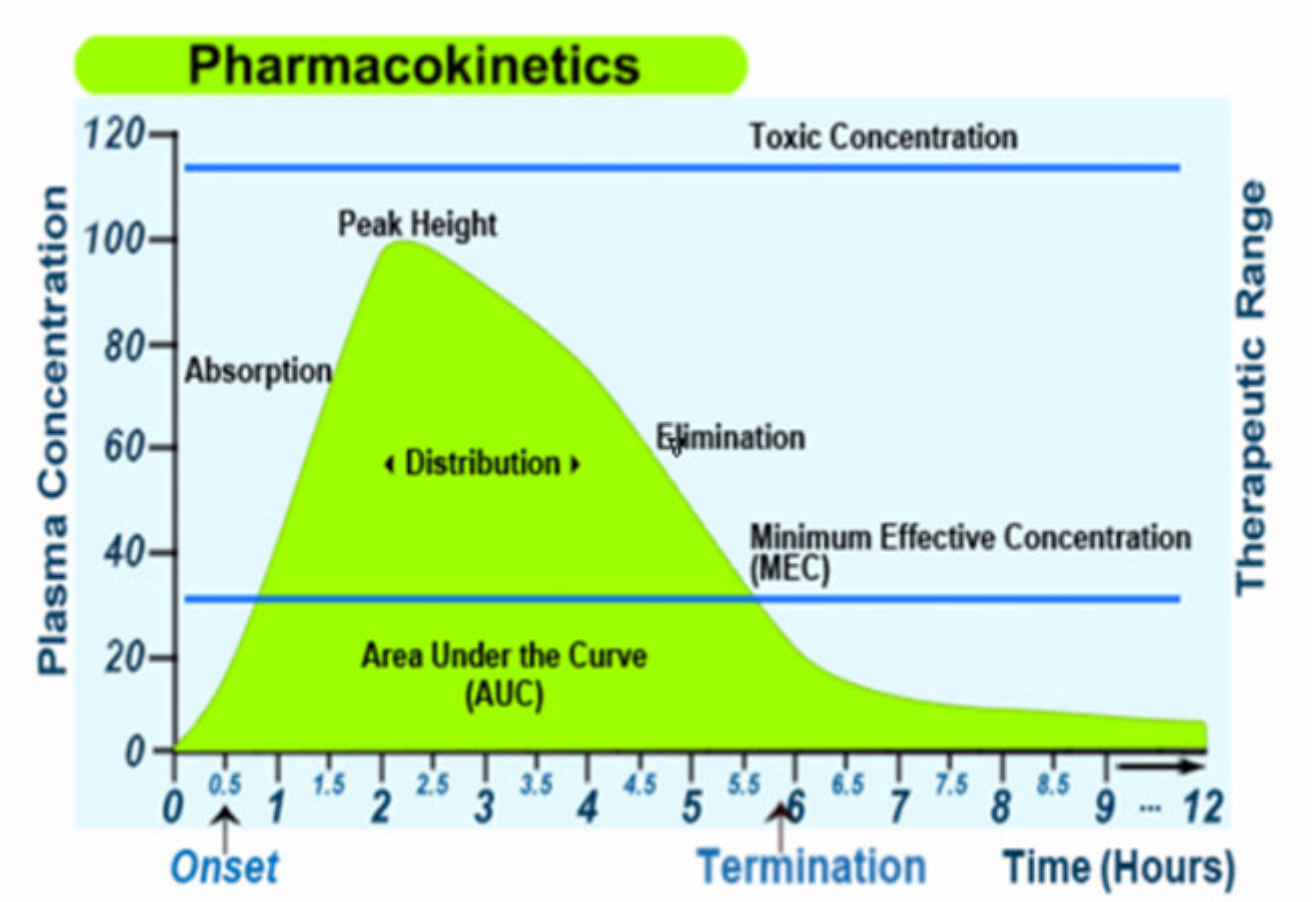
Pharmacology 1 and Prescription Knowledge

Pharmakokinetics

Refer lecturer for course updated notes.

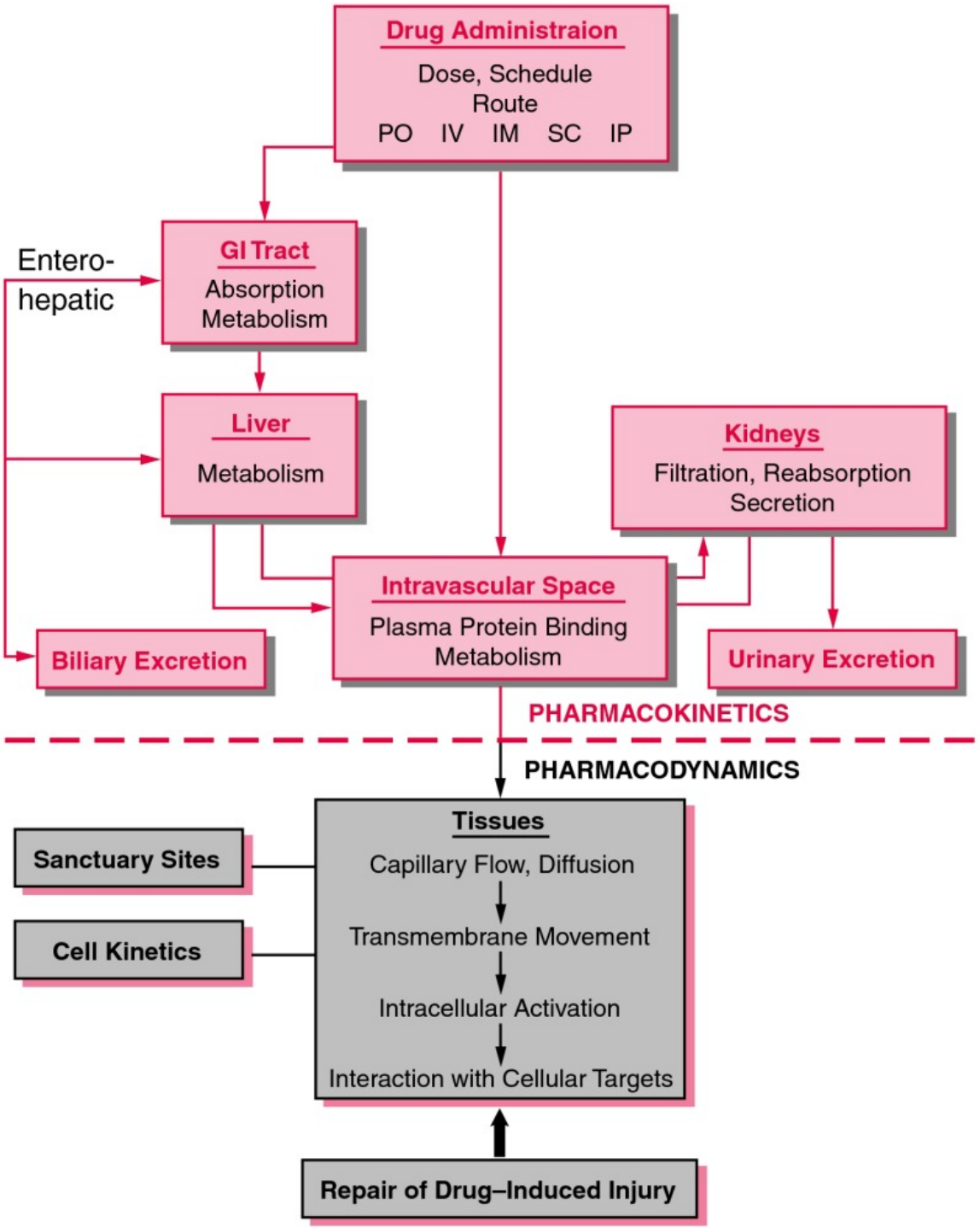
Students are oblidged to follow the courses for evaluation process and presented notes are preliminary drafts for the whole evaluation process.

- Pharmacokinetics is the study of drug absorption, distribution, metabolism, and excretion



Pharmacokinetics is currently defined as the study of the time course of drug absorption, distribution, metabolism, and excretion. *Clinical pharmacokinetics* is the application of pharmacokinetic principles to the safe and effective therapeutic management of drugs in an individual patient.

- Pharmakokinetic Tools
- Introduction to ADME (absorption, disrtibution, metabolism and excretion-elimination)
- Zero-order reaction
- First-order reaction



Principles of Pharmacokinet

Mark J. Ratain, MD and William K. Plunkett, Jr,

	Ionisation, %	
pKa-pH	Acidic compounds	Basic compounds
-4.0	99.99	0.01
-3.0	99.94	0.10
-2.0	99.01	0.99
-1.0	90.91	9.09
-0.5	76	24
-0.4	72	28
-0.3	67	33
-0.2	61	39
-0.1	56	44
0.0	50	50
+0.1	44	56
+0.2	39	61
+1.0	9.09	90.91
+2.0	0.99	99.01
+3.0	0.10	99.94
+4.0	0.01	99.99

- Multiple dosing
- Hepatic Clearance
- Metabolyte kinetcs
- Renal Clearance

- Pharmacokinetic models
- One-compartmental model
- Two-compartmental model
- Multicompartmental models
- Non linear pharmacokinetics

- Pharmacokinetic parameters
- Elimination rate constant
- Volume of distribution
- Half life
- Clearance
- Pharmakokinetic applications (Single IV, Multiple I/IM, IV infusion, single oral/multiple oral döşe)

- Pharmakokinetic equations
- Selection of equations in clinical practice

- Excretion ratio & first pass effect
- Target concentration
- Therapeutic drug monitoring

- **The use of drugs-the use of drugs and ways to be given; Blood (plasma, serum) min, effective density (LOEC) for a certain period of time, ensuring continuing. In the treatment of Various skin diseases skin medications, solution, lotion, ointment, cream and powder form and is applied to the skin. Sometimes, reflektorik and systemic effects (nitroglycerin transdermal disc) and in this way to ensure that they are applied. Leather, fat-soluble substances with water permeable; faster speed and, to a lesser extent, fat-soluble substances can be absorbed through the skin. Nicotine, dieldrin, parathion, karbontetraclorid and some items (like sarin) s skin can easily take a second poisoning.**

- **Mucosal Digestive channel Oral, sublingual, straight intestine Mouth is easy, secure and do not have to be pure or of sterile pharmaceutical formulations, drugs are the most common way in launching the body. Oral medications to be given solid (tablets, capsules, coated, granule, powder, chewable tablet, bubble bath tablets, etc.) and liquid (solution, suspension, syrup, draught, cuttle fish, drops, eliksir) are prepared in the form of. Drugs; local (digestive channel) and creates a systemic effect. Emilmeyi digestive channel affects many factors. The item is the size of the molecules, Crystal shape and density of the solution with other substances or when the MediaPoolTypeID is supplied With feed or interact with food, formulation and pharmaceutical, animal species differ in terms of features and functions of the digestive system between, Gastro-intestinal movements, ejaculation time and the contents of the digestive canal fluid secretions and Digestive track microbial activity, polarity, Tim**

- Gastro-intestinal mucosal epithelial cell integrity of, the content like the duration of the transition. Çözünürlüklerinin due to the salts of the drugs more alkaline or acidic patterns (ionized shapes) they are absorbed better digestive channel. The stomach acid environment water and weak acid with qualified alcohol drugs (salicylates, barbiturates, penicillin) is largely ionized in a way that never happened; so good they are absorbed. Not more than weak alkaline medications stomach emil. Stomach in all animal species is not capable of sucking the same extent. Only with good absorption in carnivorous and herbivorous animals, is weak in single quoted. The first three of the stomach Gevişenlerde pane absorption is less than that of the last part. Absorption of drugs rising hog, usually dogs and cats alike. The small intestine is the absorption of important cases, gastric emptying and gastro-intestinal drug absorption rate is important in terms of transactions. Atropine, adrenaline, etc etc, opioids, noro ...

- **Sublingual oral and sublingual mucosa capillaries are especially rich in the veins; for this reason, the ability to absorb too much. It doesn't matter in terms of veterinary pharmacology. From here, enter systemic circulation without medications absorbed liver are very fast and powerful effects scattered out into the body. Emilmeyi Accelerator property to the number of medications that are applied in this way, although very small and all of them are also used in humans. Sublingual main drugs given through organic nitrates, izoproteren and some steroid hormone. Drugs are usually quick-soluble are prepared in the form of small tablets (linguet) or solution. They cut in sugar solution drop, pill or tablet is directly between the gingiva and palate is applied. Dissolution must be swallowed saliva during a certain period of time.**

- **Straight intestinal Local (hemorrhoid) and systemic effects (fever, pain hacks) are applied in this way to create. In the last case the drugs, such as nausea and vomiting, although it is difficult or impossible (difficulty swallowing, jaw fracture) and stomach from medications (such as aspirin) startled in terms of importance. Straight intestinal veins lower hypogastric vein hemorrhoidal plexuses and facilitated direct contacts with v. cava inferior; without the liver passes through the systemic circulation is absorbed drugs; for that, it is fast and powerful effects. Due to the structure of the small intestine absorption ability and the flat field (20-400 sm2) and imbued with the small intestine largely weak and small. Straight from the bowels of each item and cannot be absorbed; absorption and secretion of bile acids for showing items needed (fat-soluble vitamins, etc.) in this way, they absorbed. Straight through the intestinal tract medications are applied in the form of ointment, solution and wick. Solution prepared drugs infusion in ...**

- **In terms of respiratory Medicines implementation and absorption is important especially in the nasal mucosa and the alveoli; be absorbed in the windpipe is extremely limited. The medication is absorbed quickly and easily from the nasal mucosa and alveolar. Especially in the alveoli is too wide (the number of people in 300-400, area 100-200 m2) creating a suction surface and veins due to be rich, some medications and substances (carbon monoxide, ammonia, sulphur dioxide gas; karbontetraklörür, benzene, turpentine, volatile liquid anesthetics such as steam; solid materials, such as silica) in the form of liquid and solid particles they are absorbed quickly and easily. Received within the particles of respiratory air movement is as follows. 25% shall be brought back. 50% of upper-respiratory tract is kept in. the lower-respiratory tract of 25% much. The diameter of the particle Aerosollarda absorption and in terms of the various parts of the Eclipse of the Airways is extremely important. ≥ 5 µm diameter particles often naso-pharyngeal region, 2 ...**

- **Incense (Fumigation): Heat can fly with the help of fan items. Divided into dry and wet because of incense. First pharmaceutical direct-fired or brick or tiles recently placed angry, the second time in boiling water, poured the wet straw etc. heated koklatılır. Respiratory tract antiseptics, expectorant, barn, folders etc places commonly referred to tütsülemeye the disinfection. Koklatma (Inhalation): Normal temperature by itself is a form of application of medications that can buharlaşa. General anesthetics, especially volatile liquids are applied in this way. Oil-water distribution coefficients of large and small molecular weight substances koklatılarak (open or closed system) that, when applied, forming a very large surface area circulate rapidly passes through the alveoli from systemic absorbed and creates the effects. Spraying: Pressurized aerosol sprayer tools prepared in drugs, through very small granules by spraying into nasal mucosa should be generally in the form of salts. Provides the driving force ...**

- **Other mucosal routes (Conjunctiva-like the vagina-) Vaginal absorption of drugs the way is very suitable for Vaginal mucosa. It is preferable to take advantage of the local impact of drugs. System-related bacterial, fungal, and parasitic diseases in drugs treatment solution, cream, ointment, and is exposed by using the local effects of applied in ovül. In particular the contact details of the birth and bleeding, uterine Mucosa, including during applied remedies absorbs quickly and easily. Eye konjunktivası Eye diseases and eye examination of polluted products can be applied in this way. Called kollir to the form of the medication that is applied to the eye; usually eye drops or ointment is prepared in the event. A portion of the drug is applied to afford naso-lacrimal duct into the nose from the mucosa is spread over a wider area and can lead to a systemic effect. Some drugs (atropine) that can cause a systemic effect on the mucous membranes of eyes to the extent of absorbable. To apply eye medications low intensity and germ-must ...**

- **Parenteral parenteral routes as common ways to use drugs; The clean, Isotonic, body pH to be close, the fire must not carcinogenic substances. Leather interior is rarely referred to as a road that leads to dermal injection is often used in the diagnosis of diseases such as tuberculosis and ruam. The amount of the given solution varies from 0.1-0.2 ml. Skin-specific Body parts of the six (DA) injected under the skin fat and connective tissue, spreading over the drug solution is quickly absorbed. Aqueous solution based on a variety of factors that affect medicines that are applied in emilmeyi (place of injection damarlaşma, oil-water partition coefficient, exposed, such as the status field, density, ionization) reaches peak plasma density within 30 min. Oily solvents absorption is difficult; in this way are not applied much. The volume of drugs to be injected; Dog and cat 1-2 ml 5-10 ml, is among the cattle. In case of loss of fluid from the body physiologically more amounts of salt water and glucose solutions follow.**

- **Mediated migration**
- · **Active relocation**
- · Drug molecules by means of a carrier (carrier protein) absorption.
- · Carrier protein speed limiter.
- · Overflow rate is proportional to the intensity of low status or medication density is against.
- · The density of the plasma with drug or there is a direct relationship between the EAA.
- · Is not proportional with the amount of discarded drug excreted in the urine; in large doses the longer half life being discarded.
- · Switch to *zero degrees kinetiğe* .
- · Shows need for metabolic energy.
- · Transition is blocked with the metabolic poison.
- · Used transport vehicles-Jesus.
- · Structure, or physico-chemical properties are similar to the days of the week are racing to connect between the transport protein.
- · Many items in the mucosa of digestive canal (amino acids, mono sakkarid, iron, glucose-sodium) absorption,
- · Strong the drug metabolites with acidic and basic drugs in the urine and bile passages,
- · Certain drugs (such as Penicillins) removal from the nervous system,
- · Certain drugs (aminoglycosides) is the active transport of bacteria cells entry.
- · Cell membranes need, as well as various transport systems are also found in the nerve endings (these are often referred to at the end of the pump in case of nerve from; these **amine pump**, cell membrane in the *Na, K-Atpase*) enabled instances of the transport system.

- **Facilitated diffusion**
- o Without sacrificing energy carrier-facilitated Drug molecules.
- o Jesus and the competition can be blocked as well.
- o Drug molecules, they are very busy environment move toward less than intensive environment.
- o According to the Simple transition faster.
- o Regulate digestive absorption, plasma and red blood cells from the channel to enter the CNS,
- o Connecting to oxygen in the lungs of Hb,
- o Amino acids into cells,
- o Kobalaminin absorption from the intestines are a prime example.
-
- · **Pinositoz** (Endocytosis, Phagocytosis)
- o Pockets of cell membranes by making an indentation in a way similar to the external environment, **liquid make droplets compatible with both** stoplazma received here is to merge with its contents.
- o **Solid particles** taking the cell phagocytosis.
- o Pinositoz;
- § In particular the large molecular weight substances are colloids with absorption,
- § Some toxic or retikulo in the spleen and liver of impurities-endothelial system (RES),
- § Alveollerdeki removal with solid particles important alveolar phagocytes.
- o Fagositozla 200-400 freshforu poison in a thousand molecules even digestive channel absorbable weight, poisoning and can lead to death.

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- Some medications (neomycin, tetracycline, Chloramphenicol), especially calves, including small intestine mucosal protrusion and a reduction in the number and height of the curve leads to the damage.
- o In addition, other items Themselves change in the absorption.
-
- · Oral given antibacterial substances in the digestive tract microbial florayı gets under pressure can disrupt the balance between them (e.g.).
- · Some drugs are broken down in this way introduced or are exposed to a high percentage of first-pass effect; Hence, in this way are not used at all.

- Bioavailability (absorption ratio)
- · Mouth, pharynx, esophagus
- · The stomach
- Intestines
- · The dispersion, dissolution, absorption
- · Absorption rate is too low from the right **solution, suspension, compressed tablets, sugar-cocoa-coated tablets, intestinal coated tablet** reduced by following the order.

- **Sublingual**
- o Oral and sublingual mucosa capillaries are especially rich in the veins; for this reason, the ability to absorb too much.
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- o Straight through the intestinal tract medications are applied in the form of ointment, solution and wick.
- § Solution prepared drugs into **infusion** (pressure) or **enema** (water cannons, enema) is applied in the form of.

Bio-equivalency (Bioequivalency): This is the shipment of an item, the same organisms and the same experimental conditions, the bioavailability of single or repeated doses of peer criteria (volume and speed) is the status that it has.

- One of the drugs Examined plasma density-time curve in conflicts or differences with the other in acceptable criteria (within the limits of 80-125%) is considered to be Bioequivalent to two substances.

Clinical equivalency The same dose and dose range the same organisms, when given the same therapeutic effect as pharmacological, chemical or pharmaceutical and leads to a generic drug or medicine is a term that meets your way.

Equivalency Pharmacological : In this case as different shape inside two separate pharmaceutical, chemical, but revealing the same active molecules in the body and leads to the same pharmacological effect is the status of the joining of molecules. Eritormisin est palasara and erythromycin stearate ester or of the same item, such as salts pharmacological ways are equivalent; they're both the same substance in the body disintegrates into.

Pharmaceutical equivalency : Of the same quantity of the same item of pharmaceutical form should be joined refers to the status in which pharmaceutical shapes, solid or fillers is different, should answered all the requirements of the official prediction.

Chemical equivalency The same amount of the same active substance and: the same dose used in different pharmaceutical forms (such as tablets, dragees) a drug official-prediction in physico-chemical properties of the transport.

Dissolution of the Body of Drugs

Drugs are not a uniform distributed throughout the body.

- **Plasma**: Dextran, heparin.
- **Plasma and intercellular liquid**: insulin, tiyosiyanat, karbenisilin, aminoglycosides.
- **Plasma, intercellular fluid and cell-liquid**: Alcohol, urea, antipyrine, macrolide and quinolone antibiotics.

The body fluid compartments

- Liquid in the body varies from 50-75%.
  - Healthy adult animals:% 55-60
  - Teens:% 70-75
  - Bansal: ≅50%
- Body water is 2/3, 1/3 HDS (plasma, intercellular fluid, transsellü, liquid)

Body fluids and rates.

Liquid part	Body weight ratio,%
Intracellular fluid	40 (65% of total body water)
Plasma	4.5-5 (7.5% of total body water)
Intercellular liquid	14 (27% of total body water)
Transsellüler water	1-6 (2.5% total body water)
Solid part	40

Factors affecting the distribution of

- Molecular size
- Tissue and blood proteins of interest connecting these format
- They present changes in the body
- The difference between plasma and various cuts pH (plasma 7.4, 7.3, milk 6.5-6.8, kidney tubules fluid 5-8, normal tissue-organ 7-7.4, inflammation tissue-organ 6-7)
- A variety of natural obstacles found in the body
- Ways of being discarded

- First pass effect

Aspirin, butorfanol, dekstropropoksifen, dihidroergotamin, diltiazem, eritromisin, 5-florourasil, hidralazin, diazepam, fenitoin, imipramid, izoproterenol, izosorbid dinitrat, klorpromazin, labetolol, levodopa, lidokain, meperidin, metilfenidat, metoprolol, morfin, neostigmin, nifedipin, nitrogliserin, nortriptilin, papaverin, penisilin G, pentazosin, prazosin, progesteron, propranolol, salbutamol, testosteron, verapamil gibi.

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A variety of natural obstacles found in the body

Ways of being discarded

- **Albumen** : MA 67,000
  - Weak acid substances: tetracycline, penicillin, aspirin, etc., coumarins, ascorbic acid.
- **Alpha-$_1$-acid glycoprotein** : MA 42,000
  - Weakly alkaline substances: Antihistamines, Neuroleptics, opioids.
- **Lipoproteins** (alpha-and beta-lipoproteins): MA 0.2-2.4 million
  - Steroids, vitamins are easy to resolve in the oil like
- **Transkortin** : MA 53,000
- **The transfer**
  - As iron.
- **Ceruloplasmin**
  - Copper

Connecting to a plasma protein ratio grouping

- **High** : ≥ 80%
- **Medium** :% 80-50
- **Low** :% 50-10
- **Very low** : ≤ 10%

- **After the break-up in the tissue**
- · **Natural obstacles**
- o **Blood-brain barrier** : Glia cells are besieged with brain capillaries vein.
-
- o **Placenta barrier**
- § **Easy/good passers**
- · Good soluble in oil
- · Small molecular weight (£500)
- · Plasma proteins are connected to low rate
- · Those who have never been ionized
- § **They're tough**
- · The large molecular weight (³1000)
- · Ionized ones
- · The uterine muscles are safe
-
- o **Breast-cloth barrier**
- § **Organic acid substances** : Barbitüratler, penis, sulfonamides drugs such as die hard; they can't get usually effective density in milk.
- § **Organic basic substances** : Morphine, lincosamide, passes through the easy drugs such as macrolides; reach effective density in milk.
-
-

Distribution volume (Vd)

- This; **visible** or **the volume of the virtual distribution** , also known as.
- The use of a certain dose of the drug (usually Dİ) is followed by the given amount (D) at any given time divided by the measured density plasma (Y) is the name given the volume.
  - The disintegration of A liquid volume equal density to plasma drug plots.
- Unit: L or L/kg
- The actual distribution volume: 0.5-0.6 L/kg
- Et al. 's size;
  - If an item is easy, out of the vein or plasma
  - They have accumulated a certain organ and/or tissue,
  - After the break-up, in the same way all over the body
  - Half-lives and/or duration of effect indicates that long.

According to the body fluids of some drugs, Vd values.

Volume L/kg	Pane	VD, L/kg	Samples
0.05	Plasma	0.05-0.1	Heparin, insulin
		0.1-0.2	Warfarin, sulfamethoxazole, atenolol
0.2	HDS	0.2-0.4	Tubokurarin
		0.4-0.7	Theophylline
0.55-0.6	Total body water	< 1	Alcohol, neostigmine, phenytoin
		1-2	Methotrexate, indometa, paracetamol, diazepam
		2-5	Chlorpromazine, morphine, nitroglycerin, propranolol
		> 10	Nortriptilin, imipira, digoxin

Medication storage

- Warfarin, Salicylates, digitoksin and they are connected to plasma proteins highly fenilbutazon.
- Chlorinated organic cotton farming, thiopental and dibena just fatty tissue.
- Tetracyclines, lead, fluoride and strontium bone tissue.
- Chloroquine nucleic acids.
- Arsenic, gold, silver, mercury and grizeofulvin skin, nails and hair as keratinized structures.
- Iodine in the thyroid gland.
- DALI self part of the adrenal gland and Ascorbic acid.
- Heavy metals, cardiac Glycoside, atebrin and morphine in the liver.
- Cardiac Glycoside in the heart muscle and striated muscle.
- Chloroquine, iron and other metals retikulo endothelial system (RES) and pile up.

Beat the fat tissue

- 5%-18% of Live weight (approximately 15%) oil; the oil ≅ 25% of the water.
- A substance that dissolves easily in hot oil (oil/water partition coefficient like thiopental with large "10") a significant portion (75%) are stored in the fat tissue and.
- Tap on the blood perfusion of oil is very low; in this case;
  - The drug slows the speed of oil entering the tissue.
  - The stored one's release.
- Very good soluble in oil (general anesthetics, volatile liquid tiyobarbi türat) originally limited and rapidly impact these cuts entry is provided to.
  - Some farming and environmental pollutant (klorluhidrokarbon) helps make it harmless or Eclipse.

Re distribution

- Once the resolution a lot of drugs (such as thiopental coefficient of oil/water distribution is large), the first to be given quickly when applied, followed by the body tissues of the organ or more veins before (brain, heart, kidney, etc.) high density.
- After a certain period of time, forming a large volume of blood circulating in the medication in the body begin to accumulate in fatty tissues
  - The circulating drug molecules are fatty tissue and organs for pharmaceutical molecules listed above over the blood and fat tissue starts to cross and blood.
  - Thus, the drug shows a new distribution pattern.
- That event is actually a distancing from the effects of drugs and the impact of weaker and serves to end.
- Fat tissue by the other drug molecules is metabolized slowly swings here and excreted.
  - In dogs oxytetracyclin.
  - Sülfadimetoksin in cattle.
  - Camelot Visco-Sulfadiazine.
  - In humans digoxin, diazepam and pentazo.
  - All Human and animal with thiopental in aminoglycoside antibiotics are distributed in the body, 3-compartment model.

Ion trap

- Simple convenient diffusion appears to be allocated and the difference between pH in a system of two-pane conveniently located iyonlaşmasına side any medicine is collected at high intensity.
- this case took place according to the pH distribution hypothesis **ion trap** .
- According to this;
  - Basic drugs in low pH (i.e. acidic),
  - Acidic drugs is even higher (i.e. alkaline) side.

Xyostimogns changing substances with activity:

Change of activity	The main drug	Metabolite
Weak effective metabolite	Lidocaine	Dietilidokain
	Aspirin	Salicylic acid
	Chlorpromazine	5-hidroksiklorpro mazin
As effective as main drug metabolite	Fenilbutazon	Oksifenbutazon
	Diazepam	Desmetildiazepam
	Cornellia98_th4e	Desmetilklordiazepoksid
More effective metabolite	Imipiramin	Desipiramin
	Codeine and heroin	Morphine
	Amitriptyline	Nortriptilin

Constituting the pharmaceutical toxic metabolite.

The main drug	The toxic metabolite
Lidocaine	Glisilheksilidin
Chloroform	Phosgene
Hasti	Formaldehyde, formic acid
Halothane stays	Trifloroasetik acid
Sulfonamides	Asetilli-sulfonamides
Metoksifluran	Flor
Paracetamol	N-acetyl-p-my benzokuinone

Front-drugs and active Lager.

Prodrug	Active shape
Vitamin D	1.25-dihidroksivitamin D
Prontosil	Sulfanilamide
Cortisone	Cortisol (hydrocortisone)
Carotene	Retinol
Kloralhidrat	Trikloroetanol
Malatiyon	Malaokson
Zidovudine	Zidovudine triphosphate
Azatiyoprin	Merkaptopurin

- **Microsomal enzymes**
- **1. Cytochrome P450** (CYP)
- o Two flavoprotein (NADPH – P450 reductase stokrom "NADPH-stokrom c reductase, also known as" and NADH-stokrom b_5 reductase)
- o Two hemoprotein (Stokrom P450 and stokrom b_5)
- o You Two pri nucleotides (NADPH, NADH)

P450-type	Reaction	Substrate
CYP1A1	Hydroxylation of	Benzo-a-painter
CYP1A2	N-Hydroxylation Of	Asetilaminofloren
CYP2A1	7 α -Hydroxylation of	Testosterone
CYP2A2	15 α -Hydroxylation of	Testosterone
CYP2B1	Hydroxylation of	Hekzobarbital
CYP2B2	O-Deetilasyon	7-Pentoksiresorufin
CYP2C	Hydroxylation of	S-Mefenitoin
CYP2D	Hydroxylation of Alisiklik	Debrisokuin
CYP2E1	Hydroxylation of	p-Nitrofenil
	Hydroxylation of	Aniline
The CYP3A	N-Demetilasyon	Ethylmorphine
	Hydroxylation of	Steroids
CYP4A1	ω -Hydroxylation of	Lauric acid
CYP11A	Rupture	Cholesterol
CYP 11B	11 β -Hydroxylation of	Deoksikortizol
CYP17	17 α -Hydroxylation of	Pregnenolon
CYP19		Androgens
CYP21	21-Hydroxylation of	Progesterone

The first figure is the family gene; upper case lower-family; If the last c
is the enzyme gene in the family-child.

2. Flavinmonooksijenaz (FMO)
FMO1, FMO2, FMO3 type.

Enzymatic activity is high-texture-organs
- Liver: Microsomal enzymes
- Lung: KOMT, MAO, PGS, AHH, angiotensin converting enzyme, such as
- Kidney: Sülfotransferazlar, glutasyon-s-transferase are
- Digestive channel: Microsomal enzymes, glukuronidaz, MAO
- Nasal mucosa: P450, FMO, glutasyon-s-transferase are
- Other textures: a large number of enzyme

IT routes
- Phase I reactions
  - Oxidation
  - Reduction
  - Rupture
- Phase II reactions
- Phase III reactions

- **Phase I reactions**
- **Oxidation**
- **They performed with ME**
- **The aromatic ring hydroxylation of**
- *AHH* (CYP1A, stokrom P448)
- Epoxide formation (Electrophilic group); arenoksit (aromatic hydrocarbons) and alkenoksit (aliphatic alken)
- By Nucleophilic acyl substitution group (giving Electron materials, such as GSH)
- PAHS (Benzo-a-painter)
-
- **Side chain aliphatic hydroxylation of** (Hidroksillenme, Karboksillenme)
- Barbiturates: Pentobarbitalden hidroksipentobarbital and pentobarbital carboxylic acid formation
- Hekzandan hexane-2.5-dion formation
-
- **Alisiklik-hydroxylation of heterocyclic ring**
- Hydroxylation of saturated rings with a single-or two-hidroksilli balance of alcohol
- Cyclohexane conformation before Siklohekzandan, then *trans*-cyclohexane conformation-1.2-dion formation
-
- **Dealkilasyon** (N-, O-and S-Dealkilasyon)
- N-, O-, S-depending on alkyl groups in yükseltgenmesi
- **N-Dealkilasyon** : Enrofloksasinden metilamfetamin caffeine from amphetamines, theophylline, ciprofloxacin, metilkarbonium ion formation of nitrosamines
- **O-Dealkilasyon** : Kodeinden morphine
- **S-Dealkilasyon** : Mesurol, merkaptopürin
-

- **Oxidative deamination**
- Alpha-my metila; amphetamine fenilaseton
-
- **N-Oxidation** (N-Oxidation, N-Hydroxylation Of)
- Aromatic and some secondary amine (aniline) are translated to my hidroksila; reaction products are toxic-harmful.
- Anilinden fenilhidroksila, 2-asetilaminoflore N-hydroxy-2-asetilaminofloren.
-
- **Kükürtsüzleşme**
- Tip and sulfhydryl groups groups respectively keto and hydroxyl groups.
- Paratiyondan paraokson, thiopental from pentobarbital.
-
- **Sulfoxide formation** (S-Oxidation)
- The formation of the sulfoxide and sülfon.
- Tiyoeter group sülfoksite.
- Klorpromazinden chlorpromazine-5-oxide occurs.
- Albendazolden albendazole-5-oxide occurs.
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- **Halogen disconnection**
- DDT occurs from DDE.
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- **They performed with non-enzyme microsomal**
- **Alcohol dehydrogenase, aldehyde dehydrogenase**
- Ethyl alcohol, Acetaldehyde, Acetic acid, water + CO_2
-
- **Monoaminoksidaz** (MAO-A AND MAO-B)
- Adrenaline, NA, setoro; Dopamine, phenylethylamine, tyranny
- MAO-A: Adrenaline, NA, serotonin
- MAO-B: dopamine, tripta, Debi
-
- **Ksantin oxidase**
- Hipoksantin, k Collins from uric acid oluşymu
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-
- **Reduction**
- **Azo Group (-N = N-) reduction**
- NAD (P) H stokrom c reductase, depending on
- Prontosilden sulfanilamide
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- **Nitro Group reduction**
- Aromatic nitro compound and hidroksila are my takes shape
- Nitrobenzen-Fenilhidroksilamin-Paraaminofenol-Sulfate compound
- Kloramfenilkolden the balance my derivative arila
-
- **Reduction of the aldehyde and ketone group**
- Aldehidler is translated to the primary alcohols, ketones to secondary alcohols
- Alcohol dehydrogenase, Carbonyl reductase
- Kloralden trikloroetanol
- Menoftondan 1.4-dihydrobenzoic-2-metilnaftalen formation
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- **Disulfide group reduction**
- Disulfide bonds downgraded to disülfid
- Disülfiramdan dietilditiyokarbamik acid formation
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-

- **Breaking reactions**
- **Hydrolysis**
- Ester (-CO. O-) and amide (-CO. NH-) groups are exposed to
- Plasma and tissue esterase (Arilesterazlar, karboksiesteraz, cholinesterase, asetilesteraz) is mediated by
- Prokainden p-aminobenzoik acid and dietilaminoetanol
- Glukuronidlerin hydrolysis (b-glukuronidaz)
- Hydrolysis of organic phosphorous cotton farming (AkE)
- İzoniazidden izonikotinik acid and asetilizo nizid; the last one is shaped from acetyl and asetilkarbonium groups
- Fenasetinden you feneti; the latter translates to Hb, mHb
-
- **Dealkilasyon (O-, N-)**
- Fenasetinden paracetamol
- Meperidinden you normeperi
-
- **Dekarboksilasyon**
- L-DANNY
- Histidine, L-dopa, alfametildopa, 5-hydroxytryptamine
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- **Halogen disconnection**
- It occurs from DDE DDT
- Karbontetraklorürden triklorometil "the CCl_3" formation
- Halotandan carbon merkezili group "CF_3-CHCl" formation
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- **Phase II reactions**
- Merger reactions (synthetic reactions)
- Merger product/products
- This reaction with the substance; water soluble and can be thrown from the body shape easier.
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-
- **Glukuronik acid incorporation**
- Alcohols, phenols, carboxylic acids, tiyol, primary amines, such as my hidroksila
- UDP-gluronil transferase: Cat, fish missing
- Glucuronide: MA £ 250 (urine), 250-350, ³ 350 (Bile)
- b -glukuronidaz: Gut-liver circulation
- The opposition has a harmless-non-toxic is the overriding reaction; also toxic metabolites (such as 6-glucuronide morphine)
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Drug and metabolites in the human kidney and liver are grouped according to the rate being expelled.

Discarded organ	Discarded ratio		
	Low (< 0.3)	Medium (0.3-0.7)	High (> 0.7)
Kidney	Cefazolin Furosemide Gentamicin Tetracycline Sülfizoksazol	Simetidin Cephalothin Procainamide Some of the Penicillins	Glucocorticoids Hipüratlar Some of the Penicillins Sulfates
Liver	Diazepam Digitoksin İndometasin Phenobarbital Procainamide Salicylic acid Warfarin	Aspirin Quinidine Codeine	Alprenolol İzoproterenol Lidocaine Meperidin Morphine Propoksifen Propranolol

Average length of stay

- Entering into drug molecules to the body : 63.2% of the amount of time necessary to be considered.
- Unit of time.
- 300 MA at 1 mg pills 2×10^{18} contains molecules; **Avogadro's** number attached to the transaction.
  - $(10^{-3}g/300)/6.023 \times 10^{23}$ = equality is found