Compounding Altered-Release Pharmaceuticals

Part II

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Compounding Altered-Release Pharmaceuticals-Part II

- Rectal/Vaginal
- Topical/Transdermal

Compounding Altered-Release Pharmaceuticals

- Rectal/Vaginal
  - Suppositories
  - Gels
  - Enemas

Suppositories

- *Factors Affecting*
- Particle size
- Concentration
- Diffusion coefficients
- Partition coefficients
- Solubility

Suppositories

- Mechanism of Release
- Stability (6 months)
- Equipment Required
- Materials/Matrices
- Preparation Methods

Morphine Sulfate 15 mg Suppositories #12

○ Morphine sulfate USP		15 mg
○ Witepsol H-15	qs	100%

Morphine Sulfate 50 mg Slow Release Suppositories #12

Morphine sulfate USP		50 mg
Alginic acid NF		25%
Witepsol H-15	qs	100%

Compounding Altered-Release Pharmaceuticals

- Topical/Transdermal
  - Ointments
  - Emulsions
  - Gels
  - Iontophoresis
  - Phonophoresis
  - Spray-On Adhesive Matrix

TOPICALS

- Preparations applied to the skin either for their physical effects or for the specific effect of a medicinal agent

- Protectants, lubricants, emollients, drying agents, astringents

TRANSDERMALS

- Designed to support the passage of drug substances from the surface of the skin, through its various layers, and even into the systemic circulation.

DRUG PENETRATION IS DEPENDENT UPON

- Amount of pressure and vigor of rubbing
- Surface area covered
- Condition of the skin
- Base used
- Occlusive dressing use

Ointments

- Factors Affecting
  - Particle size
  - Concentration
  - Diffusion coefficients
  - Partition coefficients
  - Solubility

Ointments

- Mechanism of Release
- Stability (6 months, 14 days refrig OR)
- Equipment Required
- Materials/Matrices
- Preparation Methods

Testosterone-Menthol Eutectic Ointment (2% Testosterone)

- Testosterone-Menthol Eutectic
  6.33 g
- Hydrophilic petrolatum
  93.67 g

GELS

- Are semisolid systems consisting of suspensions made up of either small inorganic particles or large organic molecules interpenetrated by a liquid.....USP/NF

Gels

- Factors Affecting
  - Particle size
  - Concentration
  - Diffusion coefficients
  - Partition coefficients
  - Solubility

Gels

- Mechanism of Release
- Stability (14 days refrigerated OR)
- Equipment Required
- Materials/Matrices
- Preparation Methods

DEFINITION-GELS

- Semisolid systems consisting of dispersions of small or large molecules in an aqueous liquid vehicle rendered jelly-like through the addition of a gelling agent.

- Semirigid systems in which the movement of the dispersing medium is restricted by an interlacing network of particles or solvated macromolecules of the

GEL COMPOSITION

- Gelling agent
- Water
- Cosolvents
- Preservatives
- Stabilizers

GELATION

- As a hot, colloidal dispersion of gelatin cools, the gelatin macromolecules lose kinetic energy.

- With a reduction of kinetic energy or thermal agitation, the gelatin macromolecules are associated through a dipole-dipole interaction into elongated or threadlike aggregates.

GELATION

- The size of these association chains increases to the extent that the dispersing medium is held in the interstices among the interlacing network of gelatin macromolecules, and the viscosity increases to that of a semisolid.

- Gelatin, agar, pectin, Irish moss, pectin, tragacanth--form gels by this mechanism

PROPERTIES OF GELLING AGENTS

Alginic acid	--
Bentonite	pH >6
Carbomer	pH 4.5-11
CMC	pH 2-10
CMC Sod	pH 5-10
Colloidal Silicon Dioxide	pH 7.5-10.7
Veegum	pH >3.5

PROPERTIES OF GELLING AGENTS

Methylcellulose	pH 3-11
Plastibase/Jelene	
Poloxamer/Pluronic	
Povidone	
Propylene Glycol Alginate	pH 3-6
Sodium Alginate	pH 4-10
Tragacanth	pH 4-8

Gels

- Methylcellulose Gels
- Sodium Carboxymethylcellulose Gels
- Hydroxyethylcellulose Gels
- Hydroxypropylcellulose Gels
- Carbopol Aqueous Gels
- Carbopol Hydroalcohol Gels
- Pluronic Gels
- Pluronic Lecithin Organogels

Methylcellulose Gel

- Methocel E4M Premium USP 1 to 5 g
- Purified Water USP qs 100 mL

Sodium Carboxymethylcellulose Gel

- Sodium Carboxymethylcellulose 1-5 g
- Purified water qs 100 mL

Hydroxyethyl Cellulose Gel

- Hydroxyethyl cellulose NF 1.75 g
  - (4500-6500 cps)
- Alcohol USP (optional) up to 30 mL
- Purified water USP qs 100 mL

Hydroxypropyl Cellulose Gel

- Hydroxypropyl cellulose 1.75-2 g
- Glycerin USP (Optional) up to 30 mL
- Alcohol 70% OR
- Purified water qs 100 mL

Carbopol Aqueous Gel

Carbopol 940 NF g		0.5-1.5
Triethanolamine		qs
Purified water USP	qs	100 mL

Carbopol and Glycerin Gel

Carbopol 934P		3 g
Glycerin		50 mL
Triethanolamine		qs
Purified water	qs	100 mL

Carbopol Hydroalcoholic Gel

Carbopol 934P NF		1 g
Alcohol USP		50 mL
Triethanolamine		qs
Purified water USP	qs	100 mL

Pluronic Gels

- Pluronic F127 NF 20-40 g
- Potassium sorbate 300 mg
- Purified water qs 100 mL

Pluronic Lecithin OrganoGel

- Active drug qs
- Propylene glycol OR
- Alcohol OR Glycerin qs
- Lecithin:Isopropyl Palmitate 22 mL
- Pluronic F127 Gel (20-30%) qs 100 mL

Ketoprofen 10% PLO

- Ketoprofen 10 g
- Propylene glycol 10 mL
- Lecithin:Isopropyl palmitate 22 mL
- Pluronic F127 Gel 20% qs 100 mL

Ketoprofen 5% in Speed Gel

- Ketoprofen 5 g
- Polysorbate 80 20 g
- Benzyl alcohol 1 mL
- Speed Gel Base with docusate sodium qs 100 g

Speed Gel Base with Docusate Sodium

- Polysorbate 80 10 g
- Lecithin:Isopropyl Palmitate 20 g
- Docusate sodium (with 15% sodium benzoate) 10 g
- Urea 10 g
- Citric acid 2.5 g

5-Fluorouracil Adhesive Gel

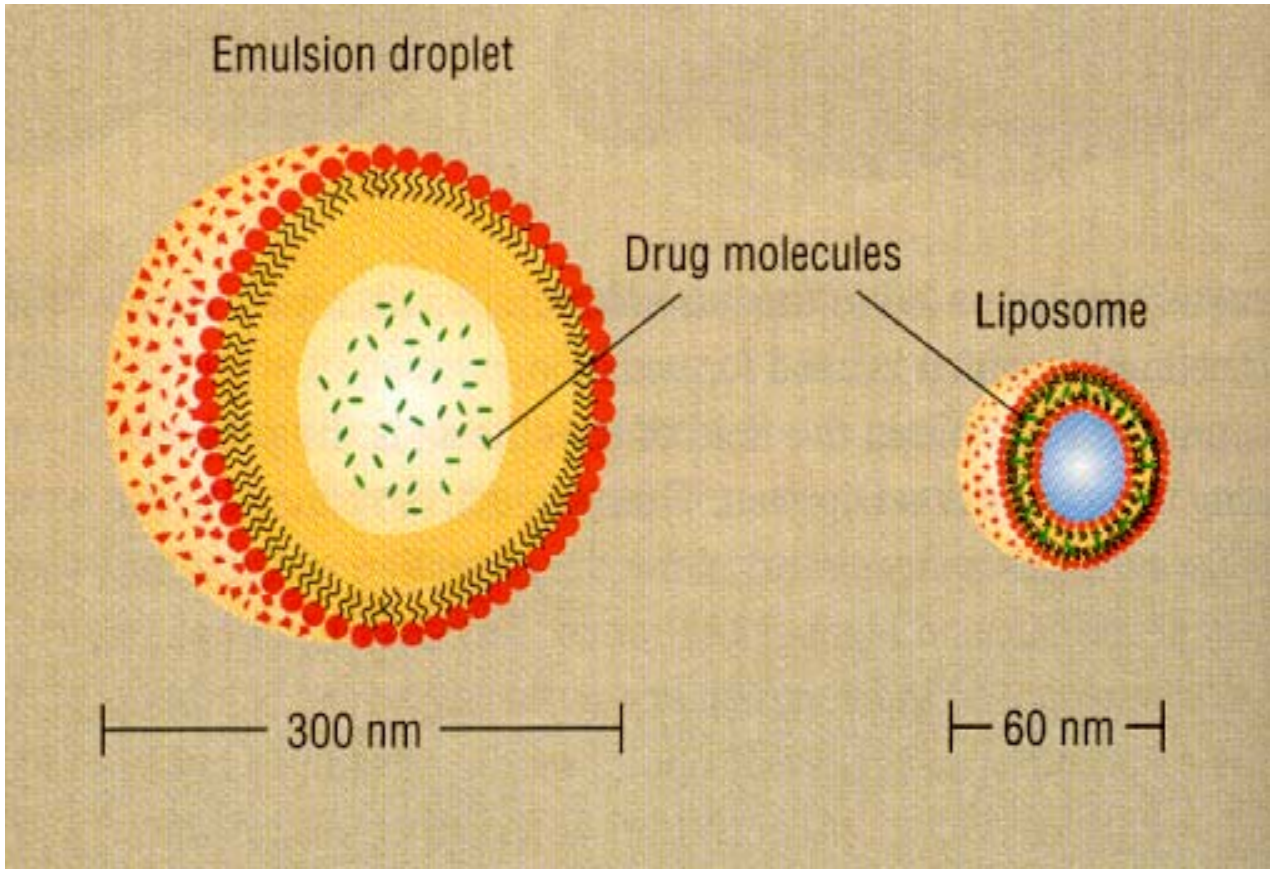
- 5-Fluorouracil 5 g
- Gelatin NF 2 g
- Methocel E4M Premium USP 2 g
- Povidone USP 5 g
- Veegum HV NF 5 g
- Purified water USP qs 100 mL

LIQUID-SOLID EMULSION GEL-DRUG RELEASE

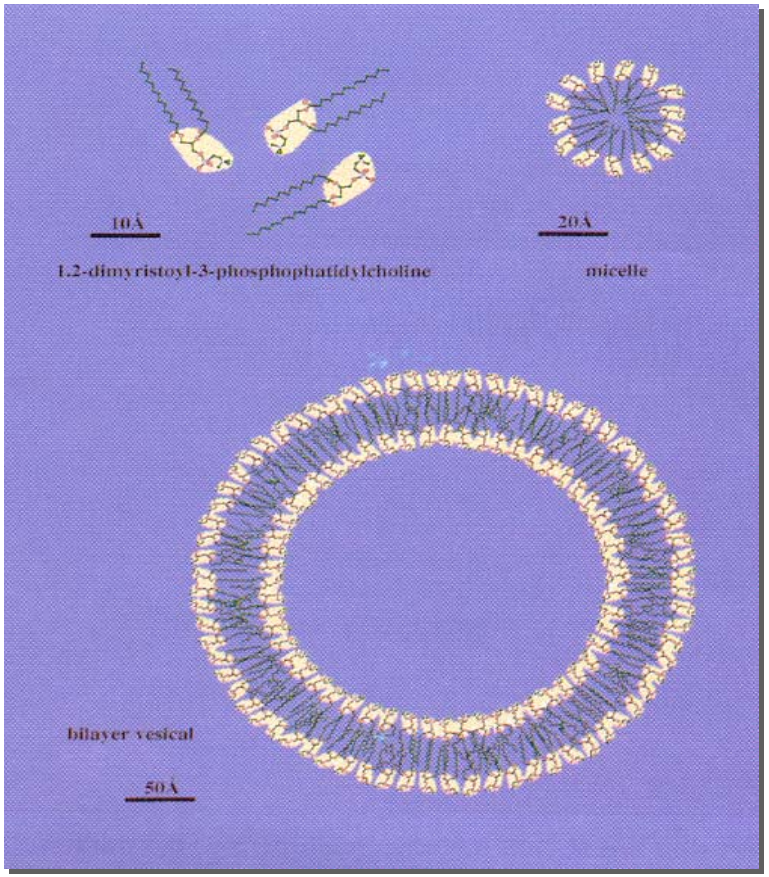
- GELATIN SOLUTION
  - Gelatin, 200 bloom 8 g
  - Phosphate buffer (pH 7) qs 40 mL

- GEL PRODUCT
  - Gelatin Solution 40 mL
  - Long-chain alcohol 10 g

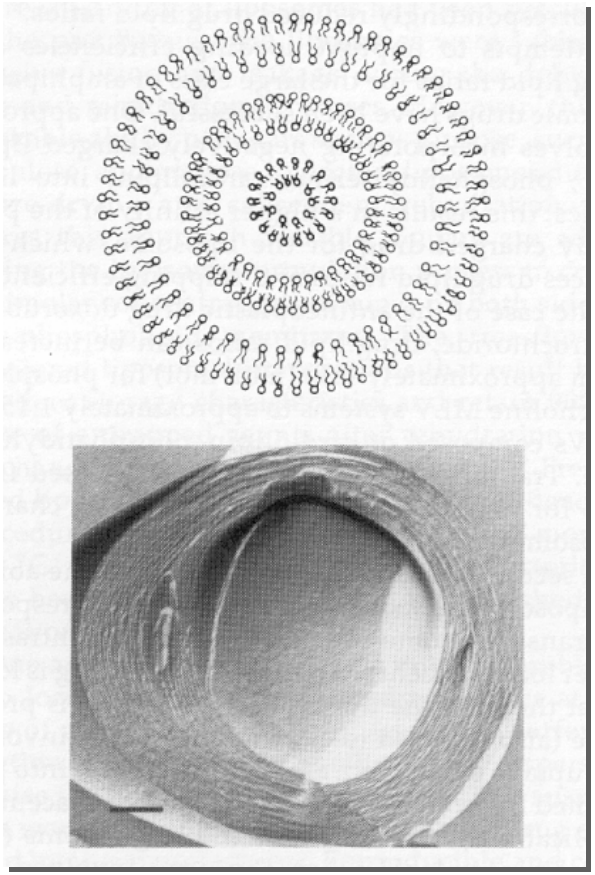
Emulsion vs Liposome

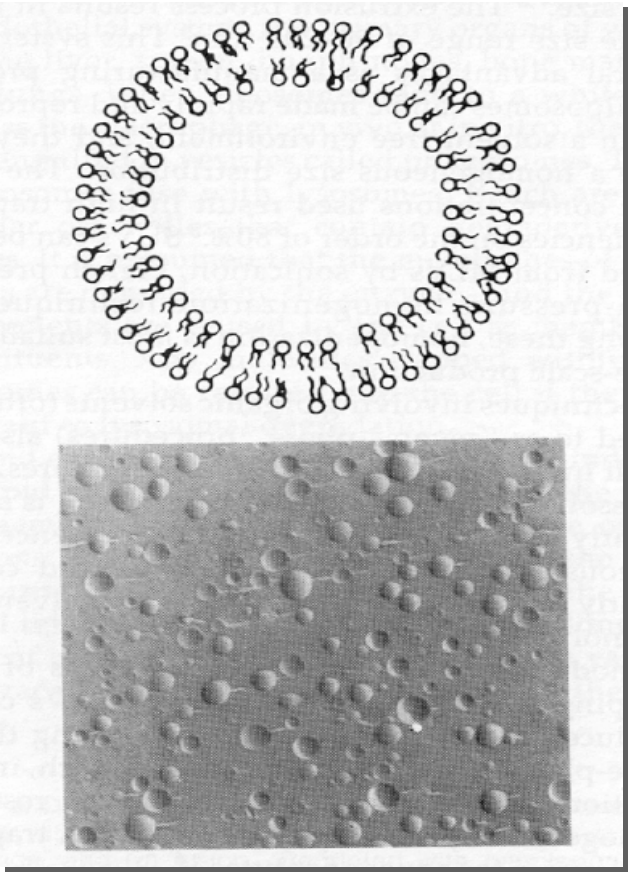


Liposomes and Micelles

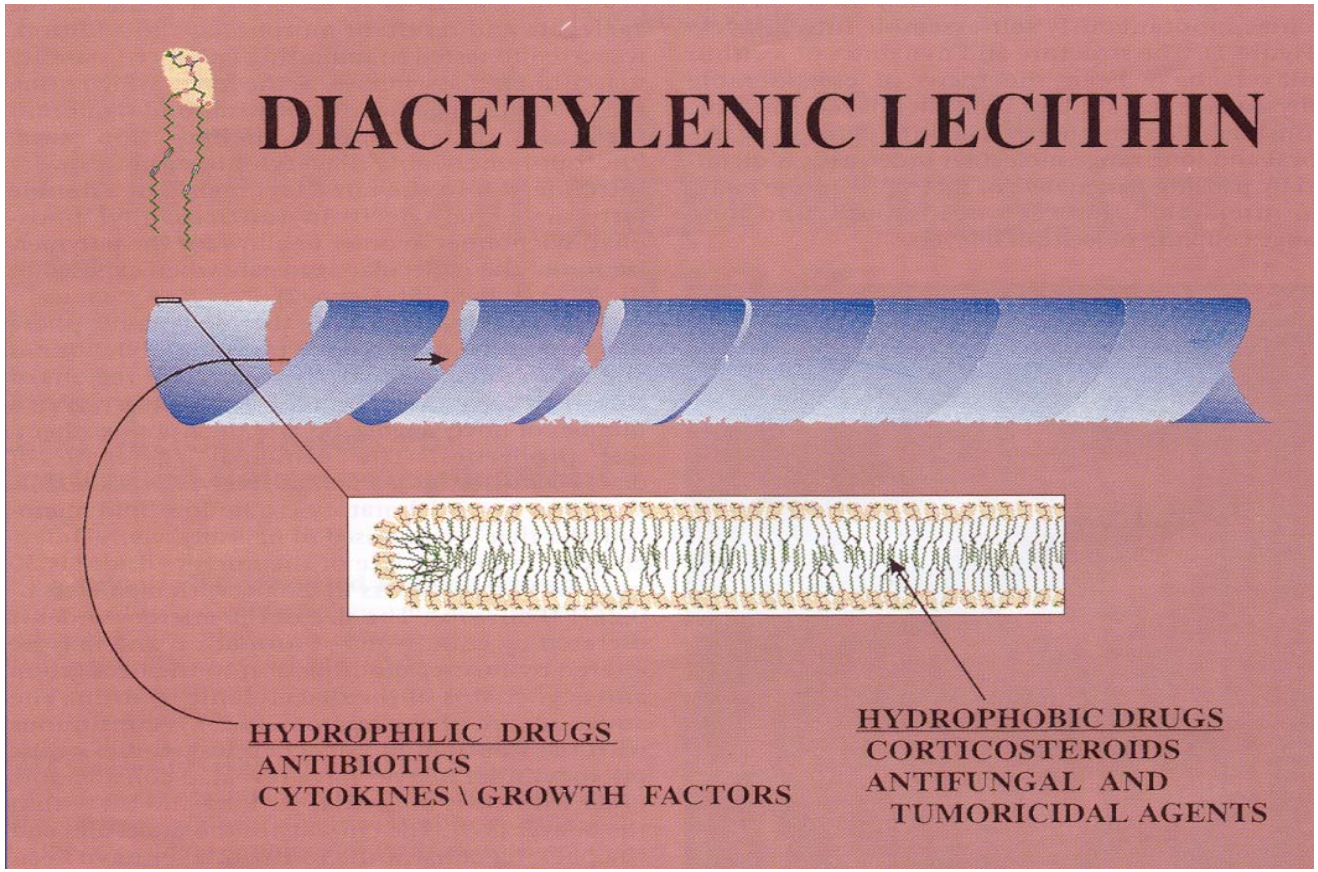


LMLVs and SULVs

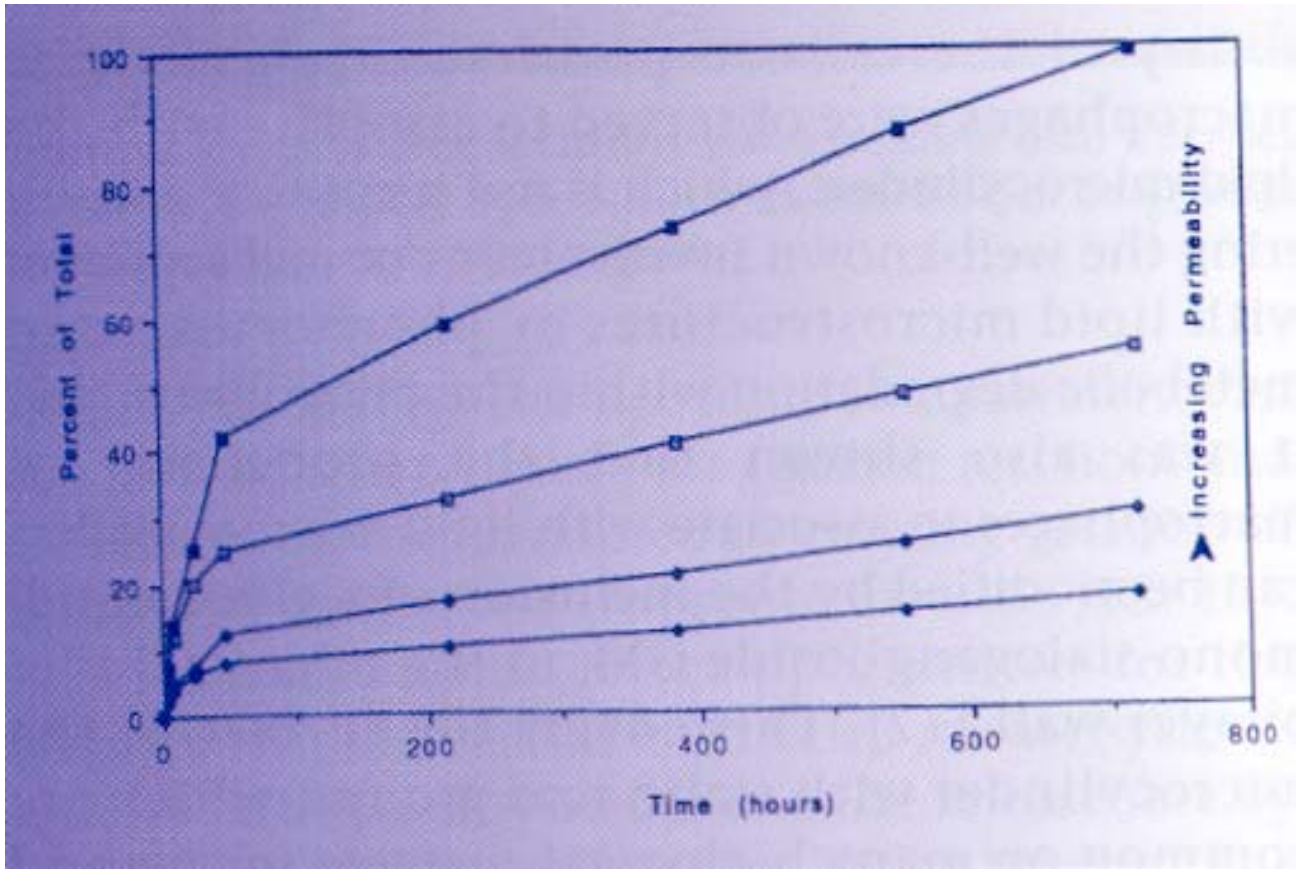




Self-Assembling Cylindrical Liposome



Drug Release from SACL



Topical Adhesives

- Factors Affecting
  - Particle size
  - Concentration
  - Diffusion coefficients
  - Partition coefficients
  - Solubility

Topical Adhesives

- Mechanism of Release
- Stability (6 months Or)
- Equipment Required
- Materials/Matrices
- Preparation Methods

Topical Adhesive Solution

Rosin		3 g
Tannic acid		5 g
Menthol		1 g
Camphor		1 g
Mineral spirits		2 mL
Benzoin tincture	qs	100 mL

Retention Enemas

- Factors Affecting
  - Particle size
  - Concentration
  - Diffusion coefficients
  - Partition coefficients
  - Solubility

Retention Enemas

- Mechanism of Release
- Stability (14 days OR)
- Equipment Required
- Materials/Matrices
- Preparation Methods

Retention Enemas

- Active drug qs
- Glycerin qs
- Methylcellulose 2% gel qs 100 mL
- OR
- Pluronic 10-20% gel qs 100 mL

Comparison

- Ointment
- Cream
- Gel
- Lotion

Sulfur and Salicylic Acid Ointment

Sulfur		5 g
Salicylic acid		2 g
Mineral oil		10 mL
White petrolatum	qs	100 g

Sulfur and Salicylic Acid Cream

Sulfur		5 g
Salicylic acid		2 g
Propylene glycol		qs
Hydrophilic ointment	qs	100 g

Sulfur and Salicylic Acid Lotion

Sulfur		5 g
Salicylic acid		2 g
Propylene glycol		qs
Purified water		20 mL
Hydrophilic ointment	qs	100 g

Sulfur and Salicylic Acid Gel

Sulfur		5 g
Salicylic acid		2 g
Carbopol 934P		2.4 g
Alcohol USP		50 mL
Purified water	qs	100 mL

LIPID CRYSTALS CREAM

- ANTHRALIN 1% IN LIPID CRYSTALS
- Anthralin 1 g
- Glyceryl laurate 7 g
- Glyceryl myristate 21 g
- Citric acid 1 g
- Sodium hydroxide 140 mg
- Purified water qs 100 g

Pastes

- Factors Affecting
  - Particle size
  - Concentration
  - Diffusion coefficients
  - Partition coefficients
  - Solubility

Pastes

- Mechanism of Release
- Stability (6 months)
- Equipment Required
- Materials/Matrices
- Preparation Methods

Morphine Sulfate 10% Transdermal Paste

○ Morphine sulfate USP		10 g
○ Mineral oil NF		qs
○ Lanolin USP		16.2 g
○ Petrolatum USP	qs	100 g

Iontophoresis

- Factors Affecting
  - Concentration
  - Solubility
  - Diffusion coefficients

Iontophoresis

- Mechanism of Release
- Stability (14 days OR)
- Equipment Required
- Materials/Matrices
- Preparation Methods