



Treatment of STDs

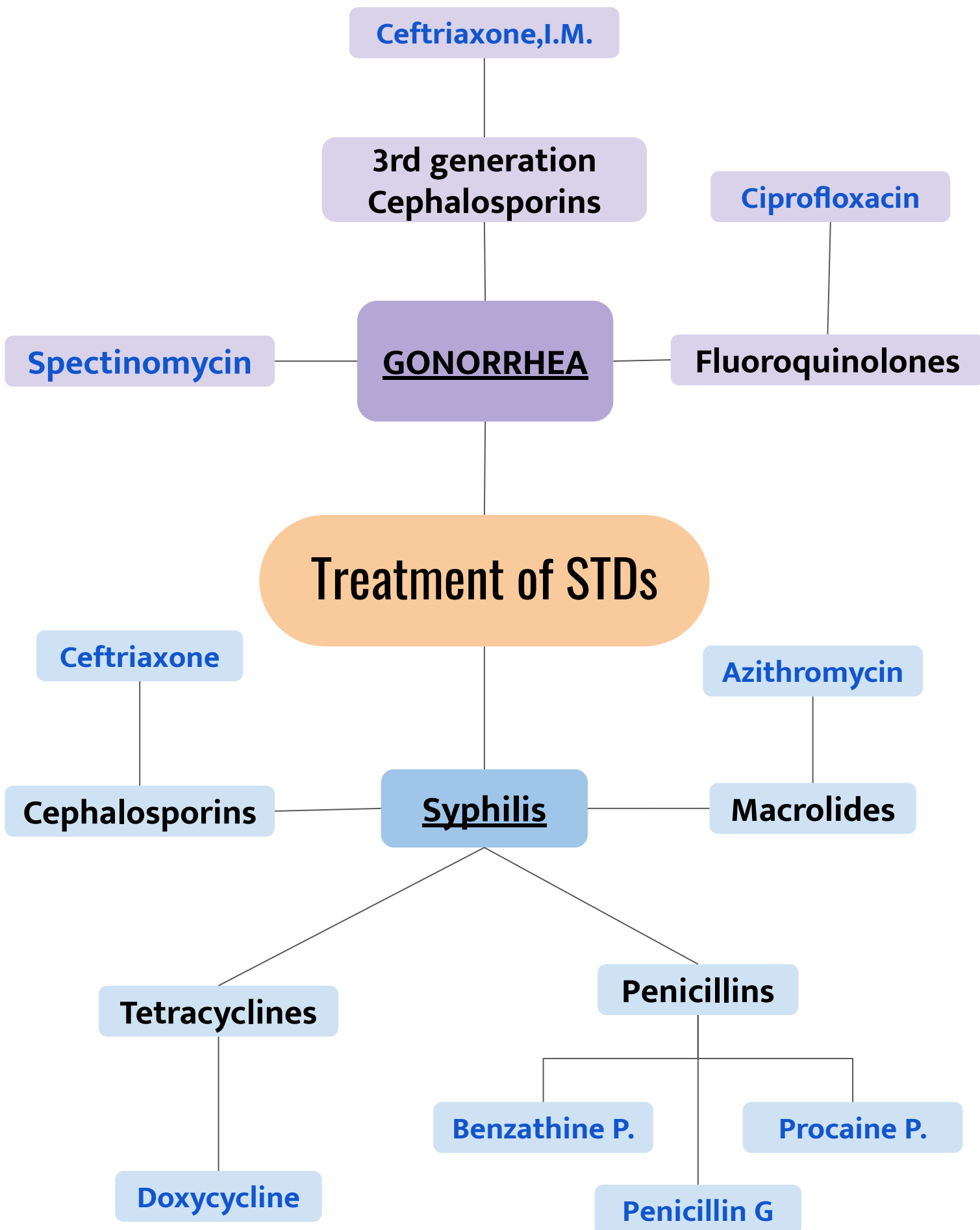
Objectives:

1. List the drugs used in the treatment of syphilis & gonorrhea.
2. Describe the mechanism of action and adverse effects of each drug.
3. Describe the contraindications of drugs used
4. Describe the recommended regimens used for the treatment of syphilis & gonorrhea
5. Know the alternative treatments in allergic patients

Color index:

Important **Note** **Extra**

Mindmap



introduction

Syphilis

Definition: Sexually transmitted disease Caused by Treponema pallidum (a spiral-shaped, Gram-negative highly mobile bacterium) T. pallidum enters the body via skin and mucous membranes through abrasions during sexual contact or blood transfusion or placental transfer from a pregnant woman to her fetus. (only female slides)

Signs & symptoms: The signs and symptoms of syphilis vary depending upon **stage of disease**. Disease progresses in stages (primary, secondary, latent, and tertiary), May become **chronic** without treatment.

Stages of syphilis

1- Primary stage

Painless skin ulceration (**a chancre**)
(on the vulva or mouth, Infectious stage (sexually only). (the patient may not feel it so it will left without treatment))

2-Secondary stage

Diffuse skin rash & mucous membranes lesions
(Palmar/Plantar Rash)
Painless but infectious

3- Latent stage

In latent syphilis there are little to no symptoms (70% do not have symptoms) which can last for years.

5-Congenital Syphilis

Woman is pregnant and has symptomatic or asymptomatic early syphilis, disseminating organisms may pass through the placenta to infect the fetus.

Manifestation: Perforation of Palate

4- tertiary syphilis

Approximately 30% of untreated patients progress to the tertiary stage within 1 to 20 years.

- Rare because of the widespread use of antibiotics.
- Manifestations as cardiovascular syphilis (syphilitic aortitis and an aortic aneurysm).

Treatment of syphilis

β-Lactam Antibiotics (Natural Penicillins)			
MOA	Inhibits bacterial cell wall synthesis through inhibition of transpeptidase enzyme required for crosslinks. (Bactericidal) (drug of choice according to previous questions)		
Uses	1st line treatment of syphilis Penicillins bursting the bacterial cell walls by acting directly on peptidoglycans, as you know gram -ve have low peptidoglycans, so Penicillins are not effective on gram -ve		
Classification	Benzylpenicillin (penicillin G)	Procaine penicillin G	Benzathine penicillin G
	Short duration of action, given I.V.	<ul style="list-style-type: none"> Given I.M.¹ - delayed absorption. Long acting (24-48 hrs) After adding Procain which is local anaesthetic, the renal excretion decreased → the Half life increase 	<ul style="list-style-type: none"> Given I.M. Delayed absorption. Long acting (every 3-4 weeks), 2.4 million units is given once.
PK	All these penicillin preparations are: <ul style="list-style-type: none"> <input type="checkbox"/> Acid unstable, so we never give them orally <input type="checkbox"/> Penicillinase sensitive (β-lactamase sensitive) <input type="checkbox"/> Not metabolized <input type="checkbox"/> Excreted unchanged in urine through acid tubular secretion. May cause convulsions <input type="checkbox"/> Renal failure prolong duration of action 		
ADR's	<ul style="list-style-type: none"> ➤ Hypersensitivity, So we have to do skin sensitivity test before administration ➤ Convulsions when the concentration of the drug in blood is high either because the dose is high or the patient has renal problem ➤ Super infections (secondary infection e.g. Candidiasis) 		

Drugs used in Allergic Patients To Penicillins:

- 1) Macrolides e.g. **Azithromycin**
- 2) Tetracyclines e.g. **doxycycline**
- 3) Cephalosporins: **Ceftriaxone** – **cefixime**

Treatment of syphilis

Tetracyclines (**Doxycycline**)

MOA	Inhibit bacterial protein synthesis by reversibly binding to 30 S bacterial ribosomal subunits. (Bacteriostatic).
PK	<ul style="list-style-type: none"> → Given orally → Well absorbed orally → Long acting → 100 mg twice daily for 14 days. → Doxycycline has 2 advantages among other tetracyclines: 1-High absorption rate up to. 2- Long half life (only twice a day).
ADR'S	<ul style="list-style-type: none"> ● Brown discoloration of teeth in children ● Deformity or growth inhibition of bones in children. ● Hepatic toxicity (prolonged therapy with high dose). ● Nausea, vomiting ,diarrhea & epigastric pain (given with food) ● Phototoxicity ● Vertigo ● Superinfections.
C.I	<p>Because the tetracyclines accumulate with Ca^{2+} we should not give it to:</p> <ul style="list-style-type: none"> <input type="checkbox"/> Pregnancy <input type="checkbox"/> Breastfeeding bc it is excreted in milk <input type="checkbox"/> Children (below 10 yrs)

Macrolides (**Azithromycin**)

MOA	Inhibits bacterial protein synthesis by binding to bacterial 50S ribosomal subunits.
PK	<ul style="list-style-type: none"> ➤ Should be given 1 hour before or 2 hours after meals bc it has food drug interaction ➤ No effect on cytochrome P450, so no drug-drug interaction. ➤ Acid stable ➤ Penetrates into most tissues except CSF ➤ Half life : 2-4 days ➤ Once daily, oral dose
ADR's	<ol style="list-style-type: none"> I. GIT upset: Nausea, vomiting, abdominal pain & diarrhea. II. Allergic reactions: urticaria, mild skin rashes but no need to stop the treatment. III. It has minor ADRs so it's a good alternative choice in case of penicillin resistance

Treatment of syphilis

Cephalosporins		
	Ceftriaxone	Cefixime
PK	<ul style="list-style-type: none"> ● Third generation cephalosporins ● Given parenterally (I.V.) “ + IM “ ● Eliminated via biliary excretion ● Long Half-life 	
MOA	I. Inhibit bacterial cell wall synthesis (β -lactam inhibitor) II. Bactericidal	
ADR'S	<ul style="list-style-type: none"> <input type="checkbox"/> Hypersensitivity reactions (allergic manifestations) <input type="checkbox"/> Thrombophlebitis due to injections (temporary) <input type="checkbox"/> Superinfections <input type="checkbox"/> Diarrhea 	

WHO guideline for the Treatment of Syphilis*

Patients	Treatment option
<u>Early</u> syphilis	
Adult (primary, secondary and early latent syphilis of not more than 2 years duration)	Benzathine penicillin G (2.4 million units once I.M.)
	Procaine penicillin G (1.2 million units I.M. for 10-14 days)
	If penicillin is not allowed due to allergy, use: <ol style="list-style-type: none"> 1. Doxycycline 100 mg twice daily orally for 14 days 2. or Ceftriaxone 1 g IM once daily for 10–14 days 3. or Azithromycin 2 g once orally.
Pregnant woman	Benzathine penicillin G (2.4 million units once I.M.)
	Procaine penicillin G (1.2 million units I.M. for 10-14 days)
	If penicillin is not allowed due to allergy, use: <ol style="list-style-type: none"> 1. Erythromycin 500 mg orally 4 times daily for 14 days ‘female slides’ 2. Ceftriaxone 1 g IM once daily for 10–14 days 3. or Azithromycin 2 g once orally. <small>1st choice, 2nd choice...etc</small>

*436 بيس أعر فوا أيش
 choice...etc

Late syphilis**Adult**

(primary, secondary and early latent syphilis of not more than 2 years duration)

Benzathine penicillin G (2.4 million units once I.M weekly for 3 consecutive weeks).

Procaine penicillin G (1.2 million units I.M. for 20 days)

If **penicillin** is not allowed due to allergy, use:
Doxycycline 100 mg twice daily orally for 30 days

Pregnant woman

Benzathine penicillin G (2.4 million units once I.M. weekly for 3 consecutive weeks)

Procaine penicillin G (1.2 million units I.M. for 20 days)

If **penicillin** is not allowed due to allergy, use:

1. **Penicillin desensitization.**
2. **Erythromycin** 500 mg orally 4 times daily for 30 days
3. **Ceftriaxone** 1 g IM once daily for 10–14 days
4. **or Azithromycin** 2 g once orally.

Congenital syphilis

In **infants** with confirmed congenital syphilis or infants who are clinically normal, but whose mothers had untreated syphilis.

Aqueous benzyl penicillin (I.V.)
100,000 - 150,000 U/Kg/Day for 10-15 days.

Procaine penicillin G (I.M.)
50,000 U/kg/day single dose for 10-15 days

Gonorrhoea**Introduction**

- Caused by **Neisseria gonorrhoea** (Pus producing bacteria , Gram negative cocci).
- Transmitted during sexual contact with affected person.
- Many people have no symptoms.
- Men may have burning with urination, discharge from the penis or testicular pain.
- Women may have burning with urination, vaginal discharge, vaginal bleeding between periods, or pelvic pain.

Treatment of Gonorrhoea

Uncomplicated Gonorrhoeal Infection

3rd generation Cephalosporins

	Ceftriaxone	Cefixime
P.K	500mg ceftriaxone , I.M	400 mg of cefixime , PO
Use	<ul style="list-style-type: none"> ● 1st line treatment ● Typically given in combination with a single dose of azithromycin (1gm, PO1) or doxycycline (100 mg 'BD', P.O.2 for 7 days) chlamydia trachomatis 	

Fluoroquinolones (**Ciprofloxacin, ofloxacin**) (2nd choice)

M.O.A	<ul style="list-style-type: none"> ☐ All are bactericidal. ☐ Inhibit DNA synthesis by inhibiting DNA gyrase enzyme (required for DNA supercoiling).
P.K	Single oral dose of : <ul style="list-style-type: none"> ● Ciprofloxacin (500 mg) ● Ofloxacin (400 mg)
ADRS	<ul style="list-style-type: none"> ● May damage growing cartilage and cause arthropathy. ● Phototoxicity, avoid excessive sunlight. ● GIT: Nausea , vomiting & diarrhea. ● CNS: Headache & dizziness.
C.I	<ul style="list-style-type: none"> ● Pregnancy. ● Nursing mothers. ● Children under 18 years.

Spentomycin (3rd choice)

M.O.A	Inhibits protein synthesis by binding to 30 S ribosomal subunits.
P.K	Is given 2g, I.M , once.
ADRS	<ul style="list-style-type: none"> ★ Nephrotoxicity. ★ Pain at site of injection. ★ Fever, nausea.

Treatment of Gonorrhoea

Complicated Gonorrhoeal Infection

When complicated gonorrhoea occurs?

If gonorrhoea left untreated, it can spread through bloodstream into:

1. Eye.
2. Joints.
3. Heart valves.
4. Brain.

Harmful effects of gonorrhoea:

• It can also spread from a mother to a child during birth. Newborn eye infections may lead to conjunctivitis called **ophthalmia neonatorum** which may lead to blindness.

WHO guidelines suggest one of the following options for topical application to both eyes immediately after birth:

1. **Silver nitrate** 1% solution.
2. Or **Erythromycin** 0.5% eye ointment.
3. Or **Tetracycline** hydrochloride 1% eye ointment.
4. Or **Povidone iodine** 2.5% solution (water-based).
5. Or **Chloramphenicol** 1% eye ointment.

Treatment of Complicated infections With conjunctivitis

	Silver nitrate	Erythromycin
M.O.A	It has germicidal effects due to <u>precipitation of bacterial proteins</u> by liberated silver ions.	0.5% ointment for treatment & prevention of corneal & conjunctival infections.
Use	With conjunctivitis in newborn Put into conjunctival sac once <u>immediately</u> after birth (no later than 1 h after birth) .	

Summary

Treatment of Syphilis

Penicillins (β -Lactam Antibiotics) 1st choice	Tetracyclines	Cephalosporins	Macrolides
<p>MOA : Inhibits bacterial cell wall synthesis (Bactericidal).</p> <p><u>ADRS :</u> -<u>Hypersensitivity</u> -<u>Convulsions</u> -<u>Super infections.</u></p>	<p>MOA :Inhibit bacterial protein synthesis by reversibly binding to 30S bacterial ribosomal subunits(Bacteriostatic).</p> <p><u>ADRS :</u> <input type="checkbox"/> <u>Brown discoloration of teeth in children</u> <input type="checkbox"/> <u>Deformity or growth inhibition of bones in children</u> <u>Hepatic toxicity</u></p> <p>C.I.: -Pregnancy -Breastfeeding -Children (below 10 yrs.)</p>	<p>MOA :Inhibit bacterial cell wall synthesis (Bactericidal) Cefixime: more effective against gram negative bacteria.</p> <p><u>ADRS :</u> <input type="checkbox"/> <u>Hypersensitivity reactions</u> <input type="checkbox"/> <u>Thrombophlebitis</u> <input type="checkbox"/> <u>Superinfections</u> <input type="checkbox"/> <u>Diarrhea.</u></p>	<p>MOA : Inhibits bacterial protein synthesis by binding to bacterial 50S ribosomal subunits.</p> <p>P.K : Should be given 1 hour before or 2 hours after meals.No effect on cytochrome P450</p> <p><u>ADRS :</u> <input type="checkbox"/> <u>Allergic reactions: urticaria, mild skin</u></p>

Uncomplicated gonorrheal infections

Cephalosporins (1st line)	Fluoroquinolones	Spectinomycin
<p>Typically given in combination with a single dose of azithromycin or doxycycline</p>	<p>MOA : Bactericidal. Inhibit DNA synthesis by inhibiting DNA gyrase enzyme (required for DNA supercoiling).</p> <p><u>ADRS :</u> <input type="checkbox"/> <u>may damage growing cartilage and cause Arthropathy, Phototoxicity.</u></p> <p>CI:Pregnancy, nursing mothers, children under 18 years.</p>	<p>MOA : Inhibits protein synthesis by binding to 30 S ribosomal subunits.</p> <p><u>ADRS : Nephrotoxicity</u></p> <p>Used when resistance to Cephalosporins + Fluoroquinolones</p>

Complicated gonorrheal infections (conjunctivitis in newborn)

Silver nitrate	Erythromycin
<p>It has germicidal effects</p>	<p>prevention of corneal & conjunctival infections.</p>

With conjunctivitis in newborn Put into conjunctival sac once immediately after birth (no later than 1 h after birth)

Quiz

Q1: What is the first line treatment for gonorrhoea infection ?

- A. Fluoroquinolones
- B. Spectinomycin
- C. Ceftriaxone
- D. Erythromycin

Q2: Which of the following is an adverse effect of Fluoroquinolones ?

- A. Nephrotoxicity
- B. Arthropathy
- C. Fever
- D. brown discoloration of teeth

Q3: Which of the following is a contraindication for Fluoroquinolones ?

- A. Pregnancy
- B. Renal failure
- C. Hepatic failure
- D. Bleeding disorders

Q4: Which of the following used for Treatment of Complicated infections With conjunctivitis?

- A. Fluoroquinolones
- B. Spectinomycin
- C. Ceftriaxone
- D. Erythromycin

Q5: Which route is Spentomycin given ?

- A. I.V
- B. S.C
- C. Orally
- D. I.M

Q6: Which one of the following is the drug of choice for treatment of syphilis?

- A. ceftriaxone
- B. Benzylpenicillin penicillin G
- C. silver nitrate
- D. ciprofloxacin

Q7: During which stages is syphilis contagious?

- A- Primary and late stages only
- B- Secondary and latent stages only
- C- Primary and secondary stages only
- D- Syphilis is contagious during all stages

Q8: Tetracyclines are contraindicated to ?

- a- Children
- b- Pregnancy
- c- Nursing mothers
- d- all of the above

Q9: Which of the following is mechanism of action of Azithromycin?

- A- Inhibit bacterial cell wall synthesis
- B- Inhibit DNA synthesis by inhibiting DNA gyrase enzyme
- C- Inhibits bacterial protein synthesis by binding to bacterial 50S ribosomal subunits.
- D- Inhibit bacterial protein synthesis by reversibly binding to 30 S bacterial ribosomal subunits

Answers:
1) C
2) B
3) A
4) D
5) D
6) B
7) C
8) D
9) C

السلام عليكم ورحمة الله

تم حمد الله ودؤيقه وفضله إتمام الفريدي لـ **85** محاضرة عام الأدوية والتي

من ضلالها تعلمنا ما يقارب **510** دواء ضلال سنتين العاوم الآسية. فإن

أصبنا فهو بفضل الله

أو

لأتم جهود كل من بادر وساهم بإخراج وإجاز هذا العول ونعتذر عن أي تقصير أو خطأ بدر

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فإذا الكلام فيكم منزلة *** ألا يا شرفاً فلتنه كزليل

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References:

- ✓ Doctors' slides and notes
- ✓ Team 436



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