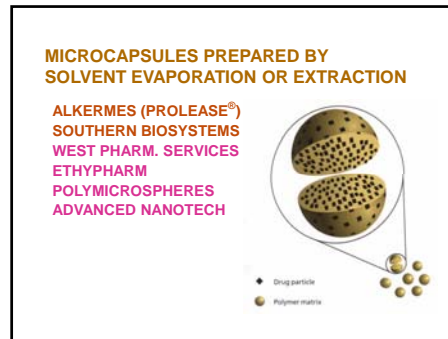
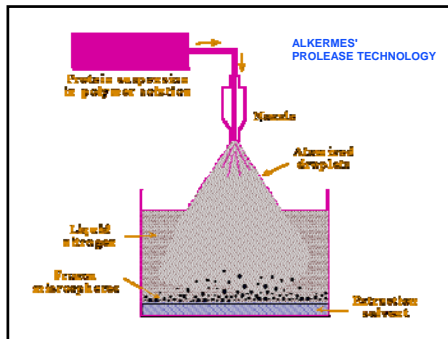
D. INTERFACIAL POLYMERIZATION

E. HOT MELT MICROENCAPSULATION

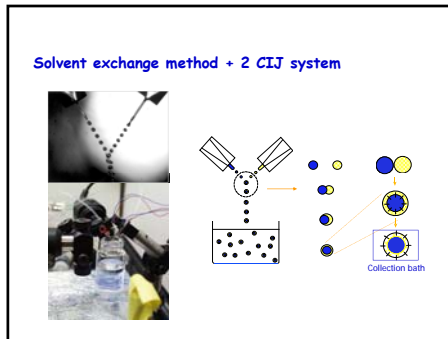
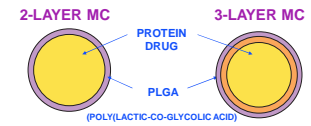
F. SPRAY DRYING

G. SPARY COATING





NEW METHOD OF MAKING MICROCAPSULES:
SOLVENT EXCHANGE METHODS



- MICROENCAPSULATION
- A. COACERVATION (=PHASE SEPARATION) SIMPLE & COMPLEX COACERVATION
 - B. SOLVENT EVAPORATION & EXTRACTION
 - C. INTERFACIAL CROSSLINKING
 - D. INTERFACIAL POLYMERIZATION
 - E. HOT MELT MICROENCAPSULATION
 - F. SPRAY DRYING
 - G. SPARY COATING

- MICROENCAPSULATION
- A. COACERVATION (=PHASE SEPARATION) SIMPLE & COMPLEX COACERVATION
 - B. SOLVENT EVAPORATION & EXTRACTION
 - C. INTERFACIAL CROSSLINKING
 - D. INTERFACIAL POLYMERIZATION (NYLON)
 - E. HOT MELT MICROENCAPSULATION
 - F. SPRAY DRYING
 - G. SPARY COATING

- MICROENCAPSULATION
- A. COACERVATION (=PHASE SEPARATION) SIMPLE & COMPLEX COACERVATION
 - B. SOLVENT EVAPORATION & EXTRACTION
 - C. INTERFACIAL CROSSLINKING
 - D. INTERFACIAL POLYMERIZATION
 - E. HOT MELT MICROENCAPSULATION (WAX)
 - F. SPRAY DRYING
 - G. SPARY COATING

- MICROENCAPSULATION
- A. COACERVATION (=PHASE SEPARATION) SIMPLE & COMPLEX COACERVATION
 - B. SOLVENT EVAPORATION & EXTRACTION
 - C. INTERFACIAL CROSSLINKING
 - D. INTERFACIAL POLYMERIZATION
 - E. HOT MELT MICROENCAPSULATION
 - F. SPRAY DRYING
 - G. SPARY COATING

- MICROENCAPSULATION
- A. COACERVATION (=PHASE SEPARATION) SIMPLE & COMPLEX COACERVATION
 - B. SOLVENT EVAPORATION & EXTRACTION
 - C. INTERFACIAL CROSSLINKING
 - D. INTERFACIAL POLYMERIZATION
 - E. HOT MELT MICROENCAPSULATION
 - F. SPRAY DRYING
 - G. SPARY COATING

