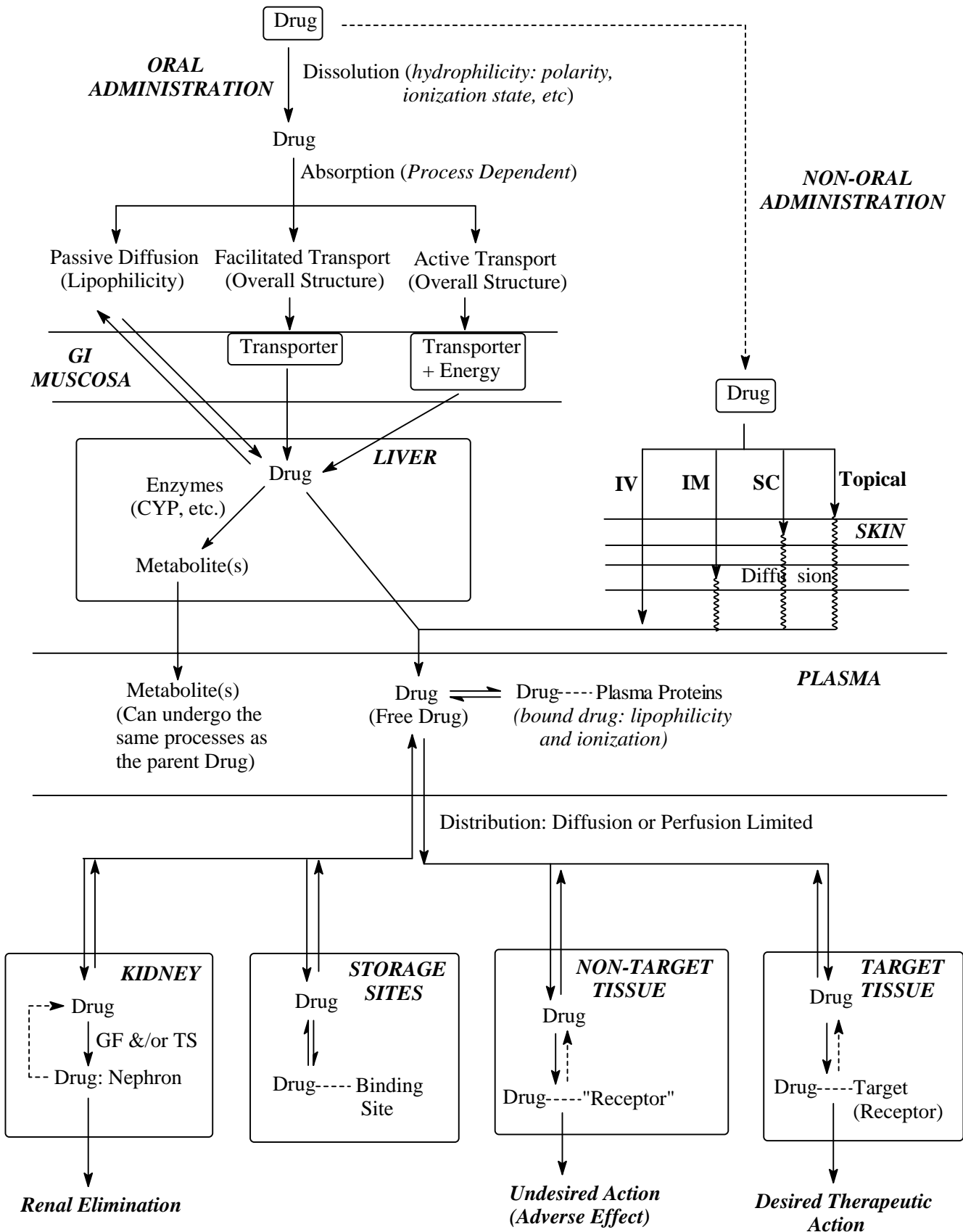
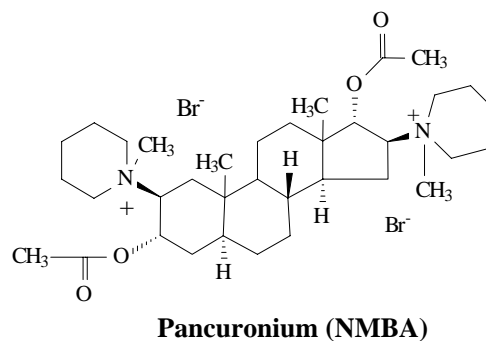
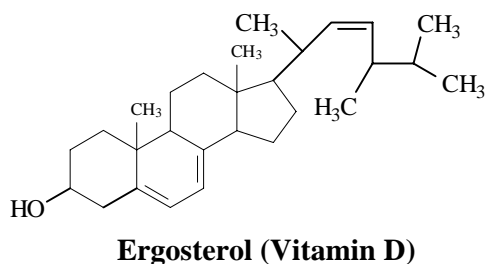
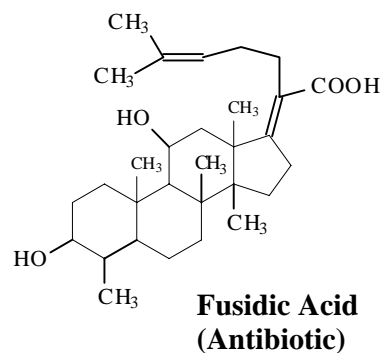
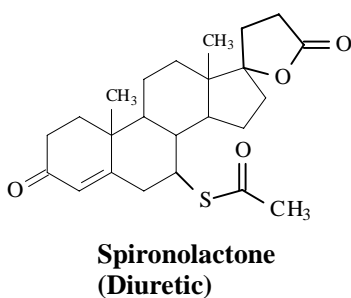
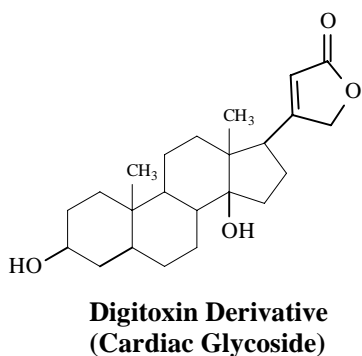
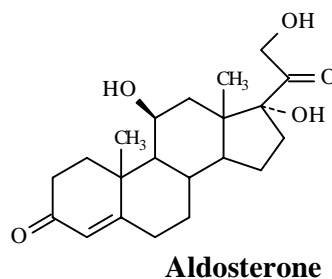
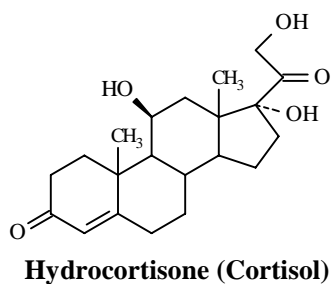
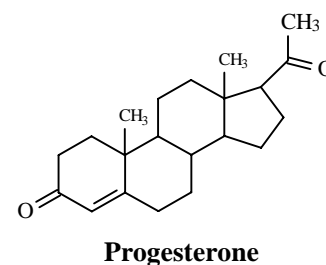
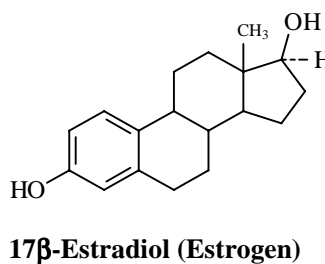
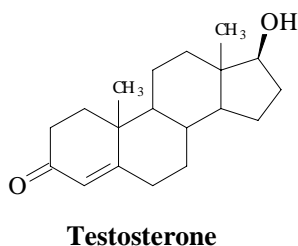
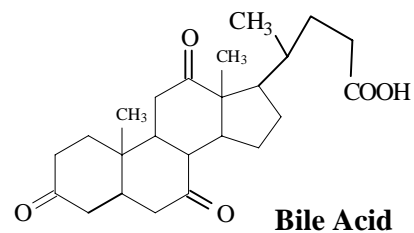
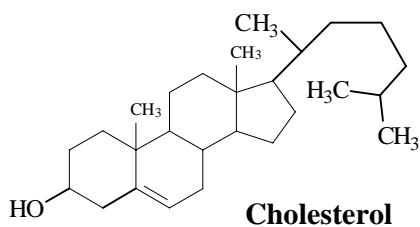
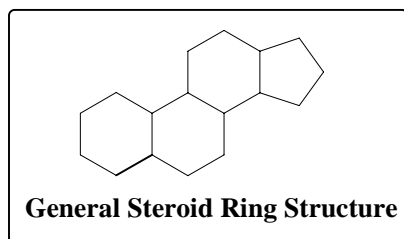


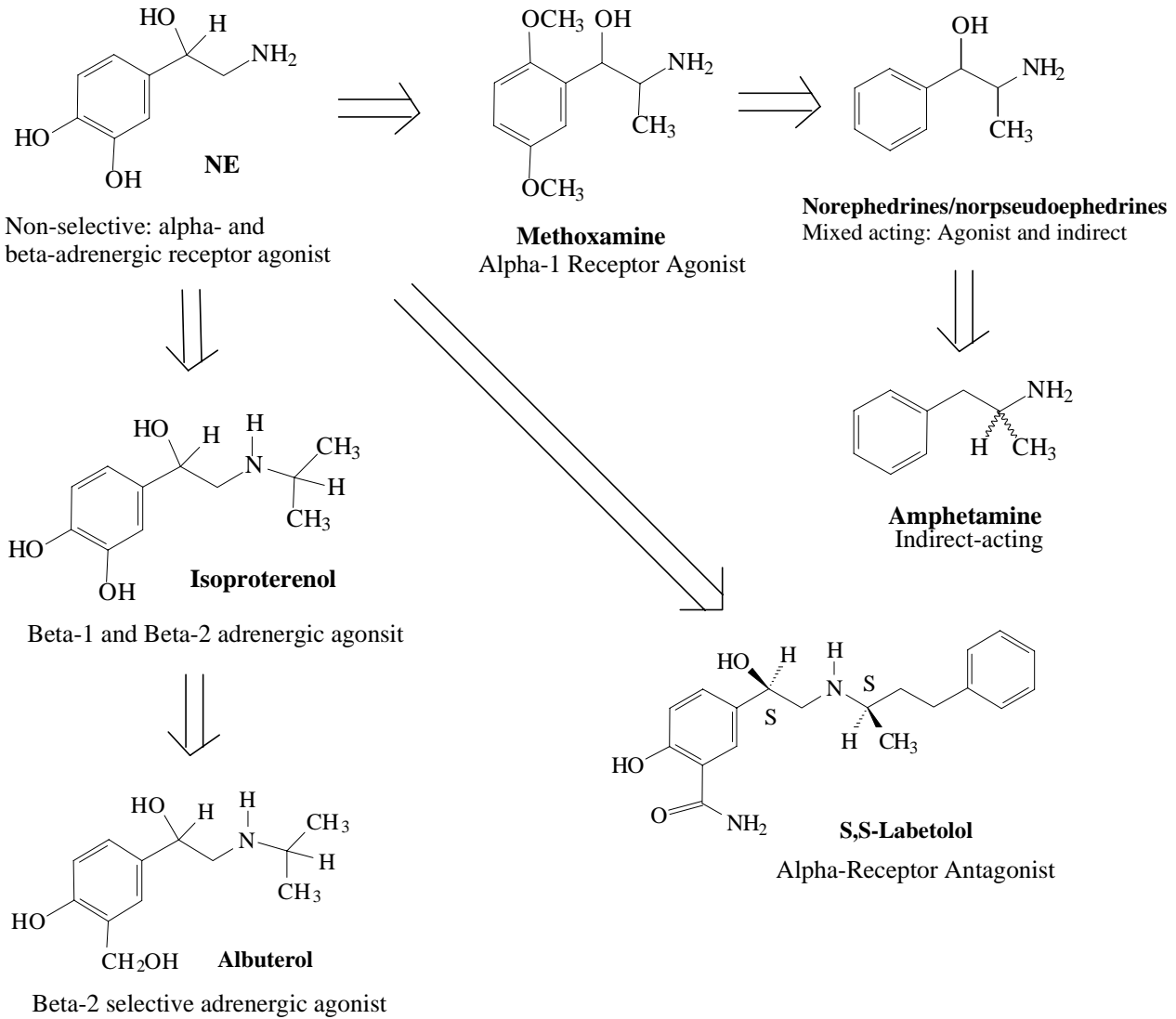
PHARMACODYNAMIC AND PHARMACOKINETIC COMPONENTS OF DRUG ACTION



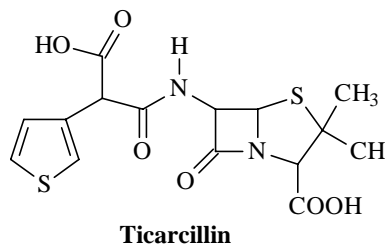
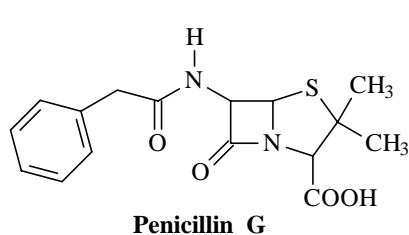
**THE INFLUENCE OF STRUCTURE ON PHARMACOLOGIC ACTIVITY:
"THE STEROIDS"**



**THE INFLUENCE OF STRUCTURE ON PHARMACOLOGIC ACTIVITY:
"THE ADRENERGIC DRUGS"**



DRUG STRUCTURE AND STRUCTURE-ACTIVITY VARIATION



Structure: Both beta-lactams of the penam class. Ticarcillin differs from Penicillin G only in the presence of an alpha-carboxyl substituent in the 6-acylamino side chain. Thus ticarcillin is a diacid while penicillin G is a monoacid.

Salt formation: Penicillin G as a monoacid can be converted to “mono-salts” with inorganic or organic bases. Ticarcillin contains an additional carboxyl group and therefore is a diacid. It can be converted to disalts with inorganic or organic bases.

Chemical Stability/Instability: Both compounds contain a relatively reactive beta-lactam with an electrophilic carbonyl capable of acylating nucleophiles. This general reaction is responsible for both drug activity and drug inactivating reactions. Ticarcillin contains an additional alpha-carboxyl group in the 6-acylamino side chain that can undergo decarboxylation in the presence of acid (stomach).

Therapeutic Activity: Both compounds are used to treat infections caused by bacteria. However their “spectrum of activity” is different. Ticarcillin is effective against a number of bacteria that are not susceptible to Penicillin G.

Mechanism of action: Similar for both compounds and involves binding to penicillin-binding proteins (PBPs) in susceptible bacteria. But these compounds differ in their binding affinity for PBPs in different bacteria.

Administration: Penicillin G can be administered orally or by injection. Ticarcillin is too acid unstable for oral administration and thus must be given by injection.

Distribution: Penicillin G is more highly protein bound than the diacid ticarcillin. Penicillin G may also penetrate some tissues (CNS) better than ticarcillin.

Metabolism: Both compounds as atypical peptide derivatives undergo minimal metabolism

Elimination: As polar, acidic compounds, both drugs are eliminated renally by glomerular filtration and tubular secretion. As a diacid, ticarcillin is capable of promoting the elimination of more cation (potassium) than penicillin G and thus is more likely to cause electrolyte disturbances.

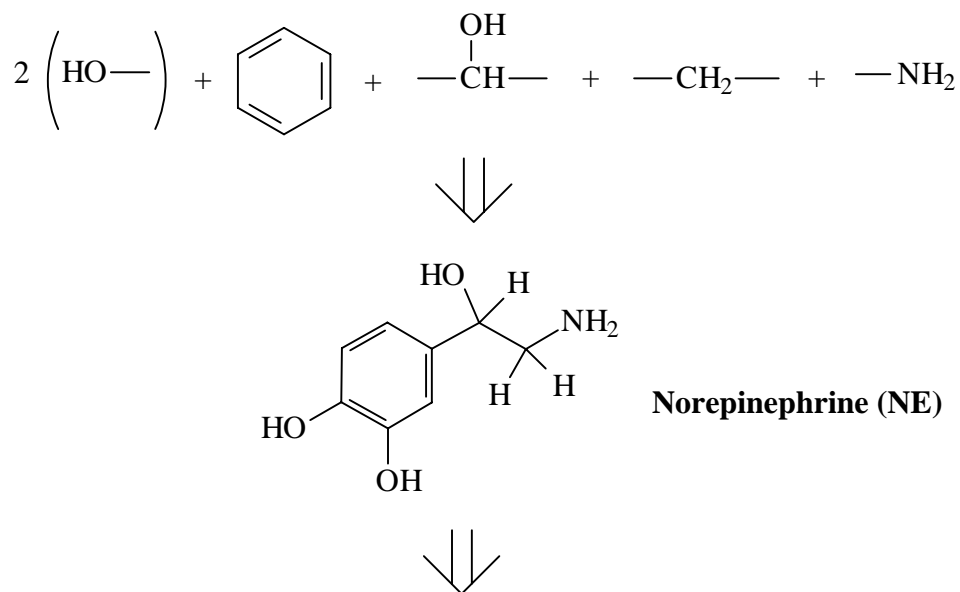
Adverse reactions: Both compounds as reactive beta-lactams can induce hypersensitivity reactions. As a diacid, Ticarcillin is more likely to cause electrolyte imbalances and to interfere with blood coagulation.

Drug Interactions: Both compounds can interfere with the efficacy of antibiotics. Because of its diacidic character and actions described above, ticarcillin is more likely to interact with diuretics and drugs that alter blood clotting.

STRUCTURE AND COMPOSITION OF DRUGS (NOREPINEPHRINE)

Molecular Formula (Atomic Composition): $C_8H_{11}NO_3$

Atom	Atomic Number	Atomic Weight	Valence	Bonds Formed (Neutral State)
H	1	1	1	1
C	6	12	4	4
N	7	14	5	3
O	8	16	6	2



PROPERTIES:

- Functional Groups: Phenol (aromatic OH), alcohol, alkane, amine
- Acidity: Phenols are weak acids
- Basicity: Amine (NH_2). Possible salt formation
- Nucleophilicity: OHs and NH_2
- Chirality: Benzylic carbon (R and S-enantiomers)
- Oxidizable Functionality: Catechol (phenols), Amine, Alcohol