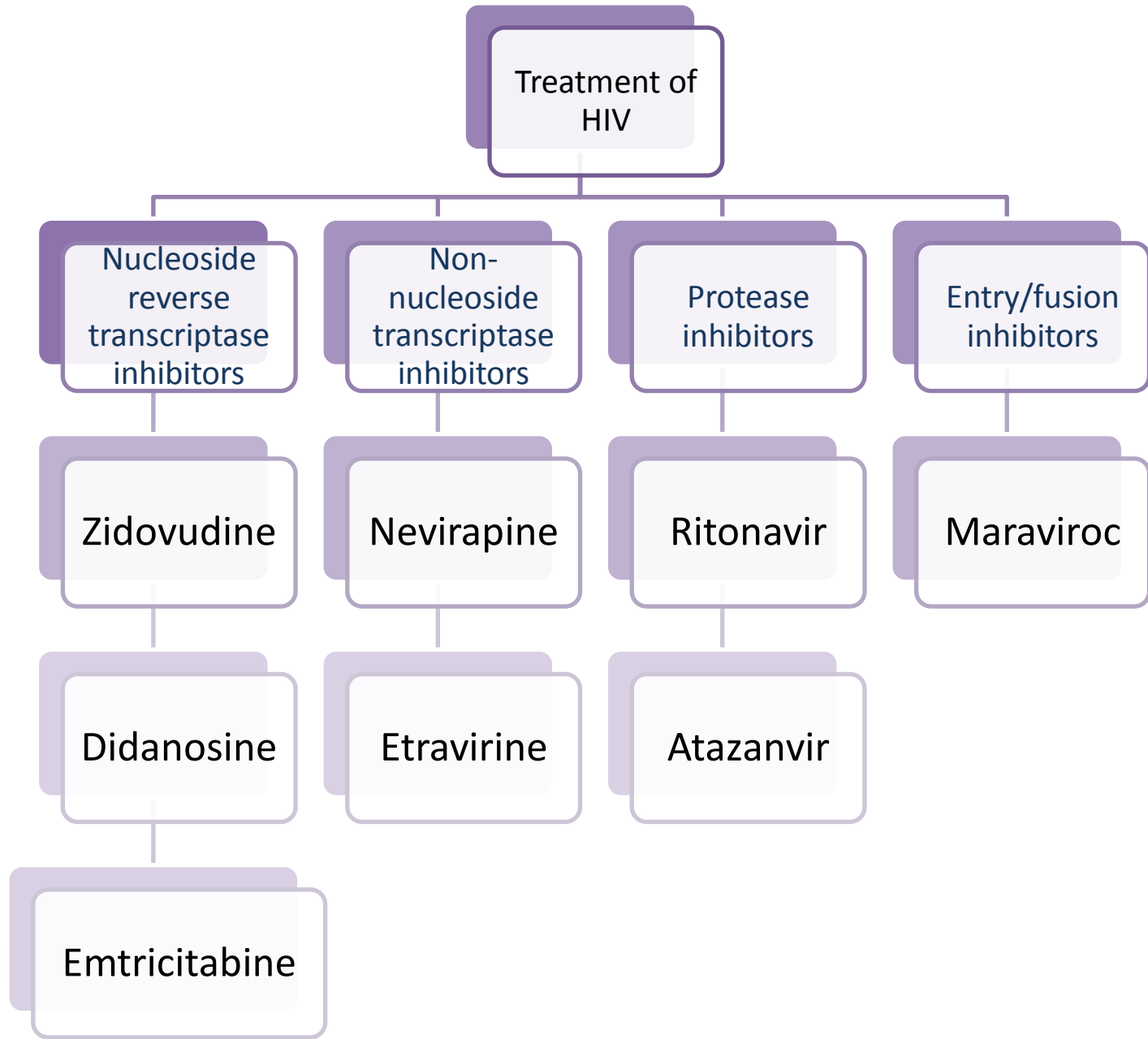


King Saud University
College of Medicine
2nd Year,
Reproduction Block



L10- Treatment of HIV Related Illnesses and AIDS

Mind Map



Introduction

HIV

- Human Immunodeficiency Syndrome”
- A specific type of virus (a retrovirus)
- HIV invades the helper T cells to replicate itself.

AIDS

- Acquired Immunodeficiency Syndrome
- HIV is the virus that causes AIDS
- Disease limits the body’s ability to fight infection
- A person with AIDS has a very weak immune system

Stages of HIV

Stage 1 - Primary	Stage 2 - Asymptomatic	Stage 3 - Symptomatic	Stage 4 - HIV ⇨ AIDS
<p>-Short, flu-like illness occurs one to six weeks after infection</p> <p>-no symptoms at all</p> <p>-Infected person can infect other people</p>	<p>Lasts for an average of ten years</p> <p>This stage is free from symptoms</p> <p>There may be swollen glands</p> <p>The level of HIV in the blood drops to very low levels</p> <p>HIV antibodies are detectable in the blood</p>	<p>The symptoms are mild</p> <p>The immune system deteriorates</p> <p>emergence of opportunistic infections and cancers</p>	<p>-The immune system weakens.</p> <p>-The illnesses become more severe leading to an AIDS diagnosis.</p>

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doctor’s note

important

explanation

Introduction

Opportunistic Infections associated with AIDS

Bacterial	Viral	Parasitic	Fungal
<ol style="list-style-type: none">1. Tuberculosis (TB)2. Strep pneumonia	<ol style="list-style-type: none">1. Kaposi Sarcoma2. Herpes3. Influenza (flu)	<ol style="list-style-type: none">1. Pneumocystis carinii	<ol style="list-style-type: none">1. Candida2. Cryptococcus

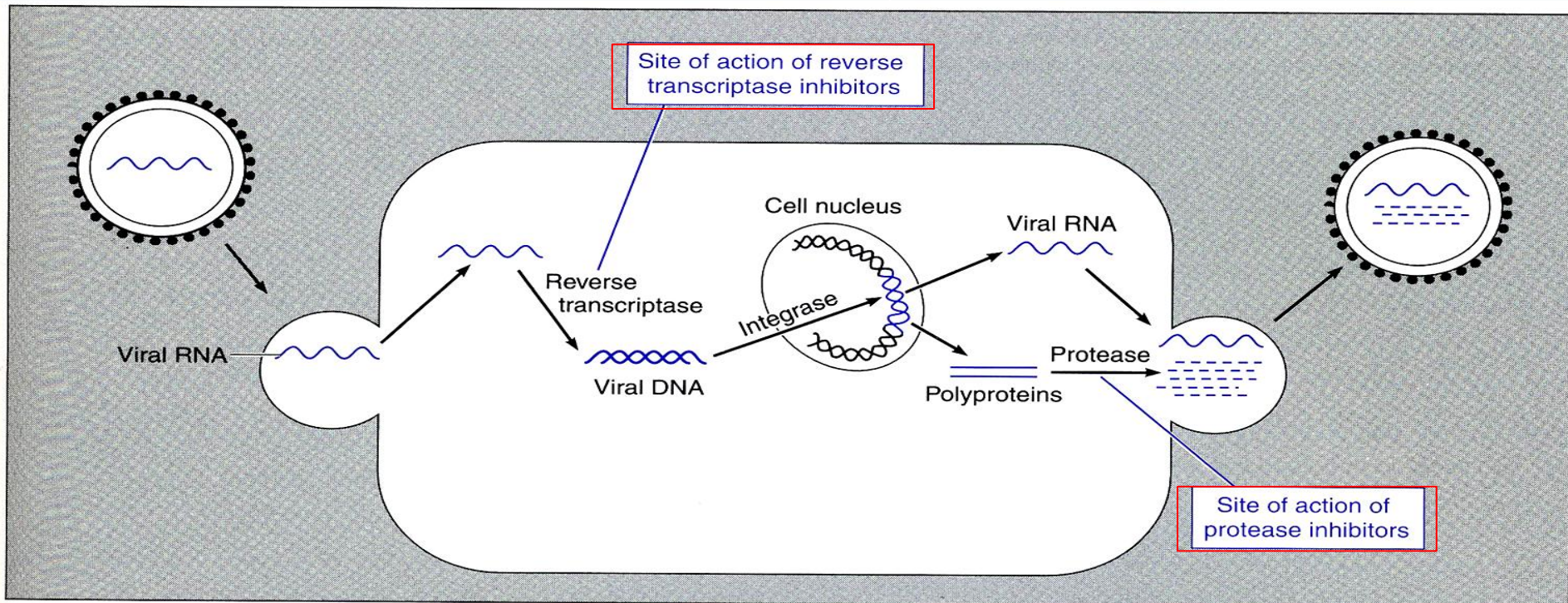
Modes of HIV/AIDS Transmission

Through Bodily Fluids	Through IV Drug Use	Through Sex	Mother-to-Baby
<ol style="list-style-type: none">1. Blood products2. Semen3. Vaginal fluids4. Breast Milk	<ol style="list-style-type: none">1. Sharing Needles Without sterilization2. Increases the chances of contracting HIV		<ol style="list-style-type: none">1. Before Birth (placental blood stream)2. During Birth3. Postpartum After the birth (breast feeding)

Treatment Options

Antiretroviral Drugs

1-Nucleoside Reverse Transcriptase inhibitors	2-Non-Nucleoside Transcriptase inhibitors	3-Protease inhibitors	4-Entry /fusion inhibitors:
<ol style="list-style-type: none">1. Zidovudine ,2. Didanosine,3. Emtricitabine	<ol style="list-style-type: none">1. Nevirapine,2. Etravirine	<ol style="list-style-type: none">1. Ritonavir,2. Atazanvir	<ol style="list-style-type: none">1. Maraviroc2. Enfuviride



1- Nucleoside Reverse Transcriptase Inhibitors

Are nucleoside & nucleotide analogues

Mechanism of action:

- Selective reverse transcriptase inhibitors
- Acts as competitive substrate inhibitors**
- Can also be incorporated into growing viral DNA chain and causes its termination

Drugs	Zidovudine	Emtricitabine	Didanosine
Pharmacokinetics	<ul style="list-style-type: none"> -Orally effective - Penetrates CSF -Excreted through kidney 	Highly absorbed orally , not affected by food	<ul style="list-style-type: none"> - Oral bioavailability is reduced by food* -Eliminated by the kidney
Side effects	<ul style="list-style-type: none"> -Bone marrow depression (leukopenia) -Headache -Nausea , anorexia -Myopathy , fatigue 	Common adverse effects: <ul style="list-style-type: none"> -GIT upset -Hyperpigmentation of palms & soles 	<ul style="list-style-type: none"> -acute pancreatitis -retinal damage -Peripheral neuropathy
Therapeutic effects	<ul style="list-style-type: none"> -Increase T cells partially restoring immune system -Reverses AIDS dementia 		
note	<ul style="list-style-type: none"> - Can be used in children in low doses , during pregnancy & delivery 	<u>contre indication:</u> Oral formulation should not be used in a pregnant AIDs patient because it contains a <u>propylene glycol</u> which is a potentially toxic compound for the fetus	*better to be taken on empty stomach

2- Non-Nucleoside Transcriptase Inhibitors

Nevirapine (1st generstion),
Etravirine (2nd generation)

Mechanism of action	<p>Bind near the active site of the viral reverse transcriptase to inhibit its activity</p> <p>(Act as a non-competitive inhibitors of reverse transcriptase enzyme)</p>
Pharmacokinetics	<ul style="list-style-type: none">-Orally effective-Metabolized in liver-Excretion through kidney-Inducer of hepatic cytochrome P450
indication	Very effective for prevention of transmission of infection as a single dose at time of labor and continue as an oral doses for 3 days for the neonates
Side Effects	<ul style="list-style-type: none">-Hepatotoxicity-Skin reaction up to life threatening as Steven-Johnson Syndrome (mainly with nevirapine)-Diarrhea-Headache

3- Protease Inhibitors

-Mechanism of action:

- Block the viral protease enzyme** necessary to produce mature virions
- (prevent polyprotein cleavage, which is necessary for the maturation of viral cells)

	Atazanavir	Ritonavir
Pharmacokinetics	<ul style="list-style-type: none">-oral absorption requires an acid environment (not given with antacid)-Excretion via biliary elimination-Enzyme inhibitors P450	<ul style="list-style-type: none">-Should be taken with meals (its oral bioavailability increases with food)-Clearance is mainly via the liver-Enzyme inhibitors P450
Side effects	<ul style="list-style-type: none">-Increased bleeding in hemophilic patients-Increased blood sugar level-Changes in body fat distribution central obesity, buffalo hump, gynecomastia*NOT given to diabetic patient & hemophilic patients	

4- Entry Inhibitors : Maraviroc

Mechanism of action:

- Blocks certain strains of HIV from binding to **chemokine receptor type 5 (CCR5)** thus preventing the virus from entering target cells
- If the patient's virus is chemokine receptor type 4 , the drug will not be effective.
- Cross CSF
- Excreted mostly through feces
- Well tolerated & few side effects

Summary

Antiretroviral Drugs

Drug	MOA	Therapeutic effects	Side effect	Note
Nucleoside Reverse Transcriptase Inhibitors				
Zidovudine	<ul style="list-style-type: none"> • Selective reverse transcriptase inhibitors. • Acts as <u>competitive</u> substrate inhibitors. • Can also be incorporated into growing viral DNA chain and causes its termination. 	<ul style="list-style-type: none"> • Increase T cells partially restoring immune system • Reverses AIDS dementia 	<ul style="list-style-type: none"> • Bone marrow depression (leukopenia) • Nausea , anorexia • Myopathy , fatigue 	<ul style="list-style-type: none"> • used in Low dose: • Children • During pregnancy ,labor
Emtricitabine			<ul style="list-style-type: none"> • GIT upset. • Hyperpigmentation of palms& soles. 	Don't use <u>Oral formulation</u> in a pregnant because it contains a propylene glycol (toxic) compound for the fetus.
Didanosine			<ul style="list-style-type: none"> • acute pancreatitis. • retinal damage. • Peripheral neuropathy. 	

Non-Nucleoside Transcriptase Inhibitors

Nevirapine (1 st generstion)	Bind near the active site of the viral reverse transcriptase to inhibit its activity (<u>non-competitive inhibitors</u>)	prevention of transmission: <u>single dose at time of labor</u> and continue as an oral doses for 3 days for the neonates	<ul style="list-style-type: none"> • Hepatotoxicity. • life threatening Skin reaction Steven-Johnson Syndrome (nevirapine). • Diarrhea ,Headache. 	Inducer of hepatic cytochrome P450
Etravirine (2 nd generation)				

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doctor's note

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explanation

Summary

Antiretroviral Drugs

Drug	MOA	Therapeutic effects	Side effect	Note
Protease Inhibitors				
Ritonavir	<ul style="list-style-type: none"> Block the viral protease enzyme necessary to produce mature virions (prevent polyprotein cleavage, which is necessary for the maturation of viral cells) 		<ul style="list-style-type: none"> Increased bleeding in hemophilic patients (G6PH deficiency) . Increased blood sugar level (✖ diabetes). Changes in body fat distribution: central obesity, buffalo hump, (gynecomastia). 	<ul style="list-style-type: none"> oral absorption requires an acid environment Excretion via biliary elimination Enzyme inhibitors P450
Atazanvir				<ul style="list-style-type: none"> Should be taken with meals (its oral bioavailability increases with food) Clearance is mainly via the liver Enzyme inhibitors P450
Entry Inhibitors				
Maraviroc	Blocks certain strains of HIV from binding to chemokine receptor type 5 (CCR5) thus preventing the virus from entering target cells.		Well tolerated & few side effects	

Quiz yourself



Q1:A pregnant lady came to the clinic with HIV symptoms, What's the best choice in this case:

- A-Emtricitabine.
- B-Didanosine.
- C-Zidovudine.
- D-Nevirapine.

Q2:A HIV patient came to the ER complaining of black dots all over his face, Which drug cause this side effect:

- A-Emtricitabine.
- B-Ritonavir.
- C-Didanosine.
- D-Atazanavir.

Q3:A liver failure patient diagnosed with AIDS at the same time she has G6PD deficiency, Which one of these drugs is contraindicated:

- A-Nevirapine.
- B-Maraviroc.
- C-Enfuviride.
- D-Atazanvir.

Q4:A HIV patient came to the ER with sudden upper abdominal pain and fever, Which one of these drugs cause this side effect?:

- A-Emtricitabine.
- B-Didanosine.
- C-Zidovudine.
- D-Maraviroc.

Q5:A pregnant lady with AIDS came to the ER to have her baby, Which one of these drugs is used as prevention:

- A-Etravirine.
- B-Emtricitabine.
- C-Maraviroc.
- D-Zidovudine.

Q6:Diabetic patient diagnosed with AIDS, which one of these drugs is contraindicated:

- A-Zidovudine.
- B-Emtricitabine.
- C-Ritonavir.
- D-Nevirapine.

Answers: 1-C 2-A 3-D 4-B 5-A 6-C

Done by



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IT HAS BEEN A LONG RIDE !

We were able to get through 4 blocks CNS , GIT , Endocrine and Reproductive.

We have been through very difficult times, But we were able to overcome them only because of the help That we have been generously receiving from each and everyone of

you, Our team members. There are no enough words to describe our gratitude to you guys, But maybe a simple thank you is enough ,, so **THANK YOU**

This team could never succeeded without your effort, your commitment, your sacrifice, until the very end.. So thank you and **THANK YOU AGAIN.** 

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Awatif alenazi	Munira AL Mehsen	Abdulaziz ALSudairi	Omar AlDhasee
Areej alwahaib	Nawt Alfuweres	Abdulmalek alnujidi	Yousef Alfadli
Anjod almuhareb	Nawal Asiry	Abdulrahman Alharbi	Ziyad Alajlan
Ahlam sallam	Nada Bin dawood	Abdullatef Alhassan	
Alaa Alzulfi	noha almndeel	Abdulrahman Althaqib	
Ebtesam alateeg	Nouf Alrushaid	Abdullah Alzahrani	
Fatimah AlQarni	Noura alrayes	Abdulrahman Aldubaib	
Ghaida Alawaji	Rahma alshehri	Ahmad Alzoman	
Hanan Aldossari	Rawan Alotaibi	Bander alenazi	
Haifa al-otaibi	Rawan alyahya	Faisal Saleh AlGhamdi	
Jumanah Albeeybe	Reem almassoud	Fahad alqahtani	
Khawla dayel	Sara alkharashi	Faroq Abdulfattah	
kholoud Al-dosari	Sarah aljabri	Fahad Alotaibi	
Latifa AlAnazi	yara alanazi	Faisal mohamed Alghamdi	