Indikator Gangguan Metabolik Pada Penyakit Degeneratif

Husaini Umar
Sudirman Katu

Divisi Endokrin – Metabolik / Divisi Penyakit Tropik Infeksi
Departemen Penyakit Dalam Fakultas Kedokteran
Universitas Hasanuddin/RS Wahidin Sudirohusodo
Makassar

Agenda

Pendahuluan dan Latar belakang

Hiperglikemia dan Diabetes Me4litus tipe 2

Dislipidemia

Obesitas

Hipertensi

Jenis-Jenis Penyakit

Penyakit yang menyerang manusia dapat digolongkan:

- Penyakit infeksi
- Penyakit non infeksi, yang dibagi:
  - a) penyakit kelebihan/kekurangan gizi;
  - b) penyakit degeneratif.;
  - c) keracunan,
  - d) penyakit karena kecelakaan;
  - e) dll.

Pengertian Penyakit Degeneratif

- Penyakit degeneratif adalah istilah medis untuk menjelaskan suatu penyakit yang muncul akibat proses kemunduran fungsi sel tubuh yaitu dari keadaan normal menjadi lebih buruk.
- penyakit yang mengiringi proses penuaan/ terjadi seiring bertambahnya usia.

PERKEMBANGAN LANJUT USIA DI INDONESIA

	Umur harapan hidup	Jumlah Usila (juta)
1980	52,2	7,998 (5,45%)
1990	59,8	11.277 (6,29%)
2000	64,5	14,440 (7,18%)
2010	70,6	23,993 (9,77%)
2014	72	28,823 (11,34%)

Sumber : BPS

MASALAH KESEHATAN LANSIA (Riskesdas 2007)

Dalam persen

Jenis penyakit	55- 64 th	65 – 74 th	≥ 75 th
Penyakit sendi	56,4	62,9	65,4
Hipertensi	53,7	63,5	67,3
Katarak	28,8	41,9	51,6
Stroke	20,2	31,9	41,7
Jantung	16,1	19,2	20,4
Gangg mental emosional	15,9	23,2	33,7
DM	3,7	3,4	3,2

Fakta di Dunia

680 Juta kasus jantung

171 Juta kasus diabetes mellitus

15 Juta kasus kanker

2 Miliar kasus osteoporosis

2020 :

73% kematian disebabkan penyakit degeneratif

PERMASALAHAN

* **WHO →Penyakit Tidak Menular** merupakan penyebab :

  60% kematian

  43% kesakitan didunia

* **PTM di Indonesia cenderung meningkat**
  → penyebab utama kematian
  → penyebab disabilitas

Beberapa Penyakit Degeneratif

Ada sekitar 50 jenis penyakit degeneratif antara lain:

- Diabetes melitus tipe 2, stroke, hipertensi, penyakit kardiovaskular, dislipidemia.
- Kanker prostat, kanker usus dan kanker kulit akan selalu menjadi masalah kesehatan utama bagi pria, terutama seiring bertambahnya usia.
- Penyakit tulang yang termasuk degenerative: low back pain, cervical pain, neck shoulder syndrome, Osteoartritis (OA) , Arthropathy degeneratif.
- Beberapa penyakit degeneratif lainnya : otak palsy supranuclear Progresif (PSP), Rasmussen's ensefalitis, Creutzfeltd-Jakob, dan penyakit dan Wilson Alpers penyakit.

Etiologi

1. Genetik.

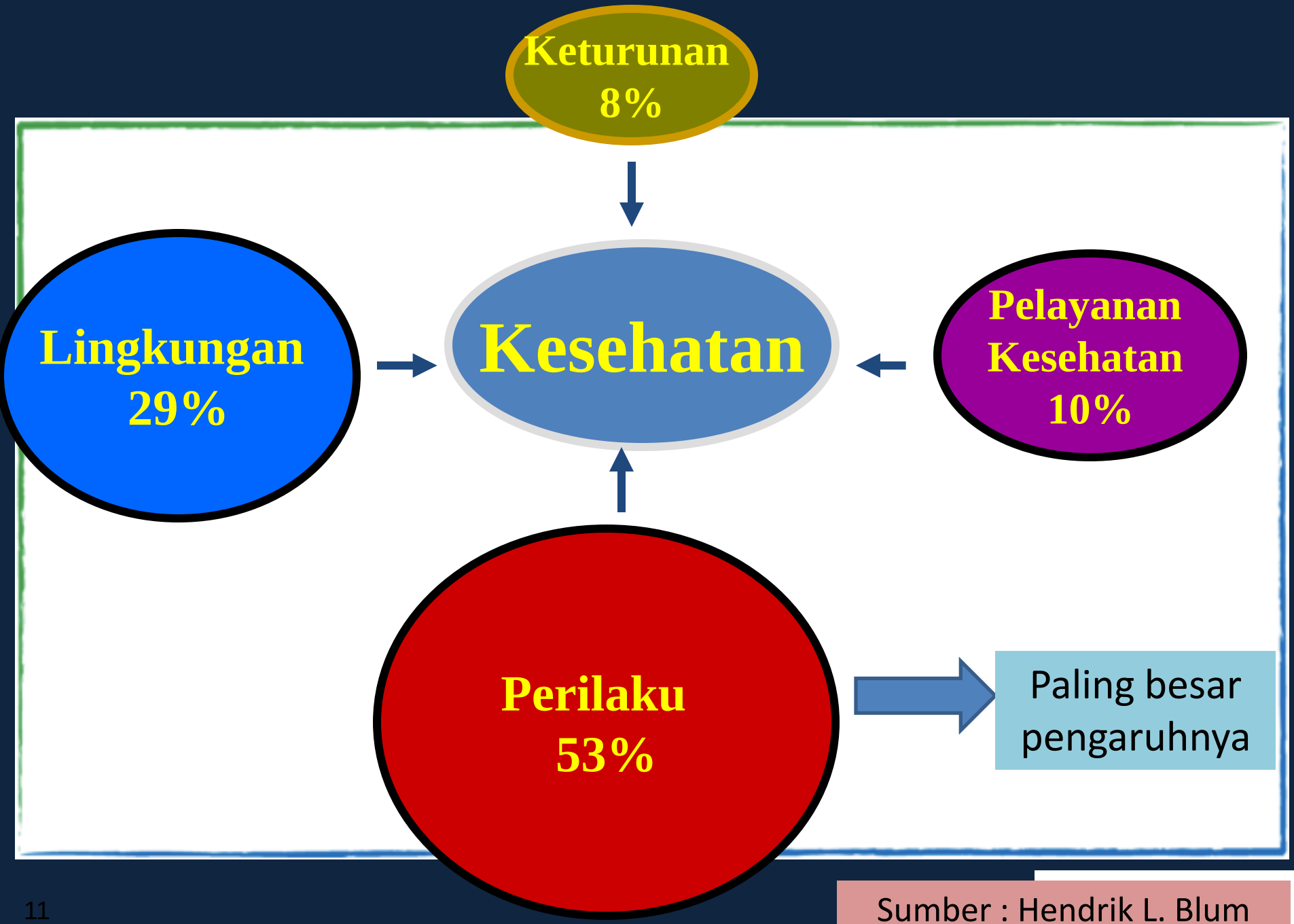
   Setiap spesies termasuk manusia telah terprogram secara genetik. Didalam nukleus terdapat suatu jam genetik yang telah diputar menurut proses replikasi.

2. Faktor Lingkungan.

   faktor lingkungan termasuk periode dalam rahim,

   faktor gaya hidup seperti diit, aktifitas fisik.

3. Inflamasi grade rendah dan stres oksidatif.



Sumber : Hendrik L. Blum

Gangguan metabolisme tubuh akan memberi dampak berupa gangguan fungsi organ ➔ memicu berbagai penyakit degeneratif seperti obesitas, stroke, kencing manis, hipertensi, hiperkolesterol/ trigliserid, penyakit jantung, gangguan sistem pencernaan, gangguan asam urat, emosional (mudah stres, depresi, hiperaktif, dll.).

- **Setiap** orang pasti menginginkan tubuh yang sehat sepanjang usianya.
- Secara alami usia-usia senja ➔ muncul penyakit ➔ ancaman penyakit muncul berdasarkan usia

- **Penyakit biasanya akan menyerang seseorang yang memiliki sistem kekebalan tubuh lemah**, dan
- umumnya seiring bertambah usia maka kekebalan tubuh juga melemah.

- Sekarang → **Usia 30-an tahun** →adanya perubahan pola hidup "salah" → beberapa penyakit seperti jantung atau diabetes bisa muncul.
- Selain itu beberapa kanker tertentu juga dapat menyerang.

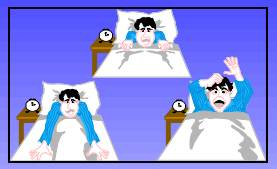
- Pada usia ini seseorang cenderung mulai dihantui oleh gangguan kolesterol tinggi dan juga gangguan kadar gula darah

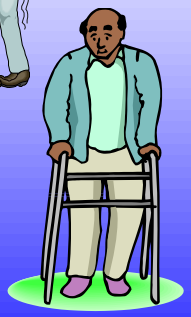
Risiko Gizi tak Seimbang

GAYA HIDUP TIDAK SEHAT

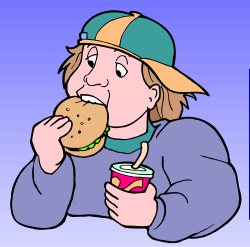
Stress

- Insomnia
- Depresi
- Kecemasan
- Hipertensi
- Obesitas
- Merokok
- Alkoholik
- Serangan Asma
- Angina Pectoris
- TIA & Stroke





FAKTOR UTAMA PENYEBAB PENYAKIT GAYA HIDUP



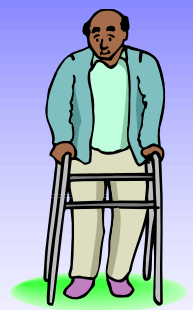
Diet Tidak Sehat *(Unhealthy Diet)*

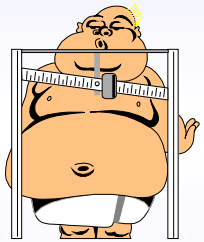
Ketidakaktifan Fisik *(Physical Inactivity)*

Merokok *(Smoking)*

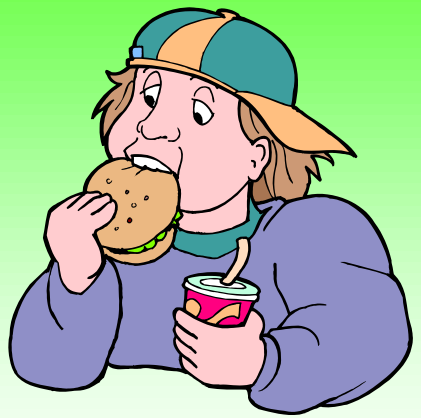
Stress

- **Hipertensi**
- **Hiperlipidemia**
- **Diabetes Mellitus**
- **Obesitas**
- **Osteoporosis**
- **Osteoarthritis**
- **Asma**

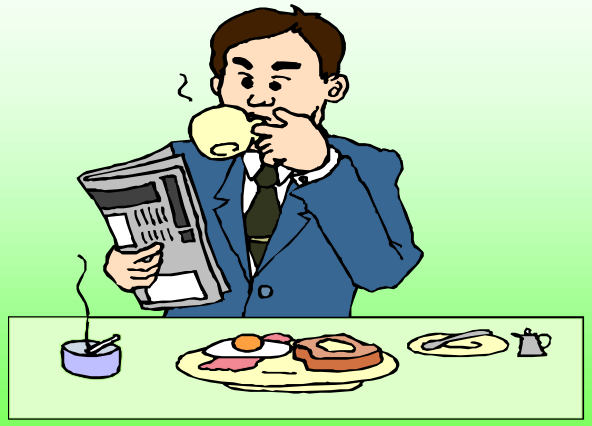




GAYA HIDUP TIDAK SEHAT



Pola Makan & Diet Tidak Sehat *(Unhealthy Diet)*



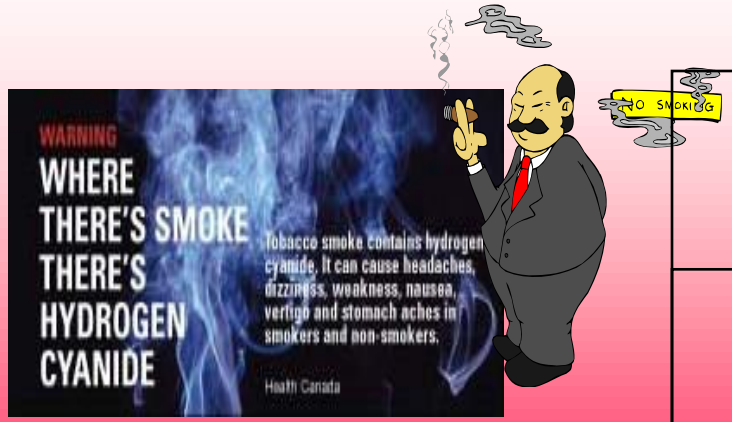
- Makanan Tinggi Kalori → Obesitas, Diabetes Mellitus, Hiperlipidemi, Hipertensi, Kanker Usus
- Makanan Tinggi Lemak → Diabetes Mellitus, Hiperlipidemi, Hipertensi, Kanker Usus
- Makanan Tinggi Garam → Hipertensi
- Makanan Rendah Serat → Kanker Usus
- Makanan Kurang Calsium → Osteoporosis
- Gunakan Bahan Perasa Pengawet, Pewarna Buatan → Radikal Bebas

GAYA HIDUP TIDAK SEHAT

Ketidakaktifan Fisik
(Physical Inactivity)

- Obesitas
- Diabetes Mellitus
- Hipercholesterolemia
- Hipertensi
- Peny.Jantung Koroner
- Stroke
- Osteoporosis
- Osteoarthritis
- Nyeri Punggung

GAYA HIDUP TIDAK SEHAT



Merokok
(Smoking)

- **Penyakit Jantung Koroner**

- **Stroke**

- **Susah Napas**

- **Kanker Paru-2**

- **Gangguan Kehamilan**

- **Impotensi**

Agenda

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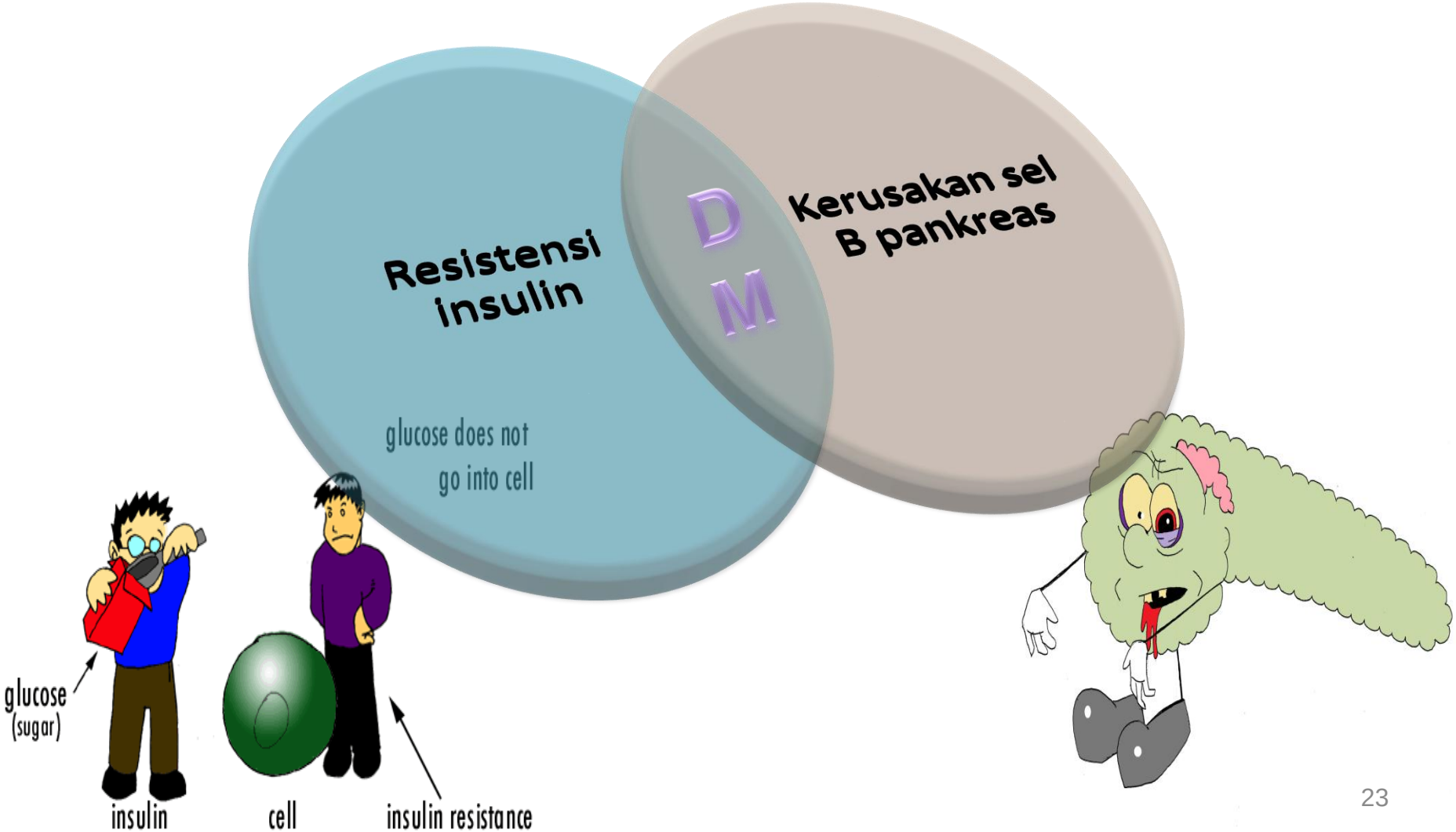
Dislipidemia

Obesitas

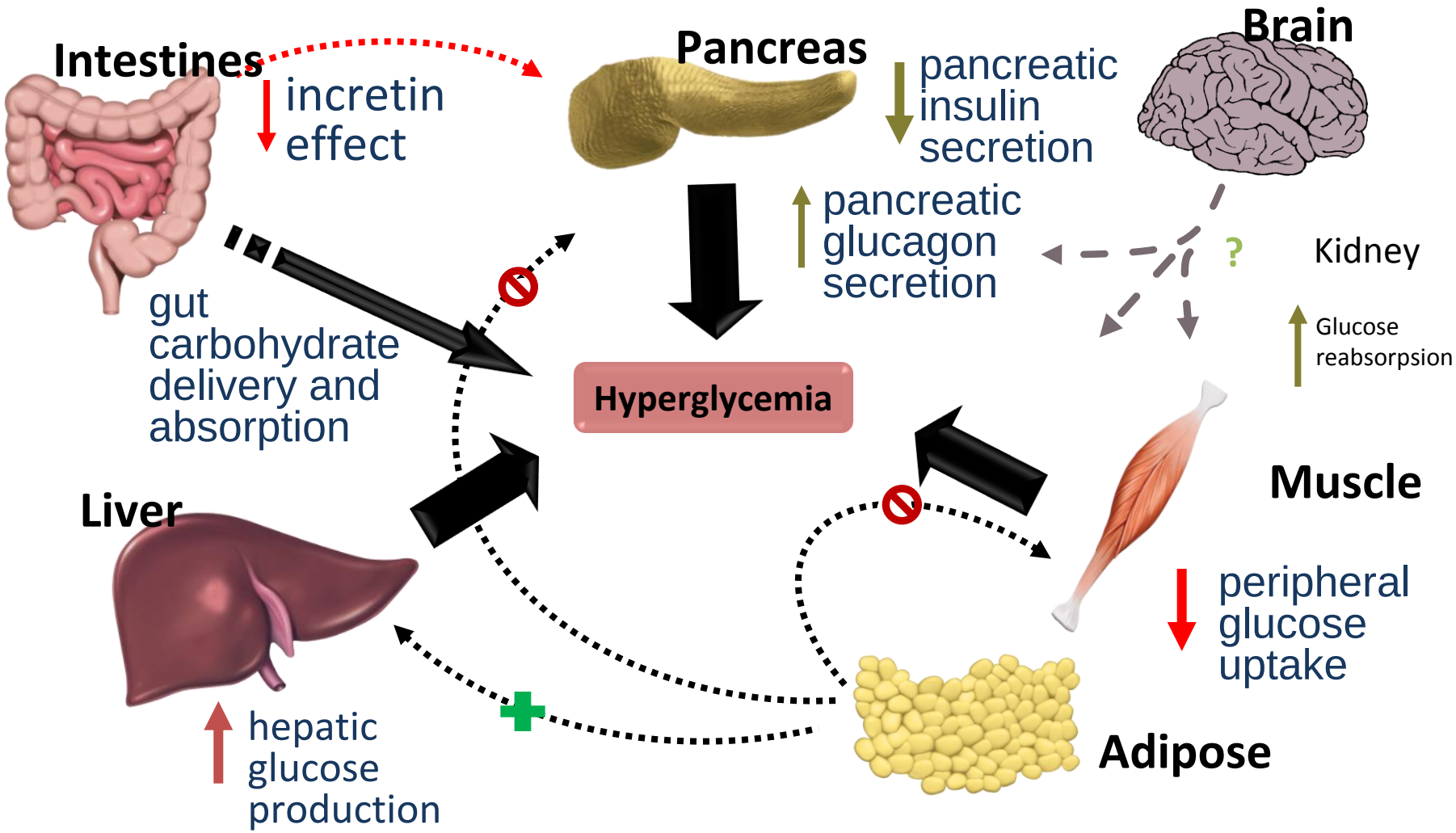
Hipertensi

HIPERGLIKEMIA DAN DIABETES MELITUS TIPE 2

Mengapa terjadi peningkatan gula darah

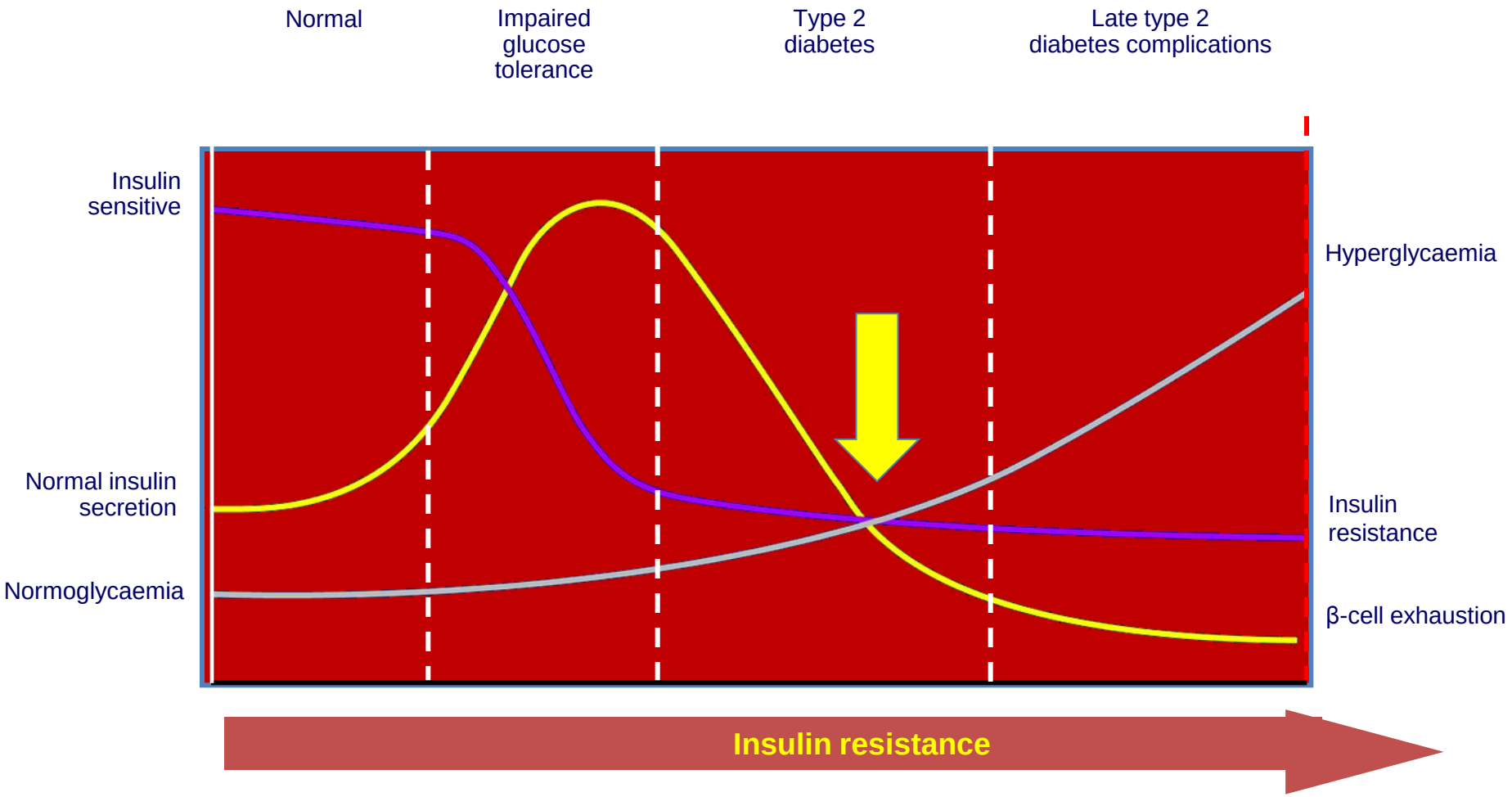


Main pathophysiological defects in type 2 DM



Adapted from:Inzucchi SE, Sherwin RS. Diabetes Mellitus. In: Goldman L, Ausiello D, eds. Cecil Textbook of Medicine. 23rd Edn. Philadelphia, Pa: Saunders Elsevier; 2007.

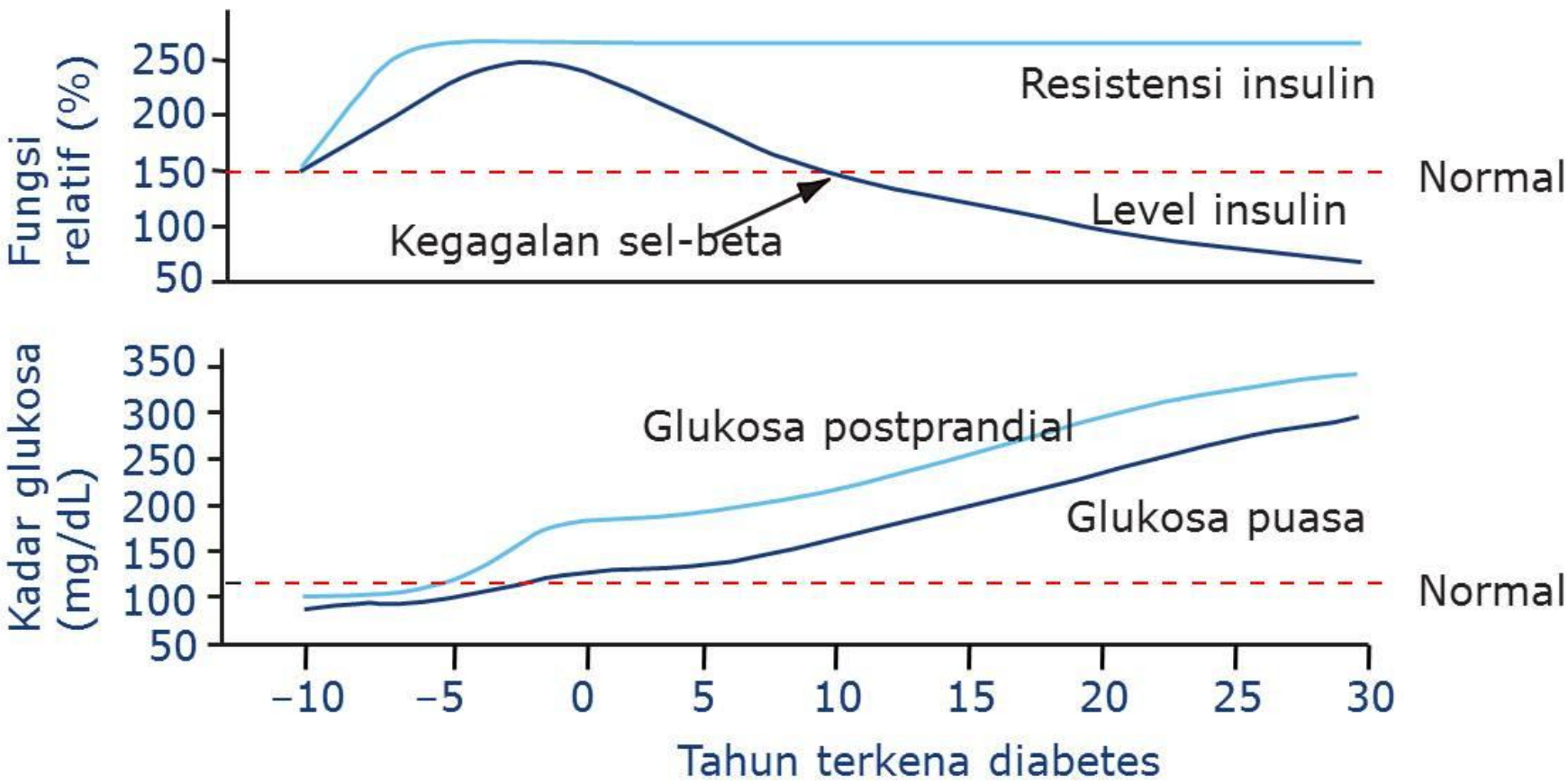
The progressive nature of type 2 diabetes



Fasting plasma glucose
Insulin sensitivity
Insulin secretion

Adapted from Bailey CJ *et al. Int J Clin Pract* 2004;58:867–876.
Groop LC. *Diabetes Obes Metab* 1999;1 (Suppl. 1):S1–S7.

Natural history of T2DM



GPT, glukosa puasa terganggu

Cara Diagnosis Diabetes

- Keluhan 3P + GDS $\geq$ 200 mg/dl
- Glukosa darah puasa $\geq$ 126 mg/dl
- TTGO 75 gr glukosa $\geq$ 200 mg/dl
- HbA1c $\geq$ 6.5

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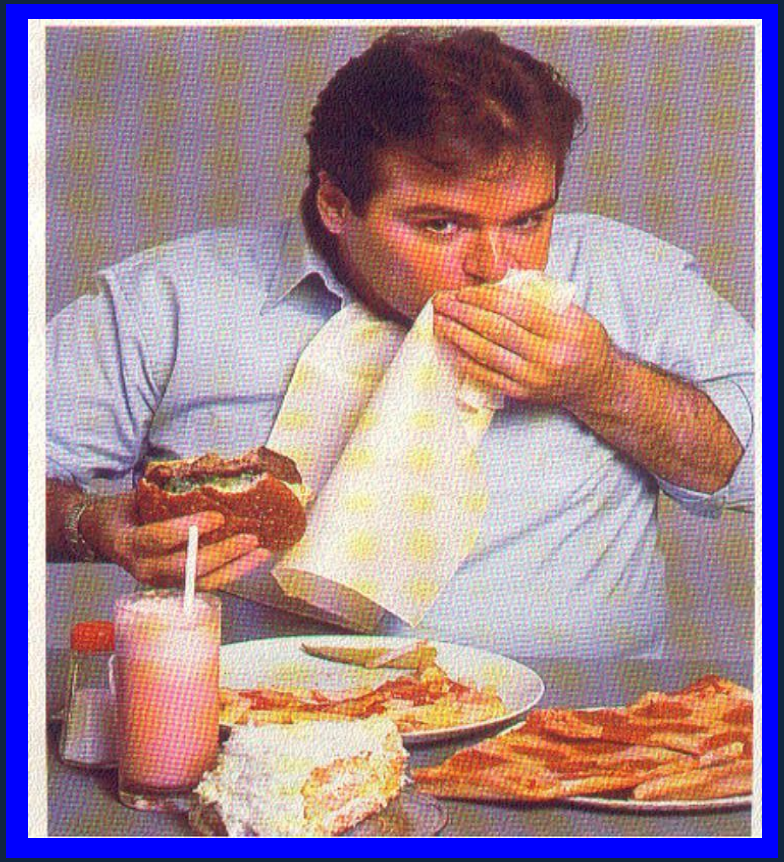
DISLIPIDEMIA



Adipose Tissues

- Storage of fat (TG)
- Endocrine organ : produced hormone (adipocytokine), leptin, TNF-α, IL-6, resistin → pro-inflammatory

adiponektin → anti-inflammatory

Jaringan perifer

Jaringan lemak

Adiponectin

↑ Ambilan glukosa

TNF-α,
IL-6,
Leptin,
Resistin

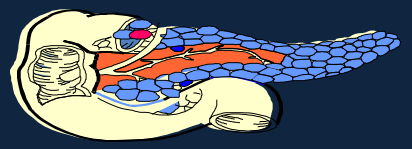
↓ Ambilan glukosa

Otot

Asam lemak bebas (proses lipolisis)

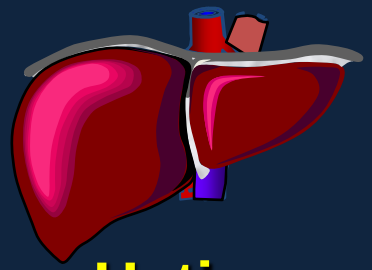
↓ Ambilan glukosa

Sekresi insulin terganggu, apoptosis



Pankreas

Produksi glukosa meningkat



Hati

Pro – inflammatory Adipocytokines

- **Leptin** : ↑ dgn pe ↑ BB, bekerja pada sistem saraf perifer dan pusat
- **TNF-α** : berperan pada resistensi insulin perifer, mengganggu insulin signaling, menekan ekspresi glucose transporter (GLUT-4)
- **IL-6** : meningkatkan glukoneogenesis
- **Resistin** : ↑ resistensi insulin

Anti-inflammatory Adipocytokines

- **Adiponektin : hormon peptida diproduksi oleh adiposit → mencegah terjadinya resistensi insulin.**
- **Adiponektin ↑ jika p↓ BB**

LIPOPROTEIN

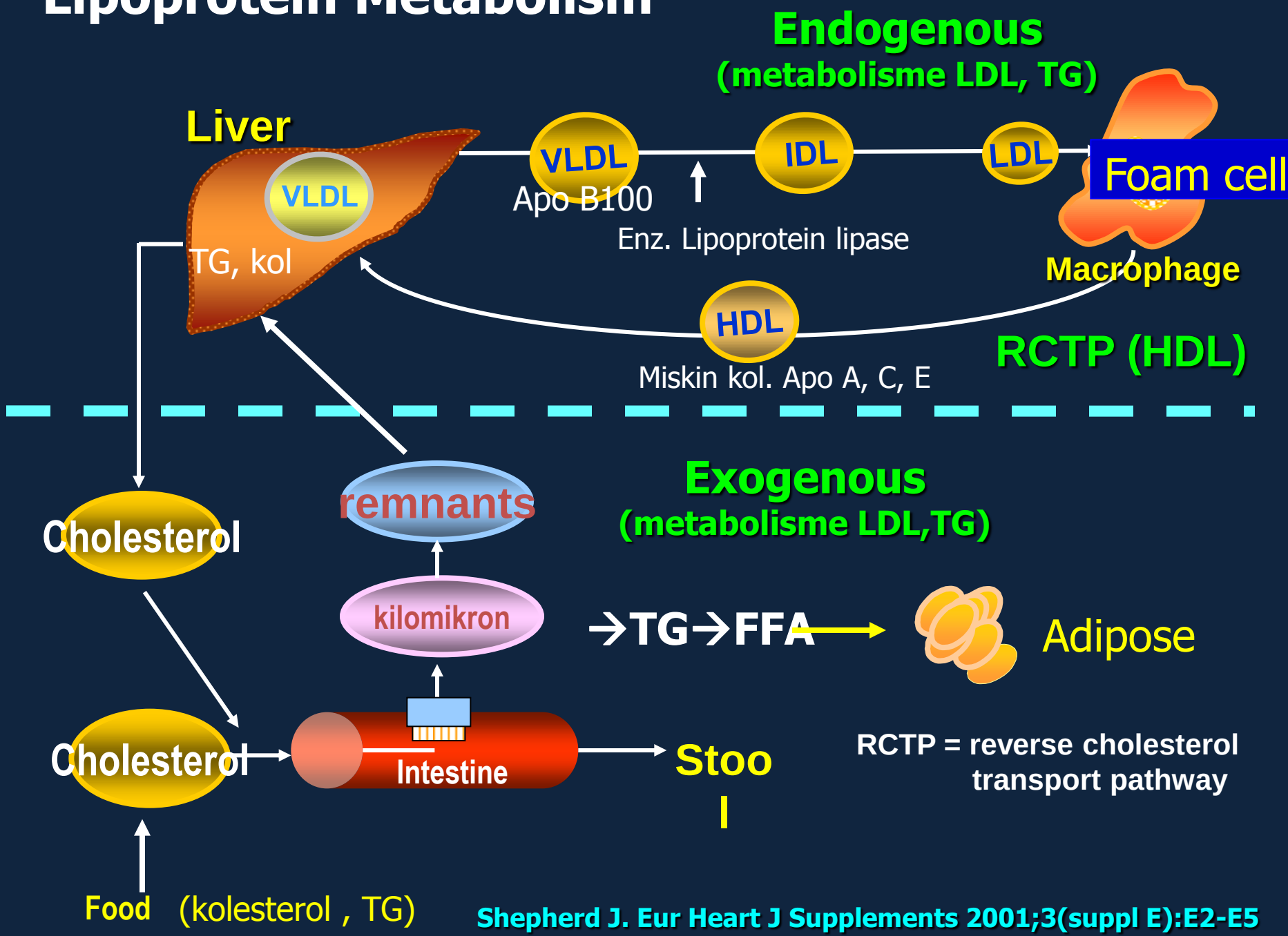
Jenis Lipoprotein :

- HDL : high density lipoprotein
- LDL : low density lipoprotein
- IDL : intermediate density lipoprotein
- VLDL : very low density lipoprotein
- Kilomikron
- Lipoprotein a kecil (Lp(a))

Setiap Lipoprotein t.d :

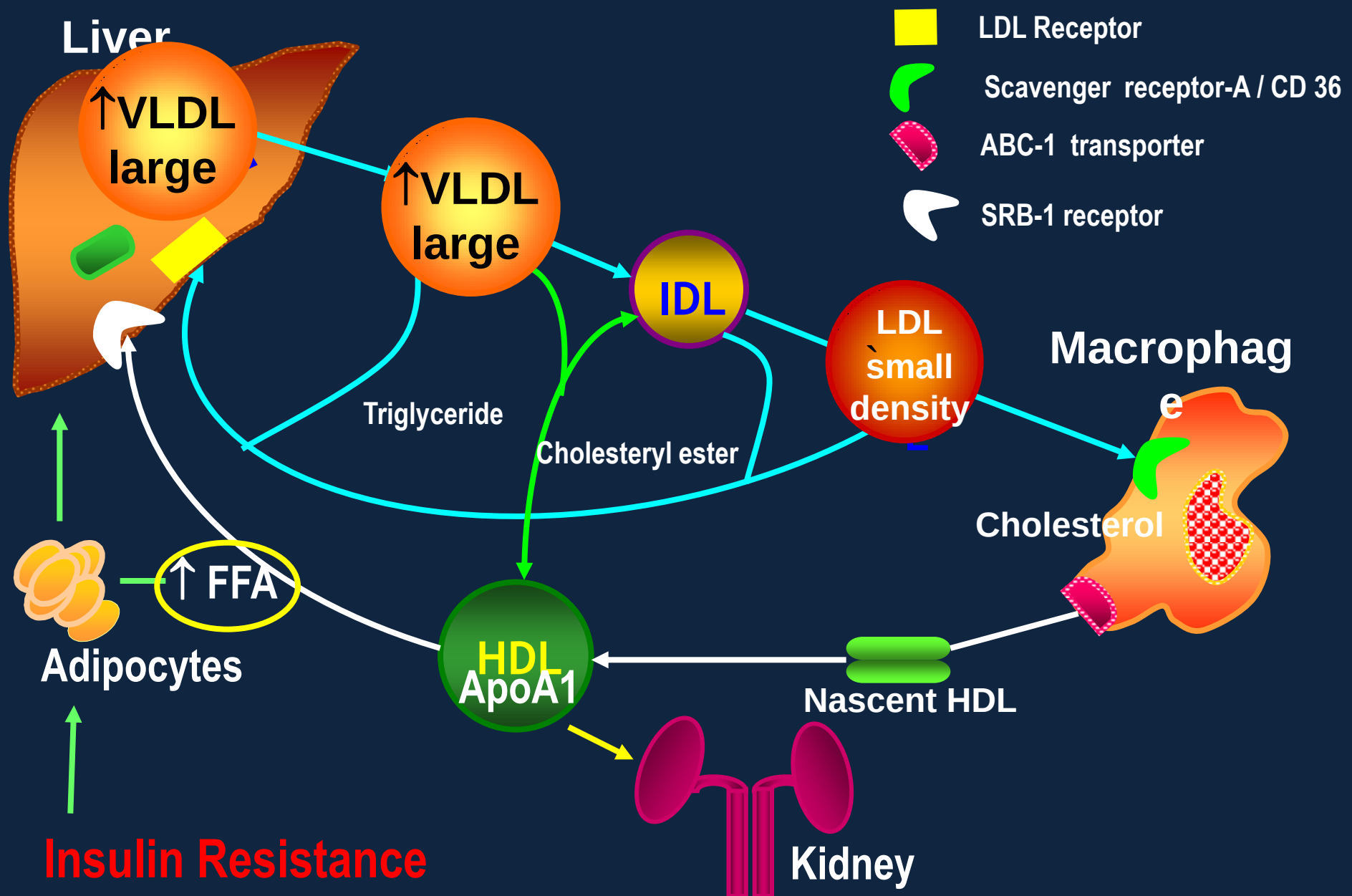
kolesterol (bebas/ester), trigliserida, fosfolipid, dan apoprotein

Lipoprotein Metabolism



Shepherd J. Eur Heart J Supplements 2001;3(suppl E):E2-E5

Reverse cholesterol transport



DISLIPIDEMIA

Dislipidemi diabetes tipe 2 / resistensi insulin

Resistensi insulin mengakibatkan FFA meningkat → hati, menjadi sumber VLDL

VLDL–LDL, pertukaran TG dan kolesterol → LDL kecil padat
ApoA1 dikeluarkan oleh ginjal, sehingga HDL–kolesterol rendah

Kesimpulan : TG tinggi,
HDL-kol rendah,
LDL-kol kecil padat tinggi

CLASSIFICATION OF

LDL-cholesterol, Total-cholesterol, HDL-cholesterol and Triglycerides

NCEP-ATP III

KLASIFIKASI TOTAL, LDL, HDL-KOLESTEROL, DAN TRIGLISERID MENURUT NCEP ATP III

LDL kolesterol

< 100	mg/dl	Optimal
100 – 129	mg/dl	Mendekati optimal
130 – 159	mg/dl	Sedikit tinggi (Borderline)
160 – 189	mg/dl	Tinggi
≥ 190	mg/dl	Sangat tinggi

Total kolesterol

< 200	mg/dl	Diinginkan
200 – 239	mg/dl	Sedikit tinggi (Borderline)
≥ 240	mg/dl	Tinggi

HDL kolesterol

< 40	mg/dl	Rendah
≥ 60	mg/dl	Tinggi

JAMA 2001;285:24862-497

TRIGLISERIDA (NCEP-ATP III)

Optimal	< 150 mg/dl
Sedikit tinggi(borderline)	150 - 199 mg/dl
Tinggi	200 - 499 mg/dl
Sangat tinggi	> 500 mg/dl

Risk assessment: first step in the management of dyslipidaemia

Langkah pertama dalam terapi dislipidemia adalah dengan menghitung berapa faktor risiko yang dimiliki penderita tersebut (*risk assessment*)

Faktor risiko dikelompokkan atas tiga kelompok

risiko rendah(low risk) , risiko sedang (moderate risk), dan risiko tinggi (high risk)

RISK FACTORS FOR CORONARY ARTERY DISEASE (CAD) AS DEFINED BY THE NATIONAL CHOLESTEROL EDUCATION PROGRAM (NCEP 2001)

Risk factors

Irreversible	Modifiable
▪ Age (men > 45 years, women > 55 years) ▪ Family history of premature CHD* (CHD in male first-degree relative < 55 years: CHD in female first-degree relative < 65 years)	▪ Cigarette smoking ▪ Hypertension (BP* ≥ 140 / 90 mmHg or on antihypertensive medication) ▪ Low HDL – C < 40 mg/dl

* CHD = coronary heart disease; BP = blood preesure

- *HDL cholesterol ≥ 60 mg/dl counts as a negative risk factor, its presence removes 1 risk factor from the total count*

JAMA 2001;285:24862497

NCEP – ATP III, THREE CATEGORIES OF RISK THAT MODIFY LDL CHOLESTEROL GOALS

Risk Category	LDL Goal (mg/dl)
CHD, DM*, or *equivalent*	< 100
Multiple (2+) risk factors	< 130
0 – 1 risk factors	< 160

* Risk equivalents : Diabetes Mellitus, Stroke, PAD

JAMA 2001; 285: 2486-2497

NCEP REPORT – 2004

Grundy SM Circulation. July, 2004;110:227-239

In high risk persons, the recommended LDL-C goals is < 100 mg/dl, but when the **risk is very high, an LDL-C of < 70 mg/dl is a therapeutic option**

This therapeutic option extends also to patients at high risk who have a

base line LDL-C < 100 mg/dl

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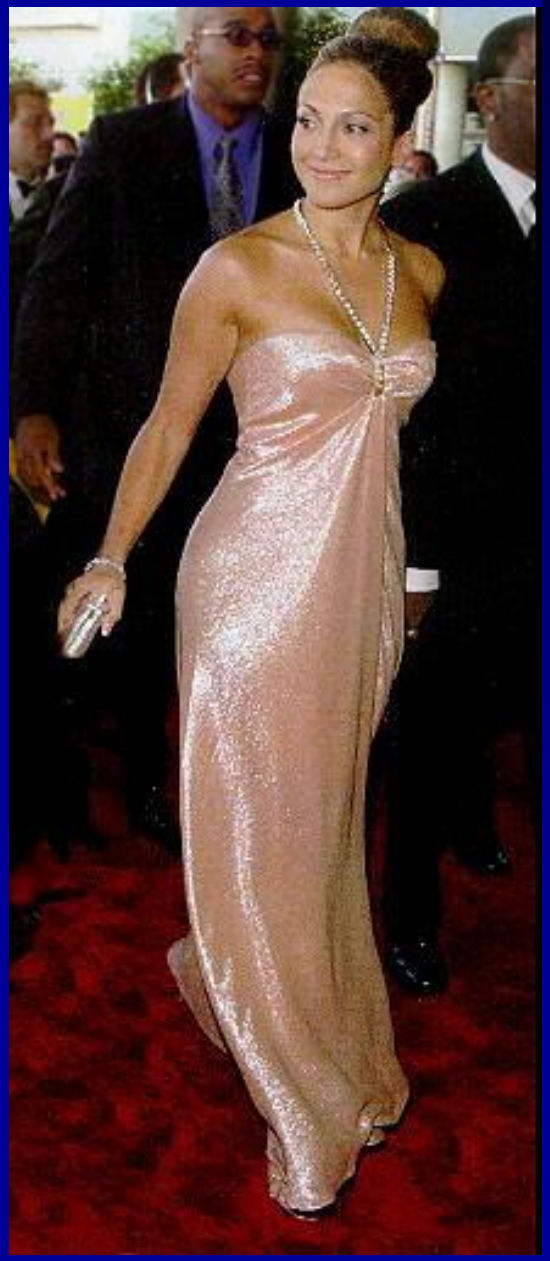
Obesitas



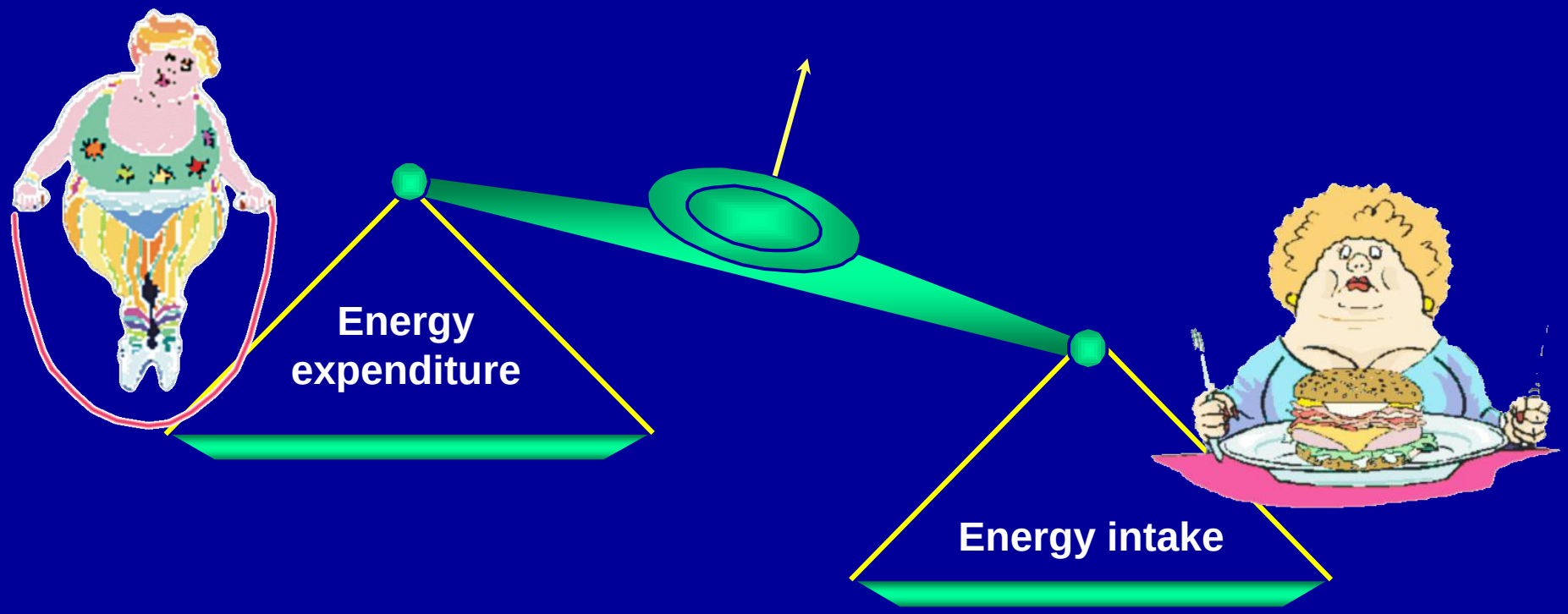
I’m not talking about the patient who looks like this

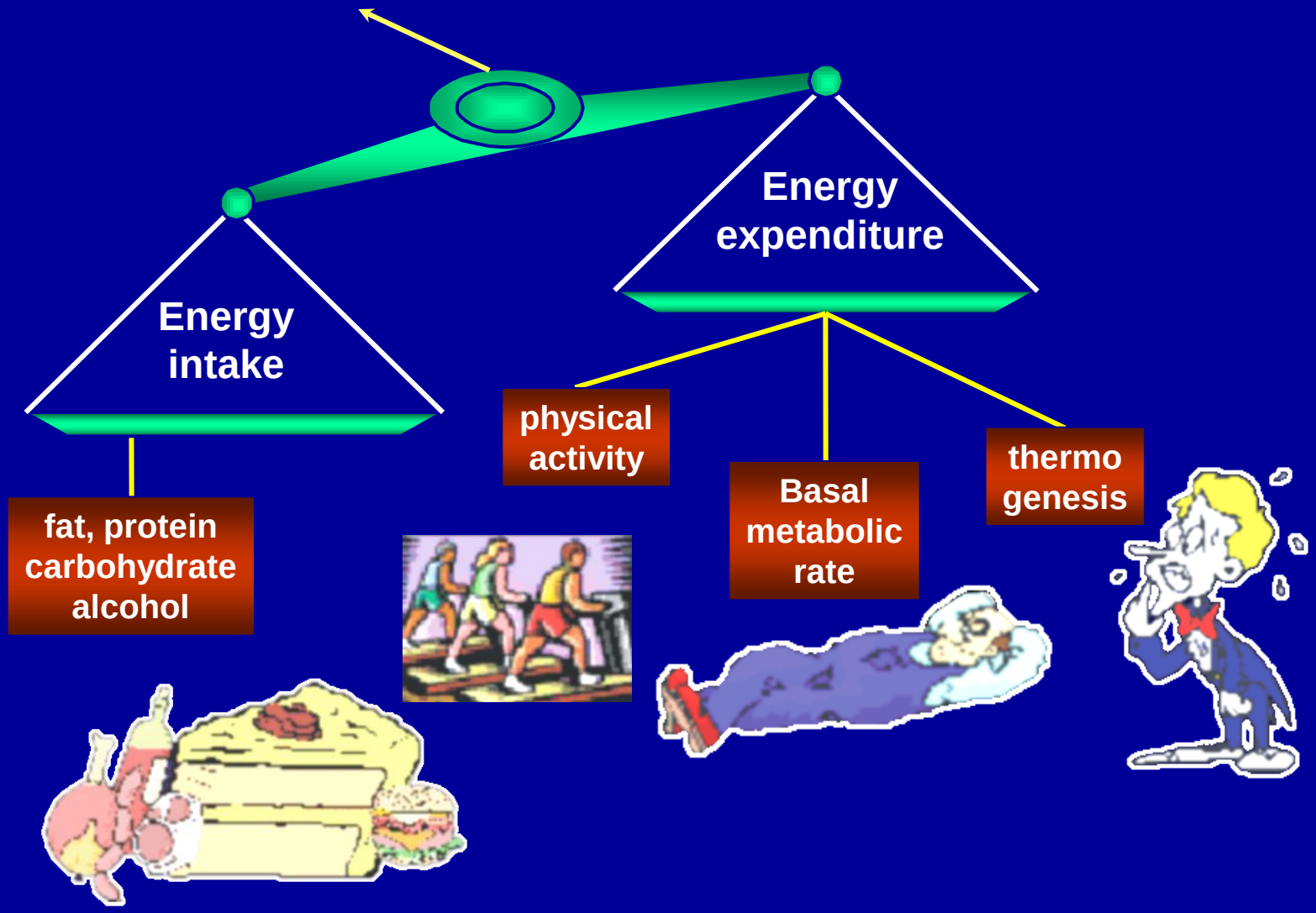
But feels like this

Obesitas : Kondisi dimana terjadi penumpukan lemak tubuh yang berlebihan.

Definisi operasional obesitas dan overweight didasarkan pada indeks massa tubuh.

Penyebab ???




Energy intake
Energy expenditure
fat, protein carbohydrate alcohol
physical activity
Basal metabolic rate
thermo genesis

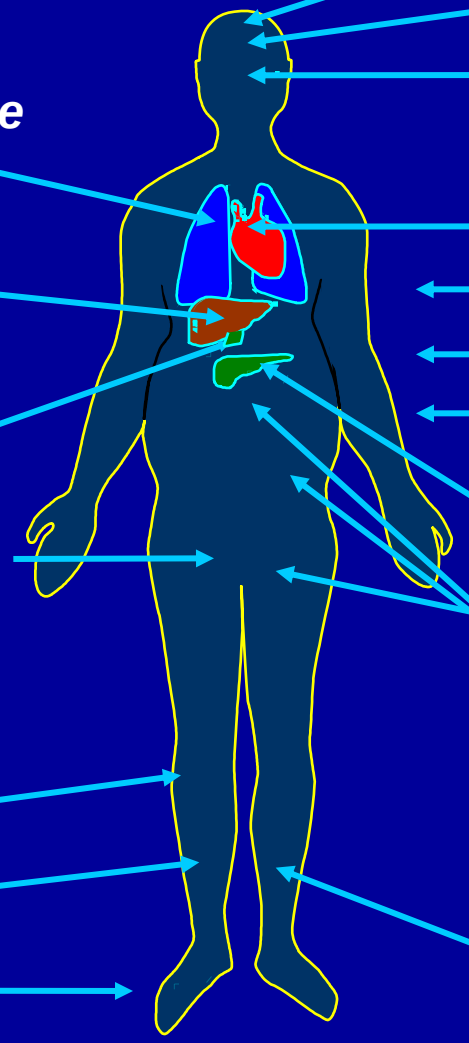
PROPOSED CLASSIFICATION of WEIGHT by BMI in ADULT ASIANS (WHO 2000)

Classification	BMI (kg/m^2)	Risk of co-morbidities
Underweight	< 18.5	Low (but Increased risk of other clinical problems)
Normal Range	18.5 – 22.9	Average
Overweight	≥ 23	
At Risk	23 - 24.9	Increase
Obese I	25 - 29.9	Moderate
Obese II	≥ 30	Severe

Regional Office for the Western Pacific of the World Organization, The International Association for the Study of Obesity, The International Obesity Task Force. The Asia-Pacific perspective: Redefining obesity and its treatment. WHO Collaborating Centre for the epidemiology of Diabetes and Health Promotion for Noncommunicable Disease, Melbourne 2000

The Asia-Pacific Perspective: Redefining Obesity and its Treatment. Assessment Diagnosis. 2000

Obesitas dan komplikasinya



Idiopathic intracranial hypertension

Stroke

Cataracts

Pulmonary disease
abnormal function
obstructive sleep apnea
hypoventilation syndrome

Nonalcoholic fatty liver disease
steatosis
steatohepatitis
cirrhosis

Gall bladder disease

Coronary heart disease

Diabetes

Dyslipidemia

Hypertension

Severe pancreatitis

Gynecologic abnormalities
abnormal menses
infertility
polycystic ovarian syndrome

Cancer
breast, uterus, cervix
colon, esophagus, pancreas
kidney, prostate

Osteoarthritis

Skin

Gout

Phlebitis
venous stasis

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HIPERTENSI

Blood Pressure Classification (JNC-7, 2003)

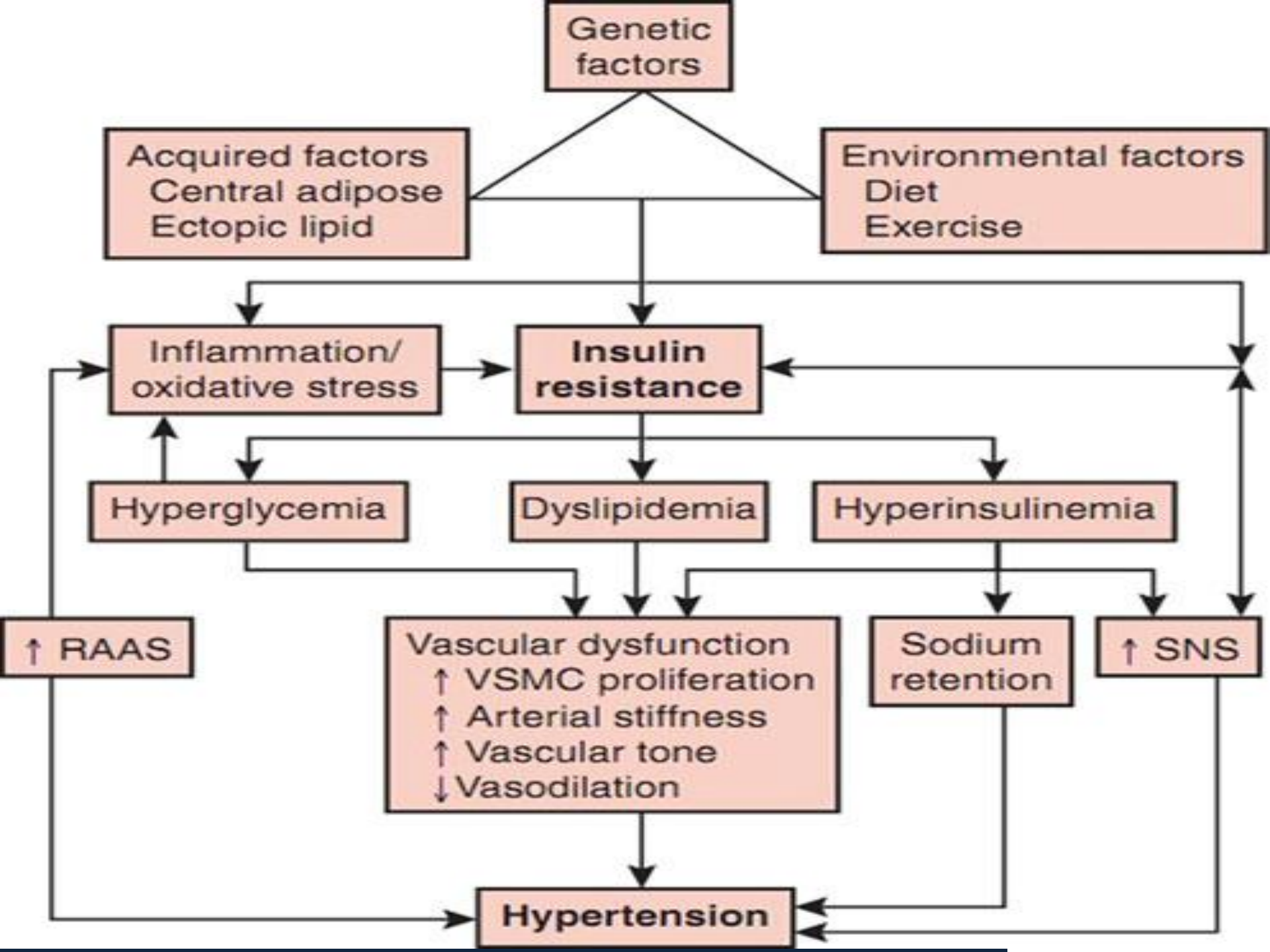
BP Classification	SBP mmHg		DBP mmHg
Normal	<120	and	<80
Prehypertension	120–139	or	80–89
Stage 1 Hypertension	140–159	or	90–99
Stage 2 Hypertension	≥160	or	≥100

JAMA. 2003;289

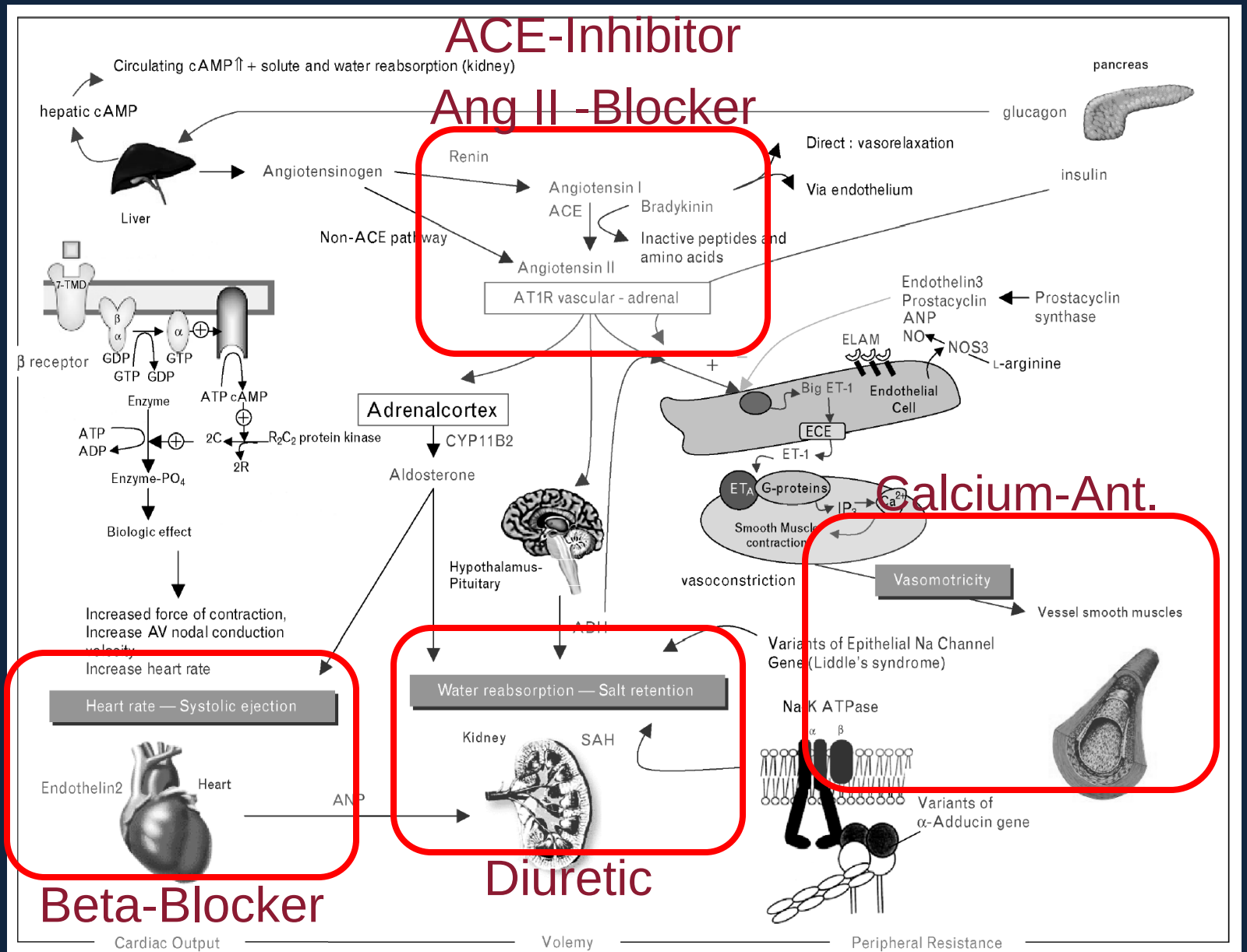
Principal Effects of Aging on the Cardiovascular System

- **Increased arterial stiffness**
- **Increased myocardial stiffness**
- **Impaired *β*-adrenergic responsiveness**
- **Impaired endothelial function**
- **Reduced sinus node function**
- **Decreased baroreceptor responsiveness**

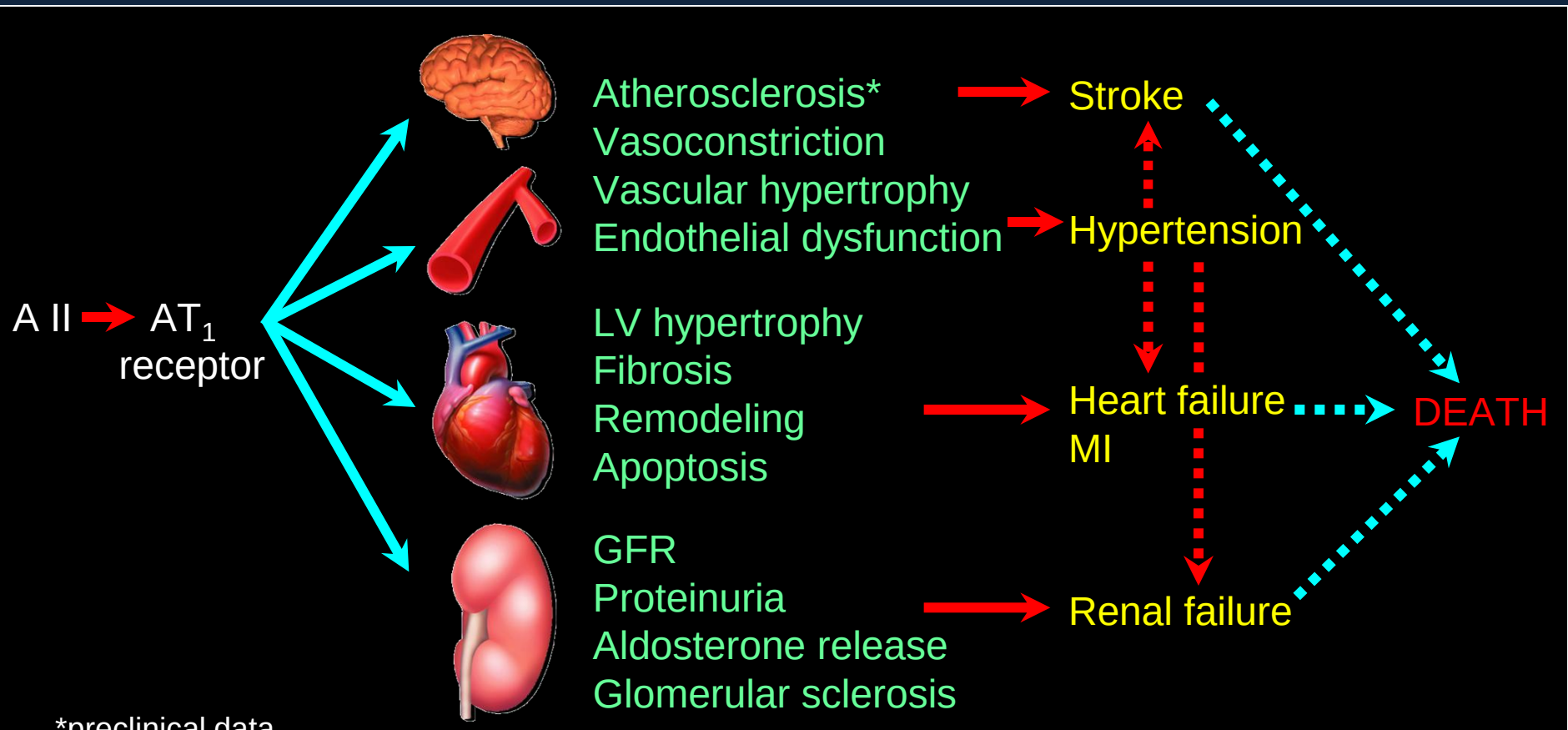
- **Net effect: Marked reduction in CV reserve**


Genetic factors
Acquired factors
Central adipose
Ectopic lipid
Environmental factors
Diet
Exercise
Inflammation/ oxidative stress
Insulin resistance
Hyperglycemia
Dyslipidemia
Hyperinsulinemia
↑ RAAS
Vascular dysfunction
↑ VSMC proliferation
↑ Arterial stiffness
↑ Vascular tone
↓ Vasodilation
Sodium retention
↑ SNS
Hypertension

Blood Pressure Regulation



Peran sentral Angiotensin II Dalam Kerusakan Organ Pada Penyakit Degenerative



*preclinical data
LV = left ventricular; MI = myocardial infarction; GFR = glomerular filtration rate

Adapted from Willenheimer R et al *Eur Heart J* 1999; 20(14): 997–1008, Dahlöf B *J Hum Hypertens* 1995; 9(suppl 5): S37–S44, Daugherty A et al *J Clin Invest* 2000; 105(11): 1605–1612, Fyhrquist F et al *J Hum Hypertens* 1995; 9(suppl 5): S19–S24, Booz GW, Baker KM *Heart Fail Rev* 1998; 3: 125–130, Beers MH, Berkow R, eds. *The Merck Manual of Diagnosis and Therapy*. 17th ed. Whitehouse Station, NJ: Merck Research Laboratories 1999: 1682–1704, Anderson S *Exp Nephrol* 1996; 4(suppl 1): 34–40, Fogo AB *Am J Kidney Dis* 2000; 35(2):179–188

Clinical Identification of Metabolic Syndrome

WHO[3]	ATP III[2]	IDF[1]
Hyperinsulinemia and or Fasting plasma glucose ≥ 110 mg/dL **And/ or** **2 h post glucose load > 140 mg/dL** **+ any 2 of following factors**	**At least 3 criteria required Diabetes included**	**Central obesity** **(waist circumference based)** Europid men ≥ 94 cm Europid women ≥ 80 cm South Asian men ≥ 90 cm South Asian women ≥ 80 cm **+ any 2 of following factors**
1. Abdominal obesity BMI > 30 kg/m2 or WHR: Men > 0.90 Women > 0.85	1. **Abdominal obesity (waist circumference)** men : > 102 cm women: > 88 cm	1. **Raised Triglyceride** ≥ 150 mg/dL or specific treatment for lipid abnormality
2. Dyslipidemia Serum Triglyceride ≥ 150 mg/dL or serum HDL-Cholesterol < 35 mg/dL	2. **serum Triglyceride** ≥ 150 mg/dL	2. **Reduced HDL-Cholesterol** men : < 40 mg/dL women : < 50 mg/dL or specific treatment for lipid abnormality
3. Hypertension blood pressure ≥ 140/90 mmHg or on hypertensive medication	3. **serum HDL-Cholesterol** men < 40 mg/dL women < 50 mg/dL	4. **Raised blood pressure** ≥ 130 mmHg/ ≥ 85 mmHg or treatment of previously diagnosed hypertension
	4. **blood pressure** ≥ 130 mmHg/ ≥ 85mmHg	5. **Raised fasting glucose** ≥ 100 mg/dL or previously diagnosed DM type 2
	5. **fasting glucose** ≥ 110 mg/dL	

Tips Menghindari Penyakit Degeneratif

B . A . H . A . G . I . A .

BERAT BADAN BERLEBIHAN SUPAYA DIHINDARI

aTUR MAKANAN HINGGA SEIMBANG

hINDARI FAKTOR RESIKO PENYAKIT DEGENERATIF

aGAR TERUS BERGUNA DENGAN MEMPUNYAI KEGIATAN/HOBBY YANG BERMANFAAT

gERAK BADAN TERATUR WAJIB DILAKUKAN

iMAN DAN TAQWA DITINGKATKAN

aWASI KESEHATAN DGN MEMERIKSA BADAN SECARA TERATUR.


THANK
YOU