COURSE: BACHELOR OF PHARMACY

BIOPHARMACEUTICS AND PHARMACOKINETICS (BP604T)

INTRODUCTION TO BIOPHARMACEUTICS

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by

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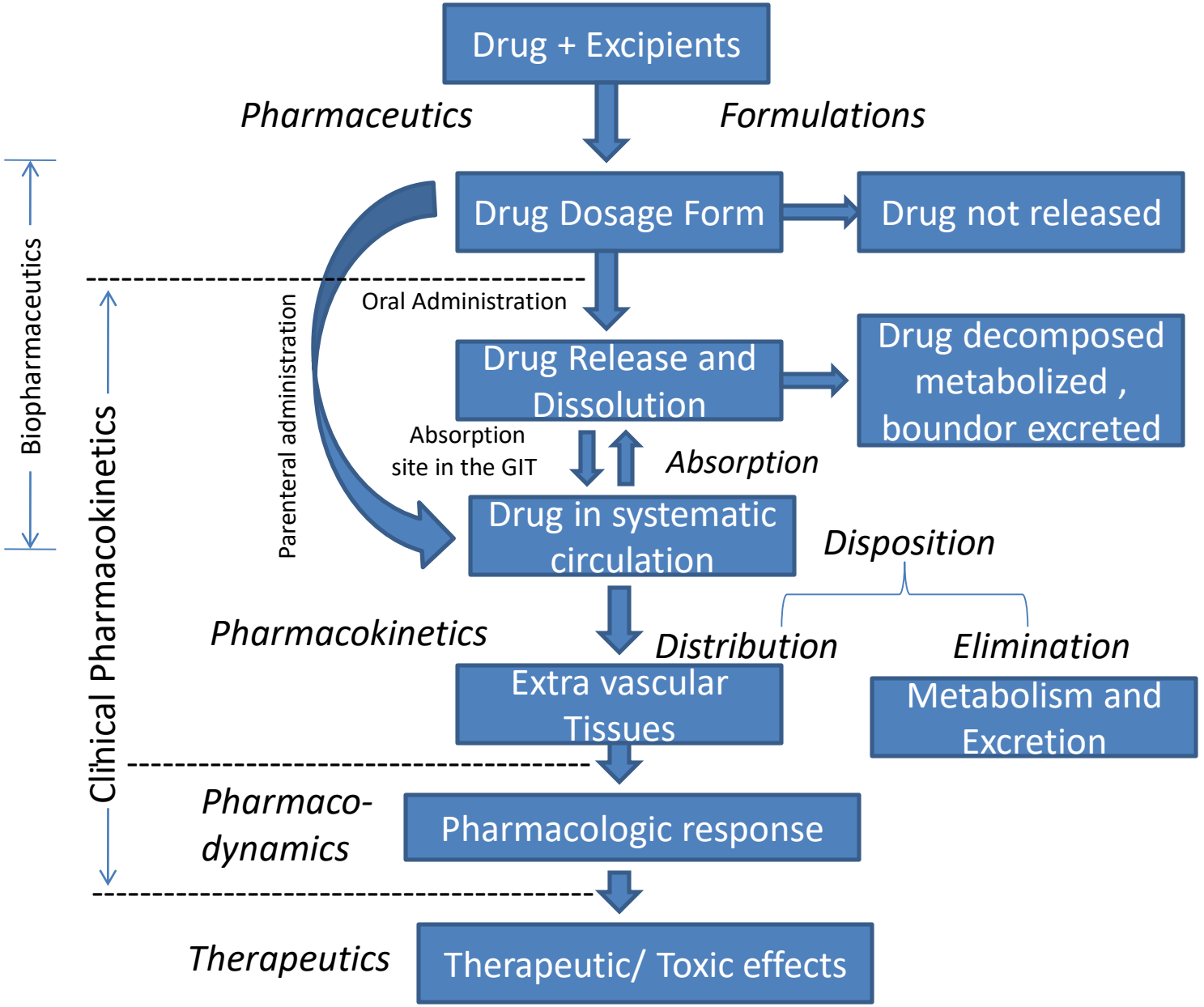
Introduction

- **Medicines are usually not given in pure form**. They are mixed with inactive ingredients and made into a form that can be easily taken from suitable root.
- **Absorption** describes the movement of a drug from the site of delivery to the systemic circulation.
- **Bioavailability** refers to how quickly and how much of a drug is absorbed into the bloodstream.

The four phases or processes of drug administration and therapy are as follows:

- **Pharmaceutical phase**: Preparation of the drug in a suitable form for administration.
- **Pharmacokinetic phase**: Absorption, distribution, metabolism, and elimination of the drug in the body.
- **Pharmacodynamic phase**: Study of the drug's mechanism of action and effects on the body.
- **Clinical phase:** Use of the drug in clinical practice including selection, dosage determination, and monitoring of patient's response.

Diagrammatic representation of therapeutic phase



- **Biopharmaceutics and pharmacokinetics** are two important aspects of pharmacology that deal with the study of the interaction between drugs and the body.
- **Biopharmaceutics** refers to the study of the physical and chemical properties of drugs, the dosage forms in which they are administered, and how they are absorbed, distributed, metabolized, and eliminated by the body.
- **Pharmacokinetics** refers to the study of how drugs are absorbed, distributed, metabolized, and eliminated by the body over time, including factors such as dose, route of administration, and patient characteristics.

Drug absorption

- Drug absorption is the process by which a drug enters the bloodstream from its site of administration.
- Factors that affect drug absorption include the physicochemical properties of the drug, the dosage form, the route of administration, and the presence of food or other drugs in the body.
- Understanding drug absorption is important for determining the appropriate dosage and formulation of a drug.

Drug distribution

- Drug distribution refers to the process by which a drug is transported from the bloodstream to its site of action in the body.
- Factors that affect drug distribution include the drug's physicochemical properties, the patient's physiological characteristics, and the presence of other drugs in the body.
- Understanding drug distribution is important for determining the appropriate dosage and route of administration of a drug.

Drug metabolism

- Drug metabolism refers to the process by which a drug is transformed by the body into other compounds, often to facilitate its elimination from the body.
- The liver is the primary site of drug metabolism, although other organs such as the kidneys and lungs can also play a role.
- Understanding drug metabolism is important for determining the appropriate dosage and frequency of administration of a drug.

Drug elimination

- Drug elimination refers to the process by which a drug and its metabolites are removed from the body.
- The primary routes of drug elimination are through the kidneys (in the form of urine) and the liver (in the form of bile).
- Understanding drug elimination is important for determining the appropriate dosage and dosing interval of a drug.

Pharmacokinetic parameters

- Pharmacokinetic parameters are numerical values that describe the time course of drug absorption, distribution, metabolism, and elimination.
- Some common pharmacokinetic parameters include bioavailability, clearance, half-life, and volume of distribution.
- These parameters can be used to predict the efficacy and safety of a drug, as well as to optimize its dosage and dosing regimen.

- **Drug distribution** is the movement of a substance from one compartment to another, typically between blood and extravascular tissues.
- **Pharmacokinetics** is the study of the **ADME** of a drug over time and how it relates to its therapeutic and harmful effects. Pharmacokinetics, to put it simply, is the kinetics of ADME or **KADME**.
- **Clinical pharmacokinetics** is the application of pharmacokinetic principles to optimize drug dosage for individual patients and achieve maximum therapeutic effectiveness.

Applications of biopharmaceutics and pharmacokinetics

- Biopharmaceutics and pharmacokinetics have many practical applications in drug development and clinical practice.
- These include predicting drug efficacy and safety, optimizing drug dosing regimens, developing new drug formulations and delivery systems, and studying drug-drug interactions.
- By better understanding the biopharmaceutical and pharmacokinetic properties of drugs, we can improve the effectiveness and safety of pharmacotherapy.

Conclusion

- Biopharmaceutics and pharmacokinetics are two important fields of pharmacology that help us understand how drugs interact with the body.
- By studying drug absorption, distribution, metabolism, and elimination, we can predict drug efficacy and safety, optimize dosing regimens, and develop new drug formulations and delivery systems.
- Understanding the biopharmaceutical and pharmacokinetic properties of drugs is critical for improving the effectiveness and safety of pharmacotherapy.

- So, the understanding and ideas of Biopharmaceutics and Pharmacokinetics play a crucial role in the design and development of novel medications and their dosage forms, as well as in the enhancement of the therapeutic efficacy of already-approved medications.

REFERENCES

- Benowitz N, Forsyth R, Melmon K, Rowland M: Lidocaine disposition kinetics in monkey and man. *Clin Pharmacol Ther* 15:87–98, 1974.
- Cone EJ, Darwin WD, Wang W-L: The occurrence of cocaine, heroin and metabolites in hair of drug abusers. *Forensic Sci Int* 63:55–68, 1993.
- Brahmankar, D.M. and Jaiswal, S.B. (2009) Biopharmaceutics and Pharmacokinetics. 2nd Edition, Vallabh Prakashan, Delhi, 399-401.

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