Galenic phase

"Today we study the Liberation Phase—often called the Pharmaceutic or Galenic Phase. This is the critical moment where the drug is freed from its vehicle to become a bioavailable molecule"

Introduction

This phase can take different names according to the context of use:

A. "The Pharmaceutic Phase" (The Categorical Term)

This is the most common term used to create a clear "3-Step" map of drug action:

1. Pharmaceutic Phase (Disintegration/Dissolution)
2. Pharmacokinetic Phase (ADME)
3. Pharmacodynamic Phase (Effect)

- **Verdict: Great for teaching flow and organization, but a bit general.**

B. "The Liberation Phase" (The Kinetic Term)

In modern research and industrial pharmacology, this is the most relevant term because it completes the LADME acronym.

- Scientific weight: Very high. It treats the release of the drug as a measurable kinetic event.
- Verdict: Best for 3rd-year students who are learning about the "Life of the Drug" in the body.

C. "Biopharmaceutics" (The Discipline Term)

If you are speaking to researchers or industrial pharmacists, they will use this term. It is the study of how the physical/chemical properties of the drug affect its biological performance.

- **Verdict: Use this to sound the most "advanced" or "academic."**

Comparison Table: Which should you use?

Term	**Used by...**	**Best for...**
Pharmaceutic Phase	**Textbooks (Nursing/Med)**	**Distinguishing the "pill" part from the "body" part.**

Term	Used by...	Best for...
Liberation (L in LADME)	**Pharmacokineticists**	**Describing the first step of drug movement.**
Galenic Phase	**Academics (French/Euro influence)**	**Highlighting the "art" and science of drug formulation.**
Dissolution/Disintegration	**Researchers/Lab**	**Describing the actual physical chemistry occurring.**

In many textbooks, this is called the Galenic Phase because it depends entirely on how the drug was manufactured.

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1. Definition:

Liberation is the process by which the Active Pharmaceutical Ingredient (API) is released from its Dosage Form (the vehicle/excipient).

If the drug doesn't leave its "packaging" (the pill or capsule), it can never be absorbed. It is the "Rate-Limiting Step"—if liberation is slow, the therapeutic effect will be slow.

2. The Three Steps (The "3 Ds")

For a solid oral drug (like a tablet), liberation follows a specific biological sequence:

1. Disintegration: The tablet breaks into smaller granules.
2. Disaggregation: The granules break into fine particles.
3. Dissolution: The particles dissolve in the gastric or intestinal fluids.

Key Biological Point: A drug must be in solution (a liquid state) to cross a biological membrane. You know from cell biology that molecules move via diffusion; a solid chunk of powder cannot diffuse!

3. Factors Affecting Liberation: *Physicochemical and Biological factors*

A. The Galenic Formulation

- **Excipients:** Some help the drug dissolve faster (disintegrants), while others (like lubricants or binders) can slow it down.
- **Coatings:** Enteric coatings are designed *not* to liberate the drug in the acidic pH of the stomach, but only when they reach the neutral pH of the intestine.

B. The Environment

- **pH:** ionized form of a drug is highly water-soluble, which drastically increases its saturation solubility (Cs) and accelerates its liberation/dissolution rate (per the Noyes-Whitney equation).
    - ✓ *Weak bases* dissolve preferentially in the highly acidic environment of the stomach where they are ionized.
    - ✓ *Weak acids* exhibit poor solubility in the stomach but liberate efficiently in the near-neutral pH of the duodenum as they transition into their ionized state.
- **Gastric Motility:** How fast the stomach "churns" and empties into the intestine.

4. Modified Release (Advanced Biotech Concept)

For Biotechnology students, this is the most interesting part. We can "engineer" liberation:

- **Immediate Release (IR):** The drug is released all at once.
- **Sustained Release (SR/Extand):** The drug is released slowly over 12–24 hours. This reduces the number of times a patient has to take the pill and maintains a steady concentration in the blood (Css).
- **Delayed Release:** Like the enteric coating mentioned above.

5. "Check-Point" Question

"If a patient crushes a Sustained Release (SR) tablet to make it easier to swallow, what happens to the Liberation phase?"

Answer for you: The "engineering" is destroyed. The entire 24-hour dose is liberated at once (this is called "dose dumping"), which can lead to toxicity!

Summary Table for the Board

Stage	Action	Result
Disintegration	**Physical breakdown.**	**High surface area.**
Dissolution	**Molecular mixing with fluid.**	**Drug is ready for Absorption.**
Vehicles	**Excipients/Coating.**	**Controls the Speed of release.**