

farmakoterapi

OBAT ASMA

fathiyah safithri

Laboratorium Farmakologi FK UMM
2020

DEFINISI

- ☺ Asthma adalah suatu kondisi yg ditandai dg episode batuk, wheezing & kesulitan bernafas yg disebabkan oleh adanya penyempitan jalan nafas secara reversibel, sebagai respon akibat berbagai stimuli (alergen / non allergen).
- ☺ Penyempitan dan obstruksi jln nafas merupakan akibat dari kombinasi :
 - ☺ Spasme otot polos bronkus
 - ☺ Bronkokonstriksi
 - ☺ Oedema mukosa
 - ☺ Penumpukan mukus di jln nafas
- ☺ Inflamasi kronik → key factor in the pathology of asthma → bronkus hiperresponsif / hyperreaktif



WAKTU SERANGAN ASMA

SIKAP DUDUK

FIKSASI KEDUA BAHU

**KEDUA BELAH BAHU
DITOPANG MELALUI
KEDUA TANGAN**

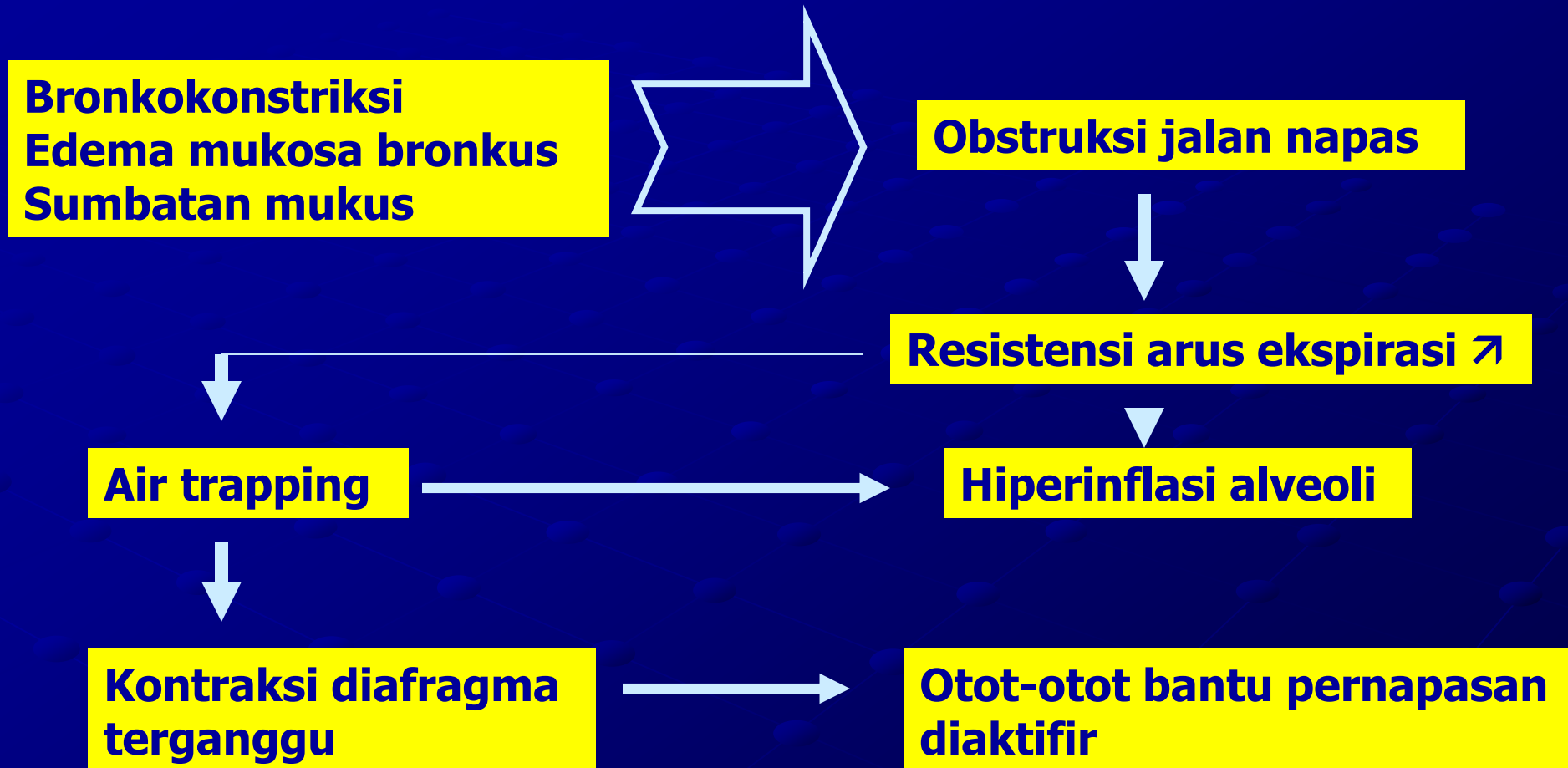
**OTOT NAPAS BANTU
BARU DAPAT
BEKERJA**

**TAMPAK ESKPIRASI
MEMANJANG**

PATOFISIOLOGI

- ▶ Mekanisme imun spesifik dan nonspesifik :
 - ✓ Antigen berikatan dengan IgE pada permukaan sel mast → degranulasi sel mast → release histamin, bradykinin, leukotrienes, platelet activity factor, prostaglandin, neutrophil, eosinophil → bronchoconstriksi
 - ✓ Aktivitas berlebih sistem saraf parasimpatis : histamin release, cold air, inhaled irritan, instrumentation endobronchial → merangsang vagal efferent → bronkokonstriksi
 - ✓ Bronkokonstriksi → peningkatan resistensi aliran udara, menurunkan kecepatan ekspirasi → hiperinflasi → *ventilation-perfusion mismatch* → hypoxia
- ▶ Episode akut : hypoxemia tanpa retensi CO₂

Keluhan dan gejala (sangat erat dg keadaan jalan napas) :



- Awal : terdengar **WHEEZING** ekspiratoir
- Lanjut : **WHEEZING** ekspiratoir dan inspiratoir

Air Trapping :



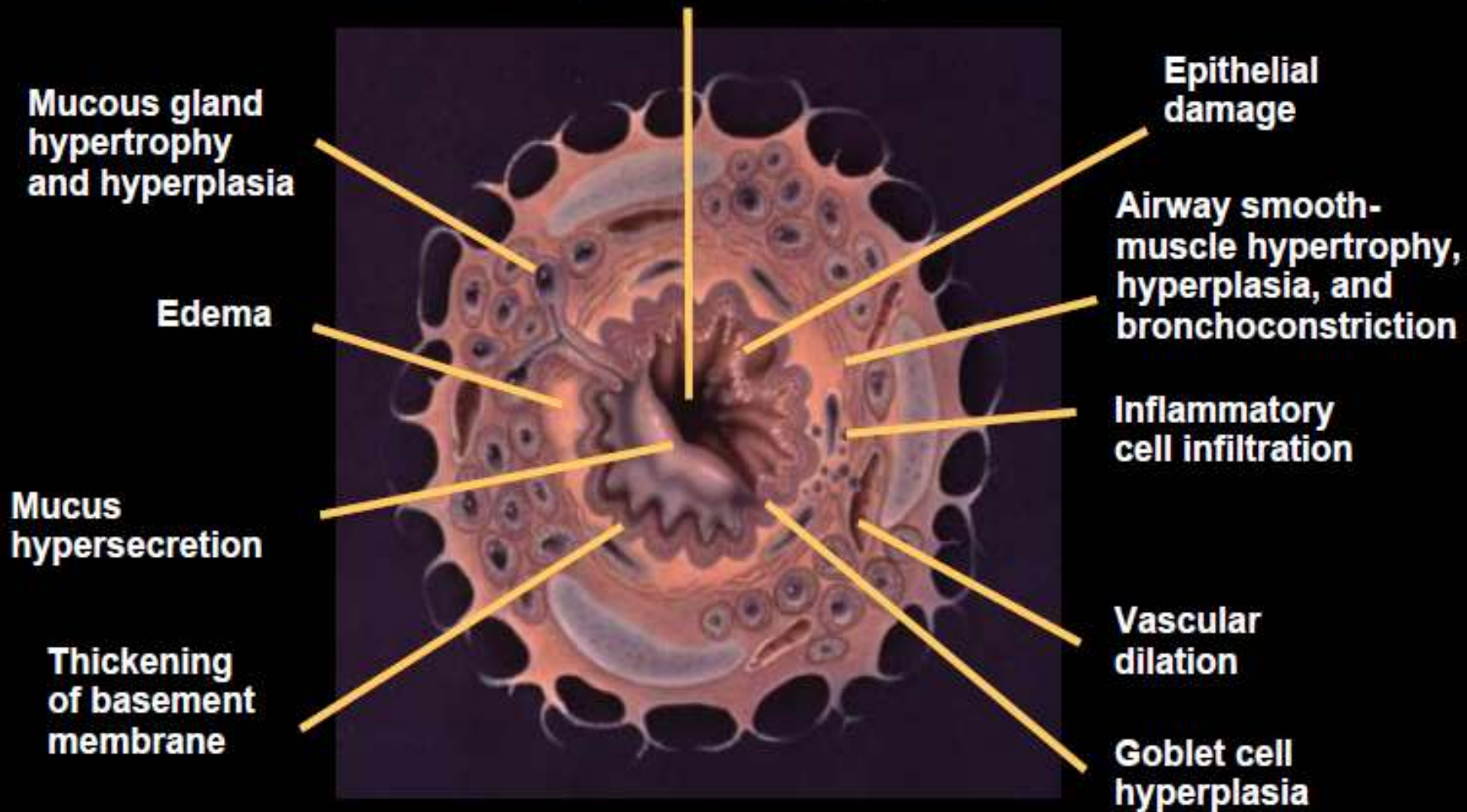
inspirasi

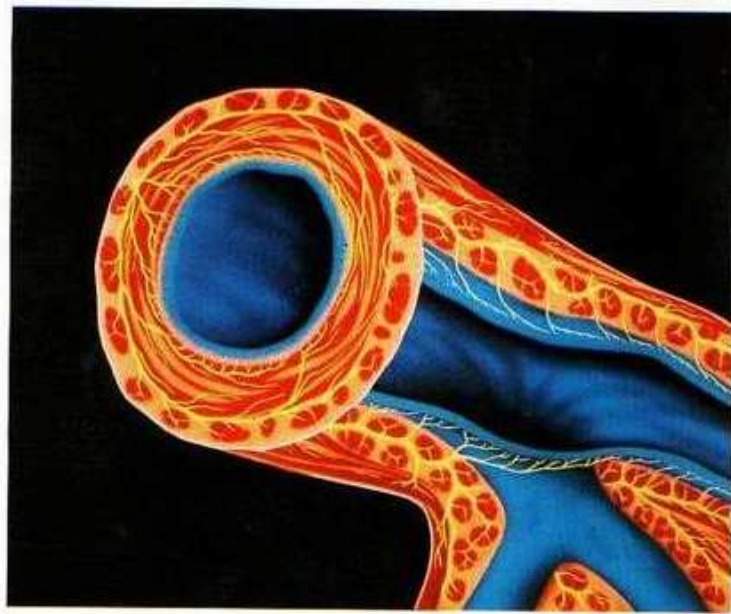


ekspirasi

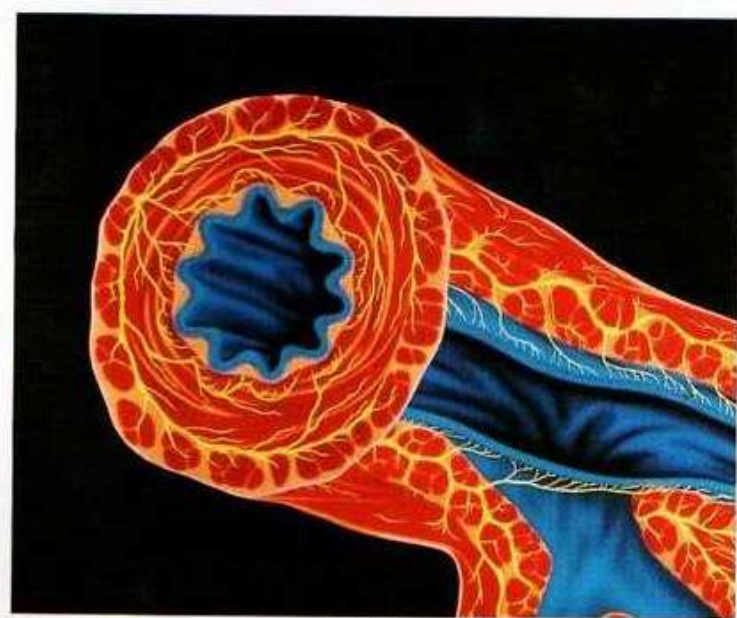
Asthma: Pathophysiologic Features and Changes in Airway Morphology

Airway lumen narrowing



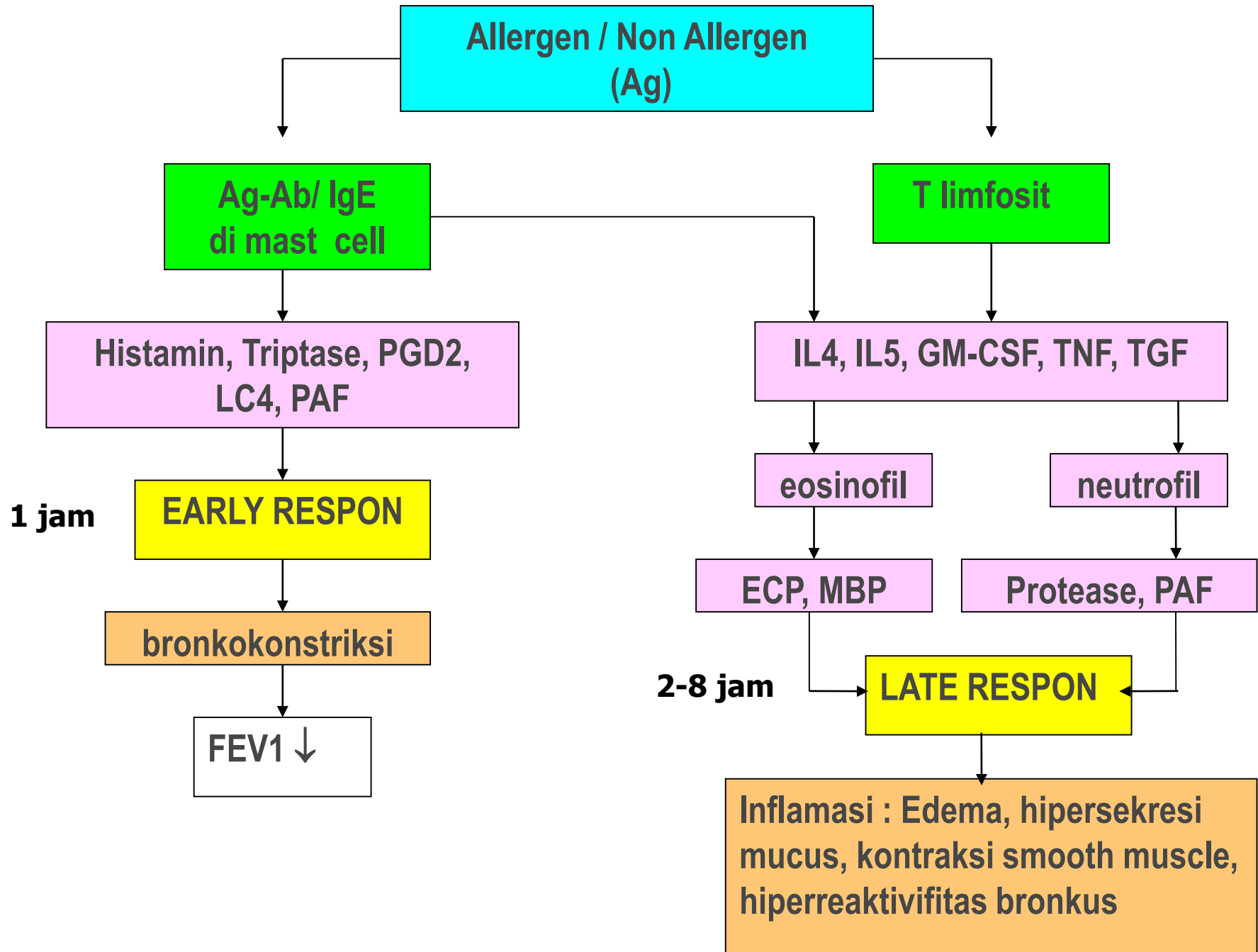


Dilated airway: Bronchial smooth muscle is relaxed under the influence of high catecholamine levels, derived from the adrenergic pathway.



Constricted airway: In this case, release of acetylcholine from efferent vagal, parasympathetic nerves induces smooth muscle contraction.





Immediate phase

Eliciting agent:
allergen or
non-specific stimulus

Mast cells,
mononuclear cells

Spasmogens
cysLTs,
H, PGD₂

Chemotaxins,
chemokines

Bronchospasm

Reversed by
 β_2 -adrenoceptor
agonists,
CysLT-receptor
antagonists and
theophylline

Late phase

Infiltration of
cytokine-releasing **Th2 cells,**
and monocytes, and activation
of inflammatory cells,
particularly **eosinophils**

Mediators e.g.
cysLTs,
neuropeptides?,
NO?, adenosine?

EMBP, ECP

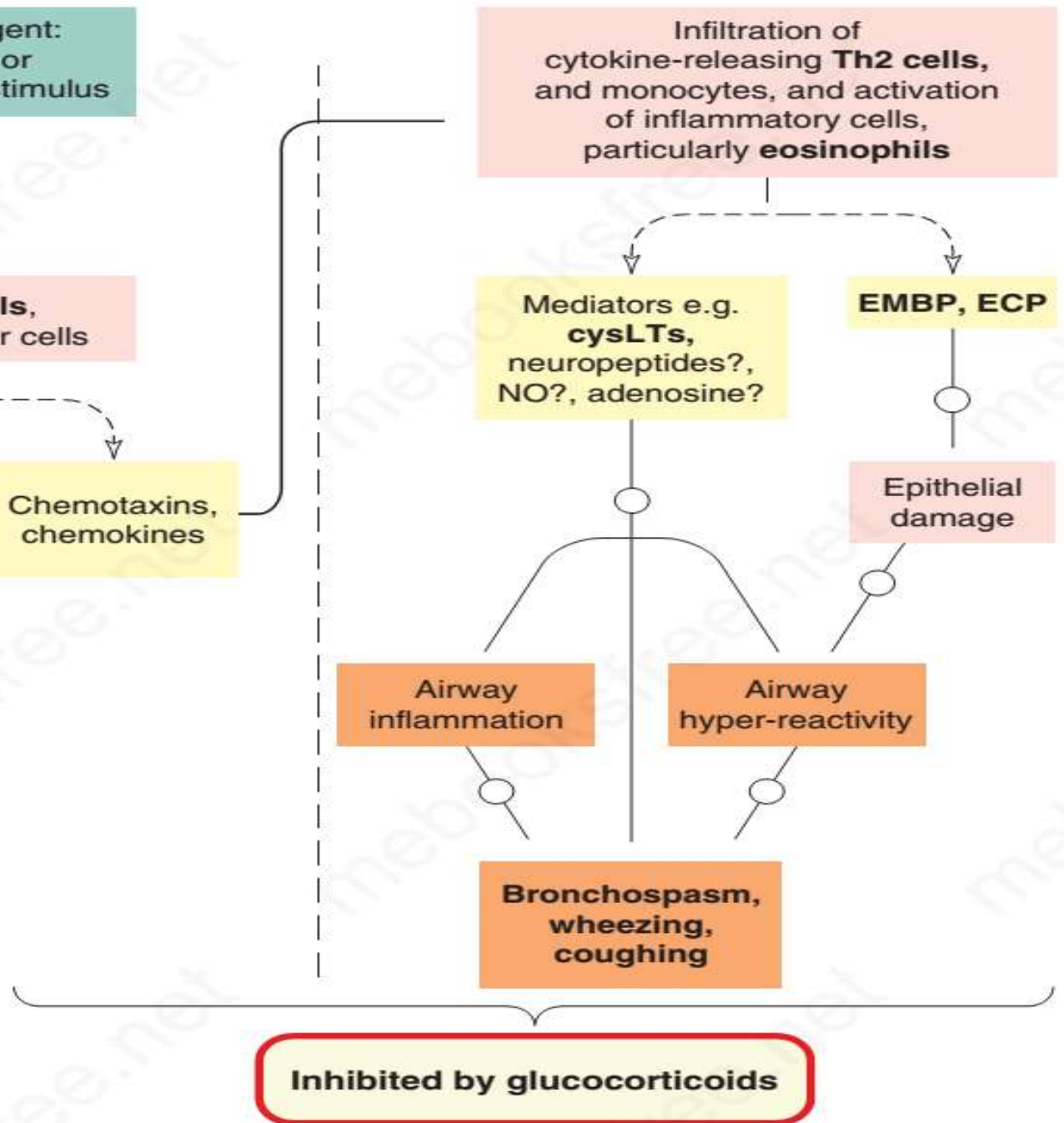
Epithelial
damage

Airway
inflammation

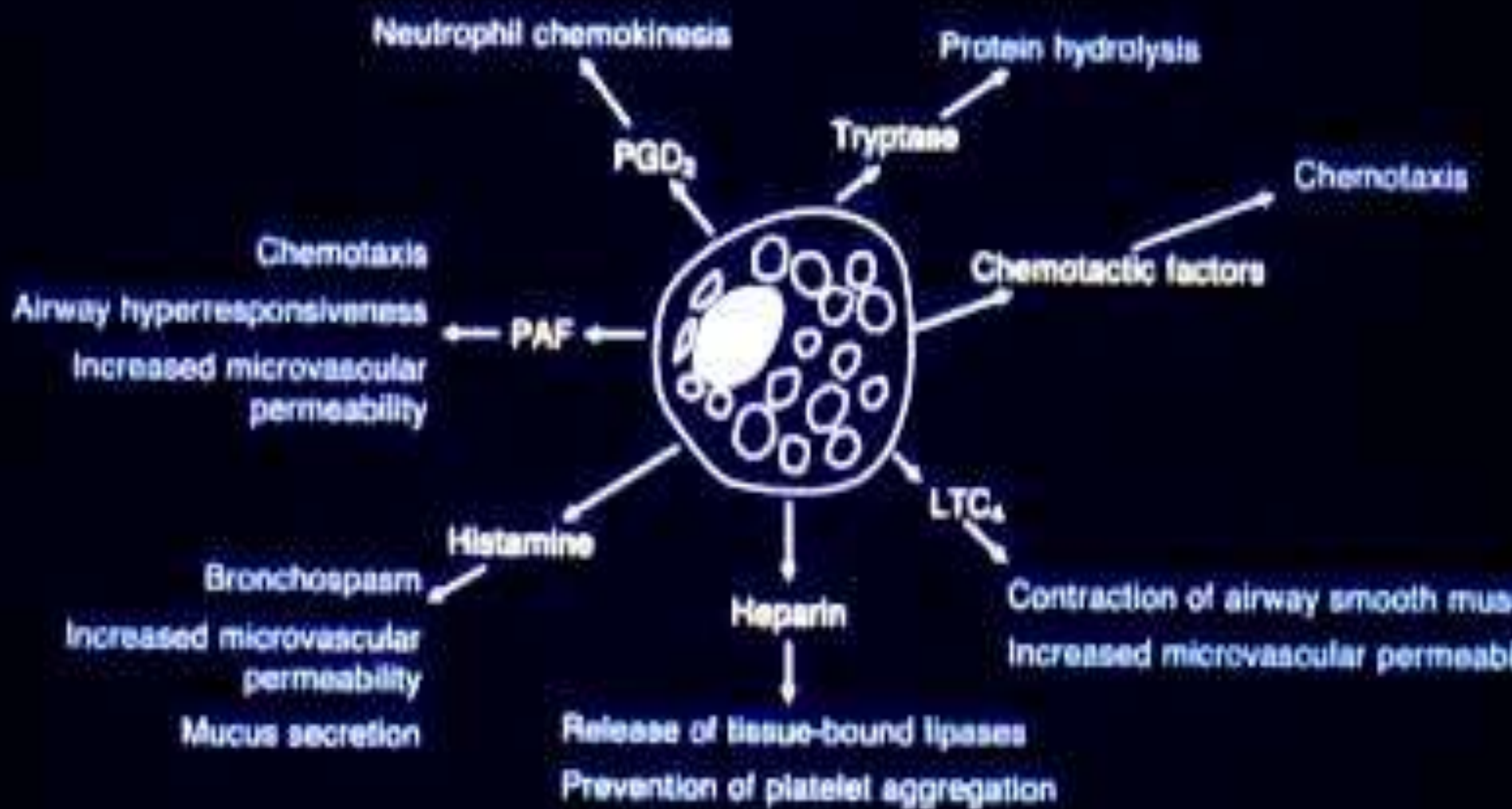
Airway
hyper-reactivity

**Bronchospasm,
wheezing,
coughing**

Inhibited by glucocorticoids

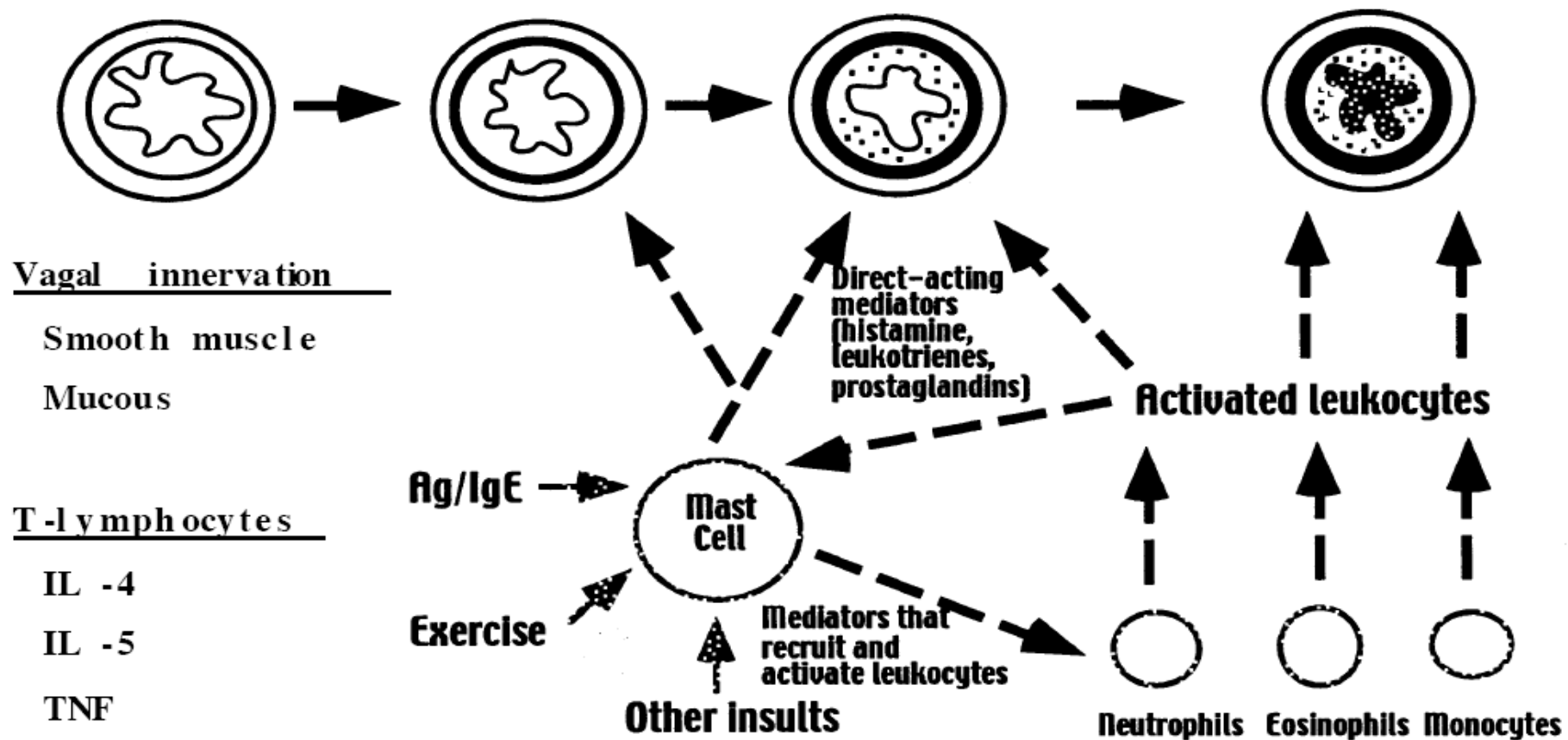


Key Mast Cell Mediators



Asthmatic Reactions in Hyperresponsive Airways

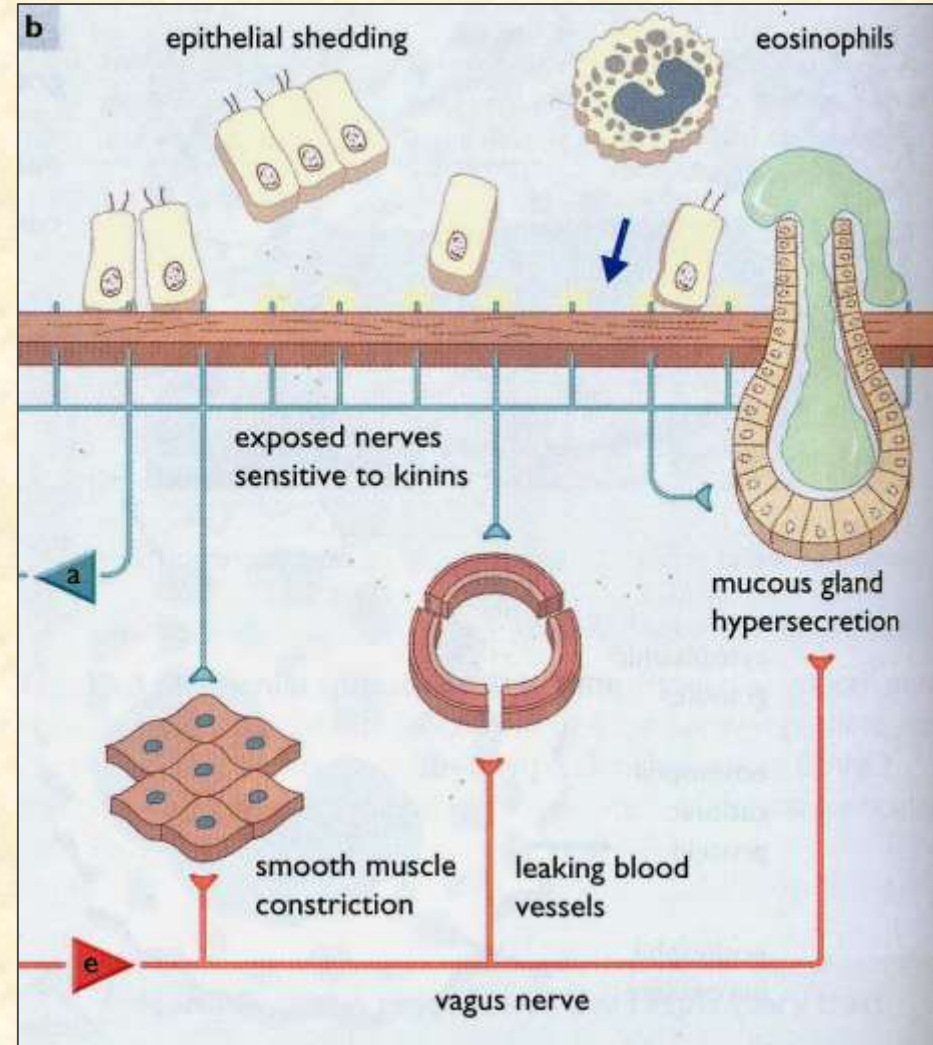
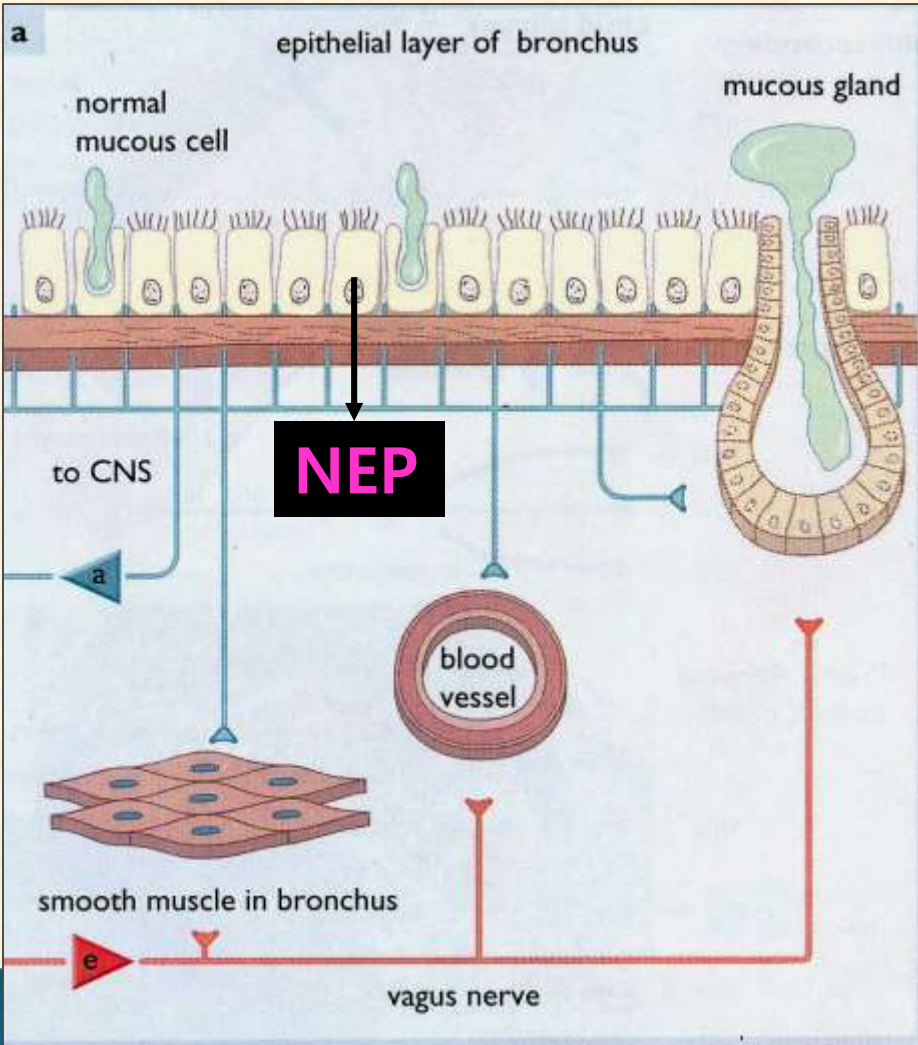
Before Stimulus Immediate Response Late Response Chronic Inflammatory Response



(Adapted from: W. Busse, Postgrad. Med. 92: 177-189, 1992)

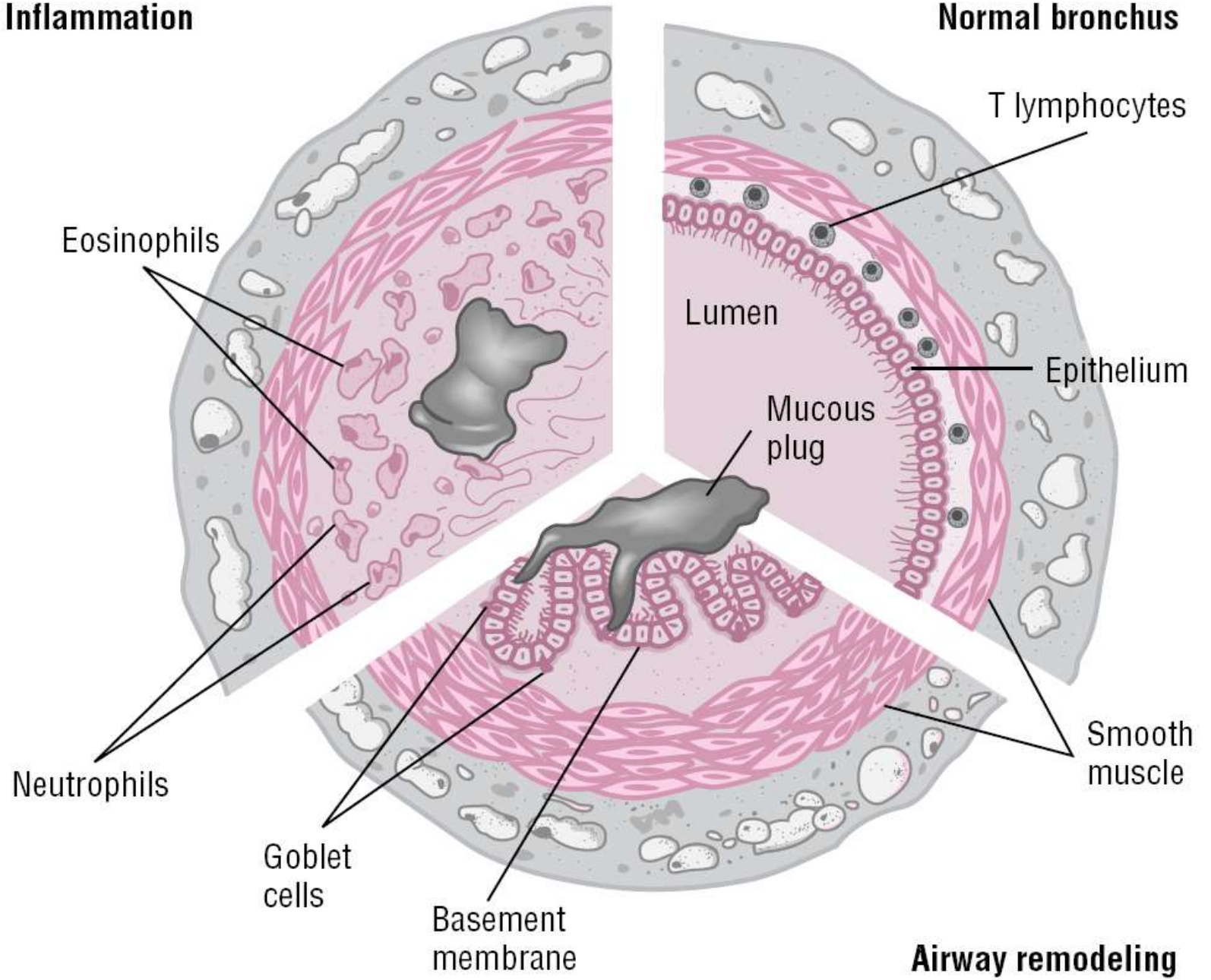
Normal airway

Asthmatic airway

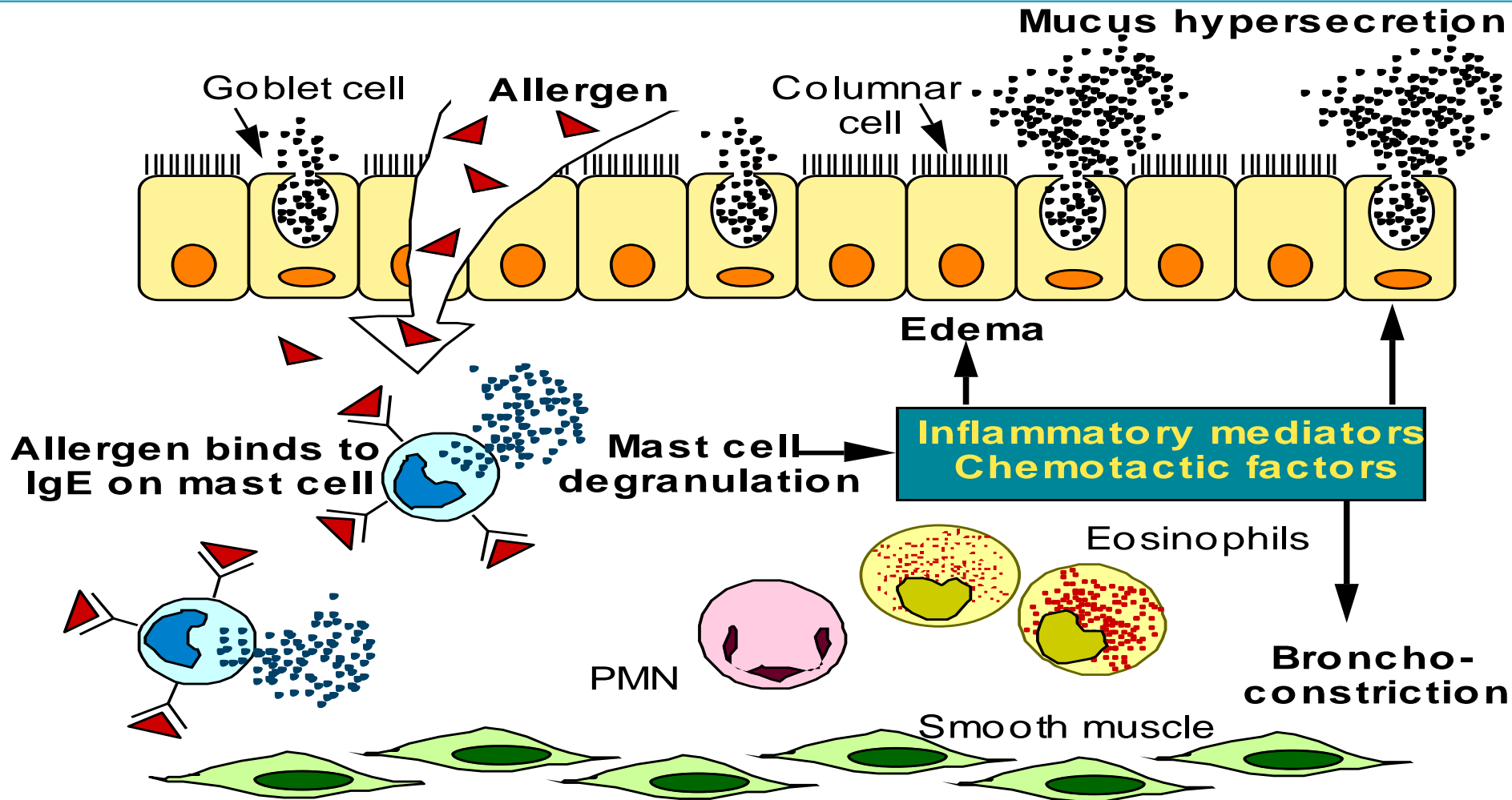


Inflammation

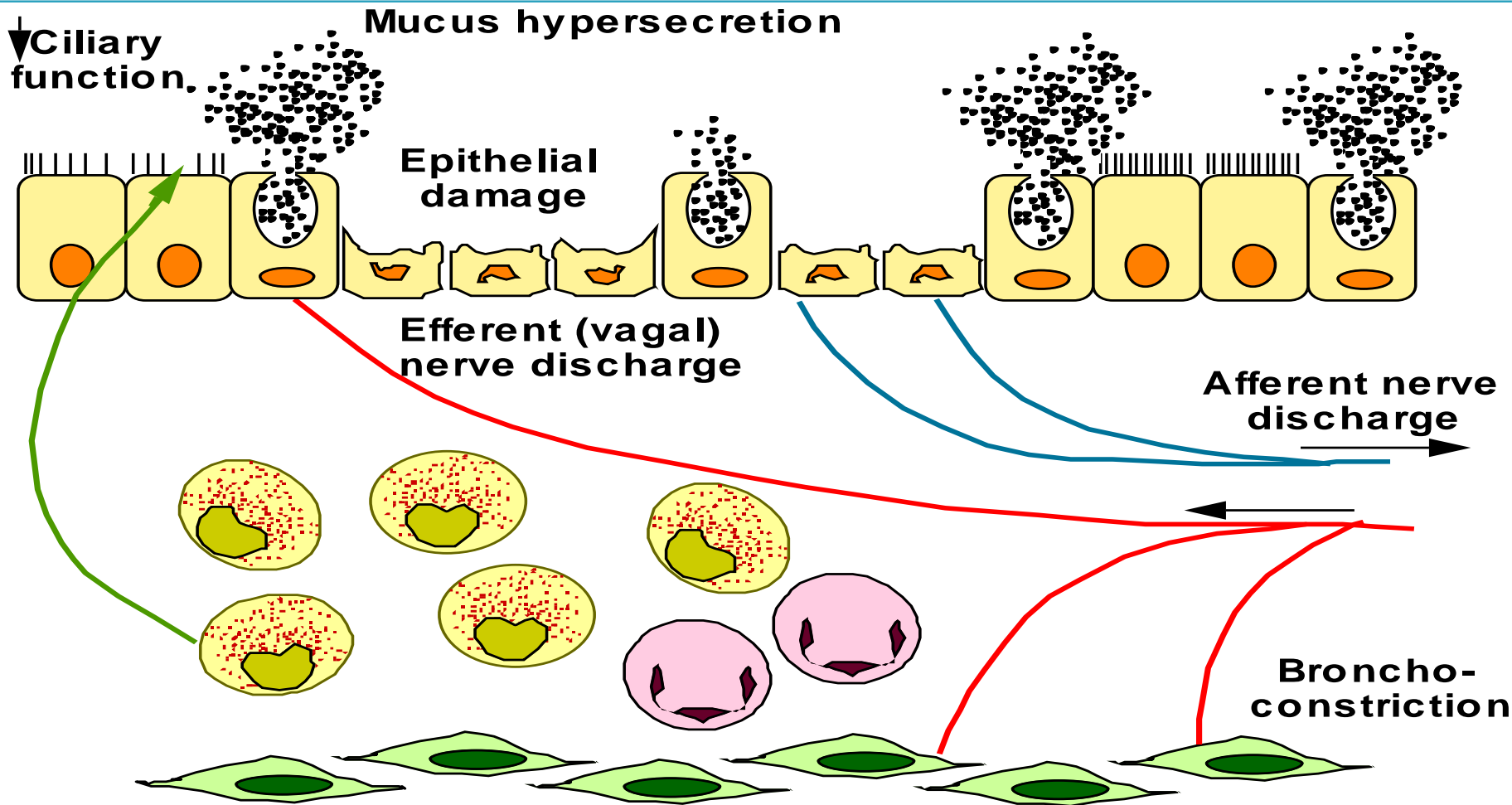
Normal bronchus



EARLY RESPONSE <1 jam stl terpapar stimuli



LATE RESPONSE : 4-8 jam stl terpapar stimuli



Epithelial Damage in Asthma



Normal



Asthmatic

Gamb klinik Asma Bronkhiale

TRIGGER ASMA

Serangan akut dyspnea akibat obstruksi akut jln nfs, yg disebabkan oleh kontraksi otot polos jln nafas

Penumpukan mukus akibat hipersekreasi mukus

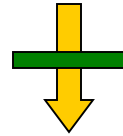
Inflamasi jalan nafas

Bronchial hyperresponsiveness

- a. Allergens
- b. Chemical irritants
- c. Dust, smokes
- d. Cold
- e. Post-exercise
- f. Psychogenic
- g. Post-coughing
- h. Post-hyperinflation
- i. Post-laughter

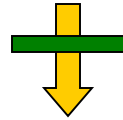
TARGET TERAPI ASMA

Ag (polutan, alergen)



hindari Ag

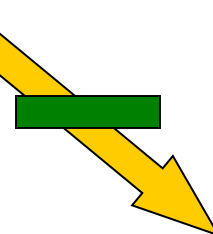
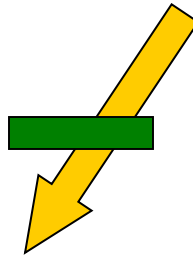
Ag-Ab/IgE di mast cell



antiinflamasi, kromolin

MEDIATOR

bronkodilator



antiinflamasi

Early response :

Bronchoconstriction



Symptom

Late response :

Inflammation

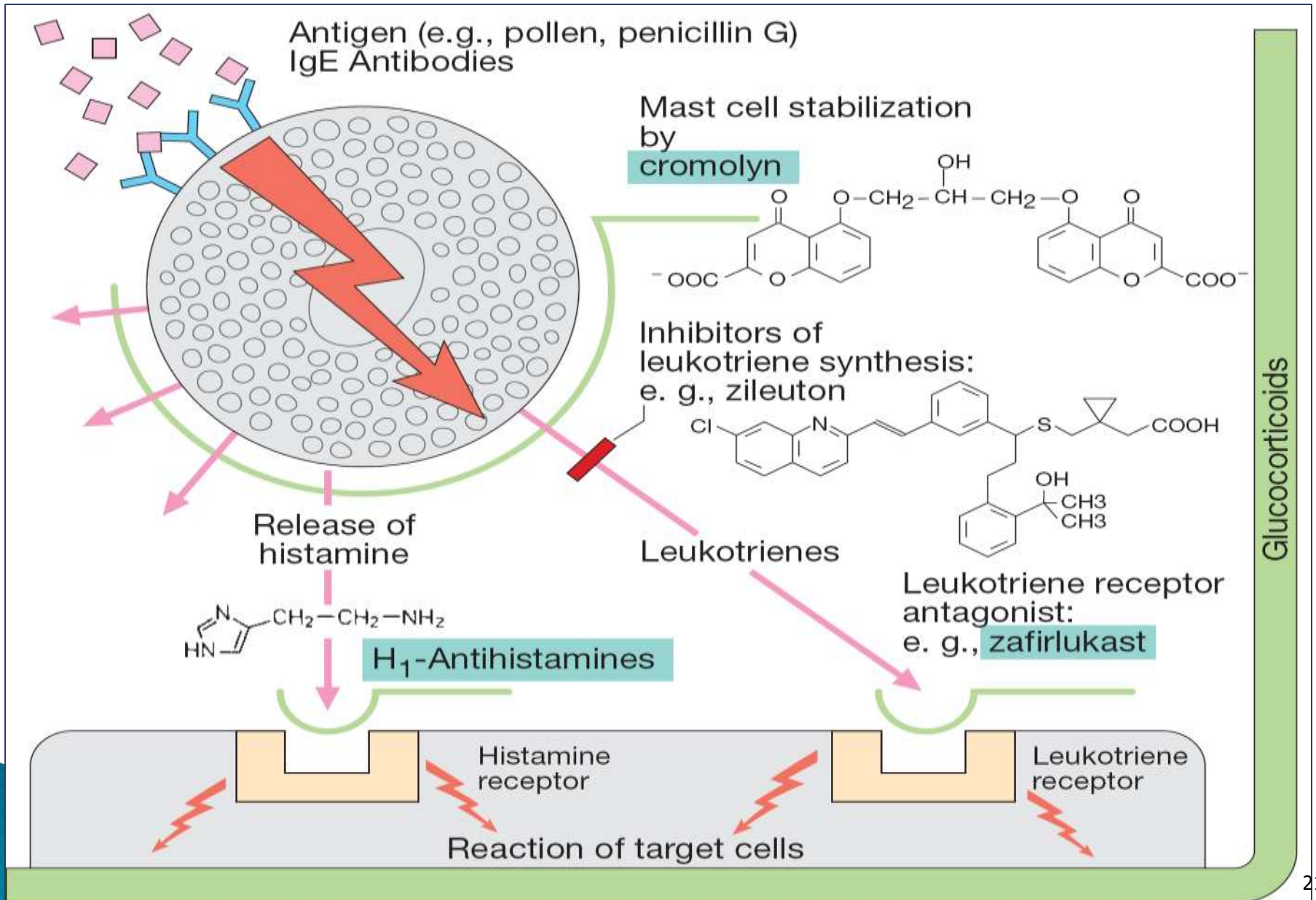


Hyperreactivity

TARGET TERAPI ASMA

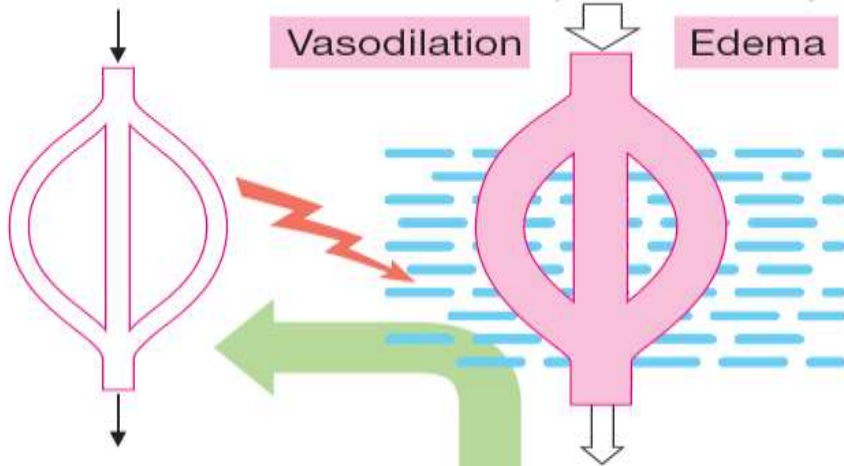
1. Me ↓ IgE berikatan dg sel mast (anti-IgE antibody)
2. Mencegah degranulasi sel mast (kromolin, nedocromil, steroid)
3. Menghambat kerja mediator yg dilepaskan sel mast (antihistamin, antagonis leukotrien reseptor)
4. Relaksasi jalan nafas secara langsung (Bronkodilator : simpatomimetik, xantin, antimuskarinik)
5. Me ↓ respon inflamasi (kortikosteroid)

TARGET TERAPI ASMA

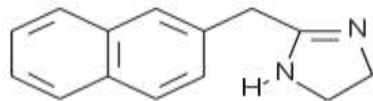


Target terapi asma

Vascular smooth muscle, permeability



α -Sympathomimetics:
e. g.,
naphazoline



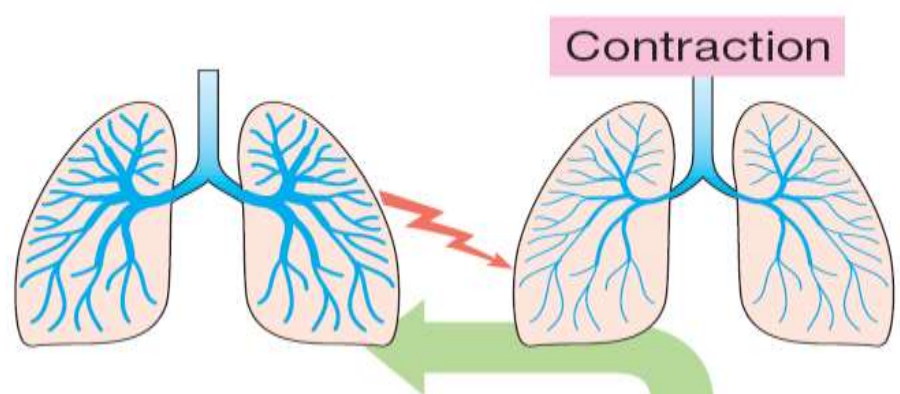
Mucous membranes of nose and eye:
redness swelling,
secretion

Skin:
wheal formation

Circulation:
anaphyl. shock

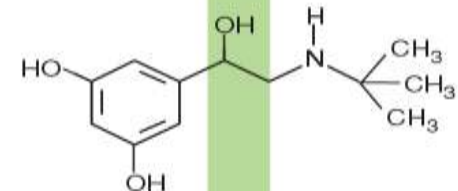
Epinephrine

Bronchial musculature

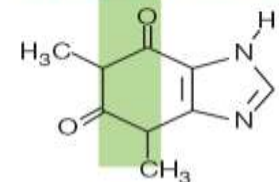


Bronchial asthma

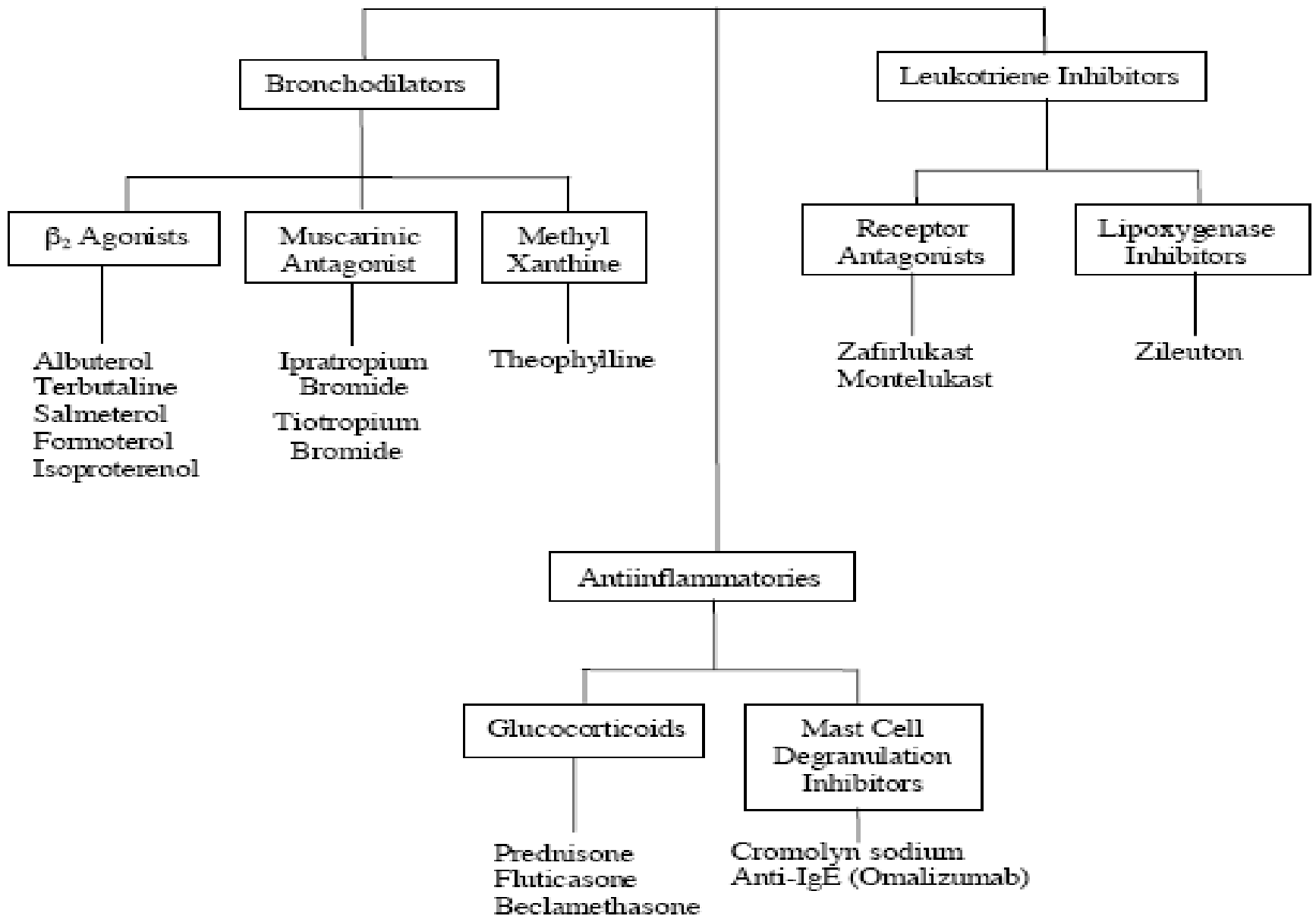
β_2 -Sympathomimetics:
e. g.,
terbutaline



Theophylline



Asthma Drugs



BRONKHODILATOR

1. SIMPATOMIMETIK/ ADRENERGIK

- adrenalin/ epinefrin
- efedrin
- isoproterenol, isoprenalin
- agonis β_2 selektif

2. DERIVAT XANTIN

- teofilin

3. ANTIKHOLINERGIK

- atropin
- ipatropium bromid

Agonis adrenergik β -2 selektif

- Terbutalin (Allupent)
- Albuterol (Salbutamol)
- Metaproterenol
- Fenoterol
- Formoterol (-15jam)
- Salmeterol (-15jam)

Selektif pada reseptor adr. β -2 , efektif pd serangan akut
Efektif pd pemberian - p.o.

- aerosol → onset cepat
langsung pd reseptor

AGONIS β -ADRENERGIK

TABLE 26–8. Relative Selectivity, Potency, and Duration of Action of the β -Adrenergic Agonists

Agent	Selectivity		Potency, β_2^a	Duration of Action ^b		Oral activity
	β_1	β_2		Bronchodilation (h)	Protection (h) ^c	
Isoproterenol	++++	++++	1	0.5–2	0.5–1	No
Metaproterenol	+++	+++	15	3–4	1–2	Yes
Isoetharine	++	+++	6	0.5–2	0.5–1	No
Albuterol	+	++++	2	4–8	2–4	Yes
Bitolterol	+	++++	5	4–8	2–4	No
Pirbuterol	+	++++	5	4–8	2–4	Yes
Terbutaline	+	++++	4	4–8	2–4	Yes
Formoterol	+	++++	0.24	≥ 12	6–12	Yes
Salmeterol	+	++++	0.5	≥ 12	6–>12	No

^aRelative molar potency to isoproterenol: 15 = lowest potency.

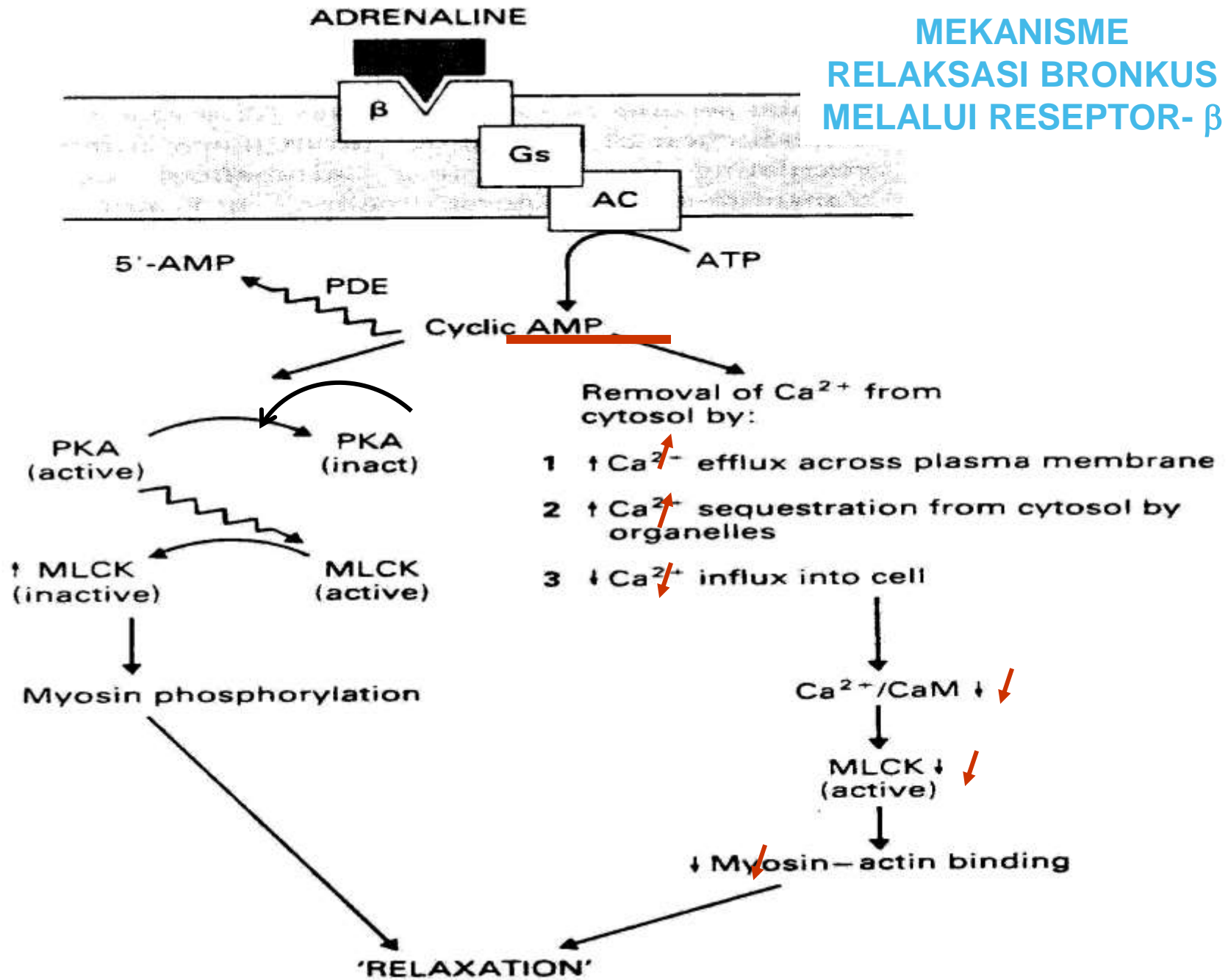
^bMedian durations with the highest value after a single dose and lowest after chronic administration.

^cProtection refers to the prevention of bronchoconstriction induced by exercise or nonspecific bronchial challenges.

TABLE 26–7. Pharmacologic Responses to Sympathomimetic Agonists

Tissue	Receptor Type	Response
Airways	β_2	Smooth muscle relaxation (bronchodilation), increased ciliary beat, increased serous secretion, and inhibition of mast cell degranulation
	α	Smooth muscle contraction (bronchoconstriction?)
Heart	β_1	Inotropic and chronotropic
	β_2	Chronotropic
Vasculature	β_2	Vasodilation, decrease microvascular leakage
	α	Vasoconstriction
Skeletal	β_2	Increased neuromuscular transmission (tremor and increased strength of contraction)
Uterus	β_2	Relaxation (tocolysis)
Metabolic	α, β_1	Glycogenolysis, lipolysis
	β_2	Gluconeogenesis, hypokalemia, increased lactate production

MEKANISME RELAKSASI BRONKUS MELALUI RESEPTOR- β



Efek samping $\beta 2$ Agonis

- selektivitas terbatas
- aritmia ok stimulasi $\beta 1$ jantung
- tremor, musc.cramps
- gangguan metabolisme KH
- iritasi pada penggunaan inhaler
- penggunaan lama → reseptor desensitif



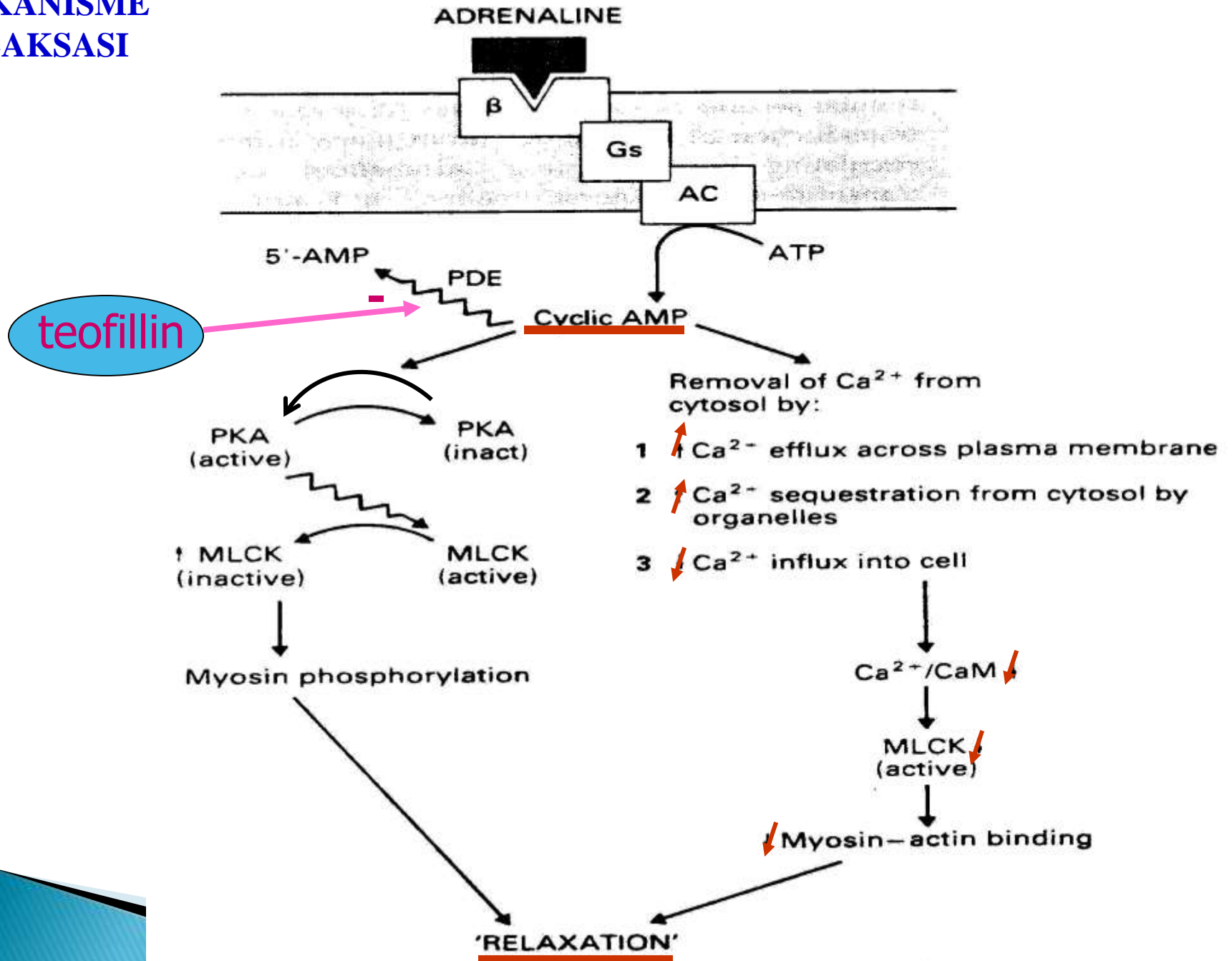
tolerans

DERIVAT XANTIN

METYLXANTIN → TEOFILLIN
TEOBROMIN
CAFFEIN

- EFEK →
- Relaksasi otot polos bronkhus
 - Stimulasi SSP
 - Stimulasi otot jantung
 - Diuresis
 - Asam lambung ↑
 - Otot bergaris

MEKANISME RELAKSASI



Mekanisme Kerja Xantin

1. Menghambat PDE → cAMP ↑
Efek langsung $[Ca^{++}]$ intrasel ↓
Hiperpolarisasi membran
Uncoupling Ca^{++} dg aktin-myosin
2. Antagonis reseptor adenosin
 - Hamb degranulasi sel mast
 - Me ↓ prod sitokin

FARMAKOKINETIK

- ☺ absorpsi baik :
 - p.o., “sustained release” → kadar stabil di plasma
 - iv
- ☺ distribusi : slrh tubuh (tms plasenta, ASI)
- ☺ metabolisme : hepar
 - ↑ ok induksi enz o/ rifampin, fenobarbtal, etanol, rokok
 - ↓ ok inhibisi enz o/ simetidin, eritromisin, alopurinol
 - kondisi patologis (gagal jantung, liver, orang tua)

Faktor yang Mempengaruhi Clearance Teofilin

Decreased Clearance	% Decrease	Increased Clearance	% Increase
Cimetidine	-25 to -60	Rifampin	+53
Macrolides Erythromycin, TAO, clarithromycin	-25 to -50	Carbamazepine	+50
Allopurinol	-20	Phenobarbital	+34
Propranolol	-30	Phenytoin	+70
Quinolones Ciprofloxacin, enoxacin, pefloxacin	-20 to -50	Charcoal-broiled meat	+30
Interferon	-50	High-protein diet	+25
Thiabendazole	-65	Smoking	+40
Ticlopidine	-25	Sulfinpyrazone	+22
Zileuton	-35	Moricizine	+50
Systemic viral illness	-10 to -50	Aminoglutethimide	+50

EFEK SAMPING TEOFILIN

- iv.cepat → aritmia jantung, hipotensi
- Sakit kepala, palpitasi, dizziness, nausea,hipotensi, nyeri prekordial
- Indeks terapi sempit (10-20 $\mu\text{g}/\text{ml}$)
→ konsentrasi plasma $> 20 \mu\text{g}/\text{ml}$ = TOKSIK (takikardia, agitasi, kejang, emesis, Gx.GIT)
- Anak-2 mudah kejang

ANTIKOLINERGIK

- * ATROPIN : iv, aerosol
- * IPRATROPIUM BROMID : aerosol

Mekanisme :

- Antagonis resept muskarinik
- otot polos : bronkhodilatasi
- kelenjar : mukus ↓

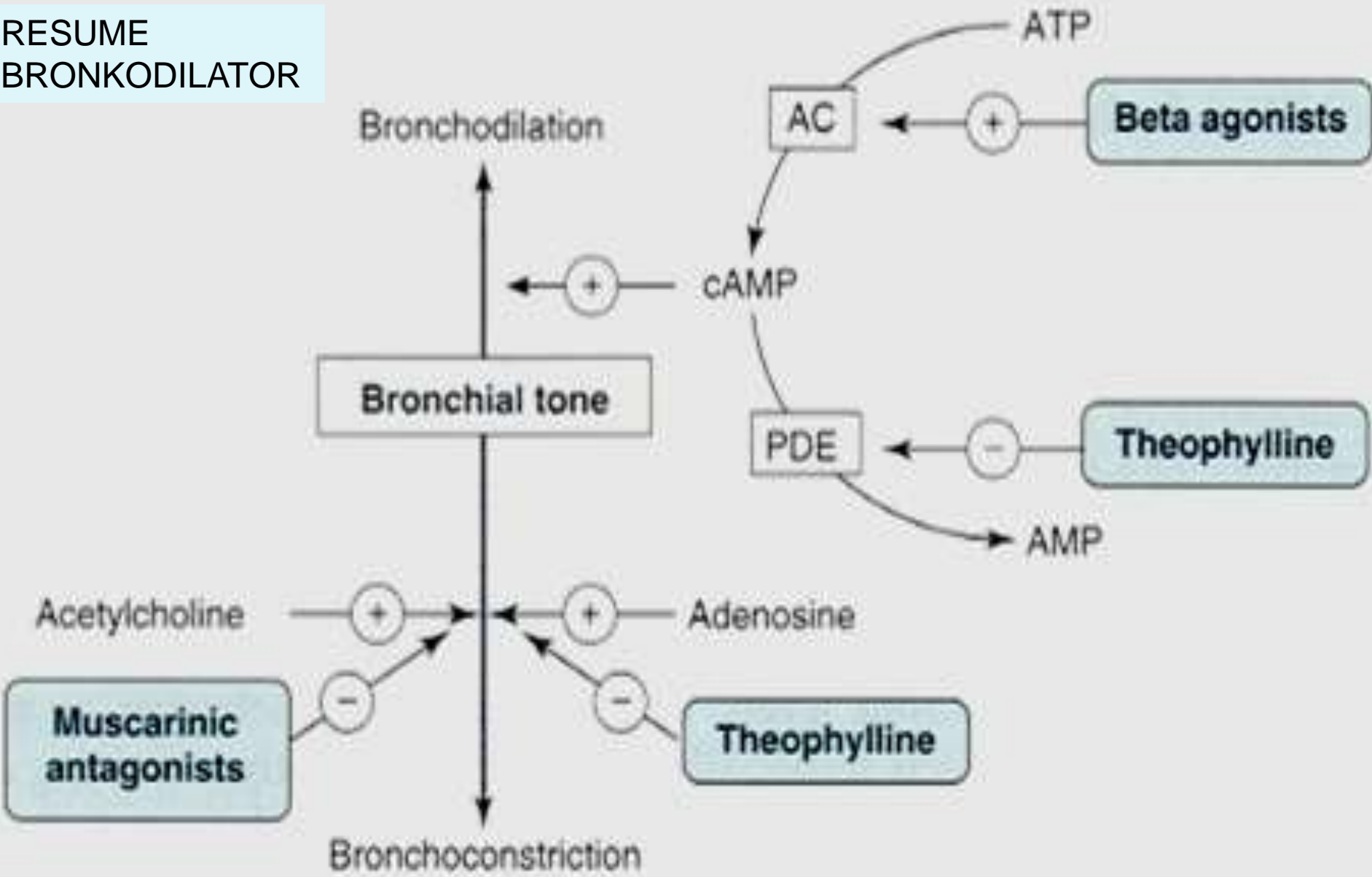
Efek sistemik :

Mulut kering, retensi urin, mata kabur, takikardi

Efektif u/

hiperreaktif bronkhokonstriksi, COPD, bronkhitis kronis, orang tua

RESUME
BRONKODILATOR



ANTIINFLAMASI

★ **Kromolin sodium &
Nedokromil sodium**

★ **Glukokortikoid**

KROMOLIN

- ▶ Per inhalasi
- ▶ Mekanisme kerja : menghambat degranulasi sel mast
- ▶ Penggunaan : profilaksis (slow onset), efektif untuk asma yang diinduksi oleh alergen / aktivitas
- ▶ Efek Samping (ES) : Batuk, edem laring, nyeri sendi, sakit kepala, rash, mual

GLUKOKORTIKOID

- oral : Prednison
- inhalasi : triamsinolon, budesonid, flutikason, beklometason, flunisolid

Efek :

- antiinflamasi : menghambat prod sitokin inflamasi (PG & leukotrien) & me ↓ infiltrasi sel inflamatori (me ↓ destruksi epitel, mukus, & bronkonstriksi)
- me ↓ hiperreaktifitas bronkial
- me ↑ affinitas β agonis & mencegah down regulation resept β

- ▶ Penggunaan :
 - oral : asthma attack, asma berulang
 - inhalasi : “first line treatment” asma ringan s.d berat
 - terapi kontrol
- ▶ ES kortikosteroid inhalasi : kandidiasis oral, serak, pe ↓ massa tulang

TABLE 26–9. Pharmacodynamic/Pharmacokinetic Comparison of the Corticosteroids

Systemic	Anti-inflammatory Potency	Mineralcorticoid Potency	Duration of Biologic Activity (h)	Elimination Half-Life (h)
Hydrocortisone	1	1.0	8–12	1.5–2.0
Prednisone	4	0.8	12–36	2.5–3.5
Methylprednisolone	5	0.5	12–36	3.3
Dexamethasone	25	0	36–54	3.4–4.0

Efek samping (pd dosis besar & lama)

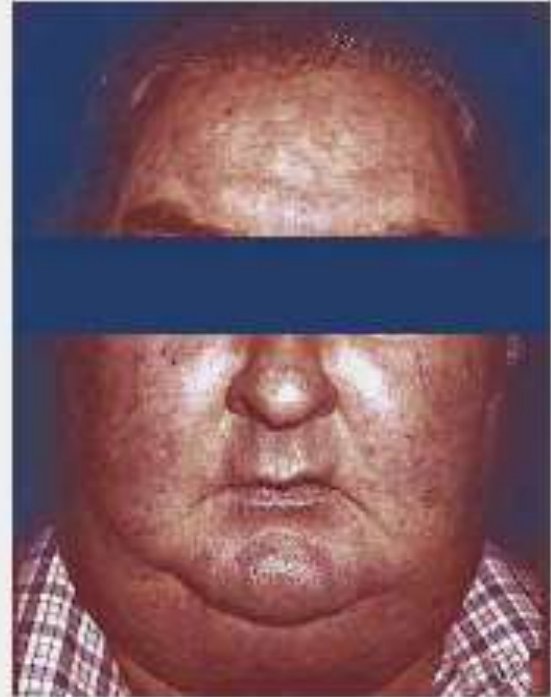
- ☹ Glukosa drh ↑, deposisi lemak → 'moon face'
'buffalo hump'
- ☹ Udema (retensi air), hipertensi
- ☹ Osteoporosis, pertumbuhan terhambat
- ☹ Iritasi lambung
- ☹ Glaukoma
- ☹ Insufisiensi adrenal

Untuk mengurangi efek samping :

- gunakan lokal/ aerosol pd asma
- penghentian obat secara bertahap dosis diturunkan



“Buffalo Hump”



“Moon Face”

ANTI LEUKOTRIEN

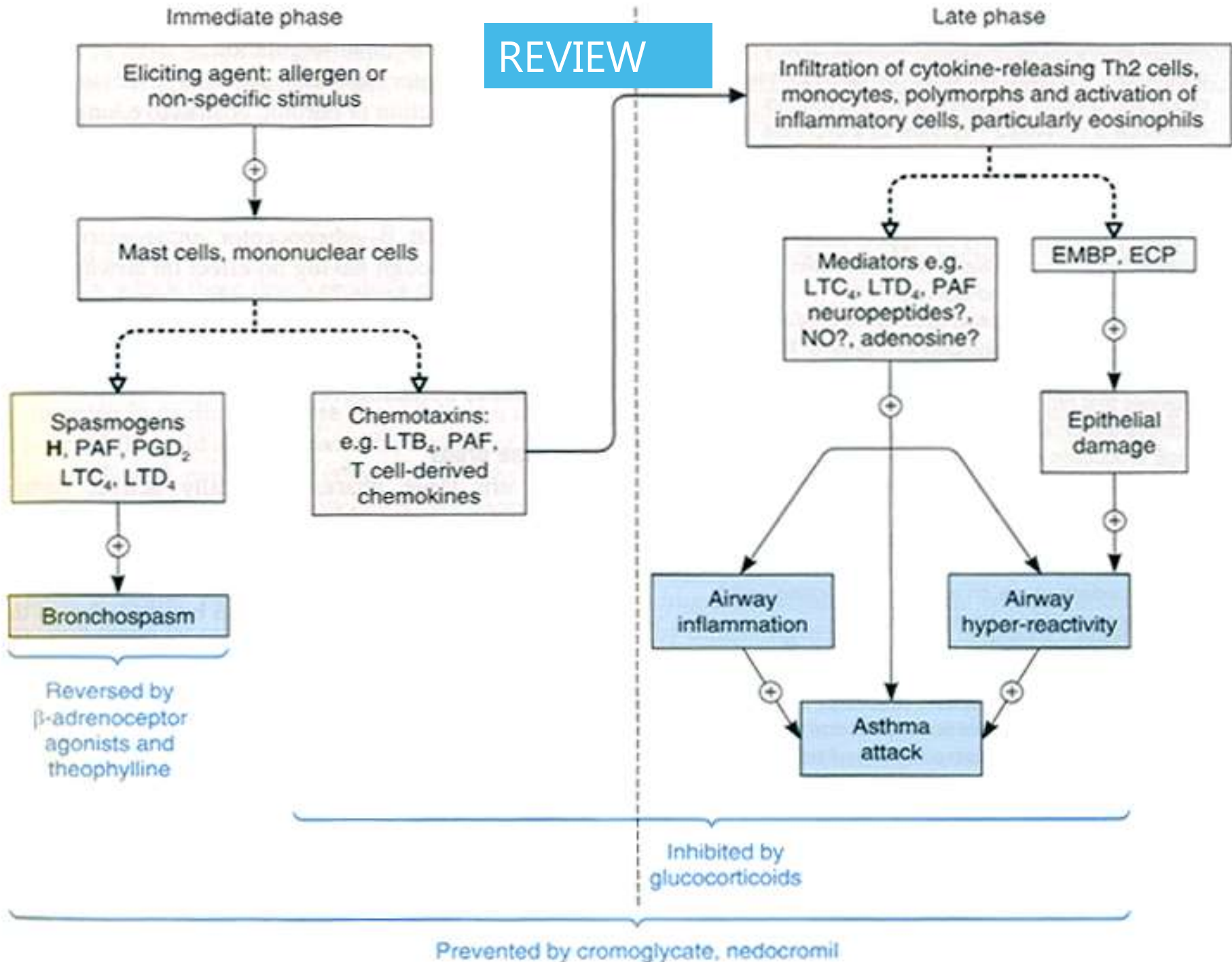
1. *LT-1 reseptor antagonis (Zafirlukast, montelukast, pranlukast)*
 - efektif hamb Ag / exercise-induced asthma
 - p.o 1-2 x sehari
2. *5-lipoxygenase inhibitor (Zileuton)*
 - Hamb produksi leukotrien
 - Interaksi obat : me ↑ konsentr teofilin & walfarin di serum

ANTI-Ig E MONOCLONAL ANTIBODY (Omalizumab)

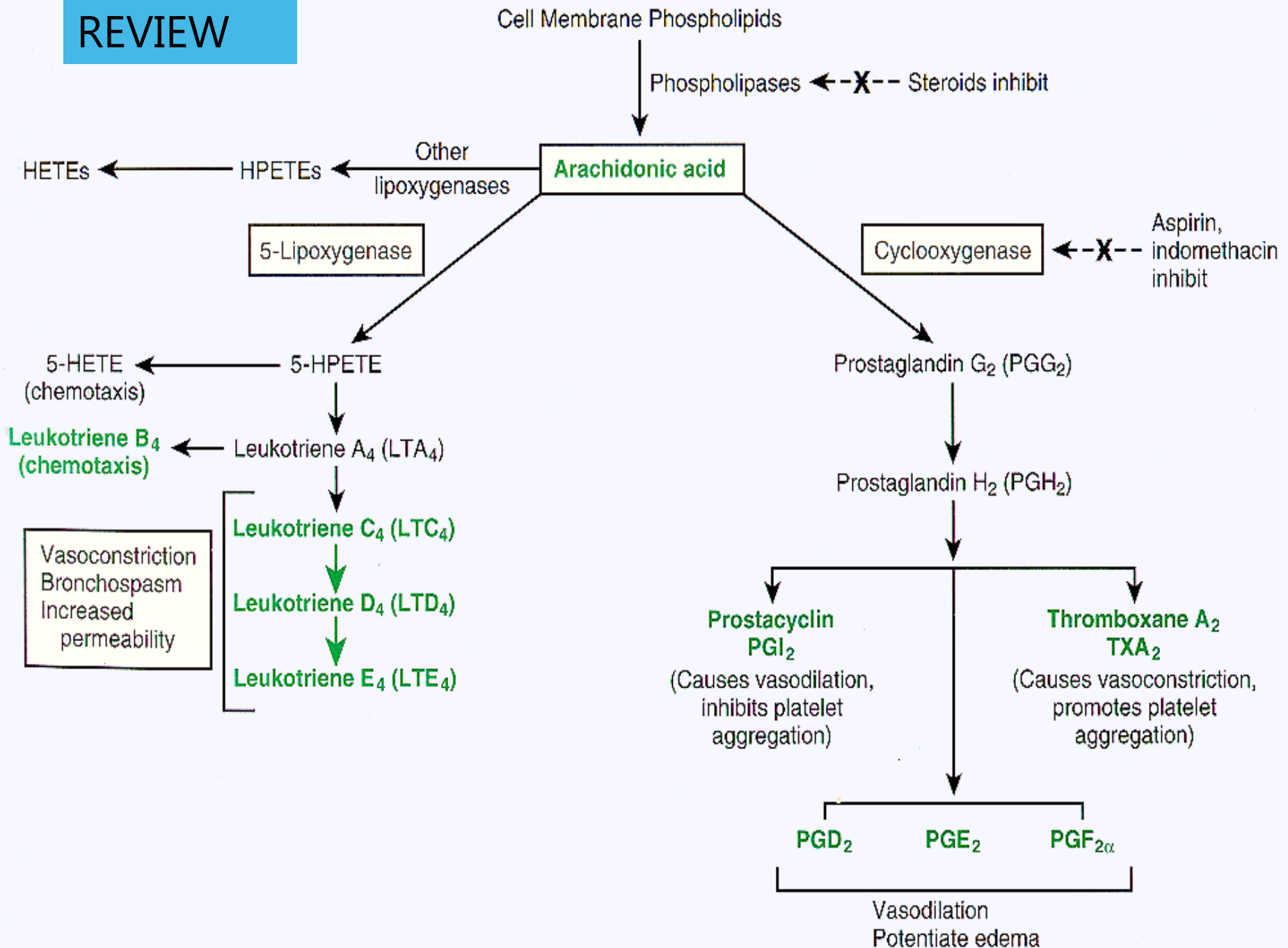
- a. “Humanized” antibody, inhibits binding of IgE to mast cells
- b. Successful phase III trials (2001)
 - i. Reduced frequency and occurrence of exacerbations
 - ii. Improved symptom control while allowing for reduction in steroid and β_2 agonist use
 - iii. Safe and well tolerated

Resume Penatalaksanaan Asma

- ▶ Correct hypoxia : Oxygen
- ▶ reverse bronchospasm : bronchodilators
 - nonspecific agonists
 - Beta 2 specific agonists
 - **inhaled short**
 - **inhaled long**
 - methylxanthines
 - anticholinergics
- ▶ treat inflammatory changes
 - anti-inflammatory
 - leukotrine antagonists- accolate, zyflo
 - mast cell membrane stabilizer- cromolyn (Intal)



REVIEW



What are the current asthma management goals?

- ▶ Global Initiative for Asthma (GINA) guidelines state that asthma management should:
 - prevent asthma exacerbations
 - achieve and maintain control of symptoms
 - maintain pulmonary function as close to normal as possible
 - maintain normal activity levels, including exercise
 - prevent asthma mortality
 - avoid adverse effects from asthma medications

Managemen & Preventif ASMA


component 1: develop px – dr partnership

component 2: identify and reduce exposure to risk factor

component 3: asses, treat and monitor asthma

component 4: manage asthma exaserbation

ASSES, TREAT AND MONITOR ASTHMA

- ▶ Assessing Asthma Control
 - ▶ Treating to Achieve Control
 - ▶ Monitoring to Maintain Control
- 

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Classification of Asthma

Mild asthma	Moderate asthma	Difficult-to-treat asthma
Well controlled with Step 1 or 2 treatment*	Well controlled with Step 3 treatment*	Requiring Step 4 or 5 treatment to prevent 2 or more exacerbations Uncontrolled or Incompletely controlled despite treatment**
Low-dose inhaled corticosteroid (ICS) and leukotriene receptor antagonist (LTRA)†	Low-dose ICS long-acting β ₂ -agonist (LABA)†	High-dose ICS/LABA†

* Step 1 refers to Asthma (2019) Step 1 Strategy for asthma management and Prevention. © 2019 GSK. ** Ibid. † Chung MP, Poon R, Hoang M, et al. International consensus guidelines on asthma: assessment and treatment of severe asthma. Eur Respir J. 2019;52(10):1900127.

Prof. dr. Ratnawati

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mengangkat tangannya bila sudah tidak mendengar dengungan. Bila penderita mengangkat tangan garpu tala segera dipindahkan ke planum mastoid penderita. Ada 2 kemungkinan pemeriksa masih mendengar dikatakan Schwabach memendek atau pemeriksa sudah tidak mendengar lagi. Bila pemeriksa tidak mendengar harus dilakukan cross yaitu garpu tala mula-mula diletakkan pada planum mastoid pemeriksa kemudian bila sudah tidak mendengar lagi garpu tala segera dipindahkan ke planum mastoid penderita dan ditanyakan apakah penderita mendengar dengungan. Bila penderita tidak mendengar lagi dikatakan Schwabach normal dan bila masih mendengar dikatakan Schwabach memanjang. Evaluasi tes Schwabach :

1. Schwabach memendek berarti pemeriksa masih mendengar dengungan dan keadaan ini ditemukan pada tuli sensori neural.
2. Schwabach memanjang berarti penderita masih mendengar dengungan dan keadaan ini ditemukan pada tuli konduktif.

Schwabach normal berarti pemeriksa dan penderita sama-sama tidak mendengar dengungan. Karena telinga pemeriksa normal berarti telinga normal juga.

PAGE 81 OF 121 35889 WORDS INDONESIA 100%

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9:15 16/06/2021

Table 2: Assessment of asthma severity using symptoms and PEF in patients presenting for the **first time on no treatment.**

INTERMITTENT	CHRONIC PERSISTENT		
Mild	Mild	Moderate	Severe
I	II	III	IV
DAYTIME SYMPTOMS* ≤2/week	DAYTIME SYMPTOMS 3-4/week	DAYTIME SYMPTOMS >4/week	DAYTIME SYMPTOMS Continuous
NIGHT SYMPTOMS** ≤1/month	NIGHT SYMPTOMS 2-4/month	NIGHT SYMPTOMS >4/month	NIGHT SYMPTOMS Frequent
PEF ≥ 80%	PEF ≥80%	PEF 60-80%	PEF <60%

*any of cough, tight chest and wheeze;

** any of cough, tight chest, wheeze and night wakening

Asthma Treatment Algorithm

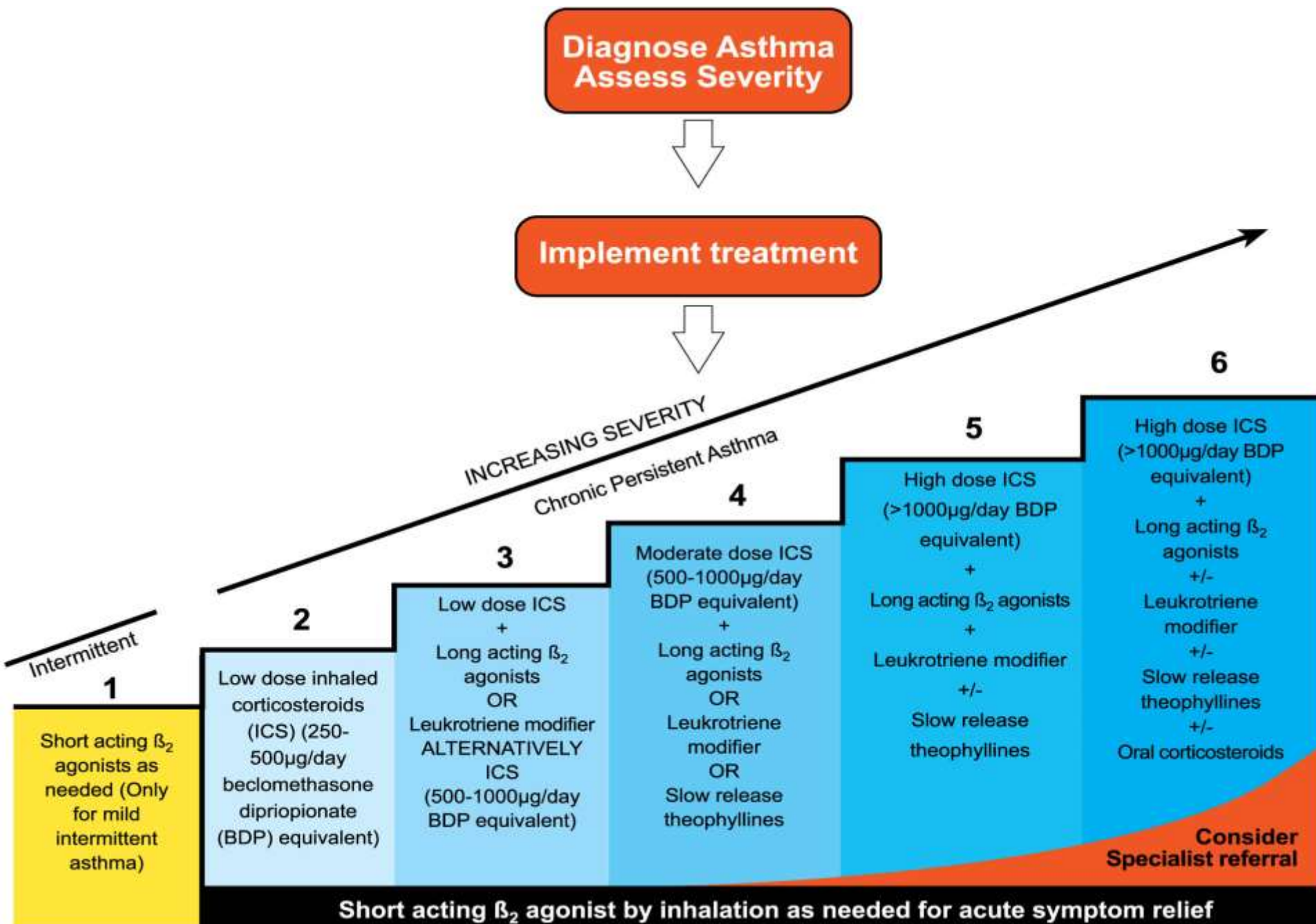


Table 5: Levels of Asthma Control

CHARACTERISTIC	CONTROLLED (All of the following)	PARTLY CONTROLLED (Any measure present in any week)	UNCONTROLLED
Daytime symptoms	≤ 2/week	> 2/week	3 or more features of partly controlled asthma in any week
Limitation of activities	None	Any	
Nocturnal symptoms/ awakening	None	Any	
Need for reliever/ rescue treatment	≤ 2/week	> 2/week	
Lung function (PEF/FEV ₁)	Normal	< 80% predicted or personal best (if known)	
Exacerbations	None	1 or more/year*	
			1 in any week**

* Any exacerbation should prompt review of maintenance treatment to ensure that it is adequate.

** By definition, an exacerbation in any week makes that an uncontrolled week.

Asthma Control Test™

LANGKAH 1 :

Lingkari nilai Anda disetiap pertanyaan dan tuliskan nilai tersebut di box/ kotak yang tersedia di sebelah kanannya - jawablah dengan jujur

Pertanyaan						Nilai	
1	Dalam 4 minggu terakhir seberapa sering asma Anda mengganggu Anda untuk melakukan pekerjaan sehari-hari di kantor, di sekolah atau di rumah ?	Selalu 1	Sering 2	Kadang-kadang 3	Jarang 4	Tidak pernah 5	
2	Dalam 4 minggu terakhir, seberapa sering Anda mengalami sesak napas ?	Lebih dari 1 kali sehari 1	Sekali sehari 2	3-6 kali seminggu 3	1-2 kali semi 4	Tidak pernah 5	
3	Dalam 4 minggu terakhir seberapa sering gejala asma (bengek, batuk-batuk, sesak napas, nyeri dada atau rasa tertekan di dada) menyebabkan Anda terbangun di malam hari atau lebih awal dari biasanya ?	4 kali/ lebih dalam seminggu 1	2-3 kali seminggu 2	Sekali seminggu 3	1-2 kali sebulan 4	Tidak pernah 5	
4	Dalam 4 minggu terakhir, seberapa sering Anda menggunakan obat semprot/ obat oral (tablet/ sirup) untuk melegakan pernafasan?	3 kali/ lebih sehari 1	1-2 kali sehari 2	2-3 kali seminggu 3	1 kali seminggu/ kurang 4	Tidak pernah 5	
5	Bagaimana Anda sendiri menilai tingkat kontrol asma Anda dalam 4 minggu terakhir?	Tidak terkontrol sama sekali 1	Kurang terkontrol 2	Cukup terkontrol 3	Terkontrol dengan baik 4	Terkontrol sepenuhnya 5	

LANGKAH 2 :

Jumlah nilai masing-masing pertanyaan untuk mendapatkan nilai total **TOTAL**

Arti nilai ACT™ Anda ;

25 - Terkontrol Penuh

Anda sudah terkontrol. Pertahankan pengobatan yang digunakan. Selalu menghindari pencetus dan tetap berkonsultasi dengan Dokter Anda.

20-24: Terkontrol Sebagian

Asma cukup terkontrol tetapi belum total. Konsultasikan pada Dokter Anda cara untuk mencapai kondisi terkontrol penuh. Edukator Asma siap membantu Anda.

≤19 - Tidak Terkontrol

Asma belum terkontrol. Konsultasikan kepada Dokter untuk mendapatkan program pengobatan agar dapat mencapai kondisi asma terkontrol penuh. Edukator asma siap membantu Anda.

HAL YANG TERPENTING ADALAH:

Jika nilai ACT Anda ≤ 19, berarti asma Anda tidak terkontrol. Perlu dilakukan rencana pengobatan untuk mencapai kualitas hidup yang lebih baik. Segera konsultasikan dengan Dokter Anda.

Despite the fact that most patients should be able to achieve and maintain

40 million
worldwide are affected
by asthma²

their current treatment include:



of patients who are
estimated to adhere poorly
to asthma medication⁴

² A cross-sectional survey of patient-reported asthma control in Europe in the past 5 years. *Eur Respir Rev.* 2012;21(123):66-74
³ Abate KH, et al. Global, regional, and national deaths, prevalence, disability-adjusted life years, and years lived with disability
asthma, 1990-2015: a systematic analysis for the Global Burden of Disease Study 2015. *Lancet Respir Med.* 2017;5(9):691-706.
⁴ How good asthma control be achieved? The Gaining Optimal Asthma Control study. *Am J Respir Crit Care Med.* 2004;170(8):836-844.
⁴ Global Initiative for Asthma (GINA). *Global Strategy for Asthma Management and Prevention.* Fontana, WI: 2020.



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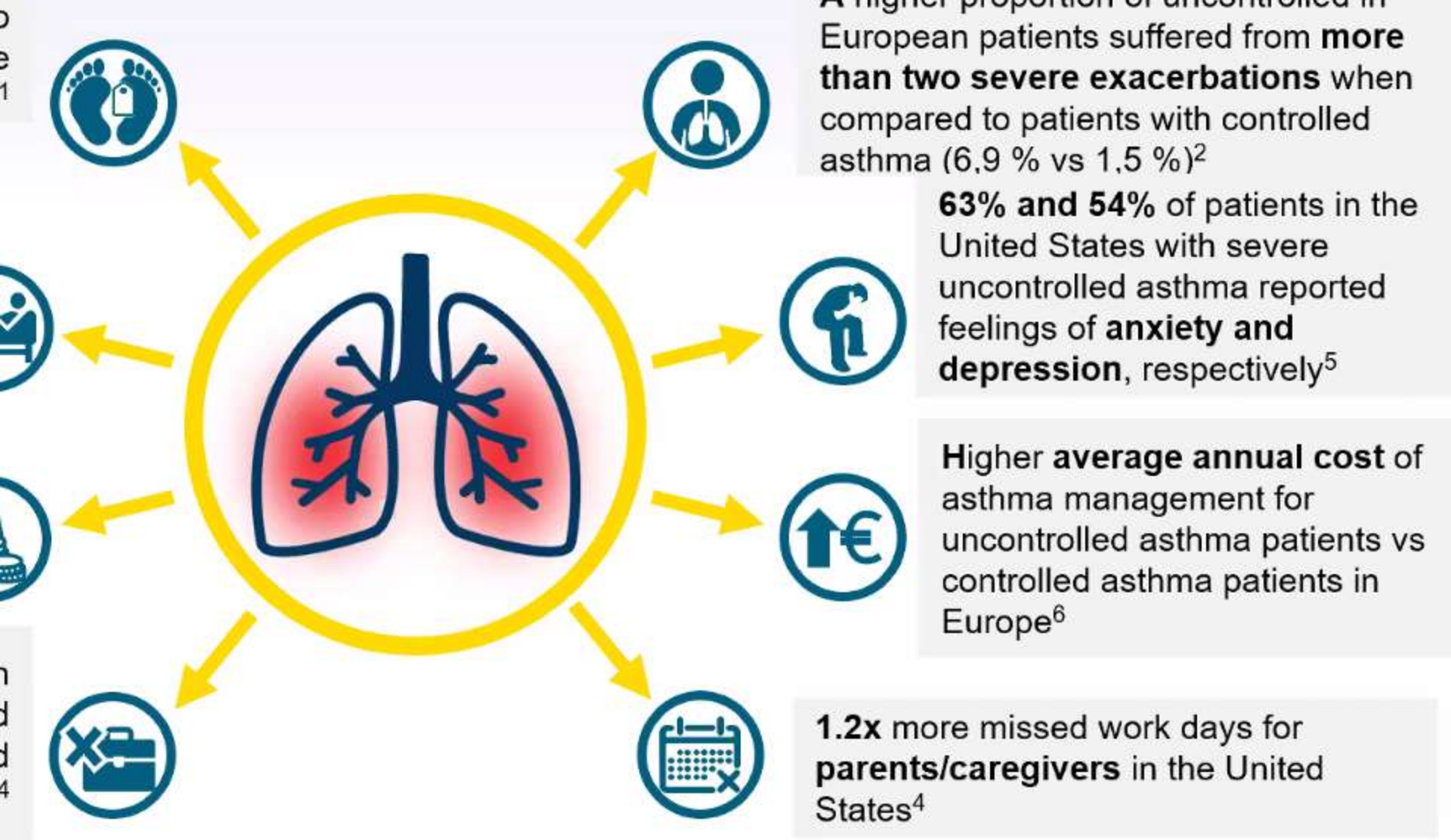
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8 8 4 2 0 2 4 6 8

Incremental health care costs, morbidity, and mortality worldwide.



1. Fernandes AG, Souza-Machado C, Coelho RC, et al. Risk factors for death in patients with severe asthma. J Bras Pneumol. 2014;40

2. Braido F, Brusselle G, Guastalla D, et al. Determinants and impact of suboptimal asthma control in Europe: The international cross-sectional and longitudinal assessment on asthma control (LIAISON) study. Respir Res. 20



GLOBAL INITIATIVE FOR ASTHMA

Exacerbations

Frequent exacerbations (≥ 2 per year) requiring OCS

or

Serious exacerbations (≥ 1 per year) requiring hospitalization



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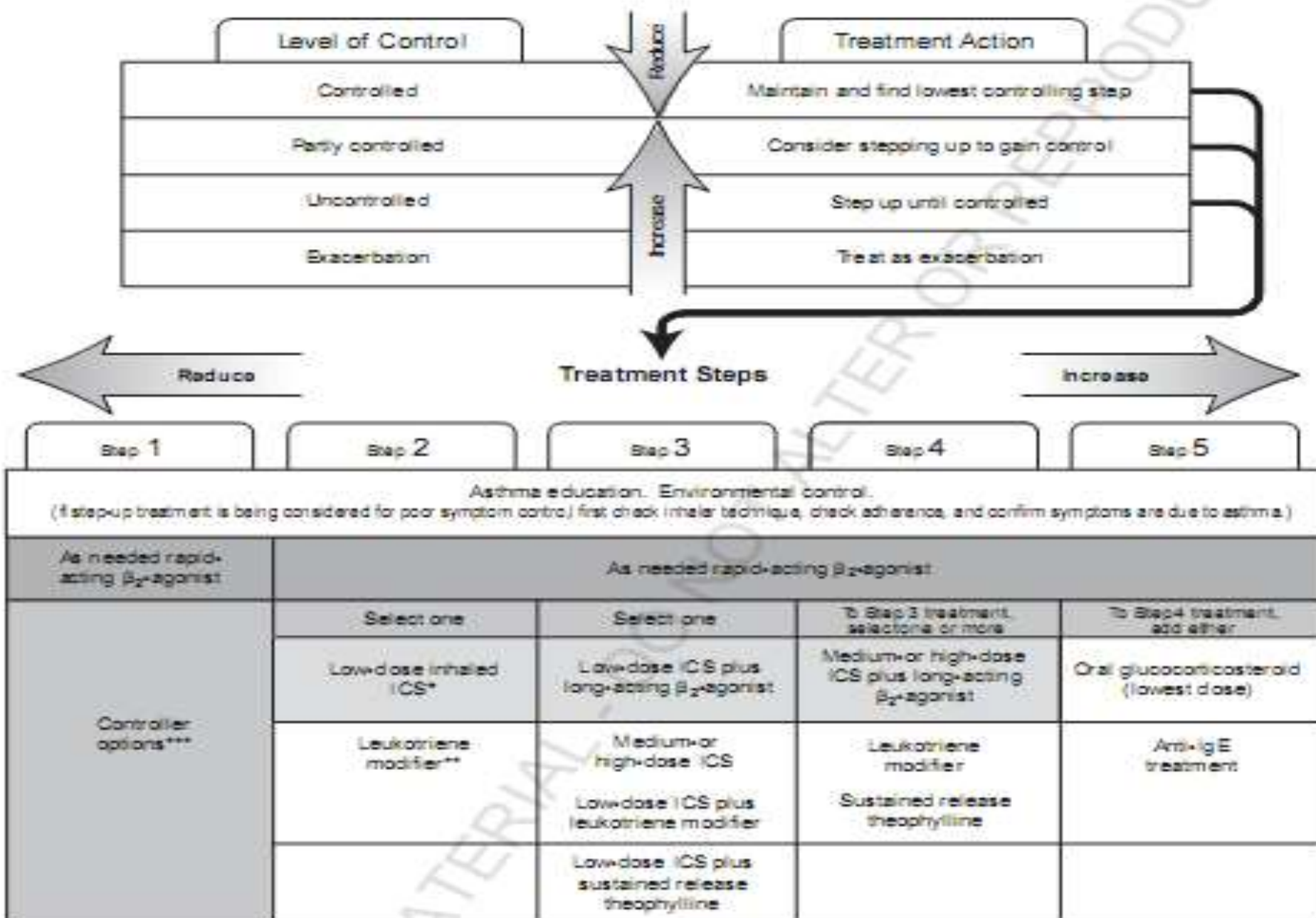
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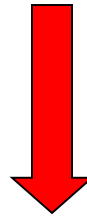
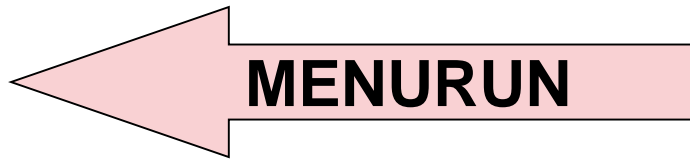
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Figure 5. Management Approach Based on Control Adults and Children Older Than 5 Years



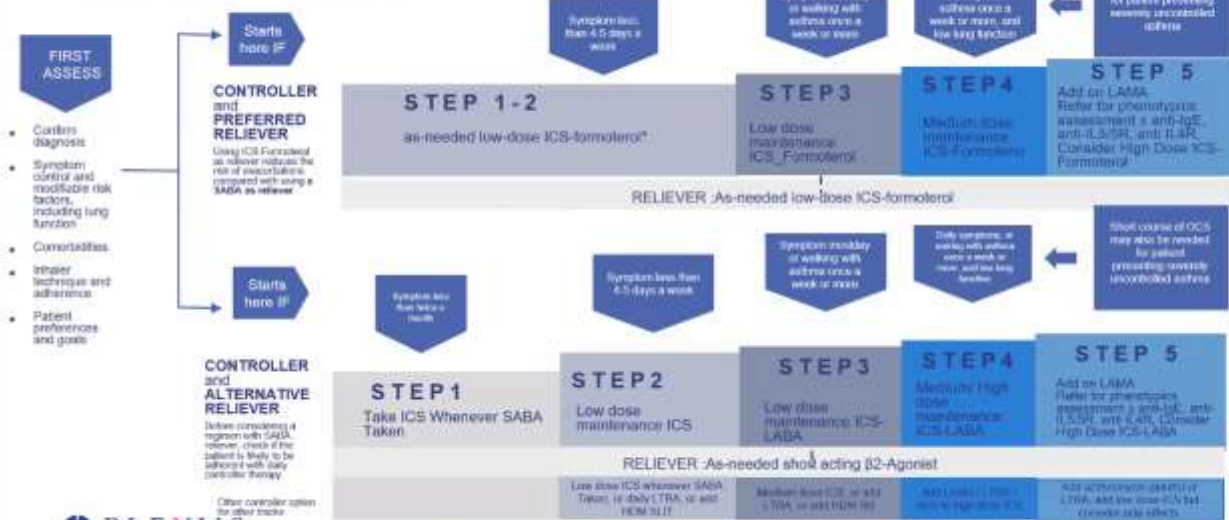
MANAJEMEN ASMA BERDASARKAN KONTROL



Step 1	Step 2	Step 3	Step 4	Step 5
EDUKASI ASMA, KONTROL LINGKUNGAN				
Jika perlu SABA	Jika diperlukan SABA			
Obat pengontrol	Pilih salah satu	Pilih salah satu	Tambahkan satu / lebih	Tambahkan satu / lebih
	Inhalasi CS dosis rendah	Inhalasi CS dosis rendah + LABA	Inhalasi CS dosis sedang @ tinggi + LABA	Glukokortikoid oral dosis terendah
	Leukotrien inhibitor	Inhalasi CS dosis sedang @ tinggi	Leukotrien inhibitor	Terapi Anti IgE
		Inhalasi CS dosis rendah + leukotrien inhibitor	Teofilin SR	
		Inhalasi CS dosis rendah + Teofilin SR		

GINA Treatment Strategy

Adults & Adolescents 12+ years



Prof. dr. Rathawati, MCH, Sp.P (K), PhD



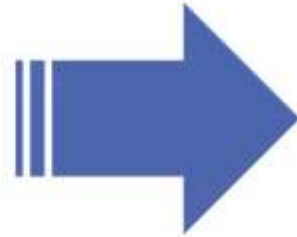
*ICS Formoterol only with 2.5 µg beclomethasone dipropionate (L25) or budesonide (L25) or fluticasone propionate (L25). ICS Formoterol only with 2.5 µg beclomethasone dipropionate (L25) or budesonide (L25) or fluticasone propionate (L25). ICS Formoterol only with 2.5 µg beclomethasone dipropionate (L25) or budesonide (L25) or fluticasone propionate (L25). ICS Formoterol only with 2.5 µg beclomethasone dipropionate (L25) or budesonide (L25) or fluticasone propionate (L25).

Adapted from Global Initiative for Asthma (GINA). Global Strategy for Asthma Management and Prevention. Fontana, WI, 2021.

Consider have LAMA Addition to LABA/ICS

Moderate Asthma start to use LABA/ICS

Symptom most days or walking with asthma once a week or more



STEP 3

Low-dose maintenance-ICS LABA



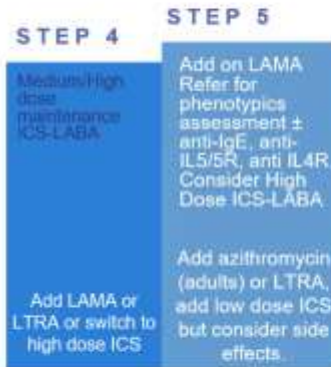
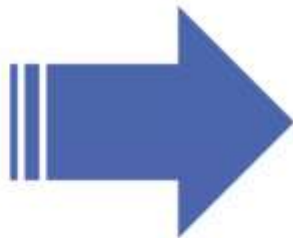
Adapted Global Initiative for Asthma (GINA), Global Strategy for Asthma Management and Prevention, Fortana, WI, 2021.



Consider have LAMA Addition to LABA/ICS

Severe Asthma consider to add on LAMA or Biologic Agent

Daily symptoms, or waking with asthma once a week or more, and low lung function



Zoom Webinar
Recording **LIVE** on YouTube

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Definition of Uncontrolled Asthma

GLOBAL INITIATIVE FOR ASTHMA

One or both of the following criteria:

Symptom control

Poor symptom control:

- Daytime asthma symptoms (>2 times/week)
- Night time awakening due to Asthma
- SABA reliever for symptoms (>2 times/week)
- Activity limitation due to Asthma

Exacerbations

Frequent exacerbations (≥2 per year) requiring OCS
or
Serious exacerbations (≥1 per year) requiring hospitalization

Level of asthma symptom control

Well Controlled	None of these
Partially Controlled	1-2 of these
Uncontrolled	3-4 of these

OCS, oral corticosteroids.

PLEXUS

Global Initiative for Asthma (GINA). Global Strategy for Asthma Management and Prevention. Toronto, ON: 2020.

Host is sharing poll results

1. Kasus No.1

Menurut dokter apakah pasien tersebut sudah terkontrol ?

Terkontrol	40%
Terkontrol Partial	57%
Tidak Terkontrol	3%

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Zoom Webinar

Recording **LIVE** on YouTube

Rationale for Dual Bronchodilation – Clinical Perspective

1 Flat dose-response curve for ICS

More patients achieved asthma control with ICS+LABA more rapidly and at a lower dose of corticosteroid than with ICS alone.

Proportion of patients and dose at which well-controlled asthma was achieved at 1 year

Treatment group	ICS use in previous 6 months	No ICS	BDP 200 µg/day	BDP >600 to <=1000 µg/day
FP (n=544)	FP (n=939)	FP (n=677)	FP (n=503)	FP (n=987)
SFC (n=544)	SFC (n=939)	SFC (n=677)	SFC (n=503)	SFC (n=987)

Legend: Discontinuation phase (dark blue), Maintenance phase (light blue)

Reference: CEL, Bouillon-Vin, Stuyckx, et al. Do guideline-defined asthma control objectives achieved? The Gaining Optimal Asthma Control Study. Am J Respir Crit Care Med. 2008;178(12):1399-405.

dr. Paulus Wisnu Kuncoro

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Name	Form	Kemampuan awal	Nilai ul	Penyelesaian	Uraian	Tipe
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KAJIAN PUSTAKA

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In conclusion

Make sure that Our patients are WELL controlled

Symptom control

Poor symptom control:

- Daytime asthma symptoms (>2 times/week)
- Night time awakening due to Asthma
- SABA reliever for symptoms (>2 times/week)
- Activity limitation due to Asthma

Level of asthma symptom control

Well Controlled	None of these
Partly Controlled	1-2 of these
Uncontrolled	3-4 of these

Asthma diagnosis and medication option based on the condition



In Conclusion

- Many asthma remain uncontrolled even though most patients should be able to achieve and maintain clinical control based on a good pharmacological strategy.
- Prevalence of Asthma is still remain uncontrolled globally and locally.
- Factors contributing to uncontrolled asthma include behaviour, the health care system, treatment, disease, and environment.

- Remember to always put attention to our patient asthma control.

One or both of the following criteria:†

Symptom control

Poor symptom control:


- **Daytime asthma symptoms** (>2 times /week)
- **Night time awakening** due to Asthma
- **SABA reliever** for symptoms (>2 times/week)
- **Activity limitation** due to Asthma

Level of asthma symptom control

Well Controlled	None of these
Partially Controlled	1-2 of these
Uncontrolled	3-4 of these



Preventative / Avoidance Measures

- A. Avoid exposure to personal and second-hand tobacco smoke**
 - B. Avoid contact with furry animals**
 - C. Reduce pollen exposure**
 - D. Reduce exposure to house dust mite**
 - E. Avoid sensitizers and irritants (dust and fumes) which aggravate or cause asthma, especially in the workplace**
 - F. Avoid food and beverages containing preservatives**
 - G. Avoid drugs that aggravate asthma such as beta-blockers (including eye drops) and aspirin and non-steroidal anti-inflammatory drugs**
- 

PHARMACOTHERAPY

(A) RELIEVERS :

Act only on airway smooth muscle spasm



i.e. Cause BRONCHODILATATION

symptoms acutely – cough

– wheeze/tightness

Take when necessary

PHARMACOTHERAPY

(B) CONTROLLERS :



underlying INFLAMMATION
and/or cause prolonged bronchodilatation



i.e. • mucosal swelling
• secretions
• irritability of smooth muscle

- ▶ Take regularly, even when well
- ▶ *For ALL asthmatics, except mild intermittent*

ASTHMA DRUG CLASSIFICATION

CONTROLLERS

RELIEVERS

Anti-inflammatory action to prevent asthma attacks

Sustained bronchodilator action but weak or unproven anti-inflammatory effect

For quick relief of symptoms and use in acute attacks as PRN dosage only

Inhaled corticosteroids

1. Beclomethasone
2. Budesonide
3. Fluticasone
4. Ciclesonide

Long-acting beta-agonists

1. Salmeterol
2. Formoterol

Short-acting beta-agonists

1. Salbutamol
2. Fenoterol
3. Terbutaline

Leukotriene modifiers

1. Montelukast
2. Zafirlukast

Oral corticosteroids

1. Prednisone
2. Prednisolone
3. Methylprednisone
4. Methylprednisolone

Sustained-release theophylline preparations

Anti-cholinergics

Ipratropium bromide

MONITOR UNTUK MEMPERTAHANKAN KONTROL

PENURUNAN TERAPI ASMA TERKONTROL

Jika terkontrol pada :

- IGCS dosis medium – tinggi dilakukan reduksi 50% setelah interval 3 bulan (level B)
- IGCS dosis rendah, dirubah menjadi dosis sekali sehari
- Kombinasi IGCS + ILABA, reduksi IGCS 50% namun ILABA diteruskan (level B)
- Bila kontrol sdh dipertahankan, reduksi IGCS sp dosis rendah dan hentikan ILABA (level D)

PENINGKATAN TERAPI ASMA TIDAK TERKONTROL

- ✚ Onset cepat ISABA atau ILABA menghasilkan kesembuhan temporer
- ✚ K/p mengulangi dosis lebih dari satu/dua hari pertama. Perlu menaikkan kontroler
- ✚ Kombinasi ISABA + ILABA dengan IGCS untuk mempertahankan kontrol asma dan mengurangi eksaserbasi (level A)
- ✚ Tidak direkomendasikan melipat gandakan dosis IGCS (level A)

Terima kasih



TERIMA KASIH
TERIMA KASIH

村松誠 【MAKOTO】