

وَقُلْ رَبِّ زِدْنِي عِلْمًا



RESPIRATORY SYSTEM

HAYAT BATCH



SUBJECT : Pharma
LEC NO. : Let 2
DONE BY : Mass

تفاريغ المادة

RS-Pharmacology notes

YouTube Videos

اضغط على الكلام المكتوب باللون الأزرق لتنتقل مباشرة الى المحاضرة

ملاحظة: يوجد تقاطع كبير بين ادوية الربو و ادوية COPD

و اغلب المصادر بتشرح الربو اول لهيك رح احط فيديوهات من شرح الربو تستفيدو منها دراستكم لل COPD

الموضوع	الفيديوهات المطلوبة 1	الفيديوهات المطلوبة 2	الفيديوهات المطلوبة 3
Treatment of COPD lec 1	احضر هذا الفيديو كامل رح يشرح موضوع الربو و الCOPD الفيديو رهيبيب	للي بحب شرح فودة احضروا هذا الفيديو من الدقيقة 36 الى الساعة و 13 دقيقة اما اذا بتحضره كامل بتكون خلصت الربو يعني درست محاضرتي	

شرح عبدالمتعال فودة

FOUDA



😊😊 المحاضره جدا سهله في كثير اخذناه و في محذوف

Lectures 2-3: Treatment of Asthma

Respiratory system

Second year

Medical school

Hashemite University

2nd semester 23/24

Sofian Al Shboul, MD, PhD.

هسا بالبداية رح انصح انه تحضرو
محاضره الباثو رقم ٣ عشان تكون اسهل
عليكم المحاضره و اذا درستوها و نسبتو
عادي هسا رح نراجع سوا



هسا رح نبليش نفرق بين ال *copd* و ال *asthma*
الادويه بينهم متشابهه لكن الاختلاف هو الترتيب
تبع الدوا يعني مين يعطيه اول هون و هون 😊

Overview & definition

يعني المرض يرجع مع رجوع مسبب الحساسيه
زي في ناس بتبليش عندهم الحاله لما يقربو من القطط ليهيك لازم ابعدهم عنهم

تذكري انه ال *copd*
is irreversible

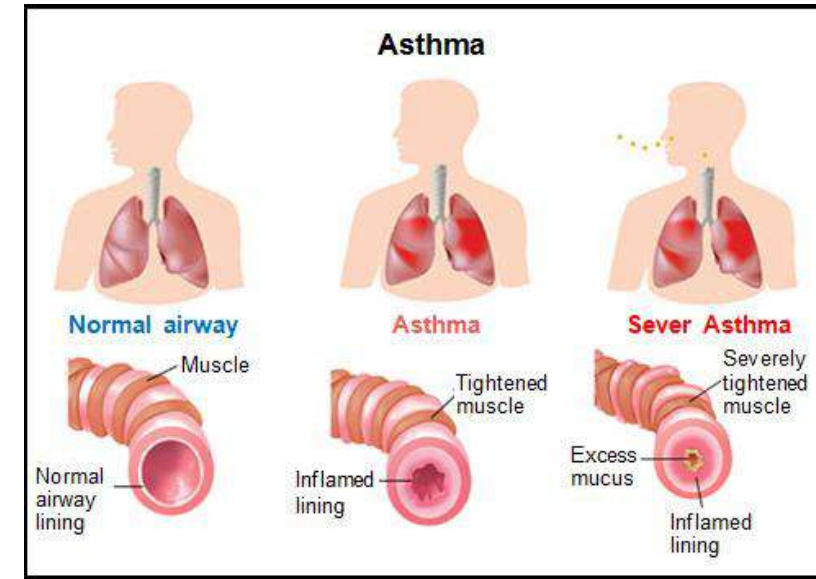
❖ A chronic inflammatory disease characterized by variable and reversible airflow obstruction, and easily triggered bronchospasms by hyperresponsive airways inhaled stimuli.

❖ **Chronic** Incurable, but most people can control their symptoms.

كل الادوية المستخدمة في علاج الامراض المزمنة *chronic* تستخدم لتخفيف الاعراض و ليس العلاج الكلي
Not cure 🙄

❖ Majority of kids with asthma eventually grow out of it.

غالبا الاطفال يلي معهم *asthma* بس يكبرو بتروح
هاي الاعراض مش لانه الدوا فعال بس لانه في
امراض بتختفي عند اغلب ال *adults* يعني اشبي
مؤقت



الدكتور بده السلايد ك باثو نفهمه
اما ك فارما لا
المعلومات سهلة احفظوها او بس

قراءه 🙄





🤔 *risk factor for copd is smoking* ال
But in asthma it is Genetic 🤔

Risk factors & triggers

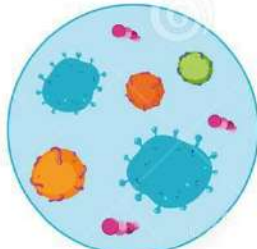
Asthma Risk Factors



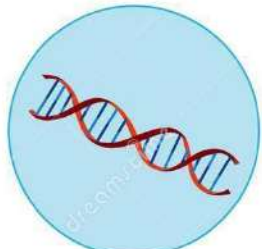
Cigarette



Food



Infection



Genetic



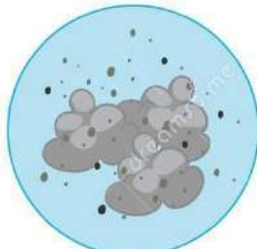
Pollution



Cold weather



Pet



Dust

Download from Dreamstime.com
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① هل التدخين له نفس التأثير في حدوث ال *asthma* مثل ال *copd*؟ اكد لا
 ② كمان سؤال ليش التدخين ما يسبب *asthma* ؟
 الجواب لانه بعمل *copd* بدهاش ذكا 🤔🤔

🌀 لكن اذا الشخص اصلا معه *asthma* التدخين بزيد الطين بلة و بعد ٢٠ سنة تدخين بصير معه *copd*
 يعني صار معه التنين سوا

Cigarette Smoking

Having allergic conditions like atopic dermatitis

Exposure to smoke, exhaust fumes or other types of pollution

Exposure to chemicals used in farming, hairdressing, manufacturing

Family history of Asthma

Overweight

موجود بال *asthma*
 but not in *copd*



Asthma usually isn't a progressive disease 🗑️

هسا بدنا نعرف انه ال *asthma* عباره عن
اعراض مؤقتة و بتبلش تتحسن مش اشني
بضل يزيدي و بضل يخف اكثر و اكثر و اذا
ما عالجت بصير *progressive*
هسا انا لما اقلك عالجت ال *asthma* قصدي
هو انه خففت تطورها مش عالجتها بشكل تام



هسا ال *copd* الفكره تبعته المرض
بضل يطور و يزيدي لهيك هو
progressive للأسف
و هون احنا منعالج المشكله
بالقصبات نفسها و الاعراض تبعتها
اما ما منقدر نتحكم بعلاج المرض 🤔





Pathophysiology

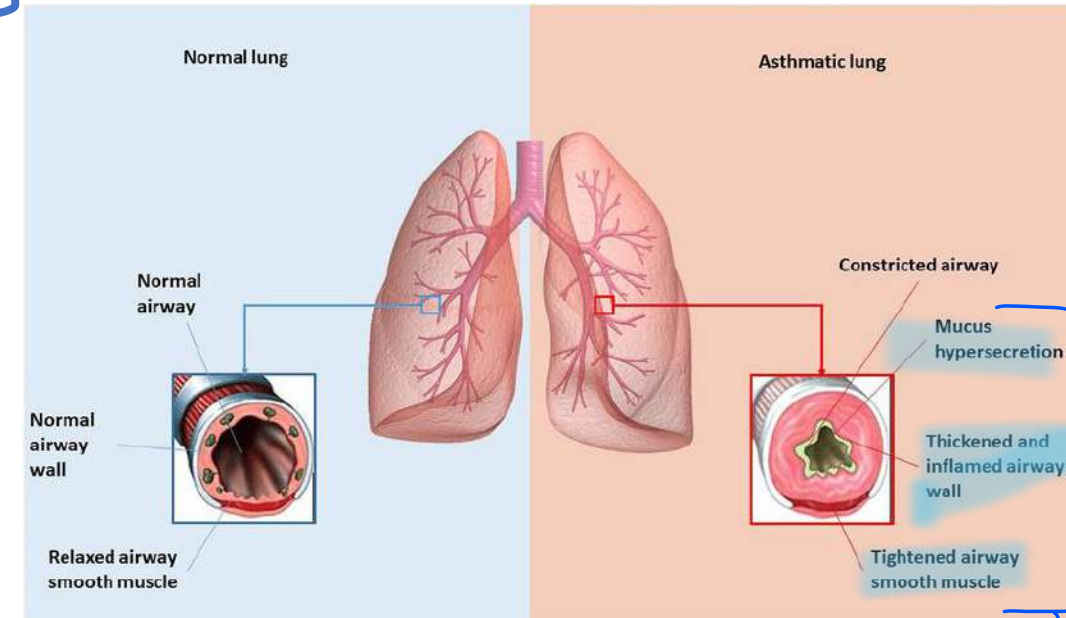
- 1- Contraction of bronchial smooth muscle
- 2- bronchial wall inflammation
- 3- increased secretion of mucus

Asthma is usually not a progressive disease. However, if untreated, asthma may cause airway remodeling, resulting in increased severity and incidence of asthma exacerbations and/or death.

لهيك انت عالج ال *inflammation* و الباقي برجع طبيعي 🤔

اكيد بدون تفكير هداول ال ٣ بعملوا *obstruction in any place*

bronchoconstriction and airflow obstruction.



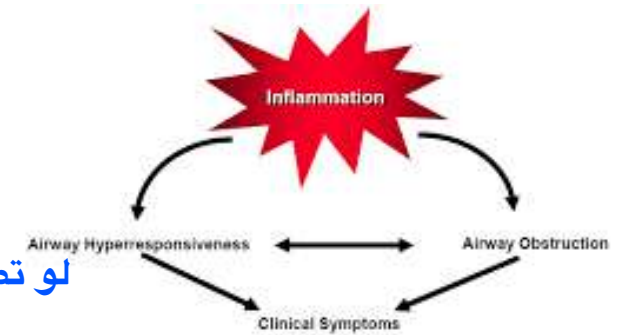
دائما اربطو ال *inflammation* بهداول الاعراض تقول زي ولادها دائما معها لهيك حتى اعالجها بعالج ولادها 🤔 و منسيمي هاد العلاج على اسم الام *anti-inflammatory drugs*



Pathophysiology & pathogenesis

- Asthma pathophysiology components:

1. Airway inflammation
2. Intermittent airflow obstruction
3. hyperplasia of the cells of all structural elements of the airway wall. *لو تطور بصير copd*



- Several immune cells are implicated:

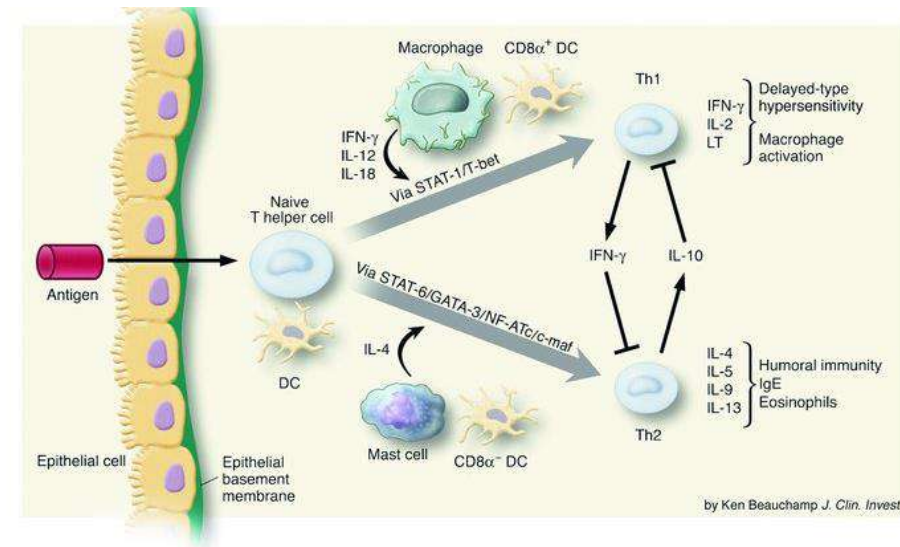
1. Eosinophils and CD4+
2. Mast cells
3. Th2 lymphocytes
4. Basophils

ذكرناهم بالبائو لهيك احطياط حفظ زياده الخير خيرين

بتعمل الحساسيه و اعراضها

- Foreign materials (allergens) >> ↑ IgE (genetically determined) >> IgE antibodies bind to mast cells in the airway mucosa

ال copd ما اله علاقه ولا شوي بال. IgE



by Ken Beauchamp J. Clin. Invest.



Signs & symptoms

اهم اختلاف مع ال *copd* يعني هاد
العرض بميز ال *asthma* و يلي بسببه
ال *mucus*

- Wheezing (could be absent during most severe episode)
 - Shortness of breath
 - Chest tightness
 - Coughing
- Symptoms are usually worse at night and in the early morning or in response to exercise or cold air.

حكيناها
بالباتو

copd
هدول المرضى عمرهم فوق ال 50 و حالته الصحية ضعيفة و



الدكتور ما بده
السلاميد بالفارما
بس بحكيك
اخذتوه فارما يعني
بعينك الله كلهم
كلمتين 😊

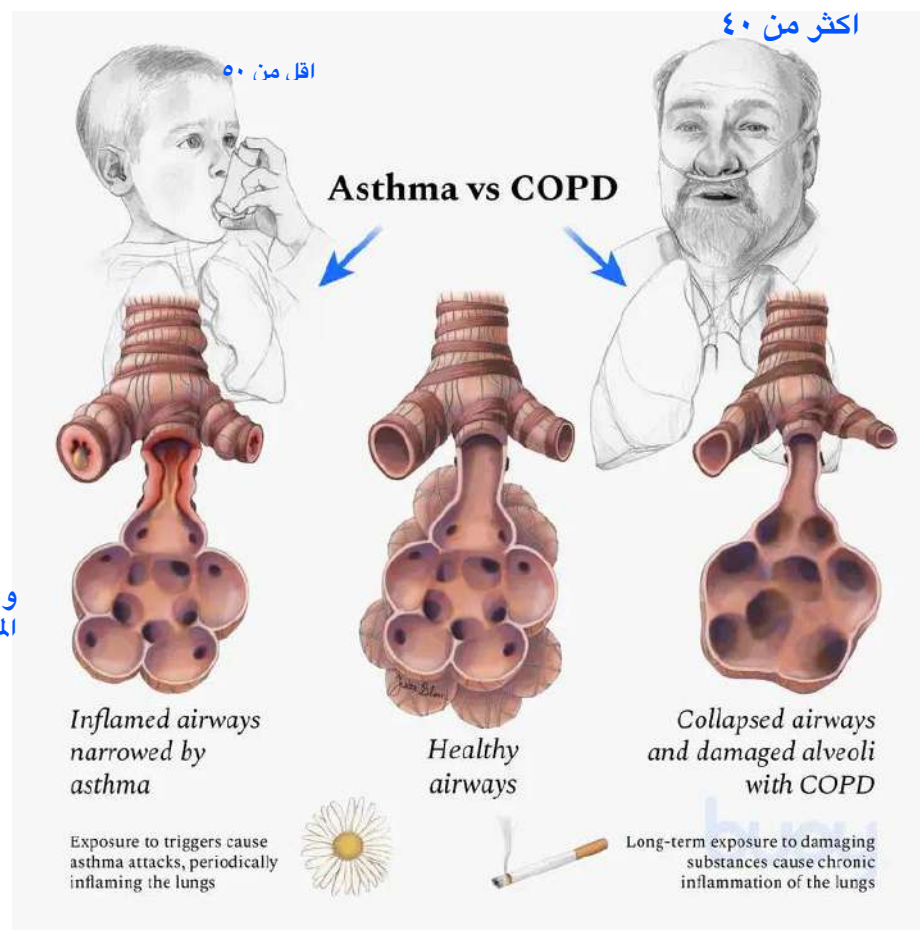


تذكر ال *asthma* بتصير *copd*
اما العكس لا

Asthma vs COPD

- Asthma is not considered as a part of COPD because:
 1. Airway obstruction in asthma is usually reversible (if left untreated, it can become irreversible)
 2. Asthma affects the bronchi (emphysema effect the alveoli)
- Asthma + component of irreversible airways obstruction = the asthma-chronic obstructive disease (COPD) overlap syndrome (ACOS).
- people with ACOS exhibit increased morbidity, mortality and possibly more comorbidities

اغلب حالات ال *asthma* بتصير *copd*
بمس بعد ٢٠ سنه تدخين
و بهاي الحاله بصير المريض عنده
المرضين و حكيناها قبل ما لحقتو تنسو





Asthma vs COPD

- Compared to asthma, COPD occurs in **older** patients, **poorly responsive** even to high-dose inhaled **corticosteroid therapy**, and is associated with **progressive, inexorable loss of** pulmonary function over time, especially with continued cigarette smoking.

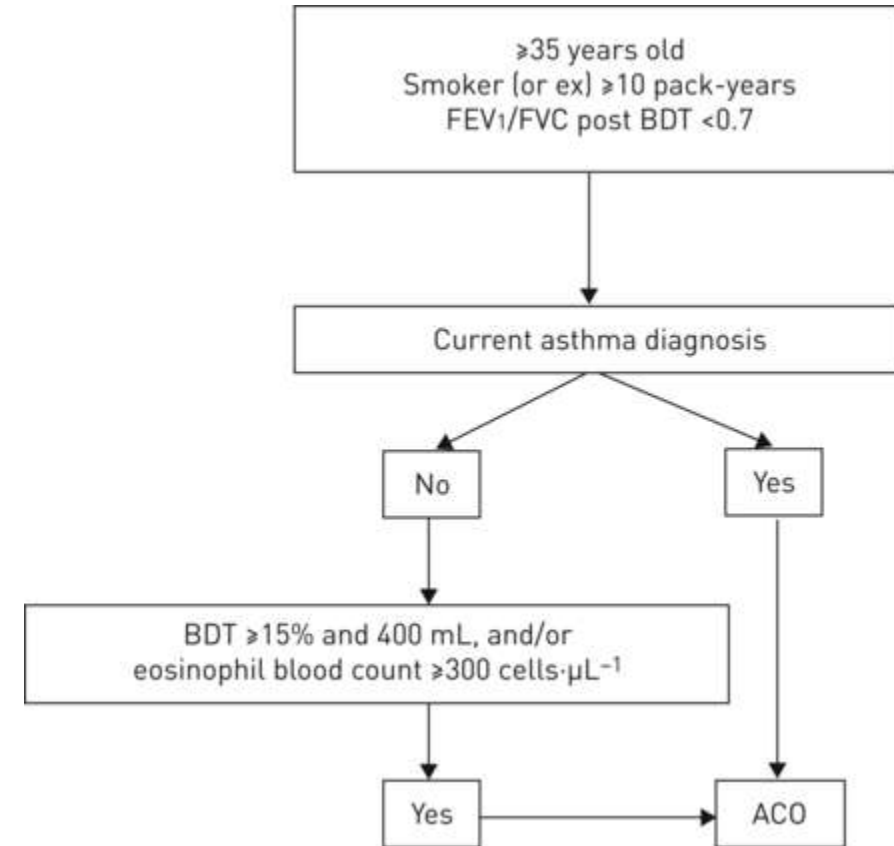
	Asthma	COPD
Age of onset	Usually < 40 years	Usually > 40 years
Smoking history	Not causal	Usually > 10 pack-years
Sputum production	Infrequent	Often
Allergies	Often	Infrequent
Disease course	Stable (with exacerbations)	Progressive worsening (with exacerbations)
Spirometry	Often normalizes	Never normalizes
Clinical symptoms	Intermittent and variable	Persistent

بالاول حكا الدكتور ما بدى هاد السلايد بعدين شرحها و حكا
احفظو الجدول للباثو يعني كل الطرق تؤدى الى روما (باثو)
ركزو بالباثو الباقي بصير اسهل 🤗🤗🤗



Asthma-COPD overlap syndrome (ACOS)

1. age >40 years
2. persistent airflow obstruction
3. history of asthma or evidence of partial bronchodilator reversibility
4. ≥ 10 pack-years tobacco smoking





اول خطوة بعلاج ال *copd* هو نوقف التدخين 🤔
اول خطوة بعلاج ال *asthma* هو انه احدد ال
triggers و اتجنبهم زي يلي بتحسسو من القطط و
انواع من الاكل الافضل اتجنبه
لانه في ناس بتموت من مجرد حساسيه يعني
الموضوع مش سهل 😞

Asthma management

- Identifying triggers and eliminating exposure to them is considered the most effective treatment
- Aims of asthma therapy:
 1. Decrease the intensity and frequency of asthma symptoms
 2. Prevent future exacerbations
 3. Minimize limitations in activity related to asthma symptoms
- Medications for asthma are broadly classified into fast-short-acting and long-acting categories



Agents used for Asthma: Adrenergic agonists

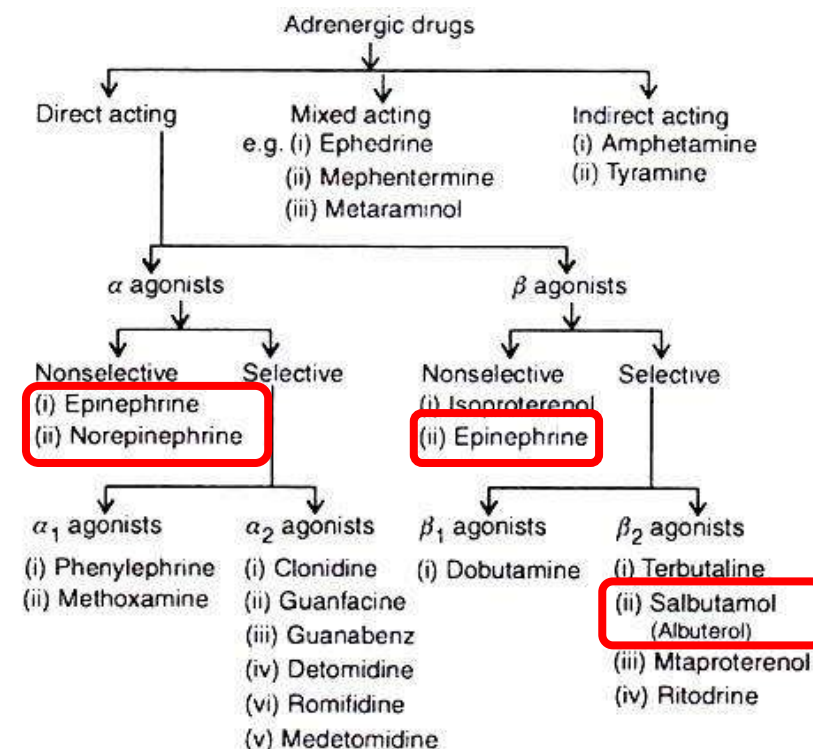
❖ pharmacological asthma related actions:

1. Relax airway smooth muscle
2. Inhibit release of broncho-constricting mediators from mast cells
3. Inhibit microvascular leakage

❖ **Epinephrine, albuterol, levalbuterol**

بنعطو بس بال *asthma* لما نشك انه المريض عنده.
Anaphylactic attack

Why is epinephrine preferred over norepinephrine for asthma?
it has a stronger effect on β_2 -adrenergic receptors



Epinephrine or adrenaline
التنين باثرو على a or B receptor يعني هما
Non selective 😊

هدول التنين بعالجو ال anaphylactic shock و هاد المرض جيلي بصير فيه
انه لقصبات بتتضيق لهيك منعطي adrenaline عشان يوسع القصبات لكن
الهدف الاساسي منه كدواء هو ال circulation effects like bradycardia
لحتى انقذ حياته بعطيه adrenaline و هو بطريقه بفتح القصبات

يعني هدول الدويين بعالجو صدمه الحساسيه

السؤال ليش بستخدمهم مع ال asthma بس ؟ ليش مش ال copd ؟
الجواب لانه ال asthma شبه الحساسيه عكس ال copd

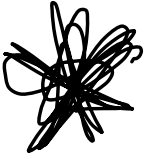
و بالعادة هدول الدويين بعطيهم inhalation or injection و الافضل ال injection طب ليش ؟
ت

لانه صدمه الحساسيه بدها اشئ سريع فيش مجال أضيع وقت ولا بروح المريض



Agents used for Asthma: Adrenergic agonists (Epinephrine)

حتى لو ال *inhalation*
كانت الجرعه تبعته كثير
كبيره مستحيل تصير
احسن من ال *injection*

- Best delivered by inhalation (greatest effect on airway + least systemic toxicity)
- Effective, rapidly acting bronchodilator when injected SC or inhaled as from a pressurized canister.
-  International asthma guidelines recommend **against** epinephrine (adrenaline) administration in acute asthma unless associated with anaphylaxis or angio-oedema

اذا الدكتور جاب حاله و
ما فيها كلمه
Anaphylactic
لا تحط خيار ال *epinephrine*



Agents used for Asthma:

Adrenergic agonists (Epinephrine) *Give it to save life*

- Maximal bronchodilation is achieved 15 minutes after inhalation and lasts 60–90 minutes.
- tachycardia, arrhythmias, and worsening of angina pectoris are troublesome adverse effects.
- its use in asthma has been displaced by other, more β_2 -selective agents.

Asthma attack are not that serious to give epinephrine

إذا كنت بحاله و مافي الا
epinephrine عادي استعمله



العلاج الأساسي لل *copd* هو
B2 زي ال *corticosteroids*

يعني اول علاج ل *copd* is
SABA and *LABA*

Agents used for Asthma: β 2-adrenergic agonists

- Used for quick relief of asthma symptoms, and as adjunctive therapy for long-term control of the disease
- SABAs have a rapid onset of action (5 to 30 minutes) and provide relief for 4 to 6 hours.
- Used for symptomatic treatment of bronchospasm
بستخدمه لما تبين اعراض المرض
بشتغلوا بس اذا المريض عنده attack
مهمه النقطة
- Can be used as monotherapy for patients with persistent asthma??

SABAs monotherapy may be appropriate for patients with mild, intermittent asthma or exercise-induced bronchospasm.





Agents used for Asthma: β 2-adrenergic agonists

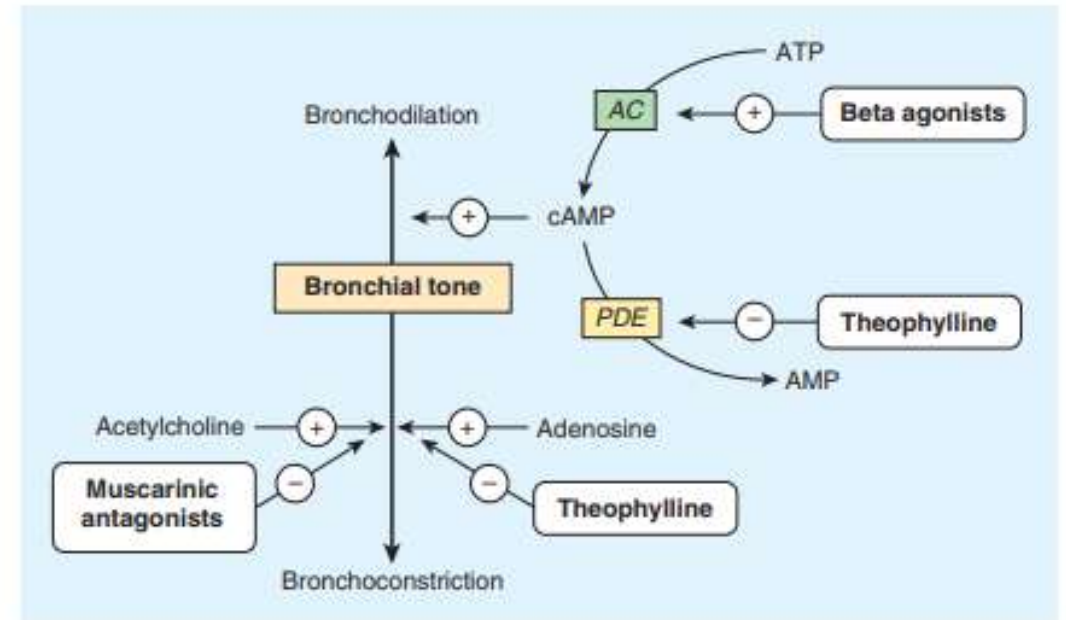
- **MOA:** COPD lecture 

Receptor activation (G protein (Gs) + adenylyl cyclase) >> **increases intracellular cAMP** >> **activate protein kinase A (PKA)** >> phosphorylate Gq-coupled receptors >> **reduce intracellular Ca²⁺ or decrease the sensitivity of Ca²⁺** >> **inhibition of myosin light chain phosphorylation (MLCK)** >> preventing airway smooth muscle contraction.

- Adverse effects: tachycardia, **hyperglycemia**, **hypokalemia**, **hypomagnesemia**, and skeletal muscle tremors

Salmeterol

هو دوا بعمل هاي
الاعراض حفظ مع مهم





Agents used for Asthma: β₂-adrenergic agonists

MEDICATION		
SHORT-ACTING β₂ ADRENERGIC AGONISTS (SABAs)		
<i>Albuterol</i>	PROAIR, PROVENTIL, VENTOLIN	Asthma, COPD
<i>Levalbuterol</i>	XOPENEX	Asthma, COPD
LONG-ACTING β₂ ADRENERGIC AGONISTS (LABAs)		
<i>Arformoterol</i>	PROVANA	COPD
<i>Formoterol</i>	FORADIL, PERFORMIST	Asthma, COPD
<i>Indacaterol</i>	ARCATA	COPD
<i>Olodaterol</i>	STRIVERDI RESPIMAT	COPD
<i>Salmeterol</i>	SEREVENT	Asthma, COPD

لعلاج ال asthma

جدول ال 3 لل copd

- LABAs used in Asthma: salmeterol and formoterol (both are chemical analogs of albuterol).
- longer duration of action, providing bronchodilation for at least 12 hours (because of their high lipid solubility).

ليس Asthmatic patient

Salmeterol Multicenter Asthma Research Trial (SMART) randomized trial comparing salmeterol (MDI) VS placebo. An interim analysis in 26,355 patients found an increase in **respiratory-related deaths and asthma-related deaths**

Use of LABA monotherapy for asthmatic patients is contraindicated

القصة يا ستي بلشت بال 2005 لما عملوا تجربه و التجربة ما اكتملت لكن اضطرو يوقفوها طيب شو التجربة ؟ هم بس قارنو بين ال salmeterol and placebo القصة بلشت انه بعد فتره لقو انه الي اخذ دوا ال salmeterol كان عنده فرصه كبيره انه يصير معه
Respiratory related death and asthma related deaths

Use of LABA monotherapy is **contraindicated**, and LABAs should be used **only in combination with an asthma controller medication**, such as an inhaled corticosteroid (ICS).

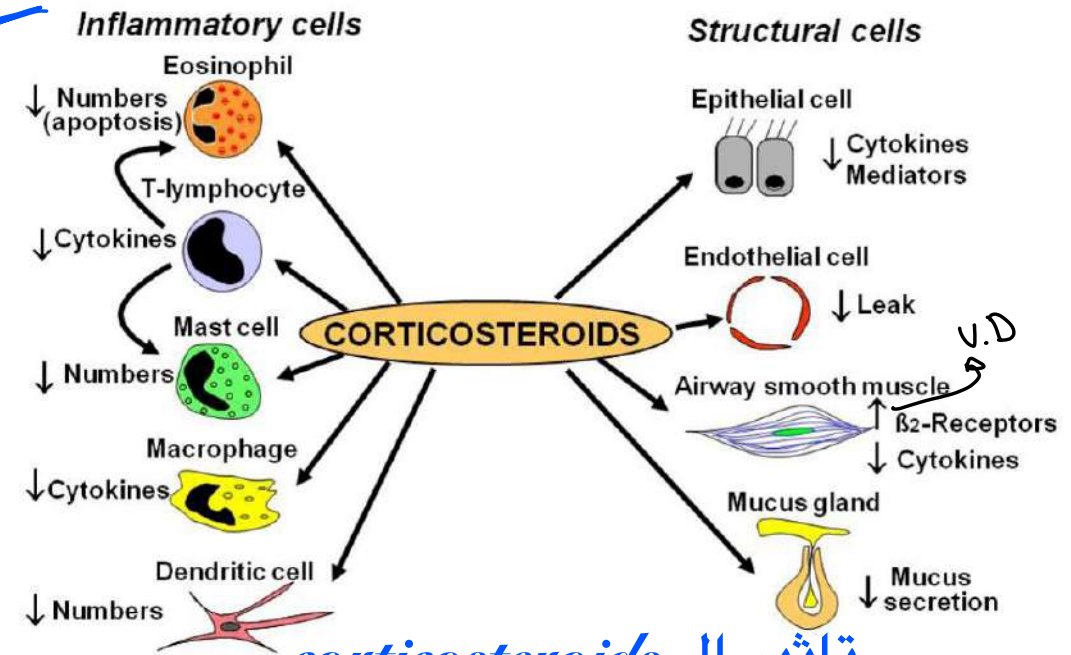


Agents used for Asthma: Inhaled corticosteroids (ICS)

• These drugs directly targets underlying airway inflammation:

مهمين
بالامتحان

1. Decreasing the inflammatory cascade (eosinophils, macrophages, and T lymphocytes)
2. Reversing mucosal edema
3. Decreasing the permeability of capillaries
4. Inhibiting the release of leukotrienes.



تأثير ال corticosteroids

كاه بقل خصوصا جماعه

ال immune cells ال ال

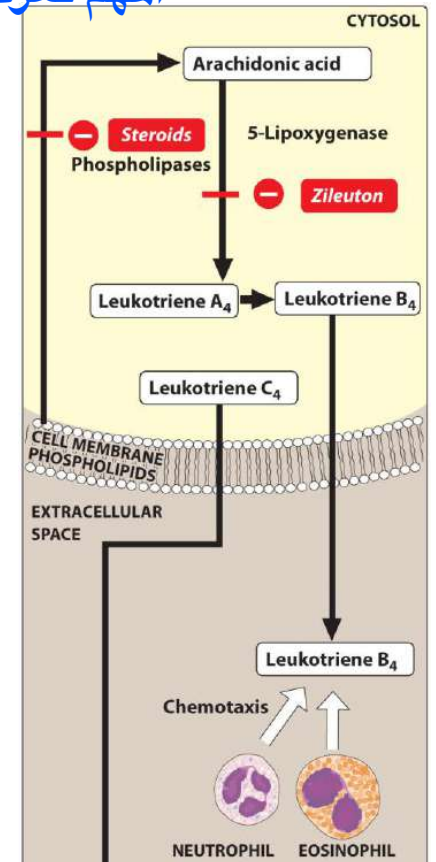
B₂ بزيد



Agents used for Asthma: Inhaled corticosteroids (ICS)

- Do NOT relax airway smooth muscle directly but **reduce bronchial reactivity** and reduce the frequency of asthma exacerbations if taken regularly
- They inhibit the release of arachidonic acid through inhibition of phospholipase A2, thereby producing **direct anti-inflammatory** properties in the airways

الآلية العمل تبعته منوخذها بسنه ثالثه
المهم تعرف التاثير تبعه بس لهسا



ICS with SABA ما بعطيهم سوا لانه
saba Short acting

ICS with LABA ايس بعطيهم سوا و يعطو مفعول جدا قويييييييييي

الفكره تبعتهم انه LABA بوسع القصبات خلال
الالتهاب و بييجي ال ICS بساعده اكثر

نراجع 🤔

adrenaline with ال
anaphylactic shock

ICS مع LABA in long term
with persistent asthma

غير هيك بستخدم Saba
يعني لو عندي acut
attack بستخدمه



Agents used for Asthma:

Inhaled corticosteroids (ICS)

هاد الدواء لازم اعطيه اما مع

LABA

- 1- reduce inflammation in the airways
- 2- decrease the frequency and severity of asthma symptoms
- 3- improve overall lung function

- ICS are the **drugs of choice for long-term control in patients with persistent asthma**

- **Potential** of the effects of β -receptor agonists

- Treatment of severe persistent asthma may require the addition of a short course of oral or intravenous corticosteroids.

Keep in mind that ICS are highly effective for long-term management, but they are not used to treat acute asthma exacerbations.



Agents used for Asthma: Inhaled corticosteroids (ICS)

Routes of administration

I. Inhalation

This formula has markedly reduced the need for systemic corticosteroid (less side effects) but appropriate inhalation technique is critical to the success of therapy

II. Oral/systemic

Patients with a severe exacerbation of asthma may require IV methylprednisolone or oral prednisone to reduce airway inflammation.

In most cases, suppression of the hypothalamic–pituitary–adrenal cortex axis does not occur during the oral prednisone “burst” (short course) typically prescribed for an asthma exacerbation. Thus, a dose taper is unnecessary prior to discontinuation.

Inhaled vs. Oral Corticosteroids

يلي بهمنا



Inhaled

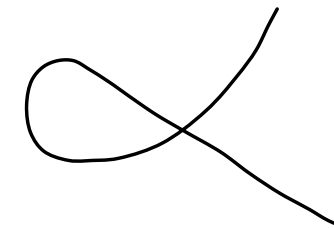
- Treatment for persistent asthma
- Intended for long-term use
- Fewer and less severe effects such as headache, sore throat, common cold or flu, and muscle aches



Oral *Or systemic*

- Treatment for severe asthma and/or attacks
- Intended for short-term usage
- More severe, diverse side effects such as nausea, acne, weight gain, and irregular heartbeat





Agents used for Asthma:

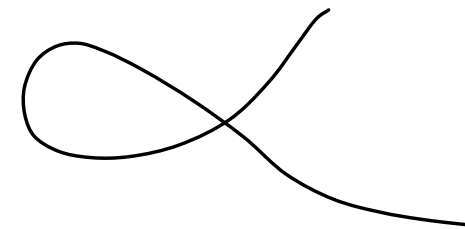
Inhaled corticosteroids (ICS)

Adverse effects

- ICS, particularly if used with a spacer, have few systemic effects.
- Deposition on the oral and laryngeal mucosa can cause **oropharyngeal candidiasis** (due to local immune suppression) and **hoarseness**.
- Patients should be instructed to rinse the mouth in a “**swish-and-spit**” method with water following use of the inhaler to decrease the chance of these adverse events.
- Chronic maintenance with oral corticosteroids should be reserved for patients who are not controlled on an ICS.



Agents used for Asthma: Alternative drugs

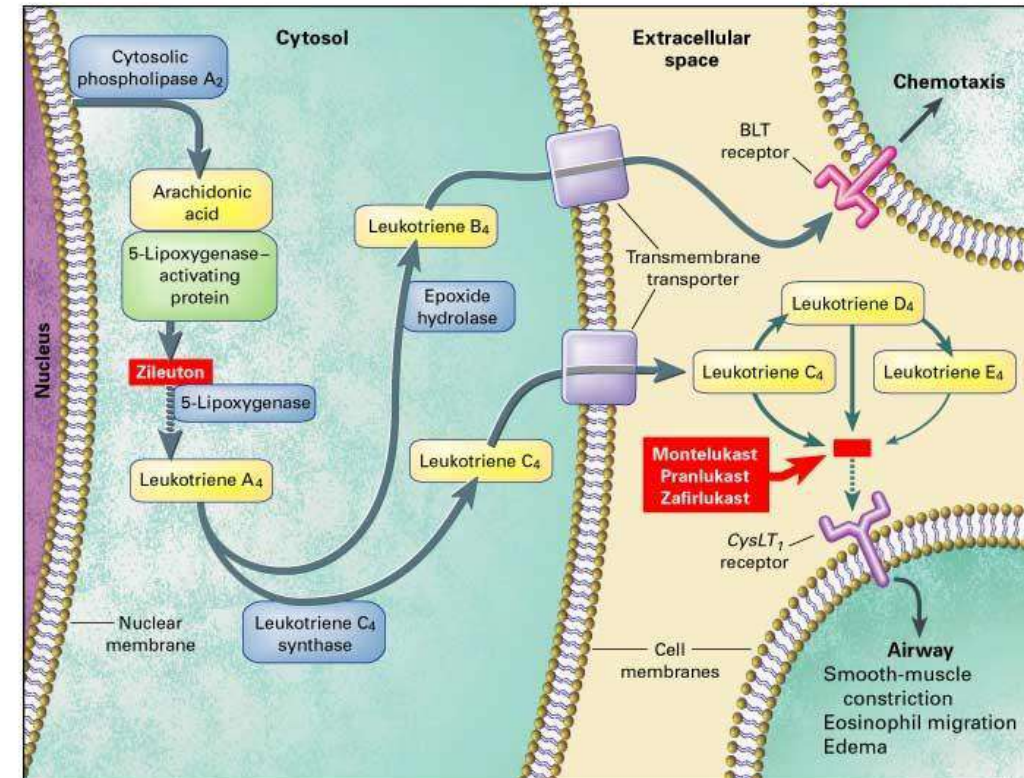
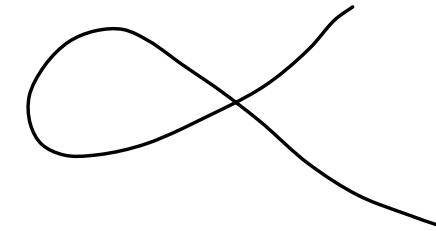


- Useful for treatment of asthma in patients who are poorly controlled by conventional therapy or experience adverse effects secondary to corticosteroid treatment.
- Should be used in conjunction with ICS therapy for most patients.
 - A. Leukotriene ((LT) modifiers (Zileuton, Zafirlukast, montelukast**
 - B. Cromolyn**
 - C. Cholinergic antagonists (ipratropium and Tiotropium)**
 - D. Theophylline**
 - E. Monoclonal antibodies (Omalizumab, mepolizumab, benralizumab and reslizumab)**



Agents used for Asthma: Leukotriene modifiers

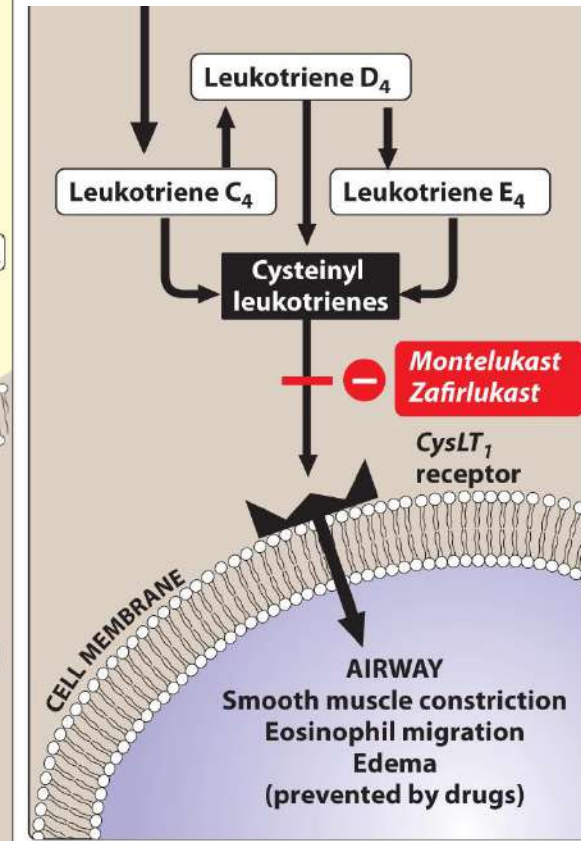
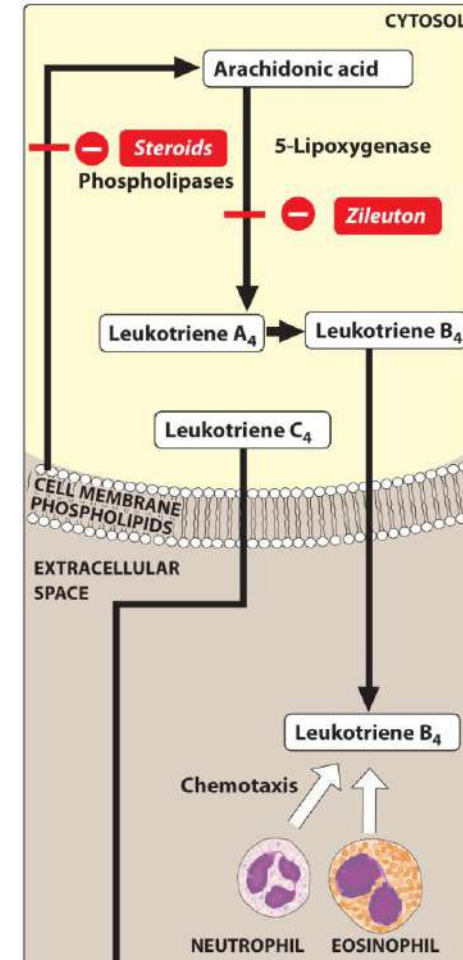
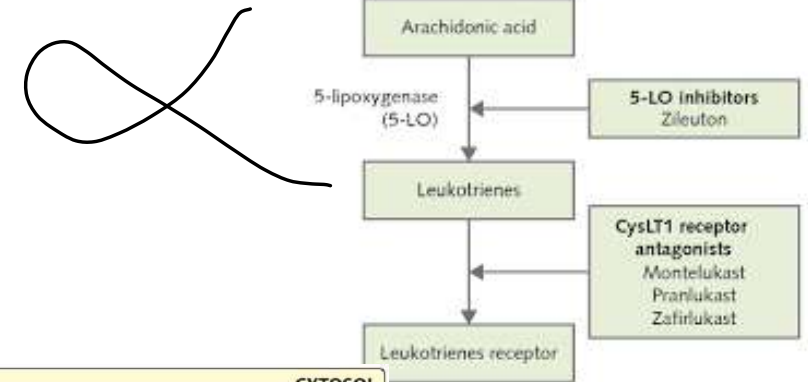
- LTB₄ and the cysteinyl leukotrienes (LTC₄, LTD₄, and LTE₄) are **products of the 5-lipoxygenase pathway** of arachidonic acid metabolism and part of the inflammatory cascade.
- 5-Lipoxygenase is found in cells of **myeloid** origin, such as mast cells, basophils, eosinophils, and neutrophils.
- **LTB₄** is a potent chemoattractant for **neutrophils** and **monocytes**, stimulates production of proinflammatory cytokines.
- **cysteinyl leukotrienes constrict** bronchiolar smooth muscle, **increase** endothelial permeability, **promote** mucus secretion, eosinophil recruitment and airway remodeling in chronic asthma

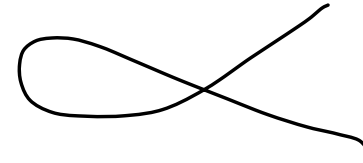




Agents used for Asthma: Leukotriene modifiers

- ✓ Zileuton is a selective and specific inhibitor of 5-lipoxygenase, preventing the formation of **both** LTB₄ and the cysteinyl leukotrienes.
- ✓ Zafirlukast and montelukast are selective antagonists of the cysteinyl leukotriene-1 receptor (CysLT₁), and they block the effects of cysteinyl leukotrienes. (Approved for the prevention of asthma symptoms).
- ✓ Should **not be used in situations** where immediate bronchodilation is required.
- ✓ Leukotriene receptor antagonists have also shown efficacy for the prevention of exercise-induced bronchospasm.





Agents used for Asthma: Leukotriene modifiers

Pharmacokinetics

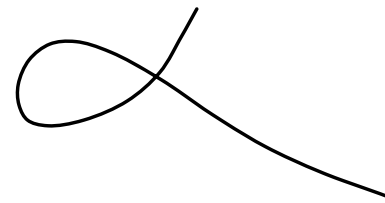
- These agents are orally active
- Undergo extensive **hepatic** metabolism (zileuton and zafirlukast reported with liver toxicity).
- Montelukast is the most prescribed (taken without regard to meals+ once-daily treatment).

Adverse effects

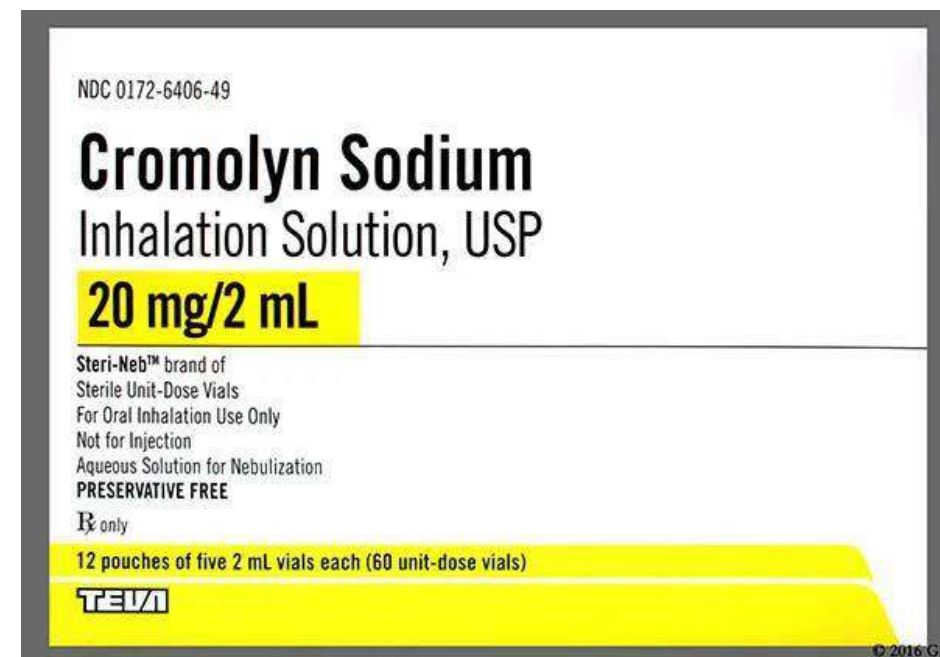
- Elevations in serum hepatic enzymes>> requiring periodic monitoring and discontinuation when enzymes exceed three to five times the upper limit of normal.
- Headache and dyspepsia.



Agents used for Asthma: Cromolyn

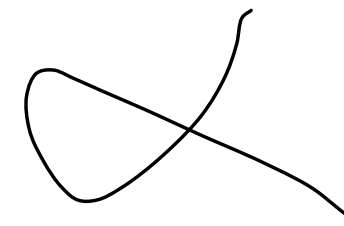


- ✓ a prophylactic anti-inflammatory agent that inhibits mast cell degranulation and release of histamine.
- ✓ An alternative (prophylaxis) therapy for mild persistent asthma and is available as a nebulized solution.
- ✓ NOT a bronchodilator>> NOT useful in managing an acute asthma attack.
- ✓ Short duration of action>>dosing three or four times daily
- ✓ Adverse effects are minor and include cough, irritation, diarrhea, and unpleasant taste.



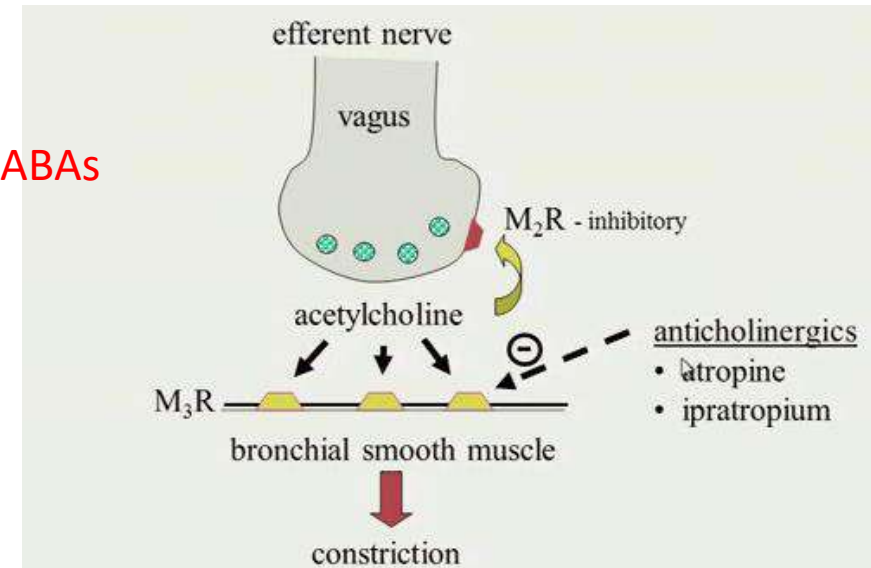


Agents used for Asthma: muscarinic antagonist



- Inhaled ipratropium is **NOT** recommended for the **routine** treatment of **acute** bronchospasm in asthma, why? *its onset is much slower than that of inhaled SABAs*
- Tiotropium (only FDA approved) can be used **as an add-on** treatment in adult patients with severe asthma and a history of exacerbations.
- Adverse effects:

xerostomia and bitter taste are related to local anticholinergic effects.



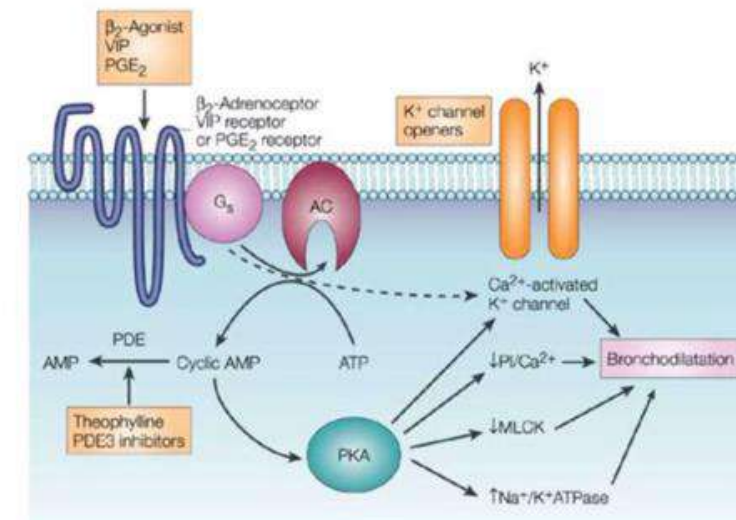


Agents used for Asthma: Theophylline

- bronchodilator that relieves airflow obstruction in chronic asthma and decreases asthma symptoms.
- It may also possess anti-inflammatory activity, although the mechanism of action is unclear.
- Overdose may cause seizures or potentially fatal arrhythmias.
- Theophylline is metabolized in the liver and is a CYP1A2 and 3A4 substrate.



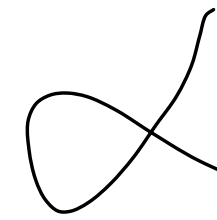
Theophylline



PDE=Phosphodiesterase
PKA=Protein Kinase A



Agents used for Asthma: Monoclonal antibodies

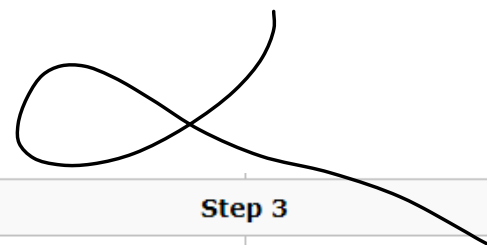


- Omalizumab
- Mepolizumab
- Benralizumab
- Reslizumab)

- **Omalizumab**: selectively binds to human **immunoglobulin E (IgE)**>> **decreased** binding of IgE to its receptor on the surface of mast cells and basophils>>**limits the release of mediators** of the allergic response.
- Mepolizumab, benralizumab and reslizumab: **interleukin-5 (IL-5) (antagonists)**.
- IL-5 is the major cytokine involved in recruitment, activation, and survival of eosinophils in eosinophilic asthma.
- These agents are indicated for the treatment of **severe persistent asthma in patients who are poorly** controlled with conventional therapy.
- Their use is limited by the high cost, route of administration (IV for reslizumab and subcutaneous for others), and adverse effect profile.
- Adverse effects include serious anaphylactic reactions (rare), arthralgias, fever, rash, and increased risk of infections.
- New malignancies have been reported.



Asthma classification



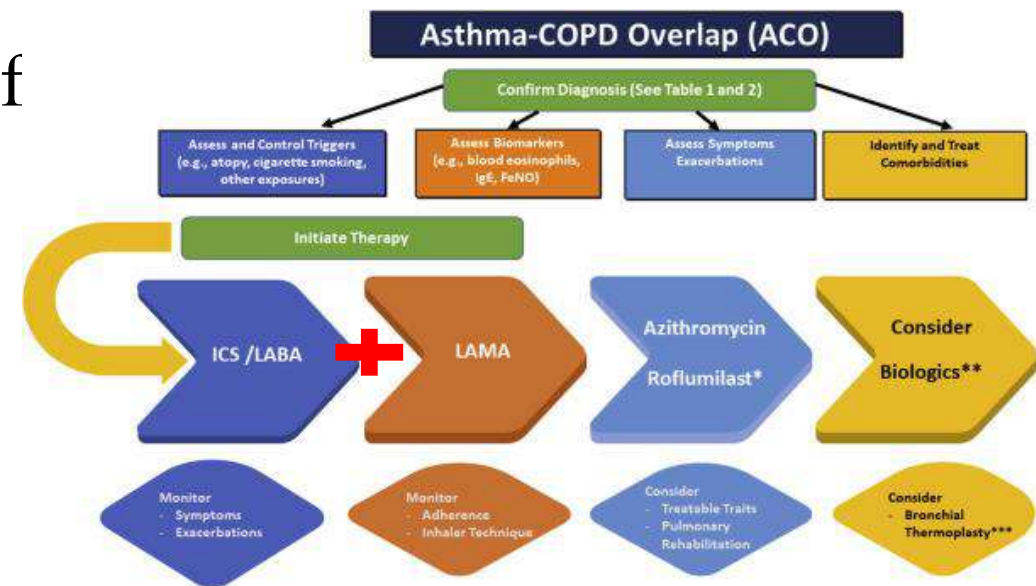
Asthma symptoms/lung function	Therapy*
Step 1	
All of the following: <ul style="list-style-type: none"> ▪ Daytime symptoms ≤ 2 days/week ▪ Nocturnal awakenings ≤ 2/month ▪ Normal FEV₁ ▪ Exacerbations ≤ 1/year 	<ul style="list-style-type: none"> ▪ SABA, as needed <p style="text-align: center;">or</p> <ul style="list-style-type: none"> ▪ Low-dose ICS-formoterol as needed (preferred)^Δ
Step 2	
Any of the following: <ul style="list-style-type: none"> ▪ Daytime symptoms > 2 but < 7 days/week ▪ Nocturnal awakenings up to 3 to 4 nights/month ▪ Minor interference with activities ▪ Exacerbations ≥ 2/year 	<ul style="list-style-type: none"> ▪ Low-dose ICS daily and SABA as needed <p style="text-align: center;">or</p> <ul style="list-style-type: none"> ▪ Low-dose ICS-formoterol as needed (preferred) <p>Alternative option(s)</p> <ul style="list-style-type: none"> ▪ Daily LTRA and SABA as needed

Step 3	
Any of the following: <ul style="list-style-type: none"> ▪ Daily symptoms ▪ Nocturnal awakenings > 1/week ▪ Daily need for reliever ▪ Some activity limitation ▪ FEV₁ 60 to 80% predicted ▪ Exacerbations ≥ 2/year 	<ul style="list-style-type: none"> ▪ Low-dose ICS-formoterol as maintenance and reliever therapy[◇] (preferred) <p style="text-align: center;">or</p> <ul style="list-style-type: none"> ▪ Low-dose ICS-LABA combination daily and SABA as needed <p>Alternative option(s)</p> <ul style="list-style-type: none"> ▪ Medium-dose ICS daily and SABA as needed
Step 4	
Any of the following: <ul style="list-style-type: none"> ▪ Symptoms all day ▪ Nocturnal awakenings nightly ▪ Need for SABA several times/day ▪ Extreme limitation in activity ▪ FEV₁ $< 60\%$ predicted ▪ Exacerbations ≥ 2/year ▪ An acute exacerbation 	<ul style="list-style-type: none"> ▪ Medium-dose ICS-formoterol as maintenance and reliever therapy[◇] (preferred) <p style="text-align: center;">or</p> <ul style="list-style-type: none"> ▪ Medium dose ICS-LABA daily and SABA <p>Alternative option(s)</p> <p style="text-align: center;">Medium-dose ICS daily plus anti-leukotriene and SABA as needed*</p>



Asthma-COPD overlap syndrome (ACOS)

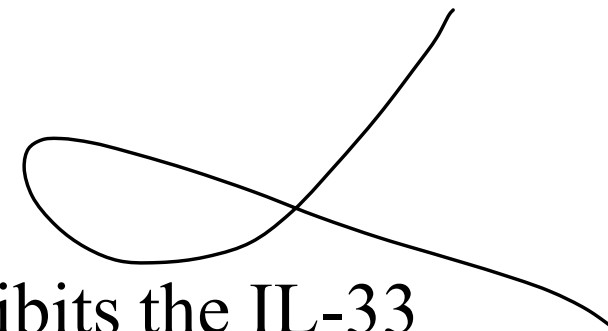
- Approach similar asthma: ICS
- Inhaled bronchodilator with rapid onset of action (SABA, SAMA combination) for as-needed symptom relief.
- Regular therapy ICS (low to moderate doses) + LABA and/or LAMA may be necessary to control symptoms.
- **LABA monotherapy should be avoided, as in asthma.**



Diego Jose Maselli, Nicola Alexander Hanania, Management of asthma COPD overlap, Annals of Allergy, Asthma & Immunology, Volume 123, Issue 4, 2019, Pages 335-344, ISSN 1081-1206, <https://doi.org/10.1016/j.anai.2019.07.021>.



Agents under investigation



- Astegolimab: human IgG2 mAb, selectively inhibits the IL-33 receptor, ST2.

<https://pubmed.ncbi.nlm.nih.gov/33872652/>.

- Tozorakimab: mAb with a dual pharmacological profile that can inhibit IL-33 activities through the ST2 and RAGE/EGFR signalling pathways. To reduce excess inflammation and epithelial remodelling in IL-33-driven disease.
- https://www.atsjournals.org/doi/abs/10.1164/ajrccm-conference.2022.205.1_MeetingAbstracts.A2397

يلي رح احكيه هسا هاد بس يلي بده اياه
الدكتور من السلايين الجايين و مش غلط
تقراوهم احطياط

انا كمريض ازما اخذت البخاخ يلي بتوقع انه
يصير انه انا بعد ما اخذته بالفم رح يروح لل
airway و من ال side effect يلي
بتوقعها تصير انه رح تقل ال local
immunity
لأنه الهواء يلي بالبخه رح يدخل ال
airway اما ال droplets رح يضلوا
بالفم
وجودهم لحاله بعمل local infection و
الحل انه اتمضمض و اغسل بعد البخه



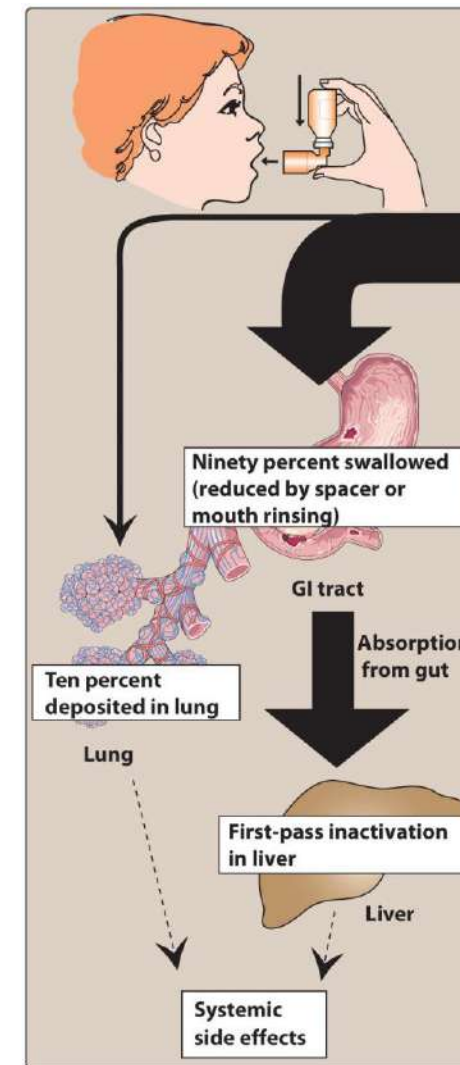


Inhaler Techniques: Metered-dose inhalers (MDIs) & dry powder inhalers (DPIs)

Exhale before using the inhaler, and then begin to inhale slowly as they press the canister and continue inhaling slowly and deeply throughout actuation.

A large fraction (typically 80% to 90%) of inhaled medication (for example, corticosteroids) is either deposited in the mouth and pharynx or swallowed. The remaining 10% to 20% of a dose of inhaled glucocorticoids that is not swallowed reaches the site of action in the airway.

DPIs require a different inhaler technique. Patients should be instructed to inhale quickly and deeply to optimize drug delivery to the lungs. Patients using any type of inhaled corticosteroid device should be instructed to rinse the mouth after use to prevent the development of oral candidiasis.

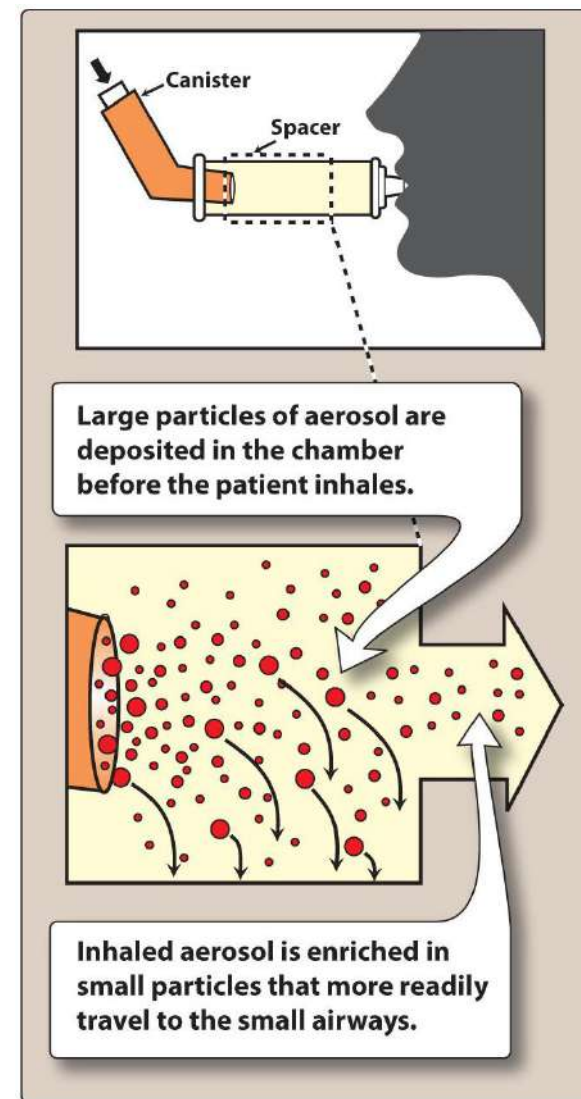




Inhaler Techniques: Spacers

A spacer is a large-volume chamber attached to an MDI. The chamber reduces the velocity of the aerosol before entering the mouth, allowing large drug particles to be deposited in the device. The smaller, higher-velocity drug particles are less likely to be deposited in the mouth and more likely to reach the target airway tissue.

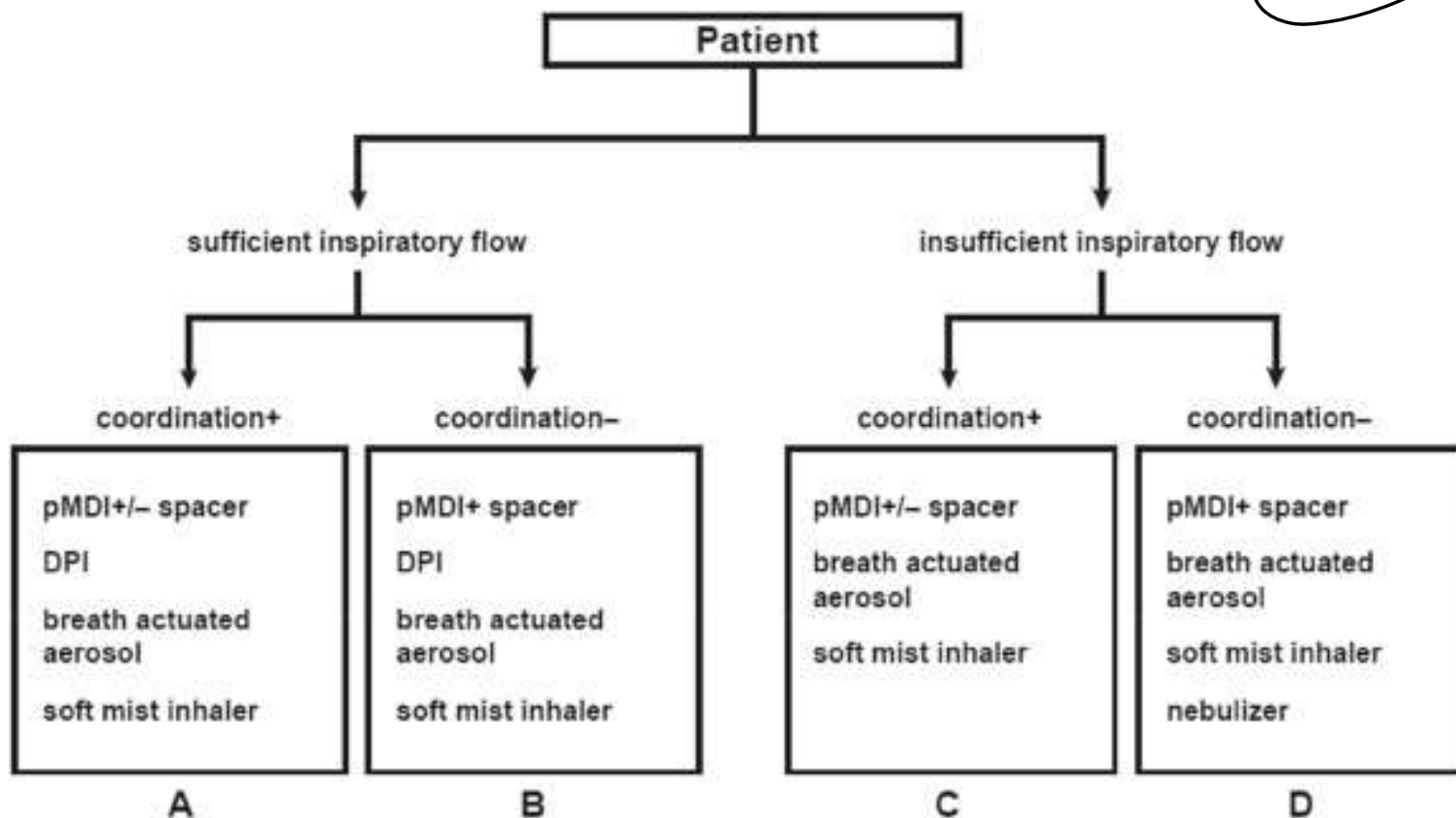
Patients should be advised to wash and/or rinse spacers to reduce the risk of bacterial or fungal growth that may induce an asthma attack.



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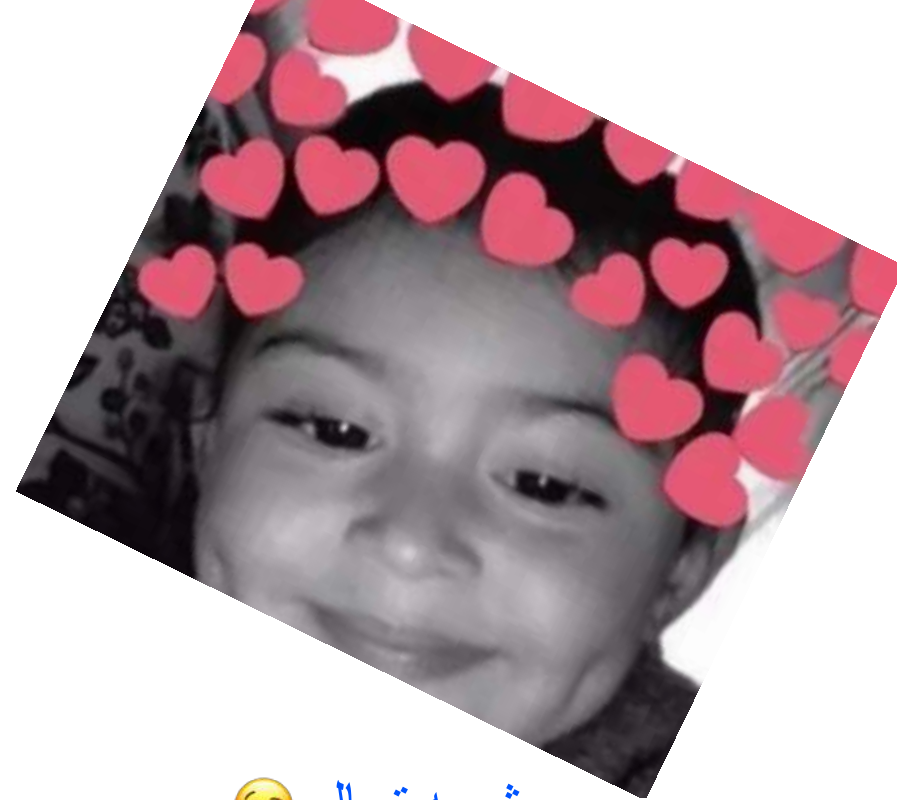
Inhaler Techniques: Metered-dose inhalers (MDIs) & dry powder inhalers (DPIs)





- <https://www.stlouischildrens.org/health-resources/pulse/medical-animation-inhalers>
- <https://www.youtube.com/watch?v=jSkwBoed6Tw>

1. Which of the following is a common symptom of asthma?
 - a) Fever
 - b) Wheezing
 - c) Joint pain
 - d) Blurred vision
2. Why is asthma not considered a part of COPD?
 - a) Both conditions affect the alveoli
 - b) Asthma is irreversible while COPD is reversible
 - c) Asthma primarily affects the bronchi, while COPD affects the alveoli
 - d) COPD primarily affects the bronchi, while asthma affects the alveoli
3. What is a characteristic feature of Asthma-COPD overlap syndrome (ACOS)?
 - a) Onset before the age of 30
 - b) Absence of bronchodilator reversibility
 - c) History of heavy alcohol consumption
 - d) Younger age and reversible airflow obstruction
4. What is the primary aim of asthma therapy?
 - a) Increase intensity of symptoms
 - b) Trigger future exacerbations
 - c) Minimize limitations in activity related to asthma symptoms
 - d) None of the above
5. Which of the following medications is preferred for quick relief of asthma symptoms?
 - a) Antibiotics
 - b) Corticosteroids
 - c) Long-acting beta agonists
 - d) Short-acting beta agonists
6. Why is epinephrine preferred over norepinephrine for asthma?
 - a) Epinephrine has a stronger effect on beta-2 adrenergic receptors
 - b) Norepinephrine has a stronger effect on beta-2 adrenergic receptors
 - c) Epinephrine has fewer side effects
 - d) Norepinephrine is not effective in asthma treatment
7. What is the preferred route of administration for inhaled corticosteroids (ICS)?
 - a) Oral
 - b) Intravenous
 - c) Subcutaneous
 - d) Inhalation
8. Which adverse effect is commonly associated with inhaled corticosteroids?
 - a) Hypotension
 - b) Oropharyngeal candidiasis
 - c) Hyperglycemia
 - d) Increased heart rate
9. What is the primary mechanism of action of beta-2 adrenergic agonists in asthma treatment?
 - a) Increase inflammation
 - b) Stimulate mucus production
 - c) Relax airway smooth muscle
 - d) Inhibit bronchodilation
10. When is the use of LABAs (Long-acting beta agonists) contraindicated in asthma treatment?
 - a) As monotherapy
 - b) With inhaled corticosteroids
 - c) In mild intermittent asthma
 - d) None of the above



شويه تسالي 🥰

1. b) Wheezing
2. c) Asthma primarily affects the bronchi, while COPD affects the alveoli
3. d) Younger age and reversible airflow obstruction
4. c) Minimize limitations in activity related to asthma symptoms
5. d) Short-acting beta agonists
6. a) Epinephrine has a stronger effect on beta-2 adrenergic receptors
7. d) Inhalation
8. b) Oropharyngeal candidiasis
9. c) Relax airway smooth muscle
10. a) As monotherapy