



المحاضرة العاشرة : علم الأدوية Pharmacology

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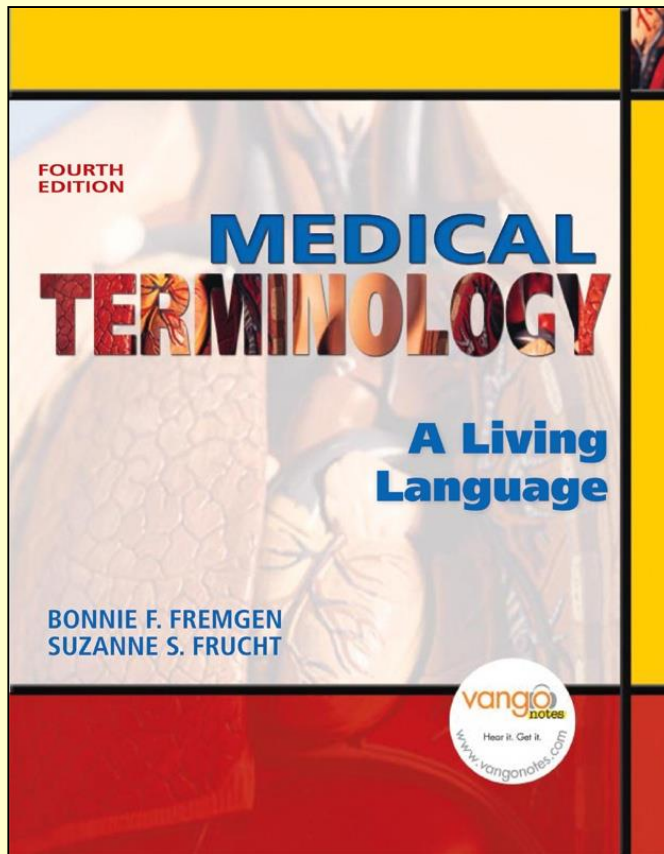
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Medical Terminology

A Living Language



Pharmacology
علم الأدوية

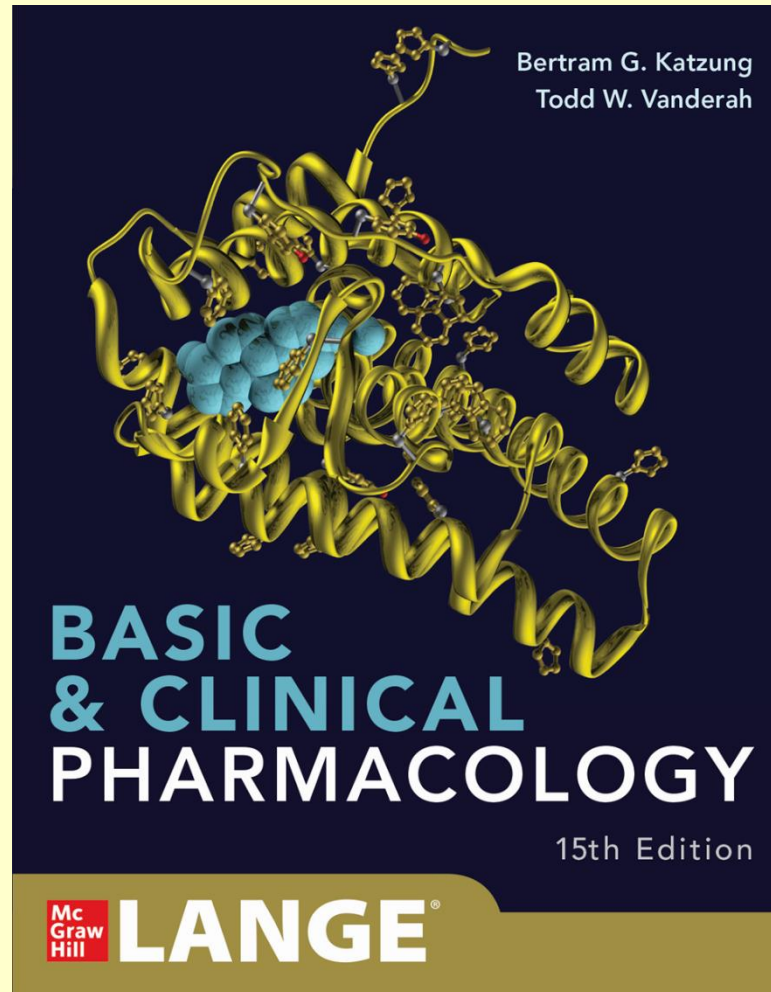
علم الأدوية Pharmacology

Pharmacology

the branch of medicine concerned with the uses, effects, and modes of action of drugs.

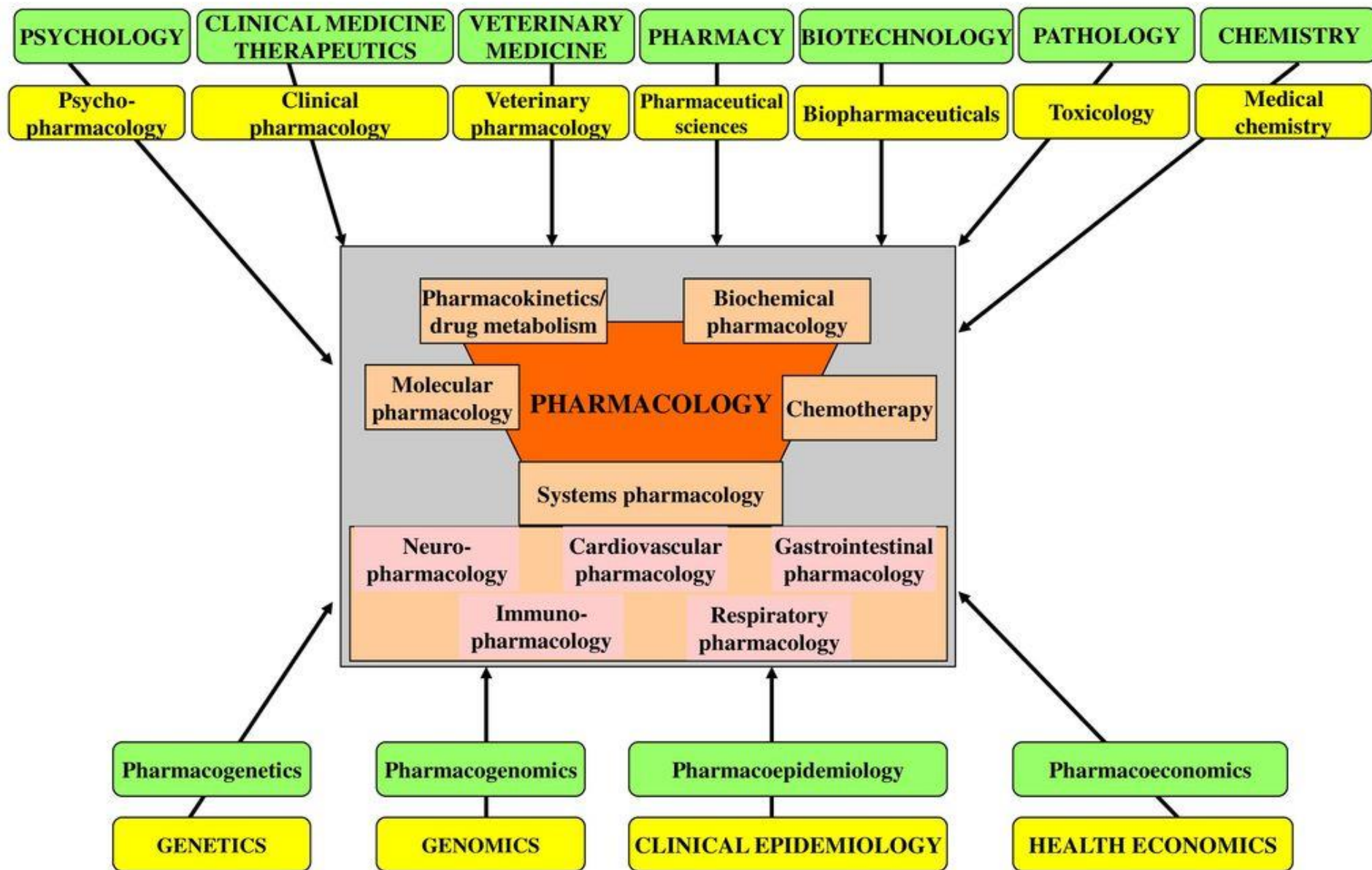


Pharmacology 2021

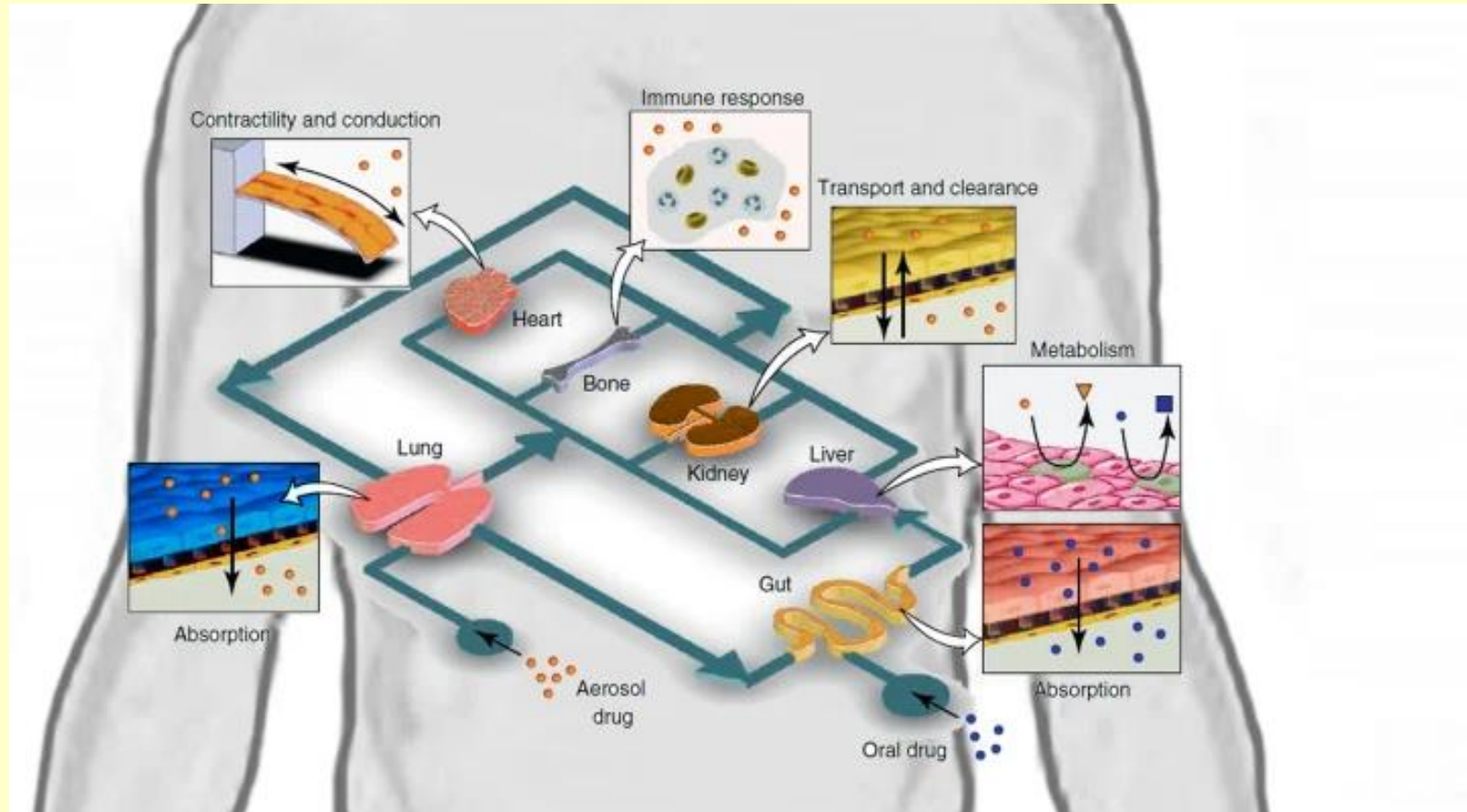




Pharmacology today with its various subdivisions.



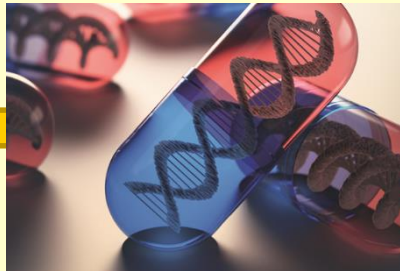
رحلة الدواء في الجسم



Lama Youssef, PhD- 16 June 2019

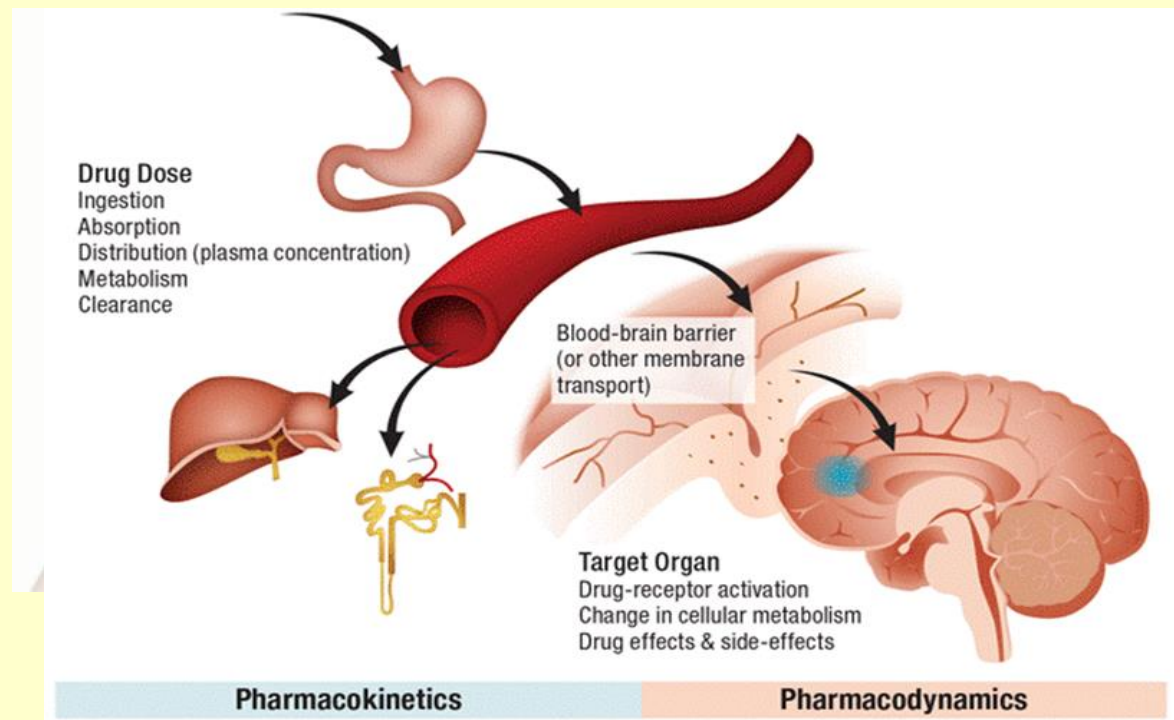
Pharmacokinetics / Pharmacodynamics

الحرائك الدوائية
Pharmacokinetics
تأثير الجسم على الدواء



الديناميكية الدوائية
Pharmacodynamics
تأثير الدواء على الجسم
(المستقبلات)

- Absorption • الامتصاص
- Distribution • التوزيع
- Metabolism • الاستقلاب
- Excretion • الإطراح



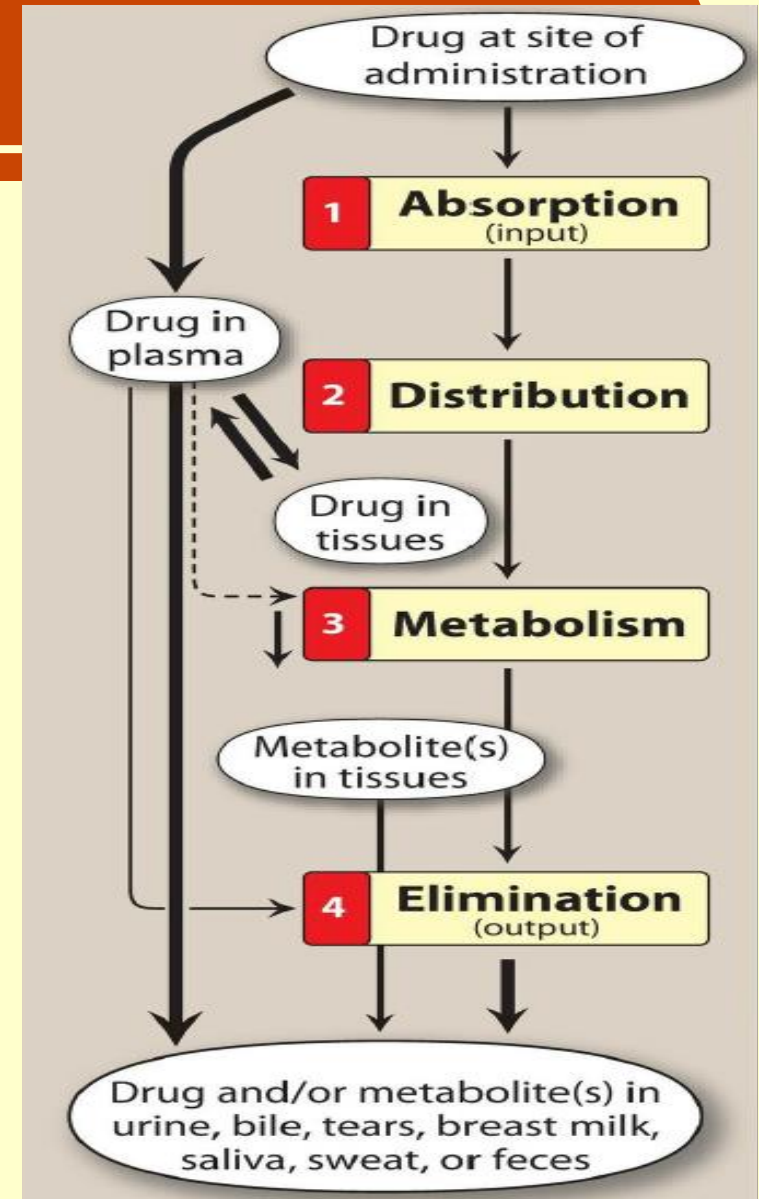
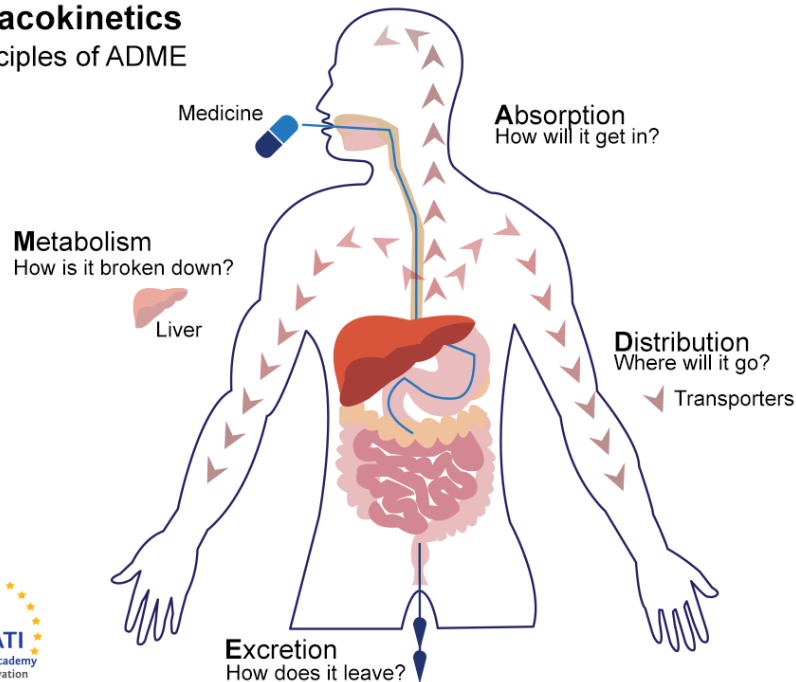
Pharmacokinetics / Pharmacodynamics

- Pharmacokinetics refers to what the **body** does to a drug.
- Pharmacodynamics describes what the **drug** does to the body.
- Four pharmacokinetic properties determine the onset, intensity, and duration of drug action:
 1. Absorption: from the site of administration permits entry of the drug (either directly or indirectly) into plasma.
 2. Distribution: the drug may reversibly leave the bloodstream and distribute into the interstitial and intracellular fluids.
 3. Metabolism: the drug may be biotransformed through metabolism by the liver or other tissues.
 4. Elimination: the drug and its metabolites are eliminated from the body in urine, bile, or feces.

Pharmacokinetics

Pharmacokinetics

The principles of ADME





RIGHT drug



RIGHT patient



RIGHT dose



RIGHT route



RIGHT time

الطب الشخصي/الفرداني Personalized Medicine

الطبّ بالغ الدقّة Precision Medicine

الطب الذي يهدف إلى إعطاء الدواء الصحيح للمريض الصحيح بالجرعة الصحيحة

بمسبيل الإيتاء الصحيح وفي الوقت الصحيح

يعتمد بشكل مباشر على التكوين الجيني للمريض Genetic Make Up، حيث تؤدي التغيرات في التكوين

الجيني للأفراد/المرضى إلى تباينات في استجابتهم إلى الأدوية

مصطلح أوسع من علم الأدوية الجيني، لأنه يغطي أيضاً عوامل لا جينية

Lama Youssef, PhD- 16 June 2019

Pharmacology Combining Forms

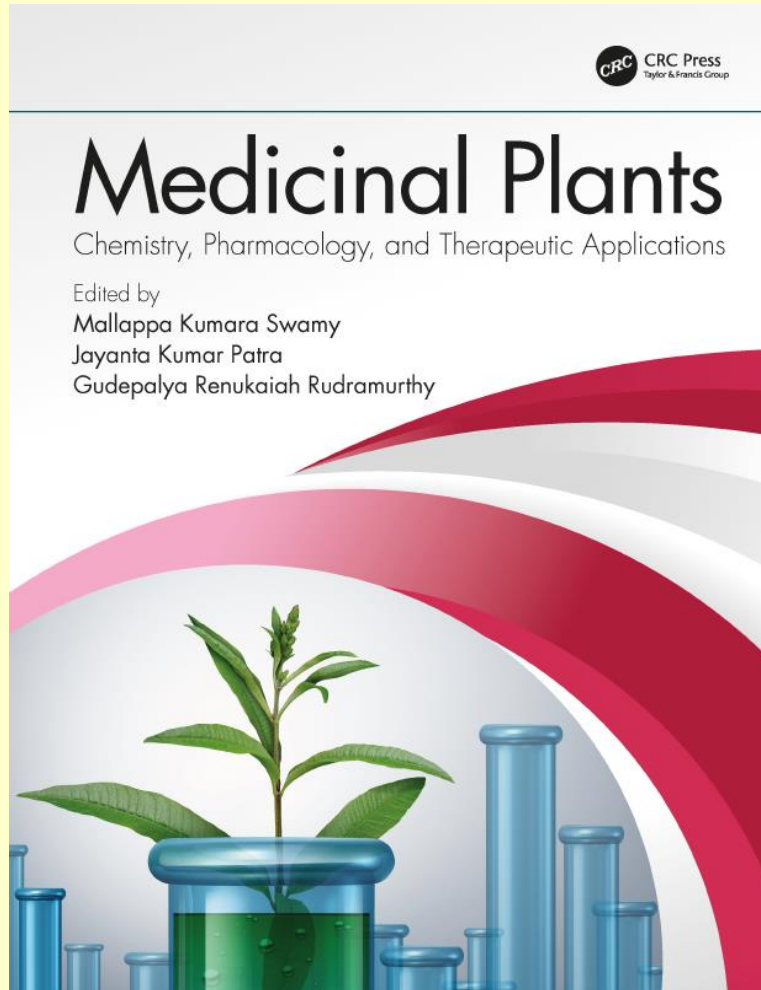
- or/o فموي mouth
- pharmac/o دواء drug
- rect/o مستقيمي rectum
- toxic/o سمي poison
- vagin/o مهبطي vagina
- ven/o وريدي vein



Pharmacology

- Drugs may be:
 - From our food من الطعام – vitamins
 - From animals من الحيوانات – hormones
 - From fungi من الفطور – antibiotics
 - From plants من النبات – very common source of drugs
 - Synthetic تركيب – artificially produced in lab

النباتات الطبية



Drug Names اسم الدواء

1. **Chemical name** اسم كيميائي
 - Describes chemical formula
 - Molecular structure
2. **Generic name** اسم عام
 - Official drug name
3. **Brand name** اسم تجاري
 - Manufacturer's trademark name

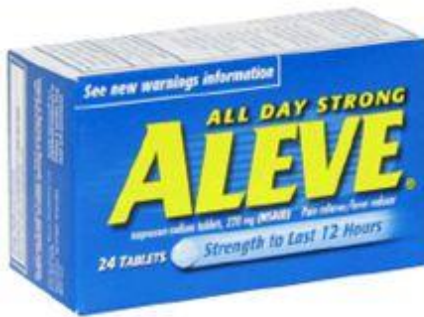
Different Drug Names

Chemical Name	Generic Name	Brand Names
2- <i>p</i> -isobutyl phenyl propionic acid	ibuprofen	Motrin™ Advil™ Nuprin™
acetylsalicylic acid	aspirin	Anacin™ Bufferin™ Excedrin™

Legal Classification of Drugs

- **Prescription drug** دواء يباع بوصفة
 - Requires **prescription** written by licensed healthcare practitioner
 - Written explanation to pharmacist
- **Over-the-counter (otc) drug** دواء يباع بدون وصفة
 - Does not require prescription

What are OTC drugs?



Legal Classification of Drugs

التصنيف القانوني للدواء

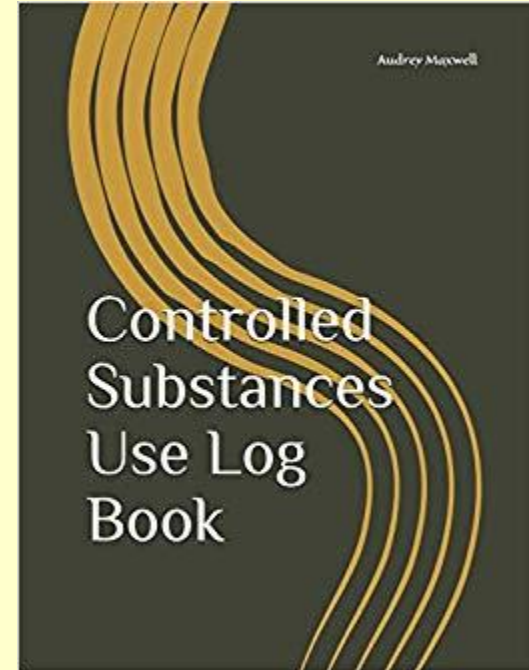
- **Controlled substances** أدوية مراقبة
 - Have potential for being addictive (habit-forming) or can be misused
 - Drug Enforcement Agency (DEA) enforces control of these drugs
 - Classified by potential for abuse (Schedule I through Schedule V)



Example of Controlled Substances

أمثلة على الأدوية المراقبة

- الكودئين Codeine
- الديازپام Diazepam
- مورفين Morphine
- فينوباربیتال Phenobarbital



Schedule for Controlled Substances

- Schedule I** Highest potential for addiction خطر أكبر للادمان
• examples: heroin and LSD
- Schedule II** High potential for addiction خطر كبير للادمان
• examples: codeine, morphine
- Schedule III** Moderate potential for addiction خطر متوسط
• example: butabarbital
- Schedule IV** Lower potential for addiction خطر خفيف
• examples: phenobarbital, diazepam
- Schedule V** Low potential for addiction خطر قليل
• example: codeine cough suppressant

Schedule I



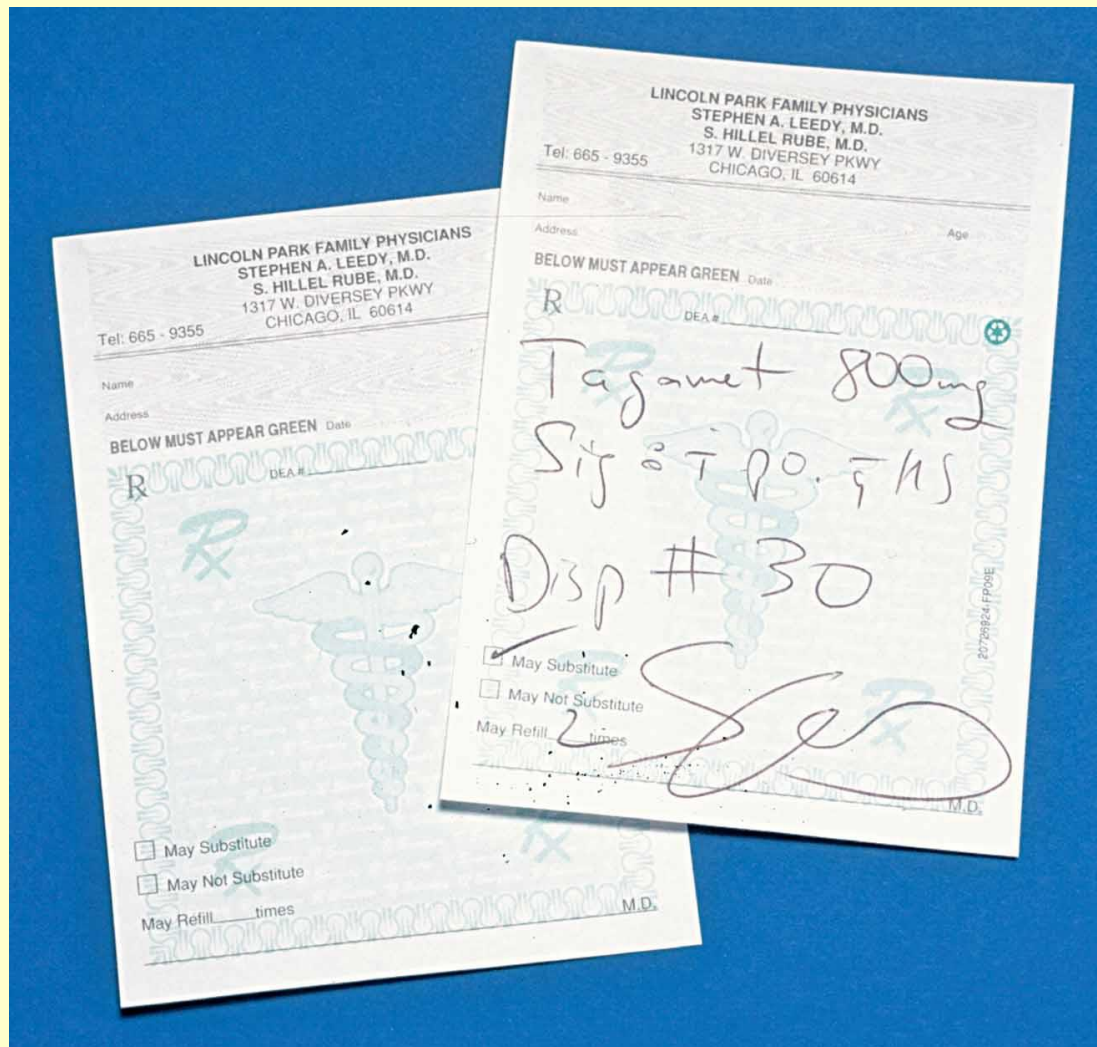
Schedule V



How to Read a Prescription

كيف نقرأ الوصفة

- Symbols and abbreviations الرموز والاختصارات
 - Based on Latin and Greek words
 - Used to save time
- Abbreviation **po** عن طريق الفم
 - Means to be taken by mouth
 - Comes from Latin term per os, meaning by mouth

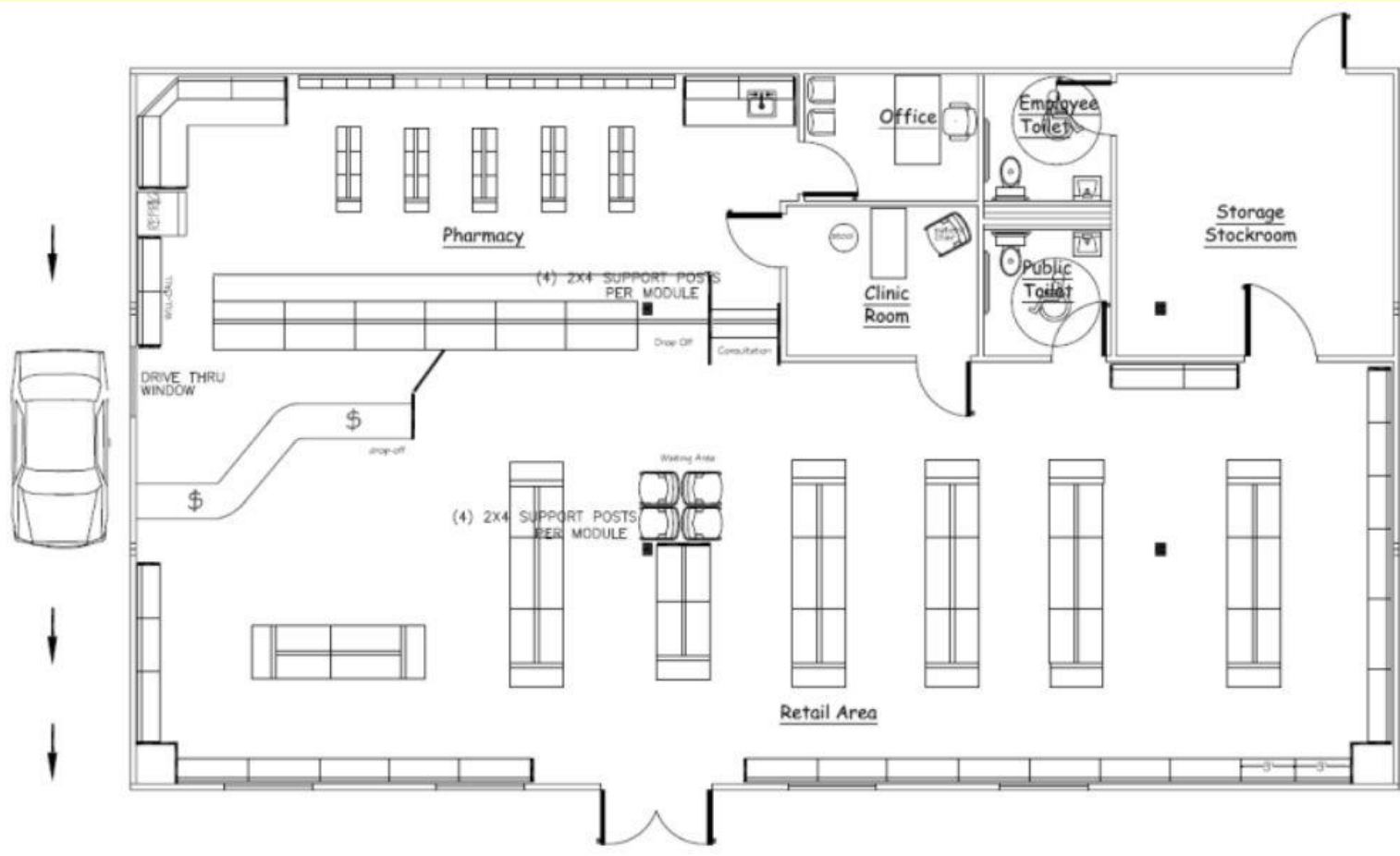


A sample prescription written by a physician.

Prescription الوصفة الطبية

- 1. Name, address and telephone of the Doctor**
- 2. Date of prescription**
- 3. Name, address and age of the patient**
- 4. Name of the medicine with dosage form**
- 5. Dose regimen**
- 6. Total amount to be dispensed**
- 7. Direction for use**
- 8. Doctor's signature**

Modern Pharmacy





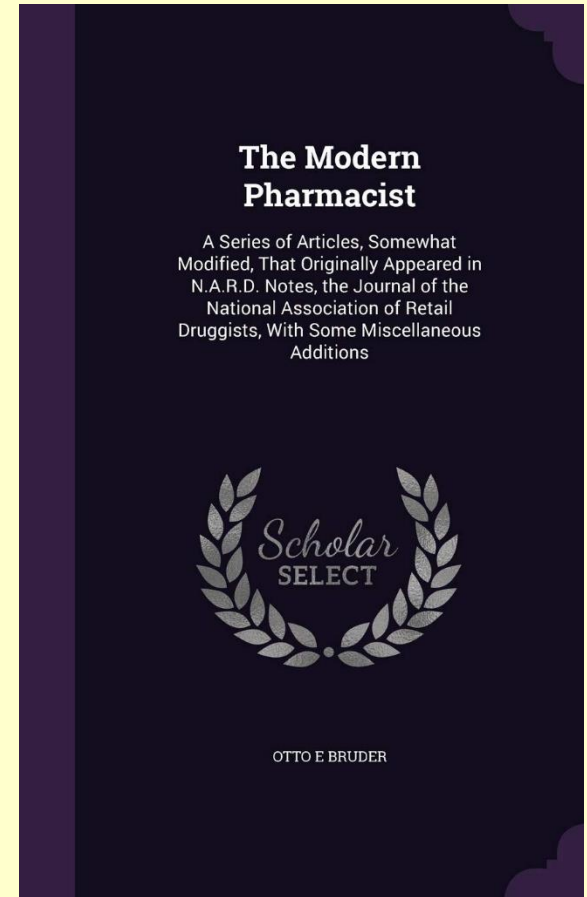






The Board of Pharmacy Specialties (BPS)

- Ambulatory Care (BCACP)
- Cardiology (BCCP)
- Compounded Sterile Preparations (BCSCP)
- Critical Care (BCCCP)
- Geriatric (BCGP)
- Infectious Diseases (BCIDP)
- Nuclear (BCNP)
- Nutrition Support (BCNSP)
- Oncology (BCOP)
- Pediatric (BCPPS)
- Pharmacotherapy (BCPS)
- Psychiatric (BCPP)
- Solid Organ Transplantation (BCTXP)





Routes of Drug Administration

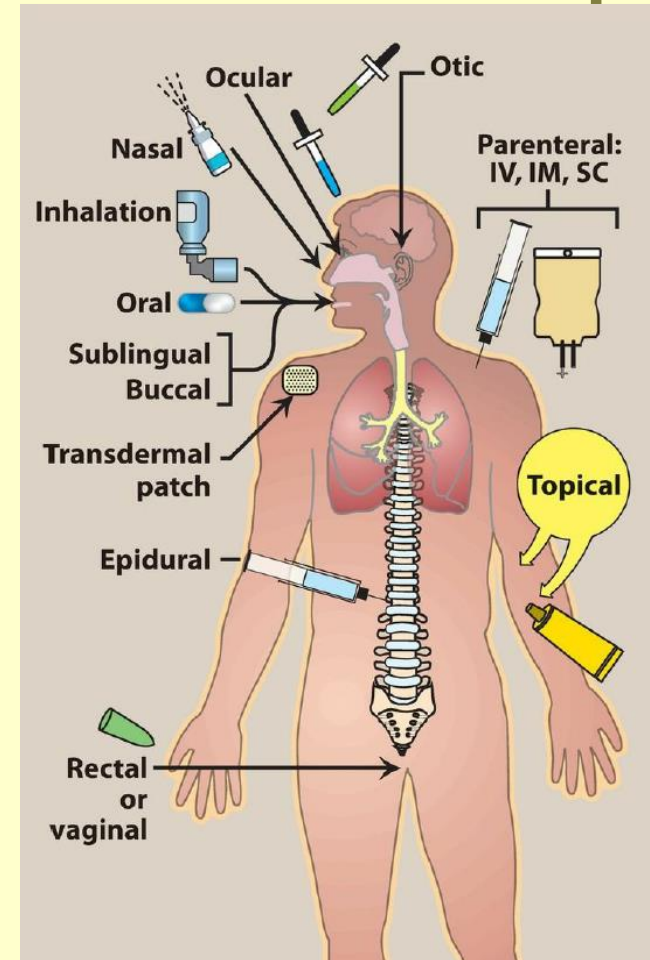
طرق إعطاء الدواء

- Method by which drug is introduced into body
- To be effective, drugs must be administered by a particular route
- In some cases, there may be a variety of routes by which a drug can be administered

Routes of Drug Administration

Route for administration -Time until effect-

□ intravenous	30-60 seconds
□ intraosseous	30-60 seconds
□ endotracheal	2-3 minutes
□ inhalation	2-3 minutes
□ sublingual	3-5 minutes
□ intramuscular	10-20 minutes
□ subcutaneous	15-30 minutes
□ rectal	5-30 minutes
□ ingestion	30-90 minutes
□ transdermal (topical)	variable (minutes to hours)



Oral بالفم

- Drugs that are given by mouth
- Advantages
 - Ease of administration
 - Slow rate of absorption by digestive system
- Disadvantages
 - Also includes slowness of absorption
 - Some chemicals don't tolerate stomach acid
 - Some medications, such as aspirin, can have corrosive action on stomach lining

Sublingual تحت اللسان

- Held under tongue and not swallowed
- Medication absorbed by blood vessels on underside of tongue as saliva dissolves it
- Rate of absorption is quicker than oral
- Example:
 - Nitroglycerin for chest pain

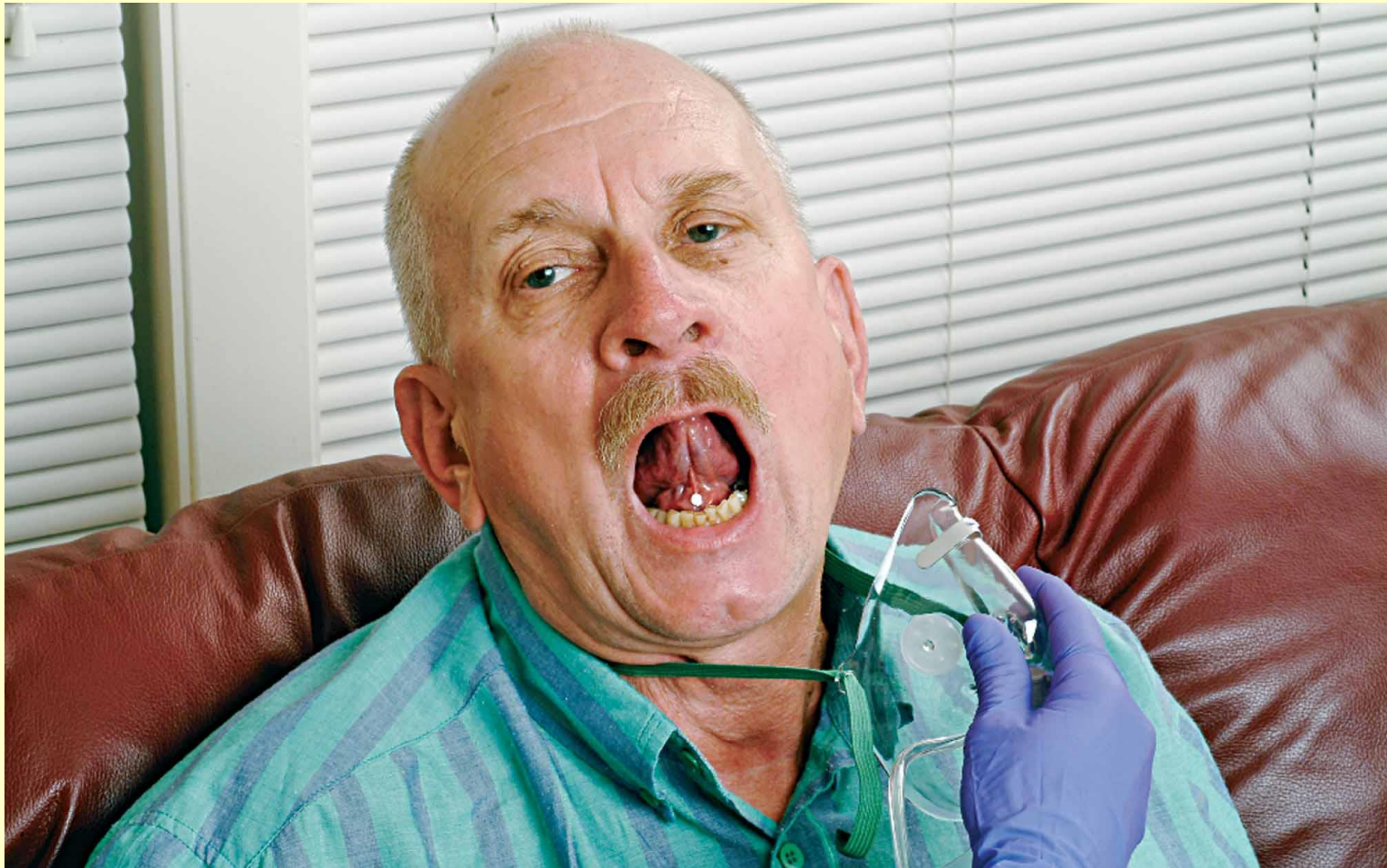


Figure 14.2 – Sublingual medication administration.

Inhalation بالاستنشاق

- Drugs inhaled directly into nose or mouth
- Example:
 - **Aerosol sprays**





Figure 14.3 – Inhalation medication administration.

Parenteral بالحقن

- Invasive method of administering drugs
 - Requires skin to be punctured by needle
- Needle with syringe attached is introduced
 - Under skin – **subcutaneous** and **intradermal**
 - Into muscle – **intramuscular**
 - Into vein – **intravenous**
 - Into body cavity - **intracavitary**

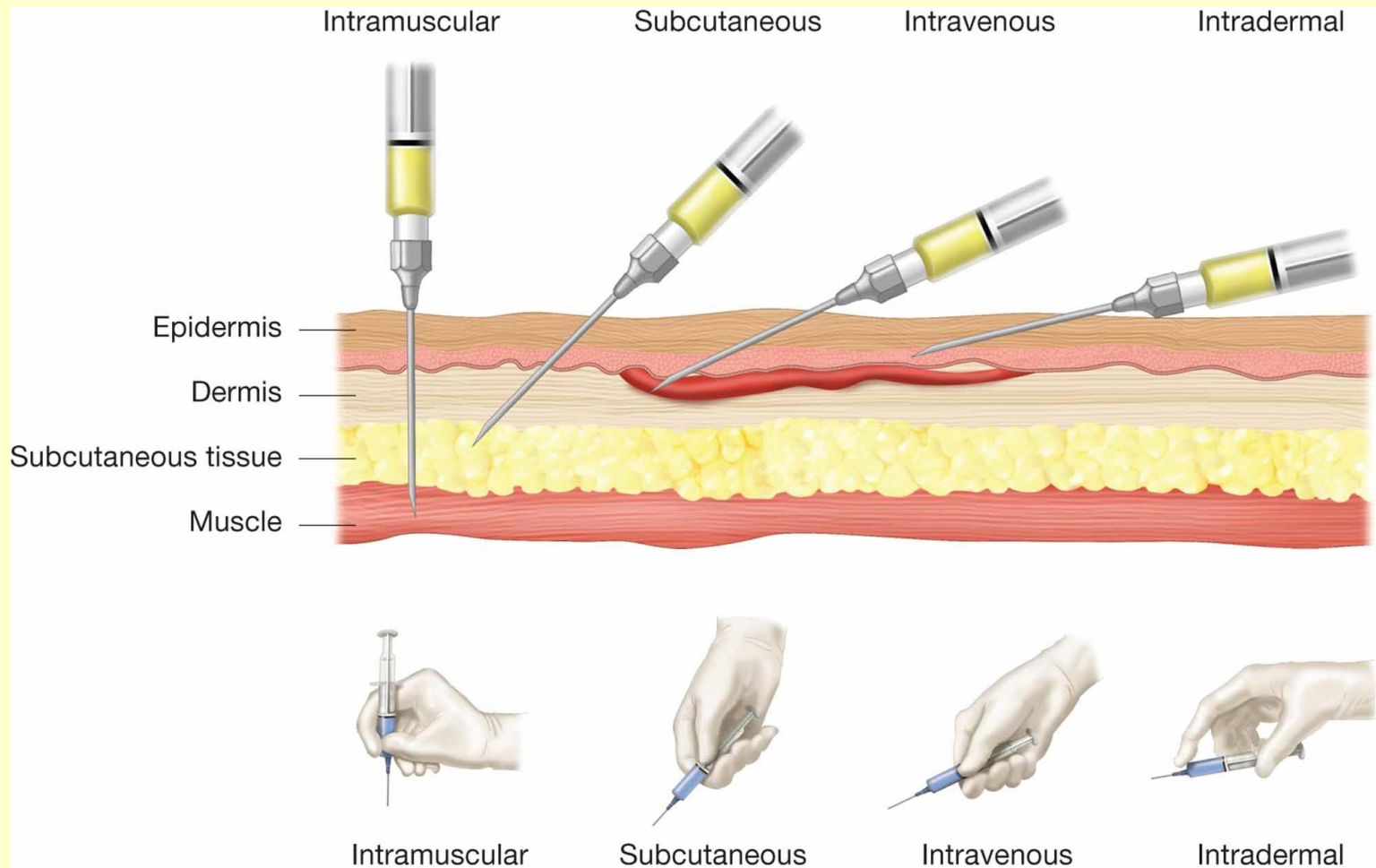


Figure 14.4 – Parenteral medication administration.

عبر الأدمة Transdermal

- Medication coats underside of a patch
- Patch applied to skin
- Medication absorbed across skin
- Examples
 - Birth control patches
 - Nicotine patches



عبر المستقيم Rectal

- Introduced directly into rectal cavity in form of **suppositories** تحاميل
- Use this route if patient unable to take them by mouth
 - Nausea
 - Vomiting
 - Surgery

Topical موضعي

- Applied directly to skin or mucous membranes
- They are distributed in:
 - Ointment مرهم سواغه دهني
 - Cream كريم سواغه مائي
 - Lotion محلول
- Used to treat skin infections

Vaginal مهبلي

- Inserted vaginally
- Dissolving tablets and suppositories
- Treats vaginal yeast infections and other irritations

قطرة عينية Eyedrops

- Used during eye examinations
 - Dilate pupil of eye for better examination of interior of eye
- Used to treat:
 - Increased eye pressure in glaucoma
 - Eye infections

Eardrops قطرة أذن

- Placed directly into ear canal
- Used to:
 - Relieve ear pain
 - Treat ear infections

عبر الغشاء المخاطي للفم Buccal

- Drugs that are placed:
 - Under lip
 - Between cheek and gum

Pharmacology Vocabulary

Addiction الاعتیاد	acquired dependence on drug
Antidote ترياق	substance to neutralize a poison
broad spectrum طيف واسع	drug is effective against wide range of microorganisms
Contraindication مضاد استطباب	condition under which a drug should not be used
cumulative action تاثير تراكمي	action that occurs when drug accumulates in body

Pharmacology Vocabulary

drug interaction تفاعل دوائي	effect of one drug affects the effect of a second drug given at same time
drug tolerance التحمل الدوائي	decreased sensitivity to drug after continued use
Habituation الاعتیاد	develop emotional dependence on drug
Placebo الدواء الغفل	inactive substance used to satisfy patient's desire for medication

Abbreviations

اختصارات

- Cap. (capsule) كبسول
- Cx مضاد استطباب
- DC, disc, (discontinue) إيقاف
- gr, g, gm (gram) غرام
- h. (every hour) كل ساعة
- IM (intramuscular) داخل عضلي
- IV (intravenous) داخل وريدي
- mcg (microgram) ميكروغرام
- mg (milligram) ميلي غرام
- ml (milliliter) ميلي لتر

- oint. (ointment) مرهم
- p.c. (after meals) بعد الأكل
- p.o. (by mouth) عن طريق الفم
- q.i.d. (four times/day) أربع مرات باليوم
- Rx (prescription) وصفة
- sol., (solution) محلول
- susp. (suspension) معلق
- syr. (syrup) شراب
- tab. (tablet) أقراص، حبوب

Pharmacology Abbreviations

Dx	diagnosis
FDA	Federal Drug Administration
gm	gram
gr	grain
gt	drop

Pharmacology Abbreviations

IV	intravenous
kg	kilogram
L	liter
mcg	microgram
mEq	milliequivalent
mg	milligram
mL	milliliter

Pharmacology Abbreviations

no sub	no substitution
non rep	do not repeat
NPO	nothing by mouth
NS	normal saline
od	overdose
oint	ointment
OTC	over-the-counter

Pharmacology Abbreviations

suppos, supp	suppository
susp	suspension
syr	syrup
T, tbsp	tablespoon
t, tsp	teaspoon
tab	tablet
tid	three times a day

Thank You

