

وَقُلْ رَبِّ زِدْنِي عِلْمًا



# RESPIRATORY SYSTEM

## HAYAT BATCH



SUBJECT : Pharmacology

LEC NO. : 1/copd

DONE BY : Anas zakarneh



# Respiratory system (Pharmacology)

- Lecture 1: Treatment of COPD
- Lecture 2: Treatment of Asthma 1
- Lecture 3: Treatment of Asthma 2
- Lecture 4: Treatment of allergic rhinitis + cough
- Lecture 5: Treatment of bacterial respiratory infections 1
- Lecture 6: Treatment of bacterial respiratory infections 2
- Lecture 7: Treatment of tuberculosis (TB)



# Lecture 1: Treatment of Chronic Obstructive Pulmonary Disease (COPD)

Respiratory system

Second year

Medical school

Hashemite University

2<sup>nd</sup> semester 23/24

Sofian Al Shboul, MD, PhD.



# Lecture objectives

- Review the pathophysiology of COPD
- Understand COPD therapeutic approach
- Describe the mechanisms of action (MOA), pharmacokinetics and side effects of agents used for COPD management



# Facts & numbers

- Nearly half COPD patients say it limits their work and social activity
- Known as disease of old age but can occur as young as 35 years
- **SMOKING**
- Approximately 15-20% of the cases occur in nonsmokers.

**CHRONIC OBSTRUCTIVE PULMONARY DISEASE**

**384 MILLION** people suffer from Chronic Obstructive Pulmonary Disease (COPD) in the world

**3 MILLION** people die each year of COPD

COPD is currently the **3RD** leading cause of death globally

COPD is highly prevalent in low resource countries

**EARLY DIAGNOSIS - SYMPTOMS INCLUDE**

- Shortness of breath
- A repetitive cough
- Increased phlegm or mucus production
- Feeling tired
- More frequent chest infections
- Longer to recover from a cold/chest infection

**BIGGEST RISK FACTORS**

- Smoking
- Indoor and outdoor pollution
- Occupational dusts and chemicals

**LEAVE NO ONE BEHIND. ON WORLD LUNG DAY CALL FOR HEALTHY LUNGS FOR ALL**

**WORLD LUNG DAY**  
25 september

firsnet.org #WorldLungDay

**It is NOT curable but treatable**



# Definition & sub-types

## Defining "Chronic Obstructive Pulmonary Disease (COPD)"



"an event characterized by dyspnea and/or cough and sputum that worsen over  $\leq 14$  days, which may be accompanied by tachypnea and/or tachycardia and is often associated with increased local and systemic inflammation caused by airway infection, pollution, or other insult to the airways"

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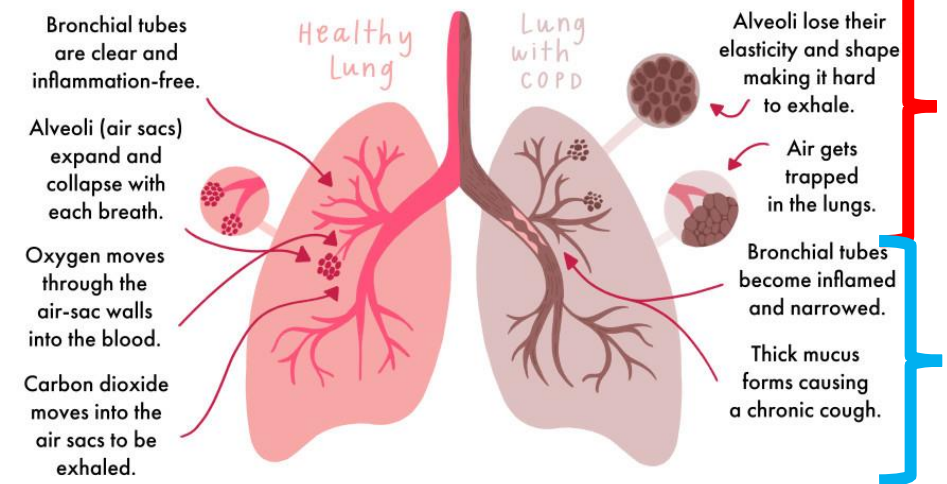
**COPD**  
Systemic disease, largely manifesting as an airflow-obstructing respiratory disorder; can manifest in the form of any of the following disorders:

- Emphysema**  
Lung tissue destruction & abnormal, permanent enlargement of lung acini: airspaces distal to terminal bronchioles
- Chronic Bronchitis**  
Chronic, productive cough for a total duration of 3 months per year, over 2 continuous years

- Clinically, COPD is seen as:**
- Progressive, **irreversible** airflow obstruction and lung hyperinflation (causing respiratory symptoms like cough, sputum production, and dyspnea)
  - Post-bronchodilator spirometry results: FEV1/FVC ratio  $< 0.7$  (FEV1 is not a defining feature of COPD, but a marker of severity)
  - $\uparrow$  frequency & severity of acute exacerbations
  - Systemic manifestations such as deconditioning and muscle weakness

### The Lungs on COPD

Learn what damage from COPD looks like and why it becomes so hard to breathe.

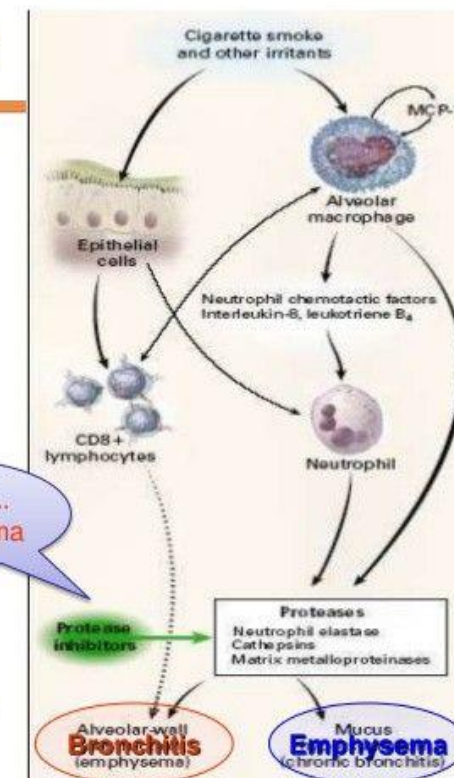


# Pathogenesis

- Chronic bronchitis and emphysema: CD8+ T-lymphocytes, neutrophils, and CD68+ monocytes/macrophages in the airways.
- the bronchial inflammation of asthma: presence of CD4+ T-lymphocytes, **eosinophils**, and increased interleukin (IL)-4 and IL-5.

## Pathogenesis of COPD

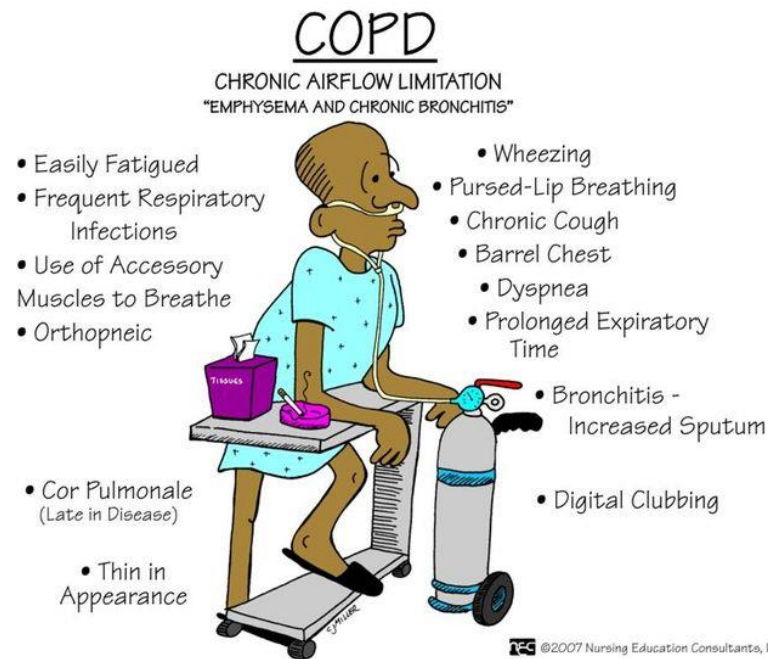
1. Smoke, irritants, carcinogens.
  2. Tissue irritation & destruction
  3. Inflam → Mucous production.
  4. Airway damage → Narrowing.
  5. Alveolar damage → widening.
- Increase in
    - Alveolar macrophages
    - CD8 Lymphocytes
    - Neutrophils
    - Proteases.
  - Airway inflam → Bronchitis
  - Alveoli damage → Emphysema.
  - Both → COPD.





# Signs & symptoms

- Dyspnea
- Chronic cough
- Sputum production
- Wheezing and chest tightness
- Breathlessness
- Difficulty sleeping
- Fatigue.



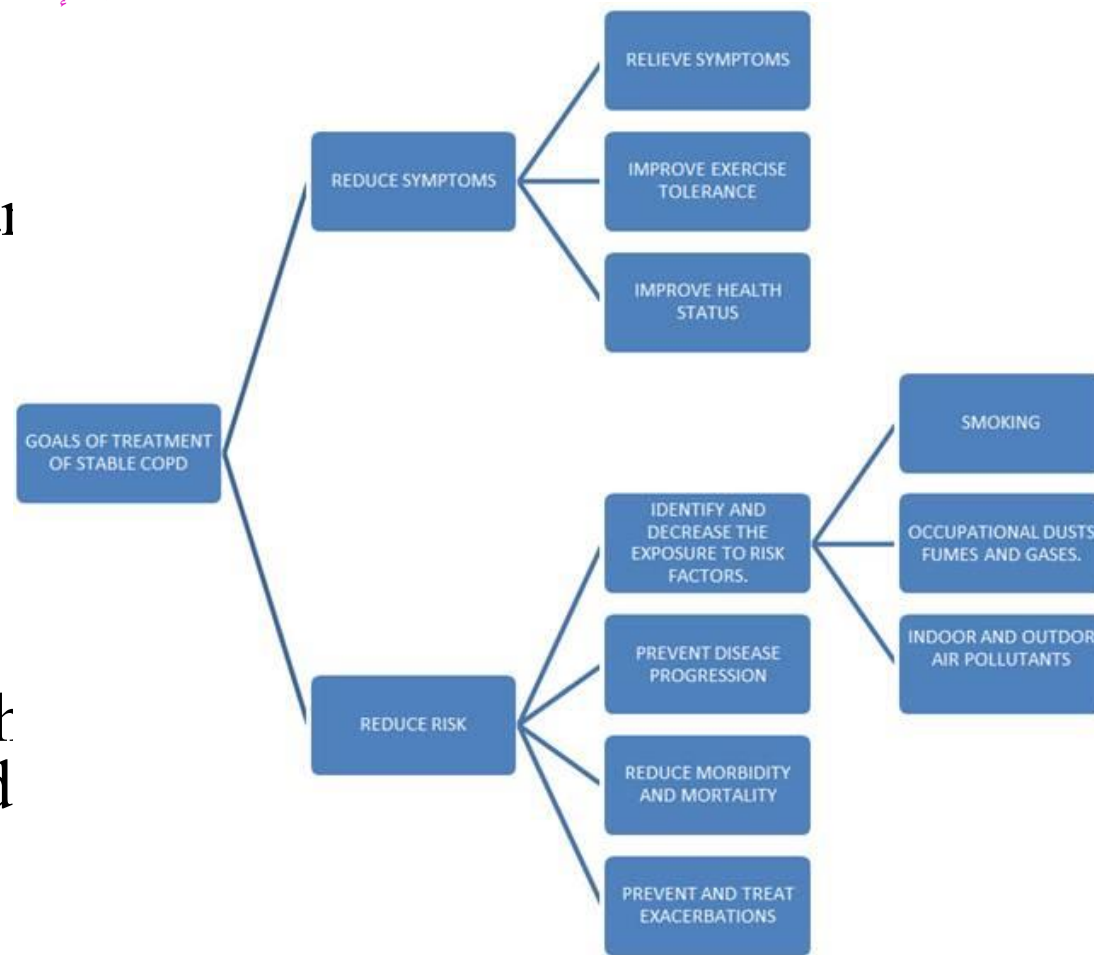




# Treatment & management

المسبب الرئيسي بس مش pharmacological cause بده يكون quit smoking  
أما إذا طلب pharmacological cause بده يكون دواء

- **Quit smoking**
- education and counselling (about COPD and inhaler techniques).
- Seasonal influenza and COVID-19 vaccinations.
- Diet: no ideal COPD diet but excess weight can contribute to dyspnea >>> normal body mass index (BMI).





# Pharmacological agents

## The main

COPD pharmacological treatment include

1. Short-acting  $\beta_2$  agonists (SABAs)
2. Long-acting  $\beta_2$  agonists (LABAs)
3. Short-acting muscarinic antagonist (SAMA)
4. Long-acting muscarinic antagonist (LAMA)
5. Inhaled corticosteroids (ICS)
6. Combinations of these classes
7. Vaccines, antibiotics and other agents

The mainstays of drug therapy for stable symptomatic COPD are inhaled bronchodilators (beta-agonists and muscarinic antagonists).



Must know these

# Pharmacological agents

MEDICATION	INDICATION
<b>SHORT-ACTING <math>\beta_2</math> ADRENERGIC AGONISTS (SABAs)</b>	
<i>Albuterol</i> PROAIR, PROVENTIL, VENTOLIN	Asthma, COPD
<i>Levalbuterol</i> XOPENEX	Asthma, COPD
<b>LONG-ACTING <math>\beta_2</math> ADRENERGIC AGONISTS (LABAs)</b>	
<i>Formoterol</i> FORADIL, PERFORMIST	Asthma, COPD
<i>Olodaterol</i> STRIVERDI RESPIMAT	COPD
<i>Salmeterol</i> SEREVENT	Asthma, COPD
<b>INHALED CORTICOSTEROIDS</b>	
<i>Budesonide</i> PULMICORT, RHINOCORT*	Allergic rhinitis, Asthma, COPD
<i>Fluticasone</i> FLONASE*, FLOVENT	Allergic rhinitis, Asthma, COPD
<i>Mometasone</i> ASMANEX, NASONEX*	Allergic rhinitis, Asthma
<b>LONG-ACTING <math>\beta_2</math> ADRENERGIC AGONIST/CORTICOSTEROID COMBINATION</b>	
<i>Formoterol/budesonide</i> SYMBICORT	Asthma, COPD
<i>Formoterol/mometasone</i> DULERA	Asthma, COPD
<i>Salmeterol/fluticasone</i> ADVAIR	Asthma, COPD
<b>SHORT-ACTING ANTICHOLINERGIC</b>	
<i>Ipratropium</i> ATROVENT	Allergic rhinitis, Asthma, COPD
<b>SHORT-ACTING <math>\beta_2</math> AGONIST/SHORT-ACTING ANTICHOLINERGIC COMBINATION</b>	
<i>Albuterol/ipratropium</i> COMBIVENT RESPIMAT, DUONEB	COPD
<b>LONG-ACTING ANTICHOLINERGIC (LAMA)</b>	
<i>Glycopyrrolate</i> SEEBRI NEOHALER	COPD
<i>Tiotropium</i> SPIRIVA	Asthma, COPD
<b>LABA/LAMA COMBINATION</b>	
<i>Formoterol/glycopyrrolate</i> BEVESPI AEROSPHERE	COPD
<i>Olodaterol/tiotropium</i> STIOLTO RESPIMAT	COPD

OTHER AGENTS	
<i>Roflumilast</i> DALIRESP	COPD
<i>Theophylline</i> ELIXOPHYLLIN, THEO-24	Asthma, COPD

كلهم للasthma + copd  
إلا اللي عليهم نجمه للcopd بس



لازم تعرف ال short / long



SABAs (Short-Acting Beta Agonists)	LABAs (Long-Acting Beta Agonists)	ICS (Inhaled Corticosteroids)	LABAs+ICS	SAMA (Short-Acting Muscarinic Antagonist)	SABA/SAMA	LAMA (Long-Acting Muscarinic Antagonists)	LABA/LAMA	others
Albuterol	Salmeterol	Fluticasone	Salmeterol/Fluticasone	Ipratropium	Albuterol/Ipratropium	Glycopyrrolate	Formoterol/Glycopyrrolate	Roflumilast
Levalbuterol	Formoterol	Budesonide	Formoterol/Budesonide			Tiotropium	Olodaterol/Tiotropium	Theophylline
	Olodaterol	Mometasone	Formoterol/Mometasone					



# Pharmacological agents

Just ignore it

مش حيجي منه

Subclass	Mechanism of Action	Effects	Clinical Applications	Pharmacokinetics, Toxicities
<b>BETA AGONISTS</b>				
<ul style="list-style-type: none"> <li>Albuterol</li> </ul>	Selective $\beta_2$ agonist	Prompt, efficacious bronchodilation	Asthma, chronic obstructive pulmonary disease (COPD)	Aerosol inhalation • duration several hours • also available for nebulizer and parenteral use • Toxicity: Tremor, tachycardia • overdose: arrhythmias
<ul style="list-style-type: none"> <li>Salmeterol</li> </ul>	Selective $\beta_2$ agonist	Slow onset, primarily preventive action; potentiates corticosteroid effects	• drug of choice in acute asthmatic bronchospasm Asthma prophylaxis	Aerosol inhalation • duration 12–24 h • Toxicity: Tremor, tachycardia • overdose: arrhythmias
<ul style="list-style-type: none"> <li>• <i>Metaproterenol, terbutaline: Similar to albuterol; terbutaline available as an oral drug</i></li> <li>• <i>Formoterol: Similar to salmeterol</i></li> </ul>				
<b>CORTICOSTEROIDS, INHALED</b>				
<ul style="list-style-type: none"> <li>Fluticasone</li> </ul>	Alters gene expression	Reduces mediators of inflammation • powerful prophylaxis of exacerbations	Asthma • adjunct in COPD • hay fever (nasal)	Aerosol • duration hours • Toxicity: Limited by aerosol application • candidal infection, vocal cord changes
<ul style="list-style-type: none"> <li>• <i>Beclomethasone, budesonide, flunisolide, others: Similar to fluticasone</i></li> </ul>				
<b>CORTICOSTEROIDS, SYSTEMIC</b>				
<ul style="list-style-type: none"> <li>Prednisone</li> </ul>	Like fluticasone	Like fluticasone	Asthma • adjunct in COPD	Oral • duration 12–24 hours • Toxicity: Multiple • see Chapter 39
<ul style="list-style-type: none"> <li>• <i>Methylprednisolone: Parenteral agent like prednisone</i></li> </ul>				
<b>METHYLXANTHINES</b>				
<ul style="list-style-type: none"> <li>Theophylline</li> </ul>	Uncertain • phosphodiesterase inhibition • adenosine receptor antagonist	Bronchodilation, cardiac stimulation, increased skeletal muscle strength (diaphragm)	Asthma, COPD	Oral • duration 8–12 h but extended-release preparations often used • Toxicity: Multiple (see text)



# Pharmacological agents:

## $\beta$ 2-adrenergic agonists (adrenergic $\beta$ 2 receptor agonists):

### act on the $\beta$ 2 adrenergic receptor:

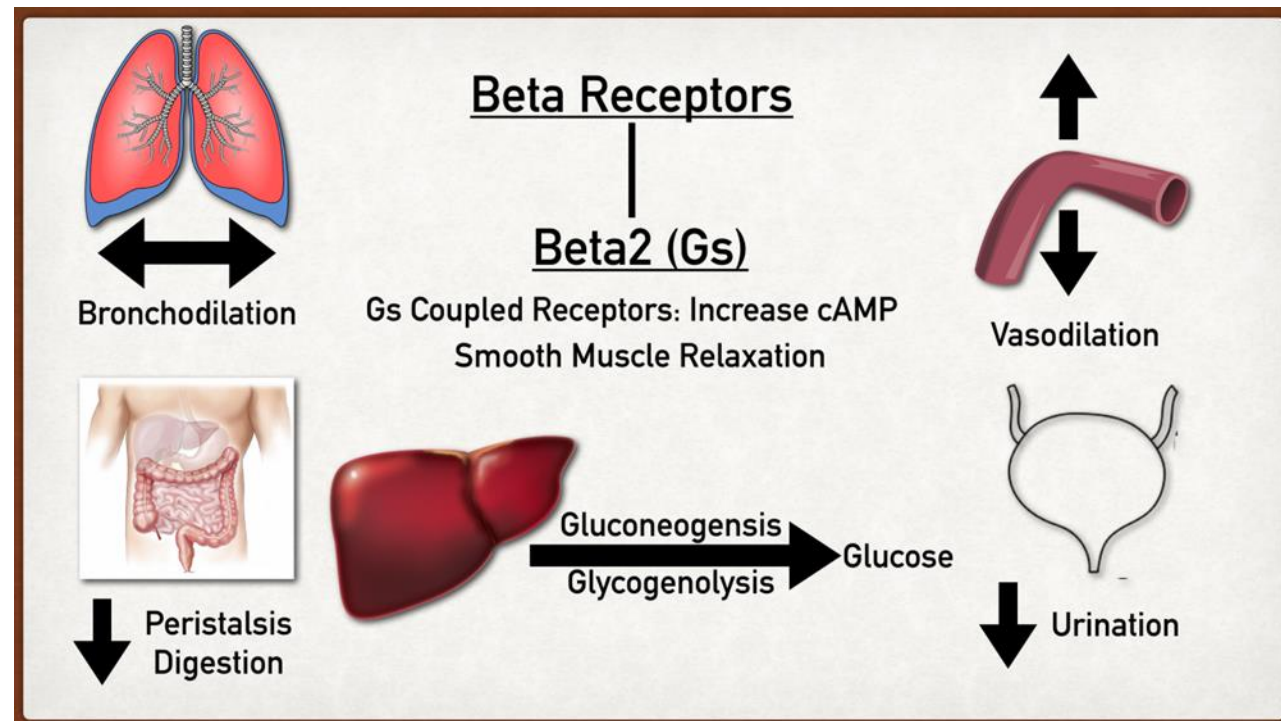
They will go to the beta 2 receptor and then will bind with the receptor and they will do what the receptor can do

شو يعمل ال receptor أصلاً ؟

Beta 2 receptor :vasodilation/ bronchodilation / release glucose /release of insulin /relaxion

So it's act on relaxation/dilation part

- smooth muscle relaxation  
هاي اهم اشى و الثلاثة الباقيين الهم علاقة بال side effect تبعت ال drugs
- dilation of bronchial passages
- vasodilation in muscle and liver
- relaxation of uterine muscle
- release of insulin.



❖ **Primarily used to treat asthma and COPD.**

# Pharmacological agents: β2-adrenergic agonists

➤ **MOA:** *You need to know the steps بالترتيب*

VIP

Receptor activation (G protein (Gs) + adenylyl cyclase) >> increases intracellular cAMP >> activate protein kinase A (PKA) >> reduce intracellular Ca<sup>2+</sup> or decrease the sensitivity of Ca<sup>2+</sup> >> inhibition of myosin light chain phosphorylation (MLCK) >> preventing airway smooth muscle contraction.

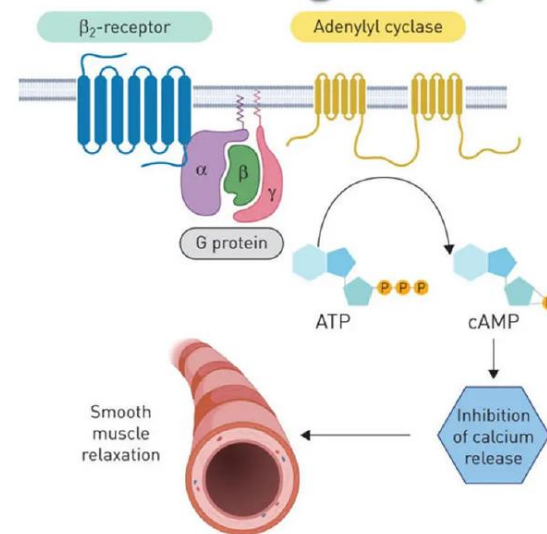
*برضو مهم*

➤ Anti-inflammatory effects?

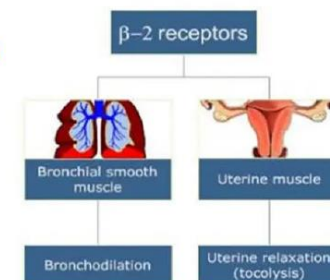
reducing intercellular adhesion molecule-1 (ICAM-1)

reducing granulocyte-macrophage colony-stimulating factors (GM-CSF) release

## Selective agonists of beta adrenergic receptors 2



1. Terbutaline
2. Clenbuterol
3. Salbutamol
4. Salmeterol
5. Pirbuterol
6. Isoetarine
7. Orciprinaline





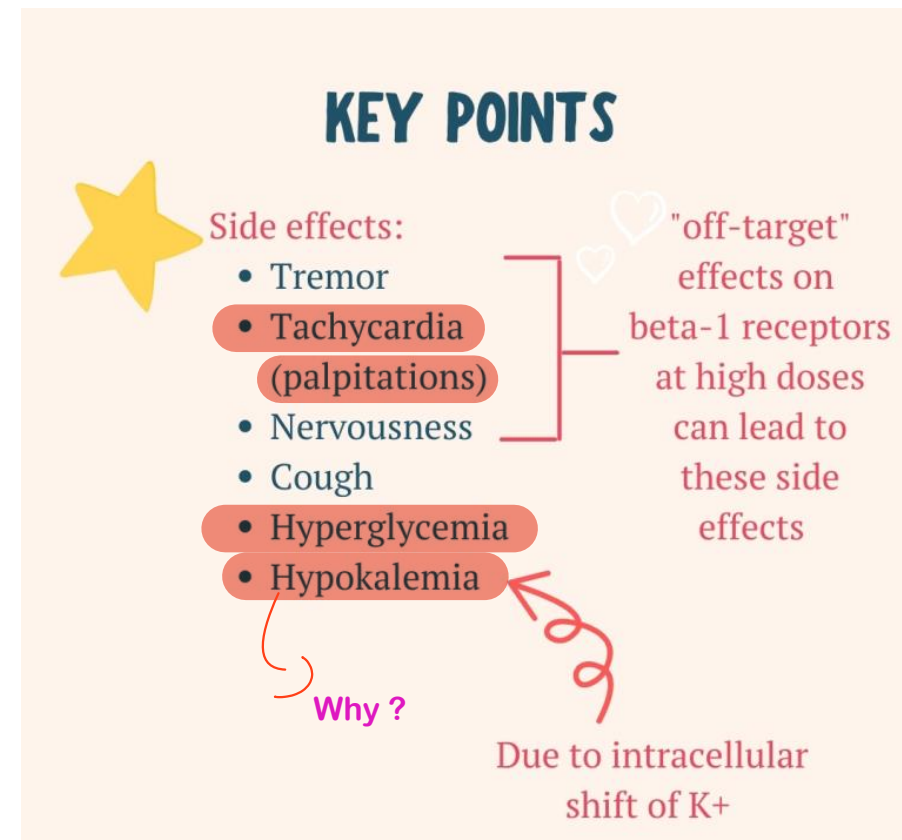
# Pharmacological agents: $\beta_2$ -adrenergic agonists

$\beta_2$ -adrenergic agonists (adrenergic  $\beta_2$  receptor agonists):

❖ Side effects:

See the figure

❖ All  $\beta_2$  agonists are available in inhaler form: metered-dose inhalers (MDI) or dry powder inhalers (DPI)



Answer: مش مطلوب للامتحان:

Beta-adrenergic drugs stimulate beta-adrenergic receptors, which can lead to increased activity of the sodium-potassium pump in cells. This increased activity promotes the movement of potassium from the extracellular space into the cells, causing a decrease in serum potassium levels and potentially leading to hypokalemia.





# Pharmacological agents: muscarinic antagonist

COPD pharmacological treatment include

3. Short-acting muscarinic antagonist (SAMA)
4. Long-acting muscarinic antagonist (LAMA)



# Pharmacological agents:

شو بساوي؟  
يشتغلو عكس ال muscarinic

## muscarinic antagonist (muscarinic receptor antagonist (MRA):

All drugs here will try to dayloid the bronchi

✓ Muscarinic receptors are predominately present on glandular cells, smooth muscle cells, and cardiac muscle cells.

✓ Competitively inhibit the effect of **acetylcholine (ACh)** at muscarinic receptors (M1 and M3)

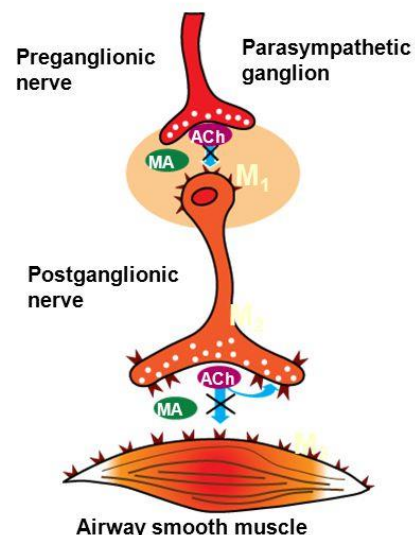
✓ M1: CNS

✓ M3: smooth muscle GI, UT, **airway**, and blood vessels  
مهم نعرف انو ال m3 موجود بال GI/UT/airways

✓ Side effects: dry mouth, constipation and urinary retention

These drugs will block the (M3 ) to prevent airway smooth muscle contraction

### Mechanism of action of muscarinic antagonists



- Muscarinic antagonists block M<sub>1</sub> and M<sub>3</sub> receptors, thus preventing binding of acetylcholine and inhibiting airway smooth muscle contraction

ACh, acetylcholine; M<sub>x</sub>, muscarinic receptor; MA, muscarinic antagonist

Tashkin DP, Fabbri LM, *Respir Res.* 2010;11:149.



# Pharmacological agents: Inhaled corticosteroids (ICS)

COPD pharmacological treatment include

5. Inhaled corticosteroids (ICS)

inhibit the release of arachidonic acid through inhibition of phospholipase A2

راح نتعمق فيهم بسنة تالته

هسا بدنا ناخذ التفاصيل اللي بتهمنا

# Pharmacological agents:

## Inhaled corticosteroids (ICS)

- Anti-inflammatory agents that should be reserved for patients with frequent or severe exacerbations and high blood eosinophils (~10% of the COPD population), or those with concomitant asthma

They are used in all diseases and symptoms

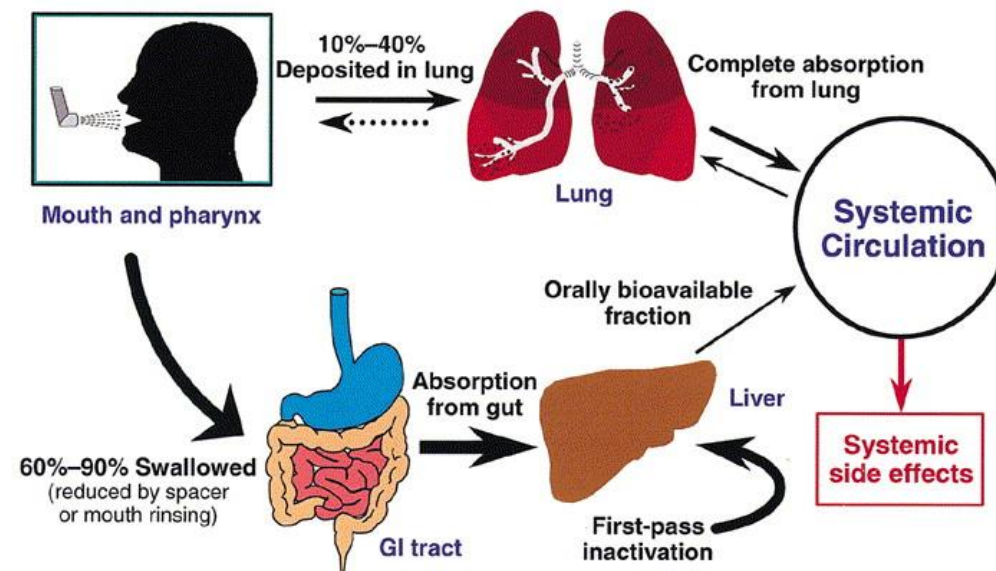
وين ما تحطهم يشتغلو بس هون راح نركز على اللي بكونو بخاخات مش الoral

لأنو التأثير العكسي تبعهم systemic

- Do not relax airway smooth muscle directly but reduce bronchial reactivity and potentiate the effects of  $\beta$ -receptor agonists
- Main effect: inhibition of the infiltration of lymphocytes, eosinophils, and mast cells.

بالعادة ما ينعطى لخالو بكون معو دواء ثاني و إذا كان لحاله بكون عشان inflammatory process تاغته

Oral glucocorticoids can be effective in treating an acute exacerbation **BUT** generally they are not recommended





# Pharmacological agents: Drug combinations

COPD pharmacological treatment include  
6. Combinations of different drug classes



لازم تعرف ال short / long

SABAs (Short-Acting Beta Agonists)	LABAs (Long-Acting Beta Agonists)	ICS (Inhaled Corticosteroids)	LABAs+ICS	SAMA (Short-Acting Muscarinic Antagonist)	SABA/SAMA	LAMA (Long-Acting Muscarinic Antagonists)	LABA/LAMA	others
Albuterol	Salmeterol	Fluticasone	Salmeterol/Fluticasone	Ipratropium	Albuterol/Ipratropium	Glycopyrrolate	Formoterol/Glycopyrrolate	Roflumilast
Levalbuterol	Formoterol	Budesonide	Formoterol/Budesonide			Tiotropium	Olodaterol/Tiotropium	Theophylline
	Olodaterol	Mometasone	Formoterol/Mometasone					



إذا حفظت الجدول بتحل كل اسئلة الدكتور

## LABA+ corticosteroids

LONG-ACTING $\beta_2$ ADRENERGIC AGONIST/CORTICOSTEROID COMBINATION	
<i>Formoterol/budesonide</i> SYMBICORT	Asthma, COPD
<i>Formoterol/mometasone</i> DULERA	Asthma, COPD
<i>Salmeterol/fluticasone</i> ADVAIR	Asthma, COPD
SHORT-ACTING $\beta_2$ AGONIST/SHORT-ACTING ANTICHOLINERGIC COMBINATION	
<i>Albuterol/ipratropium</i> COMBIVENT RESPIMAT, DUONEB	COPD
LONG-ACTING ANTICHOLINERGIC (LAMA)	
LABA/LAMA COMBINATION	
<i>Formoterol/glycopyrrolate</i> BEVESPI AEROSPHERE	COPD
<i>Olodaterol/tiotropium</i> STIOLTO RESPIMAT	COPD

SABA+  
SAMA for  
COPD  
only

LABA+ LAMA for COPD



# Pharmacological agents: Other agents

**Roflumilast** الوحيد اللي بدنا نعرفه من الothers

\* **Oral phosphodiesterase-4 (PDE4) inhibitor**

\* Reduces exacerbations in patients with **severe chronic bronchitis**. Not emphysema

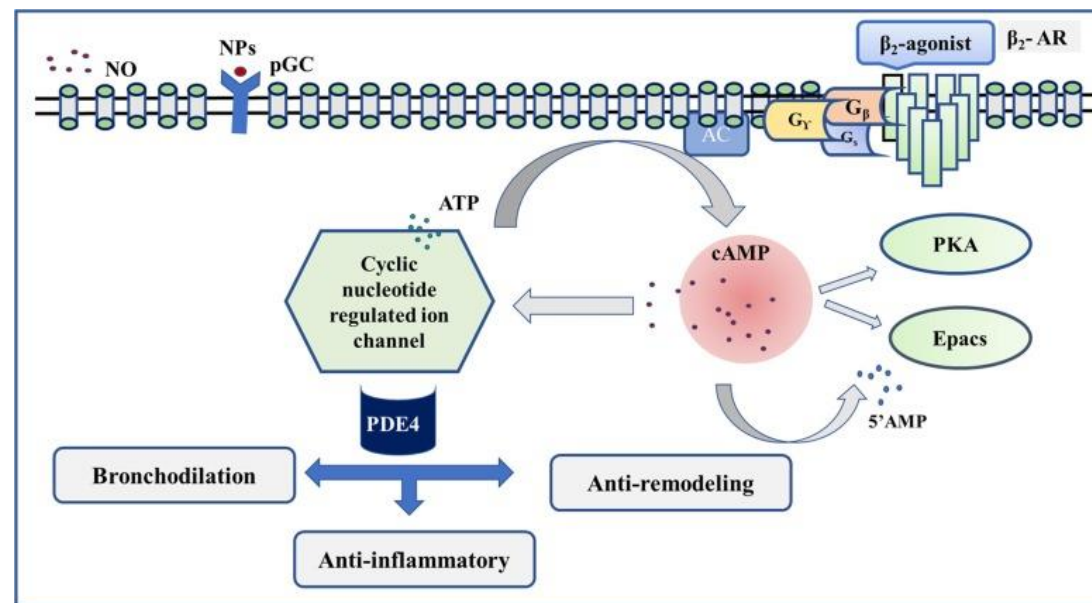
\* **Reduce inflammation** by increasing levels of intracellular cAMP in lung cells.

**PDE4: (inhibit broncho dilation)**

اهو إنزيم بوقف كل اشي بالرسمه

فأنا بس اعمله **inhibiting** بزيد فعالية كل اشي

هيك بده الدكتور 🤔





# Pharmacological agents: Other agents

- **Roflumilast**
- **NOT** a bronchodilator and is **NOT** indicated for the relief of acute bronchospasm, it decreases inflammation in lungs
- Used in treating those with chronic bronchitis and a history of exacerbations.
- Use is limited by common adverse effects including **weight loss, nausea, diarrhea, and headache.** used with caution in those suffering from **depression.** Or mental issue

VIP



# Pharmacological agents: Other agents

موجود بالشاي

- **Methylxanthines** such as **theophylline** which has mild **bronchodilatory** effect in stable COPD. Theophylline is seen to improve breathlessness when used as an add-on to salmeterol. Methylxanthines are not recommended for use in exacerbations due to adverse effects.

- Cough medicines are not recommended. / Beta blockers are not contraindicated for those with COPD and should only be used where there is concomitant cardiovascular disease

احتمال كبير تيجي هاي الفقره بالامتحان





# CAT & mMRC scales



Range of CAT scores from 0–40. Higher scores denote a more severe impact of COPD on a patient’s life.

مش مطالبين بالاسلايد لامتحان  
بس حلو تقراهم

## How is your COPD? Take the COPD Assessment Test™ (CAT)

This questionnaire will help you and your healthcare professional measure the impact COPD (Chronic Obstructive Pulmonary Disease) is having on your wellbeing and daily life. Your answers, and test score, can be used by you and your healthcare professional to help improve the management of your COPD and get the greatest benefit from treatment.

For each item below, place a mark (X) in the box that best describes you currently. Be sure to only select one response for each question.

Example: I am very happy (0)  (1) (2) (3) (4) (5) I am very sad

	SCORE
I never cough (0) <input type="radio"/> (1) <input type="radio"/> (2) <input type="radio"/> (3) <input type="radio"/> (4) <input type="radio"/> (5) I cough all the time	<input type="text"/>
I have no phlegm (mucus) in my chest at all (0) <input type="radio"/> (1) <input type="radio"/> (2) <input type="radio"/> (3) <input type="radio"/> (4) <input type="radio"/> (5) My chest is completely full of phlegm (mucus)	<input type="text"/>
My chest does not feel tight at all (0) <input type="radio"/> (1) <input type="radio"/> (2) <input type="radio"/> (3) <input type="radio"/> (4) <input type="radio"/> (5) My chest feels very tight	<input type="text"/>
When I walk up a hill or one flight of stairs I am not breathless (0) <input type="radio"/> (1) <input type="radio"/> (2) <input type="radio"/> (3) <input type="radio"/> (4) <input type="radio"/> (5) When I walk up a hill or one flight of stairs I am very breathless	<input type="text"/>
I am not limited doing any activities at home (0) <input type="radio"/> (1) <input type="radio"/> (2) <input type="radio"/> (3) <input type="radio"/> (4) <input type="radio"/> (5) I am very limited doing activities at home	<input type="text"/>
I am confident leaving my home despite my lung condition (0) <input type="radio"/> (1) <input type="radio"/> (2) <input type="radio"/> (3) <input type="radio"/> (4) <input type="radio"/> (5) I am not at all confident leaving my home because of my lung condition	<input type="text"/>
I sleep soundly (0) <input type="radio"/> (1) <input type="radio"/> (2) <input type="radio"/> (3) <input type="radio"/> (4) <input type="radio"/> (5) I don't sleep soundly because of my lung condition	<input type="text"/>
I have lots of energy (0) <input type="radio"/> (1) <input type="radio"/> (2) <input type="radio"/> (3) <input type="radio"/> (4) <input type="radio"/> (5) I have no energy at all	<input type="text"/>
<b>TOTAL SCORE</b>	<input type="text"/>

## Modified Medical Research Council (mMRC) dyspnea scale

Grade	Description of breathlessness
0	I only get breathless with strenuous exercise
1	I get short of breath when hurrying on level ground or walking up a slight hill
2	On level ground, I walk slower than people of the same age because of breathlessness, or have to stop for breath when walking at my own pace
3	I stop for breath after walking about 100 yards or after a few minutes on level ground
4	I am too breathless to leave the house or I am breathless when dressing



# Treatment plans

اللي محدد هو المهم

هون مريض معه COPD

اللي بهمني انو أقيم كم مره صار عنده moderate exacerbations او كم مره دخل المستشفى

Grade	Description of breathlessness
0	I only get breathless with strenuous exercise
1	I get short of breath when hurrying on level ground or walking up a slight hill
2	On level ground, I walk slower than people of the same age because of breathlessness or have to stop for breath when walking my own pace
3	I stop for breath after walking about 100 yards or after a few minutes on level ground
4	I am too breathless to leave the house or I am breathless when dressing

New diagnosis of COPD\*

- Recommended general and preventative care for all patients:
- Avoidance of smoking and other risk factors
  - Influenza, pneumococcal, and COVID-19 vaccinations
  - Regular physical activity
  - Short-acting bronchodilator as needed for acute dyspnea (refer to below for selection)
  - Regular review of correct inhaler technique
  - Assessment of hypoxemia and hypercarbia for long-term oxygen and/or noninvasive ventilation

Has the patient had 2 or more moderate exacerbations OR at least 1 hospitalization for COPD exacerbation in the past year?

إذا ما عنده فهو قروب AB

Quantify dyspnea and symptoms using the mMRC dyspnea scale (refer to Table 1) and CAT. Does the patient have mMRC  $\geq 2$  or CAT  $\geq 10$ ?

مهم تعرف أسم الفحصين و قيمتهم

GOLD Group A

GOLD Group B

GOLD Group E

Does the patient have high peripheral eosinophil levels ( $\geq 300/\text{microL}$ ) OR Hospitalization for COPD exacerbation?

بنا corticosteroids

هون بصير زي B

LAMA plus as-needed SABA (preferred) OR LABA plus SAMA/SABA or SABA OR As-needed SAMA-SABA or SABA

LAMA-LABA dual bronchodilator therapy AND SABA as needed for acute dyspnea

LAMA-LABA dual bronchodilator therapy AND SABA as needed for acute dyspnea

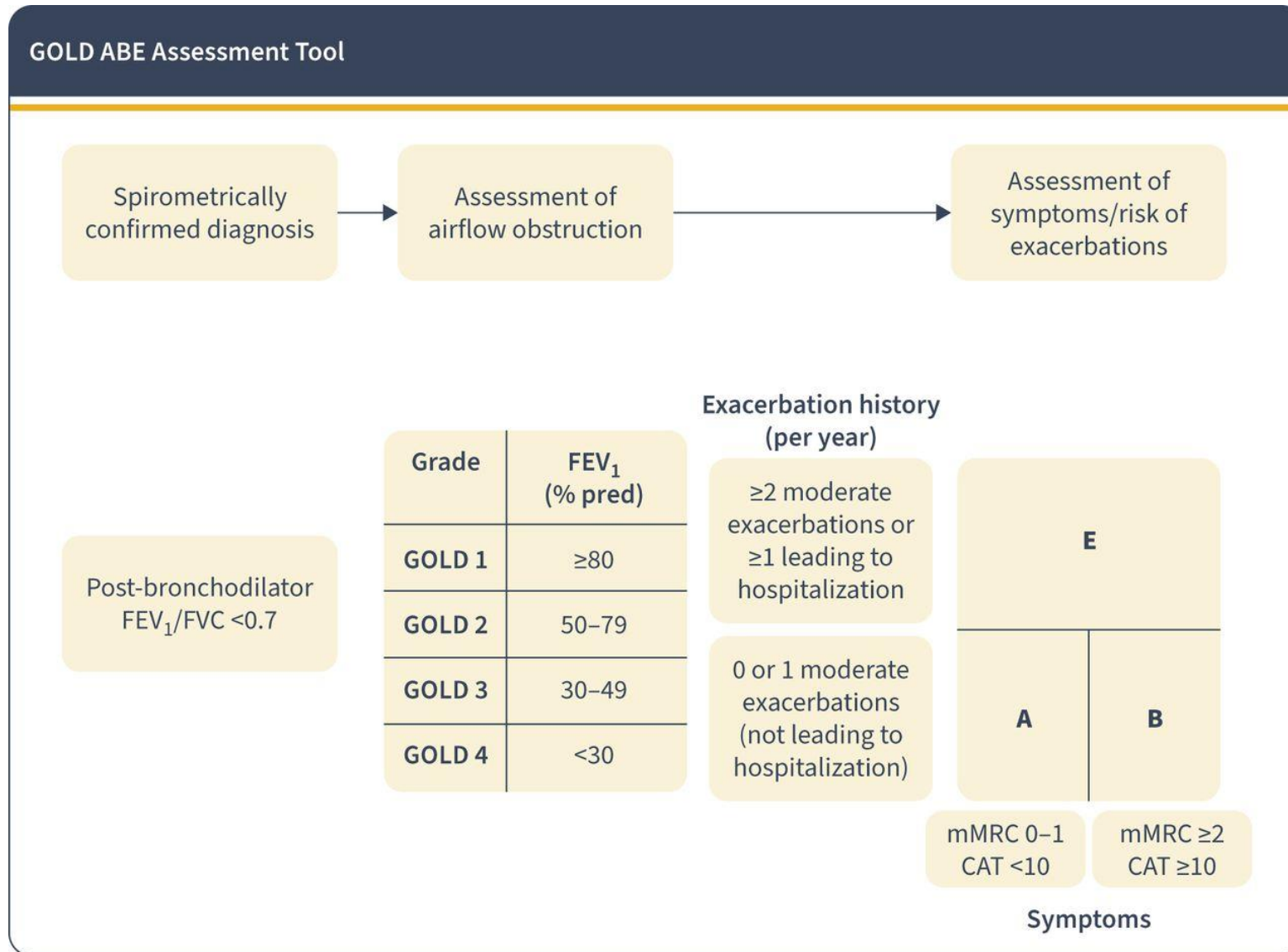
ICS-LAMA-LABA therapy AND SABA as needed for acute dyspnea

مع بعض



# GOLD ABE assessment tool.

السلامة اللي فوق بهم الدكتور (اللي حددناه)

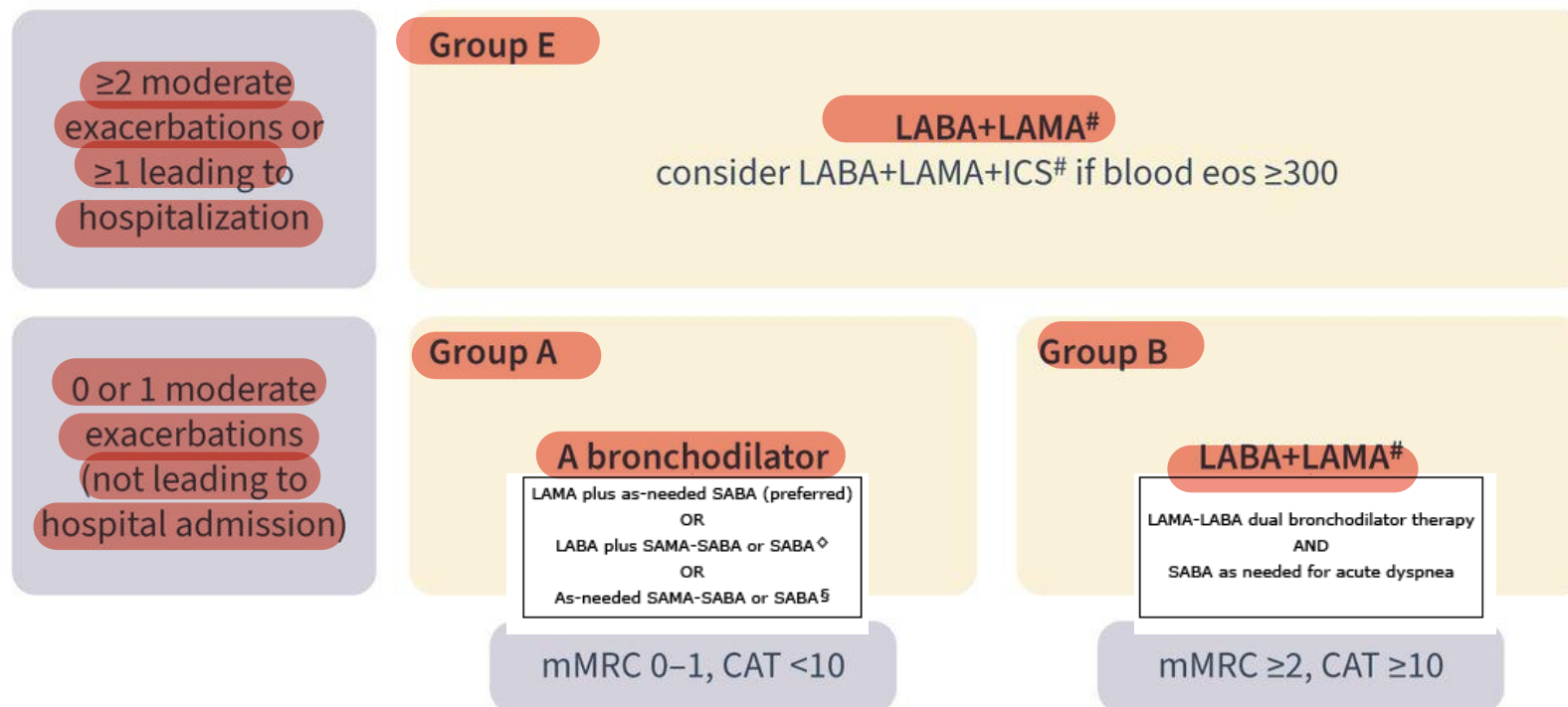




# Initial pharmacological treatment

الأصفر قرابية

## Initial pharmacological treatment

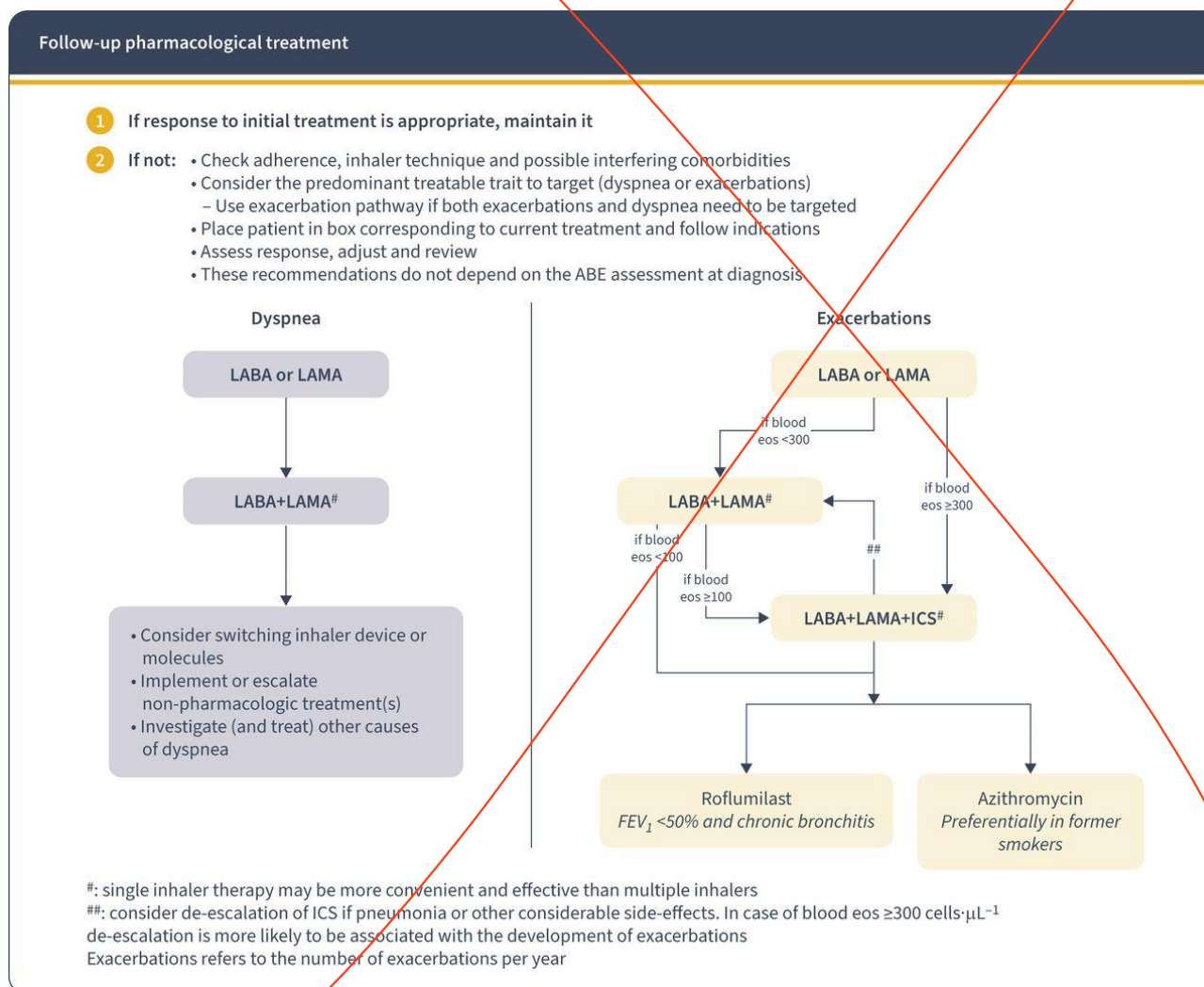


#: single inhaler therapy may be more convenient and effective than multiple inhalers  
Exacerbations refers to the number of exacerbations per year

If there is an indication for an ICS, then LABA+LAMA+ICS has been shown to be superior to LABA+ICS and is therefore the preferred choice

The use of LABA+ICS in COPD is no longer encouraged.

# Follow-up pharmacological treatment.



## Quiz time

1- A 58-year-old woman with COPD has been hospitalized three times in the past year for COPD exacerbations. She reports only mild symptoms between exacerbations. Her regimen for the past year has included inhaled salmeterol twice daily and inhaled tiotropium once daily. Her current FEV1 is below 60%. Which is an appropriate change in her drug therapy?

- A. Discontinue the tiotropium.
- B. Discontinue the salmeterol.
- c. Change the salmeterol to a combination product that includes both a LABA and an inhaled corticosteroid(for example, salmeteroVfluticasone DPI).
- D. Add theophylline.

2- A 58-year-old man who is a smoker with chronic obstructive pulmonary disease (COPD) presents to the emergency department (ED) with shortness of breath and a productive cough. This is the fourth time this year he has come to the ED because of COPD exacerbation. After this hospital stay, his primary care physician prescribes roflumilast in hopes of decreasing his ED visits for COPD exacerbation. What is roflumilast's mechanism of action?

- (A) Blocks arachidonic acid production
- (B) Bronchodilation
- (C) Inhibition of leukocyte chemotaxis by interfering with microtubules
- (D) PDE4 inhibitor
- (E) Thins and loosens mucus

3-What is the first line treatment option for COPD?

- A- Bronchodilator
- B- Muscarinic agent
- C- Corticosteroids
- D- None of the above

4-Roflumilast is a medication that belongs to class of:

- A- Anticholinergics
- B- Methylxanthines
- C- Phosphodiesterase inhibitors
- D- Long-acting beta agonist

Ans  
1)C  
2)D  
3)A  
4)C