TATALAKSANA GIZI PENCEGAHAN DAN TERAPI PENYAKIT JANTUNG KORONER
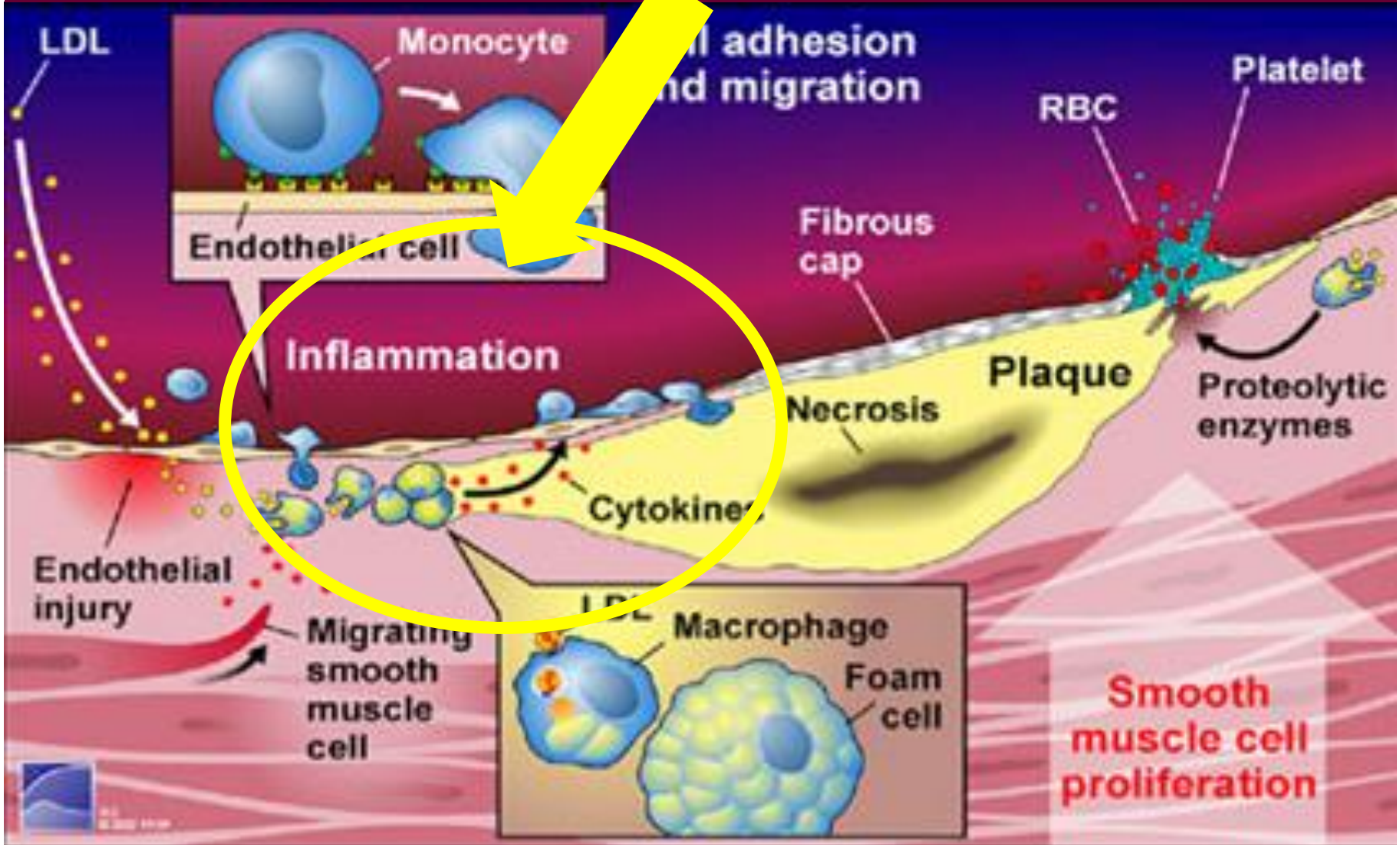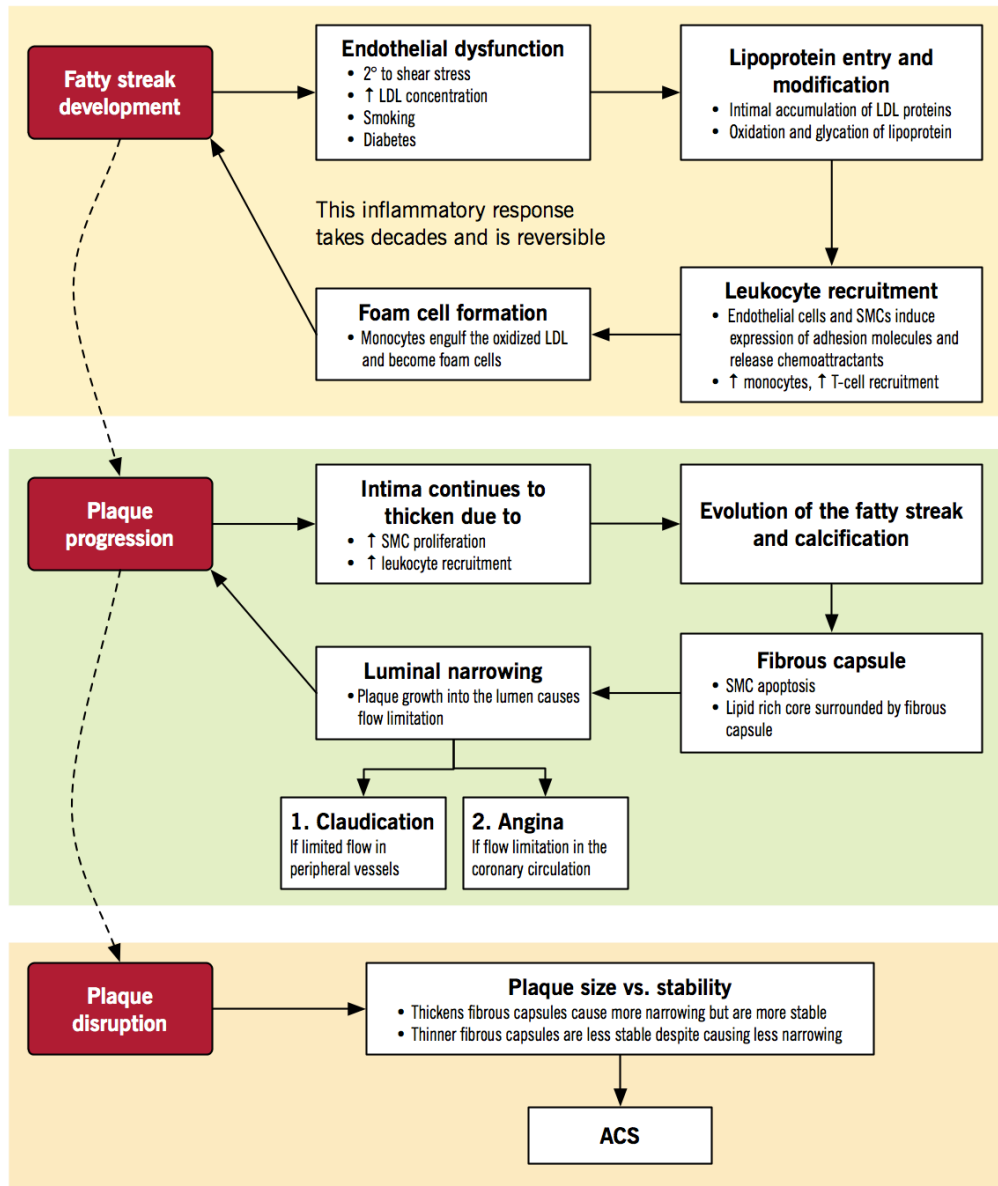
dr. Tirta Prawita Sari, M.Sc.,Sp.GK

Bagaimana penyakit jantung koroner terjadi?

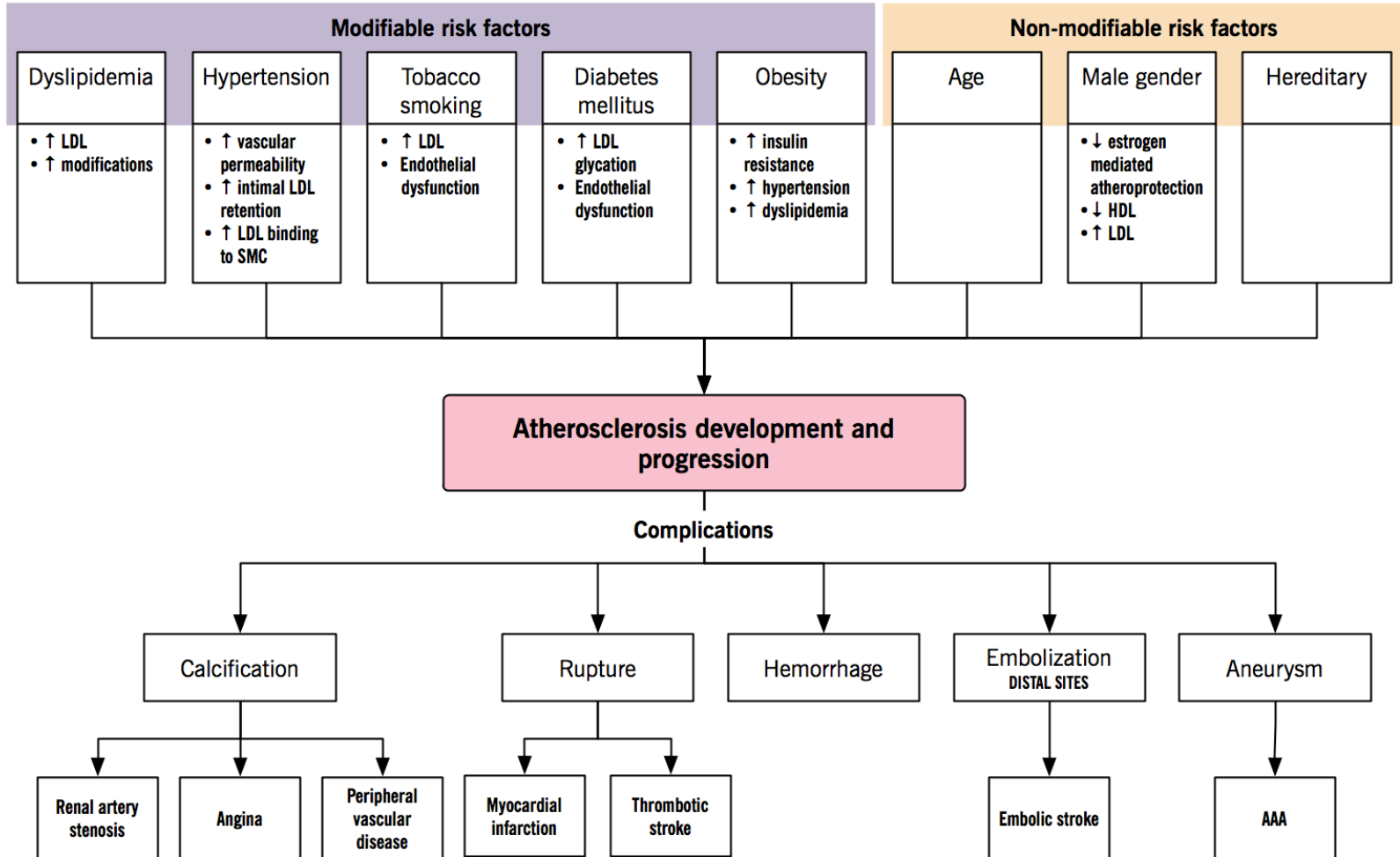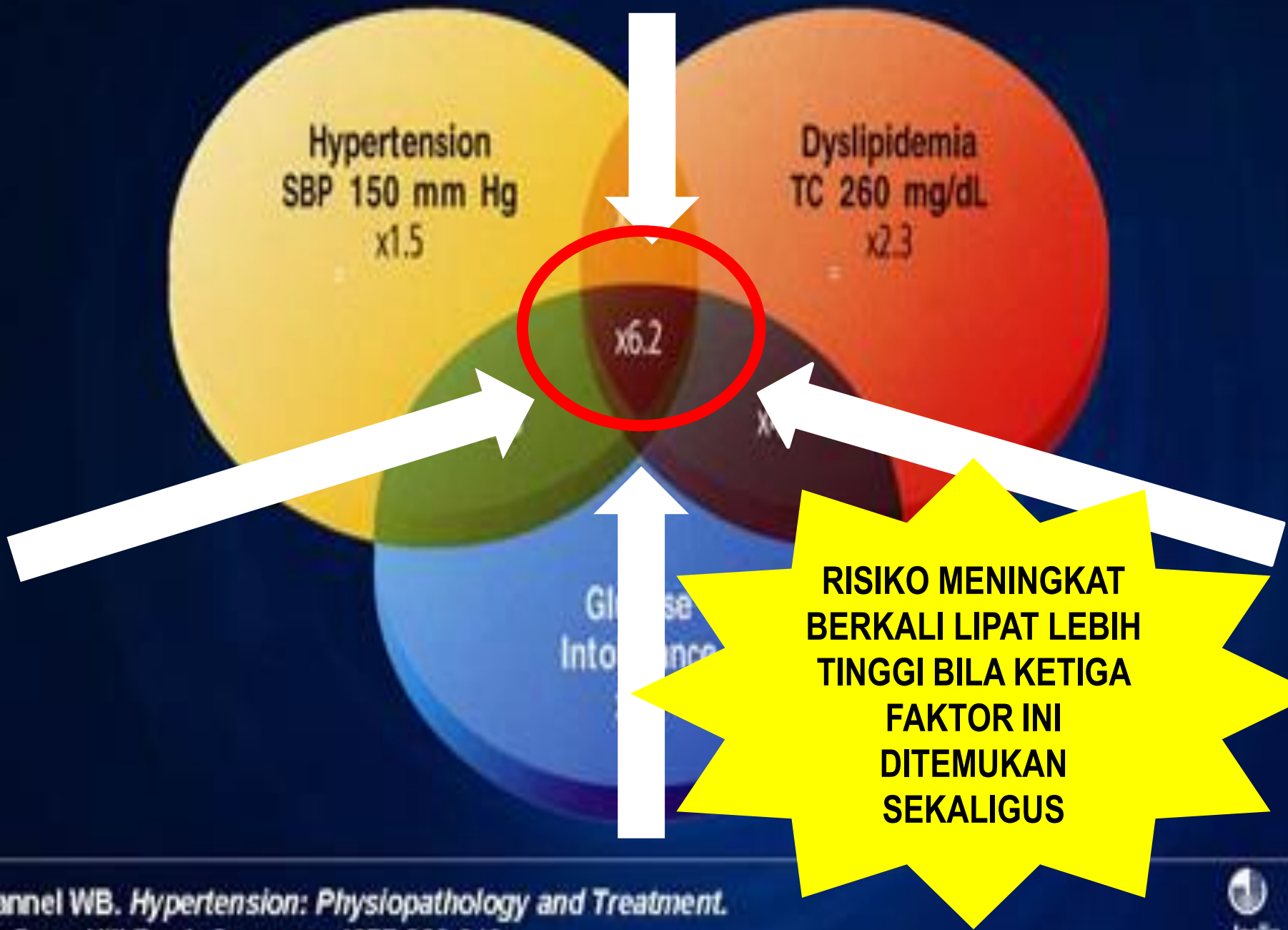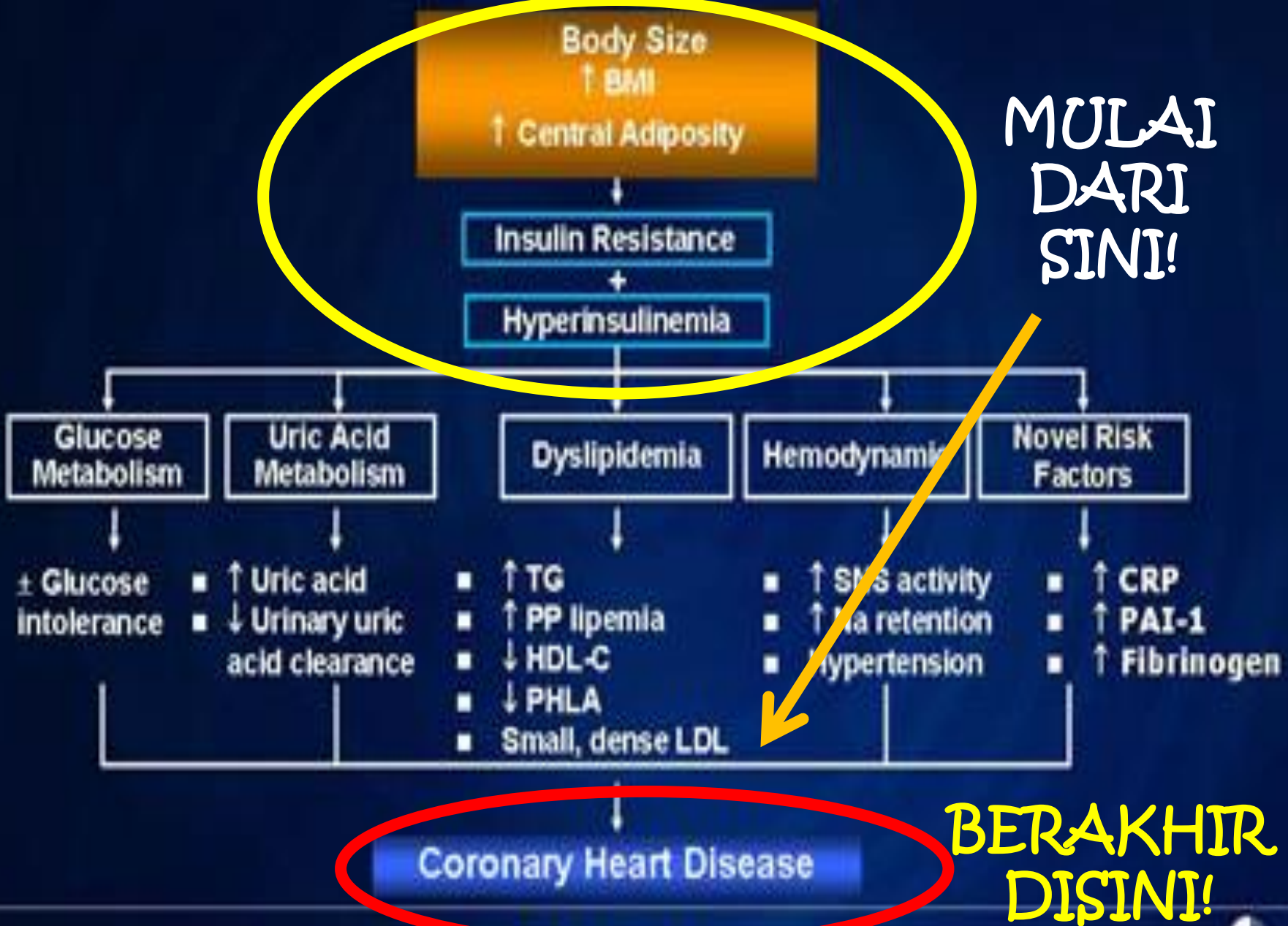BERAWAL DARI: ATEROSKLEROSIS!

ATEROSKLEROSIS: PENYAKIT INFLAMASI!

Fatty streak development

Endothelial dysfunction
- 2° to shear stress
- ↑ LDL concentration
- Smoking
- Diabetes

Lipoprotein entry and modification
- Intimal accumulation of LDL proteins
- Oxidation and glycation of lipoprotein

This inflammatory response takes decades and is reversible

Leukocyte recruitment
- Endothelial cells and SMCs induce expression of adhesion molecules and release chemoattractants
- ↑ monocytes, ↑ T-cell recruitment

Foam cell formation
- Monocytes engulf the oxidized LDL and become foam cells

Plaque progression

Intima continues to thicken due to
- ↑ SMC proliferation
- ↑ leukocyte recruitment

Evolution of the fatty streak and calcification

Fibrous capsule
- SMC apoptosis
- Lipid rich core surrounded by fibrous capsule

Luminal narrowing
- Plaque growth into the lumen causes flow limitation

1. Claudication
If limited flow in peripheral vessels

2. Angina
If flow limitation in the coronary circulation

Plaque disruption

Plaque size vs. stability
- Thickens fibrous capsules cause more narrowing but are more stable
- Thinner fibrous capsules are less stable despite causing less narrowing

ACS

ATHEROSCLEROSIS | Risk factors and complications of atherosclerosis

Modifiable risk factors

Dyslipidemia
- ↑ LDL
- ↑ modifications

Hypertension
- ↑ vascular permeability
- ↑ intimal LDL retention
- ↑ LDL binding to SMC

Tobacco smoking
- ↑ LDL
- Endothelial dysfunction

Diabetes mellitus
- ↑ LDL glycation
- Endothelial dysfunction

Obesity
- ↑ insulin resistance
- ↑ hypertension
- ↑ dyslipidemia

Non-modifiable risk factors

Age

Male gender
- ↓ estrogen mediated atheroprotection
- ↓ HDL
- ↑ LDL

Hereditary

Atherosclerosis development and progression

Complications

Calcification
- Renal artery stenosis
- Angina
- Peripheral vascular disease

Rupture
- Myocardial infarction
- Thrombotic stroke

Hemorrhage

Embolization DISTAL SITES
- Embolic stroke

Aneurysm
- AAA

INTI DARI PENCEGAHAN ATEROSKLEROSIS: ATASI INFLAMASI DAN FAKTOR DISLIPIDEMIA

Hypertension
SBP 150 mm Hg
x1.5

Dyslipidemia
TC 260 mg/dL
x2.3

x6.2

Glucose
Intolerance

RISIKO MENINGKAT BERKALI LIPAT LEBIH TINGGI BILA KETIGA FAKTOR INI DITEMUKAN SEKALIGUS

Kannel WB. *Hypertension: Physiopathology and Treatment.*
McGraw-Hill Book Company 1977:888-910.

Joslin
Diabetes
Center

Body Size
↑ BMI
↑ Central Adiposity

Insulin Resistance
+
Hyperinsulinemia

MULAI DARI SINI!

Glucose Metabolism	Uric Acid Metabolism	Dyslipidemia	Hemodynamic	Novel Risk Factors
± Glucose intolerance	■ ↑ Uric acid ■ ↓ Urinary uric acid clearance	■ ↑ TG ■ ↑ PP lipemia ■ ↓ HDL-C ■ ↓ PHLA ■ Small, dense LDL	■ ↑ SNS activity ■ ↑ Na retention ■ Hypertension	■ ↑ CRP ■ ↑ PAI-1 ■ ↑ Fibrinogen

Coronary Heart Disease

BERAKHIR DISINI!

Adapted from Reaven G. *Drugs*. 1999;58(suppl):19-20.

Joslin Diabetes Center

"Apple" vs. "Pear"

**ADIPOSITAS SENTRAL:
ITU AKAR MASALAHNYA!**

ADAM

WASPADAI BERAT BADAN BERLEBIH DAN RESISTENSI INSULIN!

PENINGKATAN KADAR ASAM LEMAK BEBAS: PENYEBAB UTAMA RESISTENSI INSULIN

Impaired Glucose-Stimulated Insulin Secretion

↑ Gluconeogenesis

FFA

↓ Glucose Uptake
↓ Glucose Oxidation
↓ Glycogenesis

↓ Glucose Uptake

Adapted from Tan MH. *Exp Clin Endocrinol Diabetes.* 2000;113(suppl):54-62.
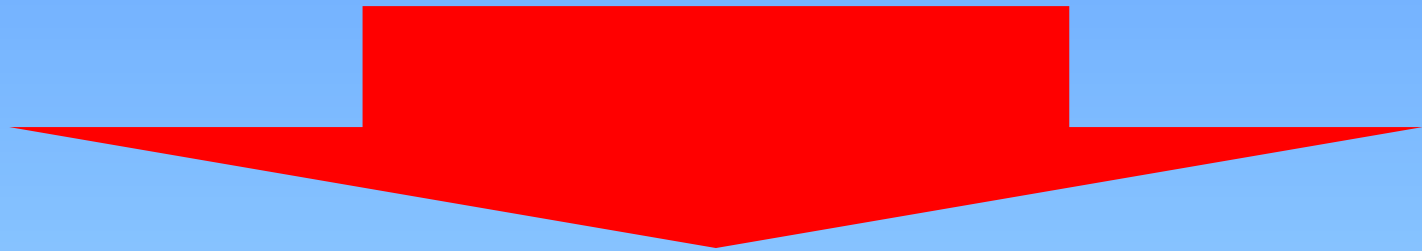
Joslin Diabetes Center

Menurunkan BB 10% dan lemak perut 30% dapat turunkan risiko PJK

Subcutaneous adipose tissue

Weight loss ~10%
Loss of visceral adipose tissue ~30%

Visceral adipose tissue

- Diet
- Exercise
- Pharmacotherapy

Deterioration — Lipid profile — Improvement

Impaired — Insulin sensitivity — Improved
Blood insulin
Blood glucose

Risk markers for thrombosis

Inflammatory markers

Impaired — Endothelial function — Improved

High — CHD risk — Low

Abdominal obesity
Increased waist circumference

After weight loss
Reduced waist circumference

Adapted with permission from Despres JP et al. BMJ. 2001;322 716-720.

Sejumlah studi yang berhubungan dengan terapi diet dan risiko PJK

CENTRAL ILLUSTRATION Flow Diagram of the Development of CVD and Possible Prevention by a Healthy Diet

Primordial Prevention

Reduction of Excess Calories

↑ Fruits, Vegetables, Whole Grains, Nuts, Legumes, Seafood

Moderate Alcohol Intake (optional)

Water, Unsweetened Tea and Coffee

↓ Proc. Meats, Refined Grains, SSBs, Added Sugar, Trans Fat, Sodium, Saturated Fat

Intervention →

Drivers of Poor Diet Quality

Lack of Knowledge | Lack of Availability | Price of Healthy Food | Time Scarcity | Social and Cultural Norms | Marketing and Branding | Taste and Flavor

Cardiovascular Disease Risk Factors

Primary Prevention

Diet and Lifestyle | Medication

Poor BP Lipid Control Glucose Control | Thrombotic Tendency | Inflammation | Plaque Formation

Intervention

Cardiovascular Disease

Secondary Prevention

Diet and Lifestyle | Medication

Intervention

Cardiovascular Disease Recurrence and Mortality

Actions

• Cardiovascular Disease as a Global Priority

• Nutritional and Agricultural Policies

• Nutritional Labeling

• Regulation of Marketing

• School and Workplace Interventions

• Standard of Care for Health Care Providers

• Individual Behavior Change

Yu, E. et al. J Am Coll Cardiol. 2018;72(8):914-26.

Avoiding excess calories is an integral part of halting the development of cardiovascular disease risk factors (i.e., primordial prevention). Unfavorable eating patterns are driven by a variety of biological, social, economic, and psychological factors, and a robust intervention from all levels of society may steer populations toward a healthier diet and prevent disease progression. Diet and other lifestyle changes remain crucial steps in primary and secondary prevention of cardiovascular disease, although the relative importance of medication and clinical procedures increases over time with disease progression. CVD = cardiovascular disease; SSB = sugar-sweetened beverage.

FIGURE 1 Summary of Various Meta-Analyses for the Associations of Key Foods and Food Groups, and Dietary Patterns With Incident CVD

Dietary Component	RR (95% CI)	Reference	No. of Studies	Analysis Unit	Outcome
Food					
Processed Meats	1.42 (1.08, 1.89)	Micha 2012	7	Per 50 g/d	CHD Incidence
Refined Grains	1.13 (0.90, 1.42)	Aune 2016	4	Per 90 g/d	CHD Incidence
Dairy	0.97 (0.91, 1.02)	Guo 2017	8	Per 200 g/d	CVD Incidence
Fish	0.94 (0.90, 0.98)	Zheng 2012	17	Per 15 g/d	CHD Mortality
Fruits	0.90 (0.86, 0.94)	Aune 2017	24	Per 200 g/d	CVD Incidence
Vegetables	0.84 (0.79, 0.90)	Aune 2017	20	Per 200 g/d	CVD Incidence
Nuts	0.79 (0.70, 0.88)	Aune 2016	12	Per 28 g/d	CVD Incidence
Whole Grains	0.78 (0.73, 0.85)	Aune 2016	10	Per 90 g/d	CVD Incidence
Beverages					
SSBs	1.17 (1.10, 1.24)	Xi 2015	4	Per serv/d	CHD Incidence
Black Tea	0.98 (0.94, 1.02)	Wang 2011	13	Per 1 cup/d	CHD Incidence
Green Tea	0.90 (0.82, 0.99)	Wang 2011	5	Per 1 cup/d	CHD Incidence
Coffee (3 cups/d)	0.88 (0.83, 0.93)	Ding 2014	36	vs. nondrinkers	CVD Incidence
Coffee (5 cups/d)	0.91 (0.84, 0.99)	Ding 2014	36	vs. nondrinkers	CVD Incidence
Dietary Pattern					
Western	1.14 (0.92, 1.42)	Rodriguez-Monforte 2015	5	Extreme categories	CVD Incidence
DASH	0.80 (0.74, 0.86)	Salehi-Abargouei 2013	6	Extreme categories	CVD Incidence
AHEI	0.74 (0.72, 0.77)	Schwingshackl 2015	6	Extreme categories	CVD Incidence
MedDiet	0.71 (0.65, 0.78)	Grosso 2015	13	Extreme categories	CVD Incidence
Prudent	0.69 (0.60, 0.78)	Rodriquez-Monforte 2015	5	Extreme categories	CVD Incidence

.65   1   1.5

High amounts of processed meat, SSBs, and refined grain consumption are associated with greater CVD incidence; moderate coffee and alcohol intake, and high fruit/vegetable, dairy (low-fat), whole grain, fish, and nut intake are associated with lower incidence. High adherence to Mediterranean, DASH, AHEI, and Prudent dietary patterns are significantly predictive of lower CVD incidence. AHEI = Alternative Healthy Eating Index; CHD = coronary heart disease; CI = confidence interval; CVD = cardiovascular disease; DASH = Dietary Approaches to Stop Hypertension; MedDiet = Mediterranean diet; RR = risk ratio; SSB = sugar-sweetened beverage.
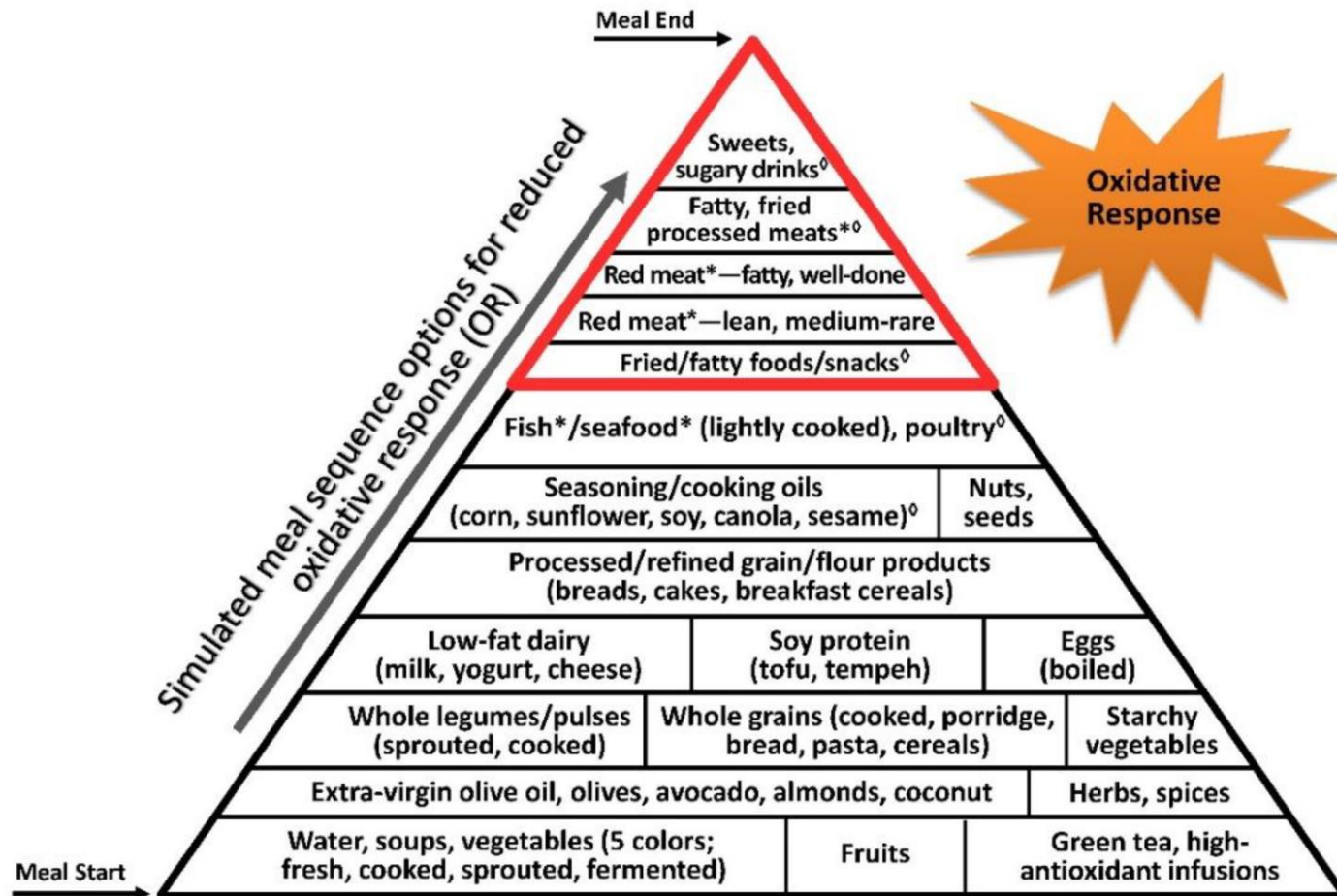
The Metabolic Concept of Meal Sequence vs. Satiety: Glycemic and Oxidative Responses with Reference to Inflammation Risk, Protective Principles and Mediterranean Diet

Niva Shapira

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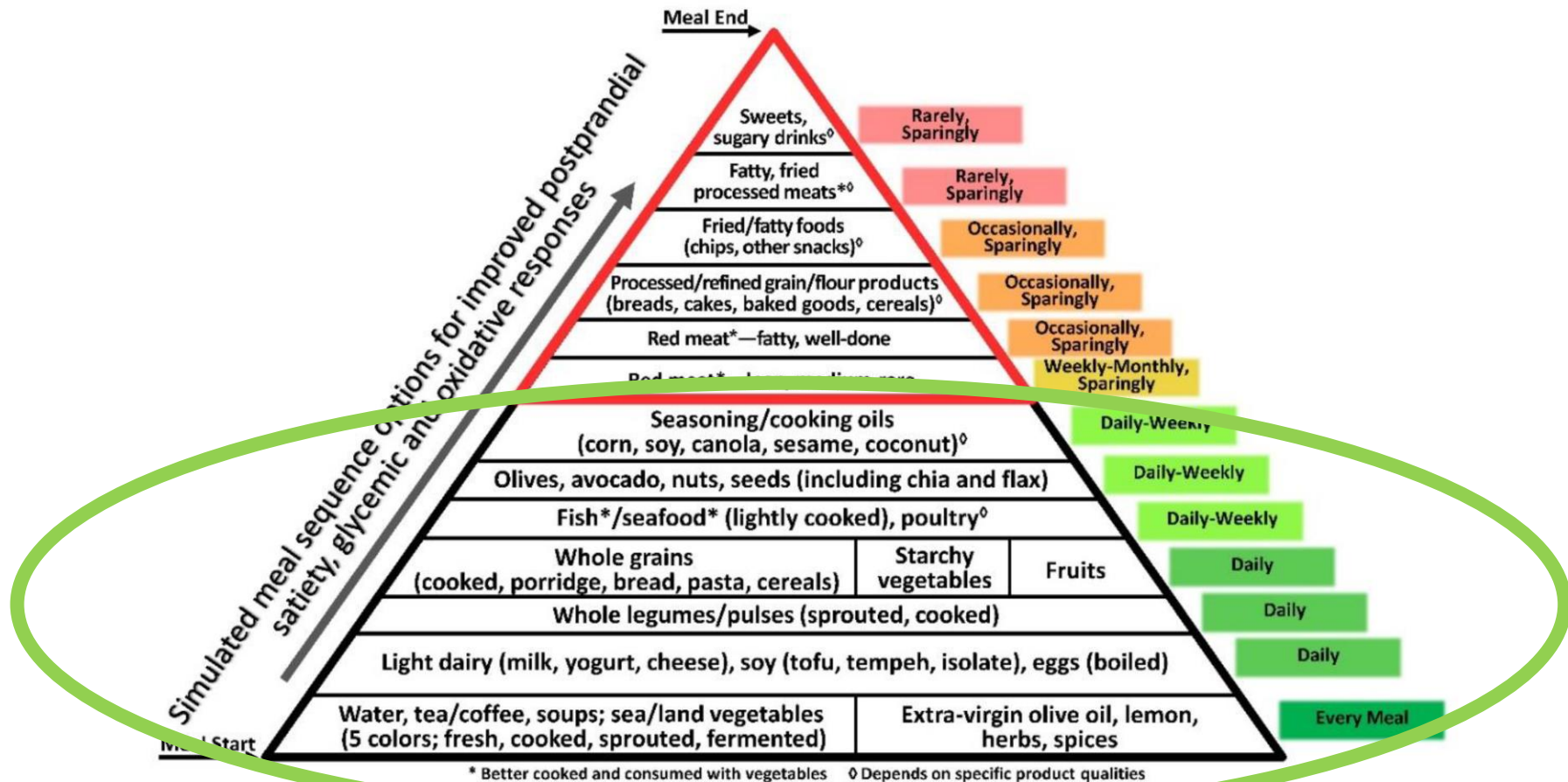
Meal End →

Oxidative Response

Simulated meal sequence options for reduced oxidative response (OR)

- Sweets, sugary drinks◊
- Fatty, fried processed meats*◊
- Red meat*—fatty, well-done
- Red meat*—lean, medium-rare
- Fried/fatty foods/snacks◊

Fish*/seafood* (lightly cooked), poultry◊

| Seasoning/cooking oils (corn, sunflower, soy, canola, sesame)◊ | Nuts, seeds |

Processed/refined grain/flour products (breads, cakes, breakfast cereals)

| Low-fat dairy (milk, yogurt, cheese) | Soy protein (tofu, tempeh) | Eggs (boiled) |

| Whole legumes/pulses (sprouted, cooked) | Whole grains (cooked, porridge, bread, pasta, cereals) | Starchy vegetables |

| Extra-virgin olive oil, olives, avocado, almonds, coconut | Herbs, spices |

| Water, soups, vegetables (5 colors; fresh, cooked, sprouted, fermented) | Fruits | Green tea, high-antioxidant infusions |

Meal Start →

* Better cooked and consumed with vegetables   ◊ Depends on specific product qualities

The advised simulated meal sequence may further suggest decreasing portions and exclusions, especially of foods towards the upper levels (inside the red triangle).

Meal End

Simulated meal sequence options for improved postprandial satiety, glycemic and oxidative responses

Food	Frequency
Sweets, sugary drinks°	Rarely, Sparingly
Fatty, fried processed meats*°	Rarely, Sparingly
Fried/fatty foods (chips, other snacks)°	Occasionally, Sparingly
Processed/refined grain/flour products (breads, cakes, baked goods, cereals)°	Occasionally, Sparingly
Red meat*—fatty, well-done	Occasionally, Sparingly
Red meat*—lean, medium-rare	Weekly-Monthly, Sparingly
Seasoning/cooking oils (corn, soy, canola, sesame, coconut)°	Daily-Weekly
Olives, avocado, nuts, seeds (including chia and flax)	Daily-Weekly
Fish*/seafood* (lightly cooked), poultry°	Daily-Weekly
Whole grains (cooked, porridge, bread, pasta, cereals) / Starchy vegetables / Fruits	Daily
Whole legumes/pulses (sprouted, cooked)	Daily
Light dairy (milk, yogurt, cheese), soy (tofu, tempeh, isolate), eggs (boiled)	Daily
Water, tea/coffee, soups; sea/land vegetables (5 colors; fresh, cooked, sprouted, fermented) / Extra-virgin olive oil, lemon, herbs, spices	Every Meal

Meal Start

* Better cooked and consumed with vegetables   ◊ Depends on specific product qualities

The advised simulated meal sequence may further suggest decreasing portions and exclusions, especially of foods towards the upper levels (inside the red triangle).

Nutrients 2019, 11(10), 2373

Five colour food

Phytochemical Contained in 5 Colors of Fruits and Vegetables

Color	Description
Purple	grapes, eggplant, blueberry, purple sweet potato anthoxanthins, resveratrol Effect – antioxidant effect, suppression and detoxification of carcinogens
Red	tomato, watermelon, strawberry, cherry Lycopene Effect – suppresses prostate cancer, lung cancer
Green	broccoli, spinach, avocado, green grapes, kale Lutein, sulforaphane Effect – prevents cancer formation and development
Yellow, Orange	orange, tangerine, carrot, pumpkin flavonoid Effect – prevents recurrence of breast cancer
White	garlic, onion, mushroom allicin, quercetin Effect – powerful anti-bacterial effect, prevents stomach cancer

Primary Prevention:
Assess ASCVD Risk in Each Age Group
Emphasize Adherence to Healthy Lifestyle

LDL-C ≥190 mg/dL (≥4.9 mmol/L)
No risk assessment; High-intensity statin
(Class I)

Diabetes mellitus and age 40-75 y
Moderate-intensity statin
(Class I)

Diabetes mellitus and age 40-75 y
Risk assessment to consider high-intensity statin
(Class IIa)

Age >75 y
Clinical assessment, Risk discussion

Age 0-19 y
Lifestyle to prevent or reduce
ASCVD risk
**Diagnosis of Familial
Hypercholesterolemia→ statin**

Age 20-39 y
Estimate lifetime risk
to encourage lifestyle to reduce
ASCVD risk
Consider statin if family history
premature ASCVD and LDL-C
≥160 mg/dL (≥4.1 mmol/L)

Age 40-75 y and
LDL-C ≥70–<190 mg/dL
(≥1.8–<4.9 mmol/L)
without diabetes mellitus
10-year ASCVD risk percent
begins risk discussion

ASCVD Risk Enhancers:

- Family history of premature ASCVD
- Persistently elevated LDL-C ≥160 mg/dL (≥4.1 mmol/L)
- Chronic kidney disease
- Metabolic syndrome
- Conditions specific to women (e.g., preeclampsia, premature menopause)
- Inflammatory diseases (especially rheumatoid arthritis, psoriasis, HIV)
- Ethnicity (e.g., South Asian ancestry)

Lipid/Biomarkers:
- Persistently elevated triglycerides (≥175 mg/dL, (≥2.0 mmol/L))

In selected individuals if measured:
- hs-CRP ≥2.0 mg/L
- Lp(a) levels >50 mg/dL or >125 nmol/L
- apoB ≥130 mg/dL
- Ankle-brachial index (ABI) <0.9

<5%
"Low Risk"

5% - <7.5%
"Borderline Risk"

≥7.5% - <20%
"Intermediate Risk"

≥20%
"High Risk"

Risk discussion:
Emphasize lifestyle
to reduce risk
factors
(Class I)

Risk discussion:
If risk enhancers present
then risk discussion
regarding moderate-
intensity statin therapy
(Class IIb)

Risk discussion:
If risk estimate + risk
enhancers favor statin,
initiate moderate-
intensity statin to reduce
LDL-C by 30% - 49%
(Class I)

Risk discussion:
Initiate statin to reduce
LDL-C ≥50%
(Class I)

If risk decision is uncertain:
Consider measuring CAC in selected adults:
CAC = zero (lowers risk; consider no statin, unless diabetes, family history of
premature CHD, or cigarette smoking are present)
CAC = 1-99 favors statin (especially after age 55)
CAC = 100+ and/or ≥75th percentile, initiate statin therapy

Recommendations	NHLBI Grade	NHLBI Evidence Statements
DIET		
LDL-C: Advise adults who would benefit from LDL-C lowering* to:		
1. Consume a dietary pattern that emphasizes intake of vegetables, fruits, and whole grains; includes low-fat dairy products, poultry, fish, legumes, nontropical vegetable oils, and nuts; and limits intake of sweets, sugar-sweetened beverages, and red meats. a. Adapt this dietary pattern to appropriate calorie requirements, personal and cultural food preferences, and nutrition therapy for other medical conditions (including diabetes). b. Achieve this pattern by following plans such as the DASH dietary pattern, the USDA Food Pattern, or the AHA Diet.	A (Strong)	CQ1: ES4 (high), ES6 (low), ES8 (moderate), ES9 (moderate)
2. Aim for a dietary pattern that achieves 5%–6% of calories from saturated fat.	A (Strong)	CQ1: ES11 (high)
3. Reduce percent of calories from saturated fat.	A (Strong)	CQ1: ES11 (high), ES12 (moderate), ES13 (moderate)
4. Reduce percent of calories from trans fat.	A (Strong)	CQ1: ES14 (moderate), ES15 (moderate)

BP: Advise adults who would benefit from BP lowering to:

1. Consume a dietary pattern that emphasizes intake of vegetables, fruits, and whole grains; includes low-fat dairy products, poultry, fish, legumes, nontropical vegetable oils, and nuts; and limits intake of sweets, sugar-sweetened beverages, and red meats. — A (Strong) — CQ1: ES1 (low) ES3 (high), ES5 (high), ES6 (low), ES7 (low), ES8 (moderate)

   a. Adapt this dietary pattern to appropriate calorie requirements, personal and cultural food preferences, and nutrition therapy for other medical conditions (including diabetes).

   b. Achieve this pattern by following plans such as the DASH dietary pattern, the USDA Food Pattern, or the AHA Diet.

2. Lower sodium intake. — A (Strong) — CQ2: ES1 (high), ES2 (moderate), ES3 (high), ES4 (high), ES5 (high), ES8 (low), ES9 (low)

3. a. Consume no more than 2,400 mg of sodium/d; — B (Moderate) — CQ2: ES2 (moderate), ES3 (high)

   b. Further reduction of sodium intake to 1,500 mg/d can result in even greater reduction in BP; and

   c. Even without achieving these goals, reducing sodium intake by at least 1,000 mg/d lowers BP.

4. Combine the DASH dietary pattern with lower sodium intake. — A (Strong) — CQ1: ES3 (high), ES5 (high), ES8 (moderate) — CQ2: ES1 (high), ES2 (moderate), ES3 (high), ES4 (high), ES5 (high), ES6 (moderate)

	PHYSICAL ACTIVITY	
Lipids		
1. In general, advise adults to engage in aerobic physical activity to reduce LDL-C and non–HDL-C: 3–4 sessions per wk, lasting on average 40 min per session, and involving moderate- to vigorous-intensity physical activity.	B (Moderate)	CQ3: ES1 (moderate), ES2 (moderate), ES5 (low)
BP		
1. In general, advise adults to engage in aerobic physical activity to lower BP: 3–4 sessions per wk, lasting on average 40 min per session, and involving moderate- to vigorous-intensity physical activity.	B (Moderate)	CQ3: ES1 (high)

```
┌─────────────────────────────────────────┐
│              Heart Damage               │
│          Ventricular Overload           │
│    Decreased Ventricular Contraction    │
└─────────────────────────────────────────┘
      │                              ▲
      ▼                              │
┌──────────────────┐      ┌──────────────────┐
│   Tachycardia    │      │  Fluid Overload  │
│ Ventricular      │      │      Edema       │
│ Dilatation       │      │                  │
│ Myocardial       │      │                  │
│ Hypertrophy      │      │                  │
└──────────────────┘      └──────────────────┘
      │                              ▲
      ▼                              │
┌──────────────────┐      ┌──────────────────┐
│ Decreased Cardiac│      │ Increased Water  │
│     Output       │      │   Reabsorption   │
└──────────────────┘      └──────────────────┘
      │                              ▲
      ▼                              │
┌──────────────────┐      ┌──────────────────┐
│ Decreased Renal  │      │  Increased ADH   │
│    Perfusion     │      │                  │
└──────────────────┘      └──────────────────┘
      │                              ▲
      ▼                              │
┌──────────────────┐      ┌──────────────────┐
│ Increased Sodium │ ───▶ │ Increased Osmotic│
│    Retention     │      │     Pressure     │
└──────────────────┘      └──────────────────┘
```

Health

Energy (ATP) demand | Energy (ATP) supply

Heart failure

HFpEF
Diastolic failure

HFrEF
Systolic failure

Mitochondrial dysfunction
↓Mitochondrial capacity
↑ROS
↓ETC (super) complexes
Altered fission/fusion
Abnormal $Ca^{2+}/Na^+/Fe^{2+}$
↓Membrane fluidity
↓Redox buffering

Energy (ATP) demand | ↓Energy (ATP) supply

Current treatment paradigms

β-Blockers
ACE/ARB
Hydralazine/
nitrates
Ivabradine

Mitochondrial dysfunction
↓Mitochondrial capacity
↑ROS
↓ETC (super) complexes
↓Cardiolipin
Altered fission/fusion
Abnormal $Ca^{2+}/Na^+/Fe^{2+}$
↓Membrane fluidity
↓Redox buffering

↓Energy demand | ↓Energy supply
(no reserve,
exercise intolerance)

Next-generation heart failure therapeutics

Restored mitochondrial function
↑Cardiolipin
↑Redox-buffering capacity
↑ETC (super) complexes
↑Biogenesis

Preserved cardiac function | ↑Energy supply

Contributors to energy demand

■ Synthesis, transport, phosphorylation, pumps
■ Heart rate
■ Relaxation
■ Contraction

Contributors to energy supply

■ Glycolysis
■ Mitochondria (oxidative phosphorylation)

CONGESTIVE HEART FAILURE

DETERMINE NEED FOR CONVENTIONAL INTERVENTION → **MINIMIZE OBSTACLES TO HEALING** → **TAILOR NATURAL INTERVENTIONS TO PATIENT NEEDS**

DETERMINE NEED FOR CONVENTIONAL INTERVENTION ↓

Severe CHF (NYHA Stage III or IV) → Refer for conventional adjunctive therapy

MINIMIZE OBSTACLES TO HEALING ↓

Hypertension → See chapter on hypertension

↓

Improve dietary choices to nurture heart tissue → Eliminate refined, processed foods. Reduce saturated animal fats. Emphasize whole plant foods. Restrict Na^+ to <1.8gm QD Increase K^+

↓

Obesity → Achieve ideal body weight

TAILOR NATURAL INTERVENTIONS TO PATIENT NEEDS ↓

Mg deficiency, hypertension, or use of conventional drugs → Magnesium

↓

Increase myocardial energy production → Thiamin Acetyl-L-Carnitine CoQ10

↓

Improve cardiac output → *Crataegus Terminalia*

↓

Enhance peripheral vascular flow → L-Arginine Citrulline

Table V.2-1 Essential ... of T... Changes (T...

Component

LDL-raising nutrients
- Saturated fats* — Less than 7% of total calories
- Dietary cholesterol — Less than 200 mg/day

Therapeutic options for LDL lowering
- Plant stanols/sterols — 2 grams per day
- Increased viscous (soluble) fiber — 10–25 grams per day

Total calories — ... caloric intake to ...

Physical activity — ... exercis... kcal pe...

* *Trans* fatty acids are another LDL-raising fat tha...

Pemilihan +pembatasan jenis lemak: kurangi trans fatty acid!

Rasio PUFA/SFA > 0,28 berhubungan dengan rendahnya kematian akibat PJK pada laki-laki namun tidak pada perempuan

Serat makanan (serat larut) + flavonoid → kacang kedelai!

Flavonoids menghambat enzim COX-2 dan iNOS dlm memproduksi protaglandin dan nitric oxide = suatu proinflamasi yang poten

Table V.2–2. Macronutrient [Recommendations for the] TLC Diet

Component	
Polyunsaturated fat	Up to 10% of total calories
Monounsaturated fat	Up to 20% of total calories
Total fat	25–35% of total calories*
Carbohydrate†	50–60% of total calories*
Dietary fiber	20–30 grams per day
Protein	A[pproximately...]

* ATP III allows an increase of total fat [to 35 percent and a] reduction in carbohydrate to 50 perc[ent for persons with metabolic] syndrome. Any increase in fat intake [should be in the form of either] polyunsaturated or monounsaturate[d fat.]

† Carbohydrate should derive predomi[nantly from foods rich in complex] carbohydrates including grains—especially whole grains—fruits, and vegetables.

Rasio PUFA lebih bermakna dalam prevensi CVD daripada jumlah asupan
Rasio PUFA omega-3/omega-6 = 4/1 secara bermakna menurunkan kematian pada 70% penderita CVD

Serat makanan terbukti menurunkan kadar marker inflamasi . Penurunan berbanding terbalik dengan jumlah asupan serat harian.

The Canadian Trial of Carbohydrates in Diabetes (CCD), a 1-y controlled trial of low-glycemic-index dietary carbohydrate in type 2 diabetes: no effect on glycated hemoglobin but reduction in C-reactive protein[1-3]

Thomas MS Wolever, Alison L Gibbs, Christine Mehling, Jean-Louis Chiasson, Philip W Connelly, Robert G Josse, Lawrence A Leiter, Pierre Maheux, Remi Rabasa-Lhoret, N Wilson Rodger, and Edmond A Ryan

Anti-inflammatory properties of dietary flavonoids

J. González-Gallego, S. Sánchez-Campos y M. J. Tuñón

Ciberehd and Institute of Biomedicine. University of Leon. Spain.

ORIGINAL ARTICLE

Whole-Grain, Bran, and Cereal Fiber Intakes and Markers of Systemic Inflammation in Diabetic Women

LU QI, MD, PHD[1,2]
ROB M. VAN DAM, PHD[1]
SIMIN LIU, MD, PHD[3]
MARY FRANZ, MS[1]
CHRISTOS MANTZOROS, MD, PHD[4]
FRANK B. HU, MD, PHD[1,2,3]

The Importance of the Omega-6/Omega-3 Fatty Acid Ratio in Cardiovascular Disease and Other Chronic Diseases

ARTEMIS P. SIMOPOULOS[1]

r Genetics, Nutrition and Health, Washington, DC 20009

Relations of Dietary Magn... Biomarkers of Inflammati... Endothelial Dysfuncti... Diverse Cohort of Postm...

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...ary heart disease risk:

...Reilly, Katarina Augustsson, Gary E Fraser, Uri Goldbourt,
...Pietinen, Donna Spiegelman, June Stevens, Jarmo Virtano,

Epidemiology/Health Services Research

Magnesium Intake in Relation to Systemic Inflammation, Insulin Resistance, and the Incidence of Diabetes

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mechanisms underlying the beneficial effects of magnesium intake on diabetes are not fully understood. Cross-sectional studies have suggested an inverse correlation between magnesium intake and in-

...et or exercise: what is more effective in preventing or reducing metabolic alterations?

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Serum C-Reactive Protein Concentrations Are Inversely Associated with Dietary Flavonoid Intake in U.S. Adults[1]

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Dietary Fat Predicts Coronary Heart Disease Events in Subjects With Type 2 Diabetes

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with type 2 diabetes who were free from CHD at baseline.

RESEARCH DESIGN AND

Sejumlah hasil penelitian masih inkonklusif

Relations of Dietary Magnesium Intake to Biomarkers of Inflammation and Endothelial Dysfunction in an Ethnically Diverse Cohort of Postmenopausal Women

Asupan magnesium berbanding terbalik dgn kadar marker inflamasi dan disfungsi endotel pada wanita pasca menopause

Antioxidant vitamins and coronary heart disease risk: a pooled analysis of 9 cohorts[1-3]

Paul Knekt, John Ritz, Mark A Pereira, Eilis J O'Reilly, Katarina Augustsson, Gary E Fraser, Uri Goldbourt, Berit L Heitmann, Göran Hallmans, Simin Liu, Pirjo Pietinen, Donna Spiegelman, June Stevens, Jarmo Virtamo, Walter C Willett, Eric B Rimm, and Alberto Ascherio

Konsumsi suplemen vitamin C > 700 mg/hari memiliki efek protektif terhadap penyakit PJK., namun tidak demikian pada konsumsi vitamin E dan carotene

CLINICAL STUDY

Diet or exercise: what is more effective in preventing or reducing metabolic alterations?

Simona Bo, Giovannino Ciccone[1], Sabrina Guidi, Roberto Gambino, Marilena Durazzo, Luigi Gentile[2], Maurizio Cassader, Paolo Cavallo-Perin and Gianfranco Pagano

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Pengaruh berbagai jenis makanan terhadap penurunan risiko PJK

Food	Study duration	Effect
Extra virgin olive oil	1 meal	Decreased TXB2 and LTB4 in comparison with corn oil, non-virgin olive oil
Tomato juice	10 days	Reduced neutrophil airway influx in asthmatics
Tomato drink	26 days	Reduced TNF-α production by whole blood
Whole tomatoes	28 days	No change in CRP
Walnuts	1 meal	Decreased monocyte ... levels
Red wine	4 weeks	Reduced CRP and fib...
Garlic powder	3 months	No effect on CRP, TNF-α
Flaxseed flour	2 weeks	Reduced CRP, fibronectin and serum amyloid A in obese subjects
Tea, black	12 weeks	40-50% reduction of CRP in subjects with CRP>3 mg/L
Tea, black	6 weeks	Decreased CRP and platelet aggregation in healthy men
Tea, green	4 weeks	No effect on CRP in men
Tea, green	4 weeks	No significant effect ...
Cherries, sweet	4 weeks	Reduced CRP and ...

CCL5, chemokine (c-c motif) ligand 5; CRP, c-reactive protein; IL... TNF, tumor-necrosis factor.

Tomat dalam bentuk jus atau minuman dpt turunkan kadar marker inflamasi drpd tomat utuh

Teh hitam lebih baik dalam menurunkan marker inflamasi pada pria daripada teh hijau

Pengaruh berbagai jenis diet terhadap penurunan faktor risiko PJK

Forest plot of hazard ratios for diet-quality scores and risk of type 2 diabetes.
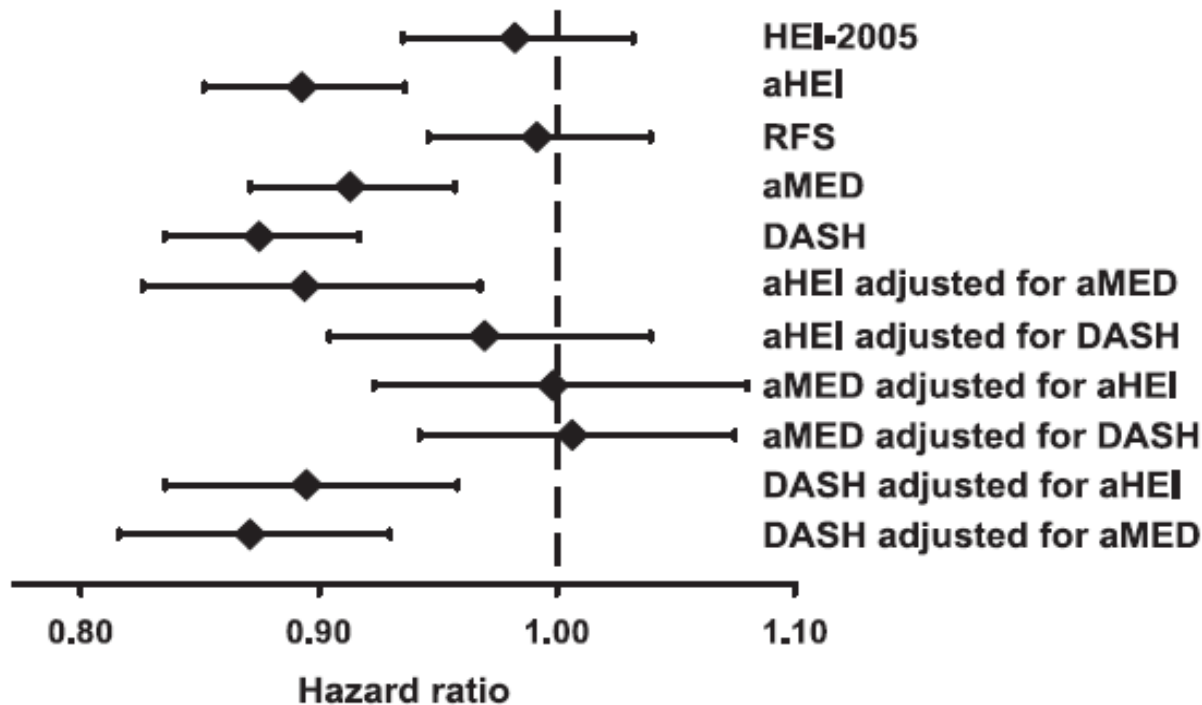
HEI: HEALTHY EATING INDEX
RFS = RECOMMENDED FOOD SCORE
AMED = ALTERNATIVE MEDITERRANEAN DIET
DASH = DIETARY APPROACH TO STOP HYPERTENSION

CONCLUSIONS—Several diet-quality scores were associated with a lower risk of type 2 diabetes and reflect a common dietary pattern characterized by high intakes of plant-based foods such as whole grains; moderate alcohol; and low intakes of red and processed meat, sodium, sugar-sweetened beverages, and trans fat. High-quality diets may yield the greatest reduction in diabetes cases when followed by those with a high BMI.

Komponen diet mediteranean

- **Minyak zaitun sebagai sumber lemak utama**
- **Konsumsi tinggi dari buah sayur, kacang-kacangan, sereal dan ikan serta red wine saat makan**

Karakteristik

**Tinggi omega 3 = 1% energi total
Rendah omega 6
Rasio omega 3/omega 6 rendah = 1/7**

UK HealthCare
GILL HEART & VASCULAR INSTITUTE

DASH DIET

4-5 servings per week of nuts, seeds, legumes

6-8 servings per day of whole grains

4-5 servings per day of vegetables

4-5 servings per day of fruits

2-3 servings per day of fat-free or low-fat dairy

Less than **6** servings per day of lean meat, poultry, fish

Less than **5** servings per week of sweets

2-3 servings per day of fats and oils

Source: National Heart, Lung and Blood Institute

M9-0383

The DASH diet (Dietary Approaches to Stop Hypertension) has been shown to help lower blood pressure and prevent heart disease, stroke, diabetes and even some forms of cancer. It focuses on eating more fresh fruits and vegetables.

This is a guide to how much of each food group you should eat every day, based on eating 2,000 calories per day.

Following the DASH Eating Plan

Use this chart to help clients plan their menus—or take it with them when they go to the store.

Food group	Servings per day			Serving sizes	Examples and notes	Significance of each food group to the DASH eating plan
	1,600 kcal	2,000 kcal	2,600 kcal			
Grains*	6	6–8	10–11	1 slice bread 1 oz dry cereal ½ cup cooked rice, pasta, or cereal	Whole wheat bread and rolls, whole wheat pasta, English muffin, pita bread, bagel, cereals, grits, oatmeal, brown rice, unsalted pretzels and popcorn	Major sources of energy and fiber
Vegetables	3–4	4–5	5–6	1 cup raw leafy vegetable ½ cup cut-up raw or cooked vegetable ½ cup vegetable juice	Broccoli, carrots, collards, green beans, green peas, kale, lima beans, potatoes, spinach, squash, sweet potatoes, tomatoes	Rich sources of potassium, magnesium, and fiber
Fruits	4	4–5	5–6	1 medium fruit ¼ cup dried fruit ½ cup fresh, frozen, or canned fruit ½ cup fruit juice	Apples, apricots, bananas, dates, grapes, oranges, grapefruit, grapefruit juice, mangoes, melons, peaches, pineapples, raisins, strawberries, tangerines	Rich sources of potassium, magnesium, and fiber
Fat-free or low-fat milk and milk products	2–3	2–3	3	1 cup milk or yogurt 1½ oz cheese	Fat-free (skim) or low-fat (2%) milk or buttermilk; fat-free, low-fat, or reduced-fat cheese, fat-free or low-fat regular or frozen yogurt	Major sources of calcium and protein
Lean meats, poultry, and fish	3–6	6 or fewer	6	1 oz cooked meats, poultry or fish 1 egg	Select only lean meats; trim away visible fat; broil, roast, or poach; remove skin from poultry	Rich sources of protein and magnesium
Nuts, seeds, and legumes	3 per week	4–6	1	½ cup or 1½ oz nuts 2 T peanut butter 2 T or ½ oz seeds ½ cup cooked legumes (dry beans and peas)	Almonds, hazelnuts, mixed nuts, peanuts, walnuts, sunflower seeds, peanut butter, kidney beans, lentils, split peas	Rich sources of energy, magnesium, protein, and fiber
Fats and oils	2	2–3	3	1 tsp soft margarine 1 tsp vegetable oil 1 T mayonnaise 2 T salad dressing	Soft margarine, vegetable oil (such as canola, corn, olive, or safflower), low-fat mayonnaise, light salad dressing	The DASH study had 27% of calories as fat, including fat in or added to foods
Sweets and added sugars	0	5 or fewer per week	≤2	1 T sugar 1 T jelly or jam ½ cup sorbet, gelatin 1 cup lemonade	Fruit-flavored gelatin, fruit punch, hard candy, jelly, maple syrup, sorbet and ices, sugar	Sweets should be low in fat

* Whole grains are recommended for most grain servings as a good source of fibers and nutrients.

† Serving sizes vary between ½ cup and 1¼ cups, depending on cereal type. Check the product's Nutrition Facts label.

‡ Because eggs are high in cholesterol, limit egg yolk intake to no more than four per week; two egg whites have the same protein content as 1 oz of meat.

§ Fat content changes serving amount for fats and oils. For example, 1 T of regular salad dressing equals one serving; 1 T of a low-fat dressing equals one-half serving; and 1 T of a fat-free dressing equals zero servings.

The key risk factors for cardiovascular disease

Behavioural risks

High Cholesterol · High blood pressure · Smoking · Diet · Physical inactivity · Harmful drinking

CVD

Social and environmental factors

Employment · Poverty · Housing · Family history · Pollution

Every 10 mmHg reduction in systolic blood pressure significantly reduces the risk of major cardiovascular disease events, including average relative risk reductions of 20% for CHD, 27% for stroke, and 28% for heart failure[11]

11,600 AF-related strokes could be averted each year if everyone with AF at high risk of stroke received anticoagulation – 25% of people with AF are not currently on anticoagulation[15]

For every 1 mmol/L decrease in total cholesterol, people can reduce their relative risk for CVD-related mortality by 24.5%, and by 29.5% for any CVD event[12]

101 cardiovascular deaths can be avoided per 1,000 familial hypercholesterolaemia patients (aged 30 to 85 years) who are treated optimally, when compared with no treatment[16]

Over 20% of all hypertension – a major risk factor for CVD – is linked to alcohol misuse. Only 1 in 5 people with hypertension are assessed for their alcohol use by their GPs[13,14]

Quitting smoking is linked to a 36% reduction in risk of all-cause mortality among people with coronary heart disease[17]

Meeting recommended physical activity levels reduces risk of CVD by 20-35%[18]

Non-modifiable risk factors include age, gender and ethnicity

Kesimpulan

- **Pola makan mempengaruhi inflamasi sistemik kronik, low grade.**

- **Berbagai evidens menunjukkan konsumsi PUFA (disertai dengan memperhatikan rasio-nya), serat, MUFA, flavonoids, antioksidan berhubungan dengan penurunan marker inflamasi.**

- **Diet mediterania dan DASH berhubungan dengan penurunan risiko PJK**