Bratislava 8 ottobre 2021

Il Futuro delle Diete Tradizionali:
l'educazione dei consumatori attraverso l'etichettatura degli alimenti

POSITIVE NUTRITION AND TRADITIONAL DIETS

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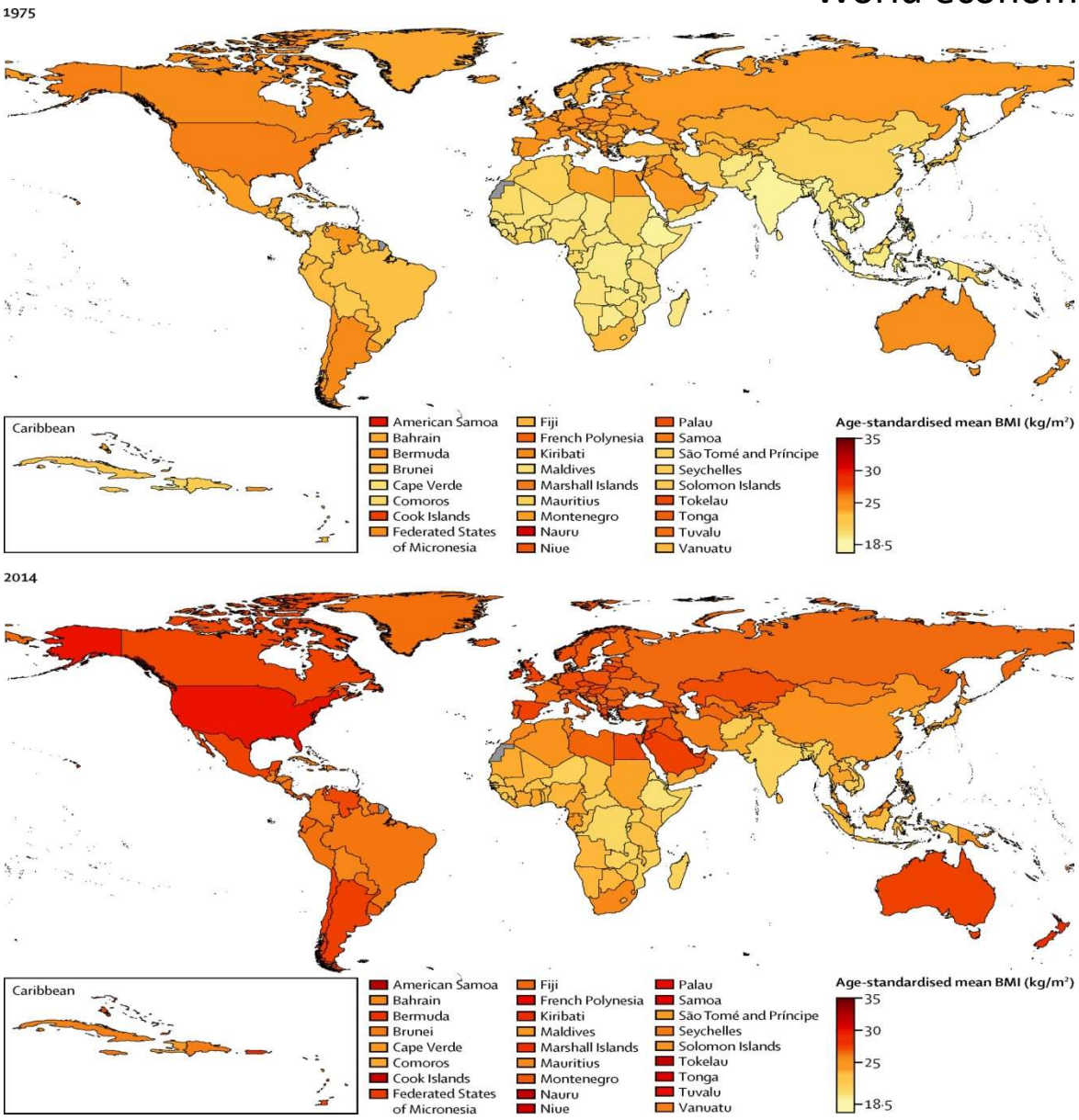
SISA (Società Italiana Scienza Alimentazione)

Worldwide overweight/obesity

World economic forum data

1975

2014



Key facts
(WHO 2018)

Raised BMI is a major risk factor for noncommunicable diseases such as:

- **cardiovascular diseases (mainly heart disease and stroke), which were the leading cause of death in 2012;**
- **diabetes;**
- **musculoskeletal disorders (especially osteoarthritis – a highly disabling degenerative disease of the joints);**
- **some cancers (including endometrial, breast, ovarian, prostate, liver, gallbladder, kidney, and colon).**
- **The risk for these noncommunicable diseases increases, with increases in BMI.**

Key facts
(WHO 2018)

The fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories expended. Globally, there has been:

- **an increased intake of energy-dense foods that are high in fat**
- **an increase in physical inactivity due to the increasingly sedentary nature of many forms of work, changing modes of transportation, and increasing urbanization**
- **Changes in dietary and physical activity patterns are often the result of environmental and societal changes associated with development and lack of supportive policies in sectors such as health, agriculture, transport, urban planning, environment, food processing, distribution, marketing, and education.**

Sir Winston L. Spencer-Churchill (1874 – 1965)

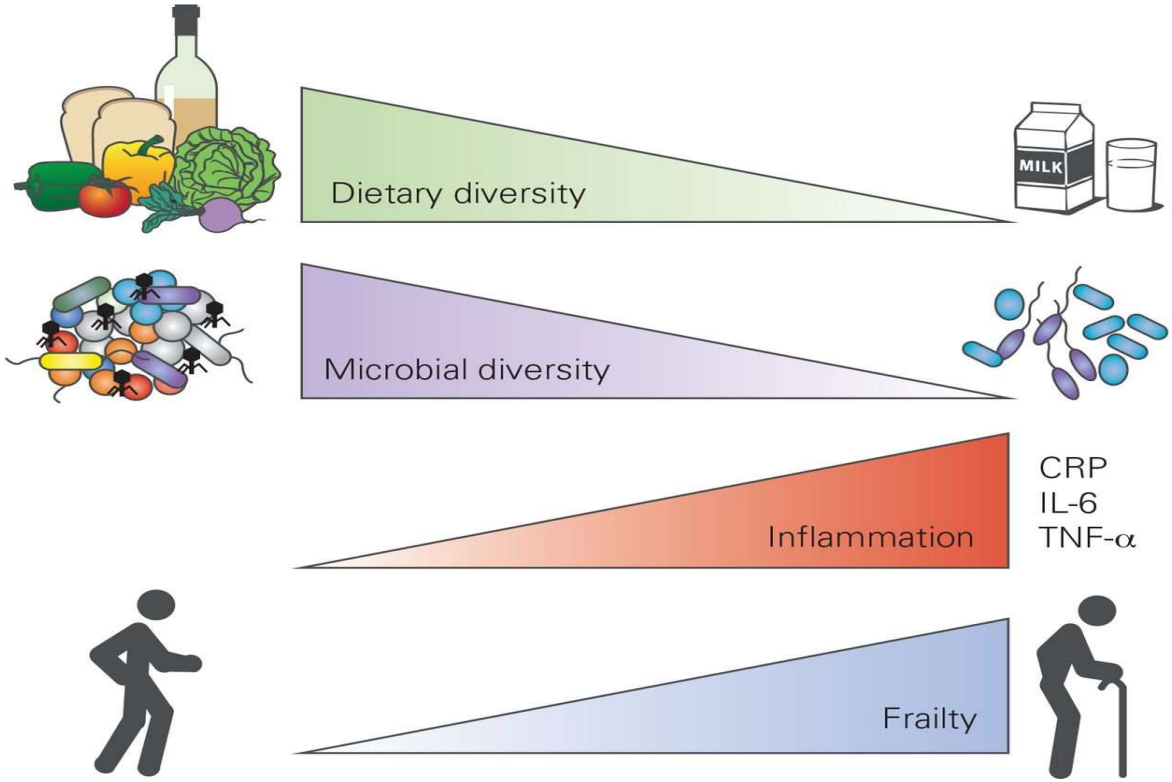
James F. Fixx (1932 – 1984)

MICROBIOTA

- The number of bacteria present in the intestine exceeds 10 times the total of human cells.
- The bacterial genome in the intestine (microbioma) exceeds 150 times that of humans
- WE ARE A SUPERORGANISM

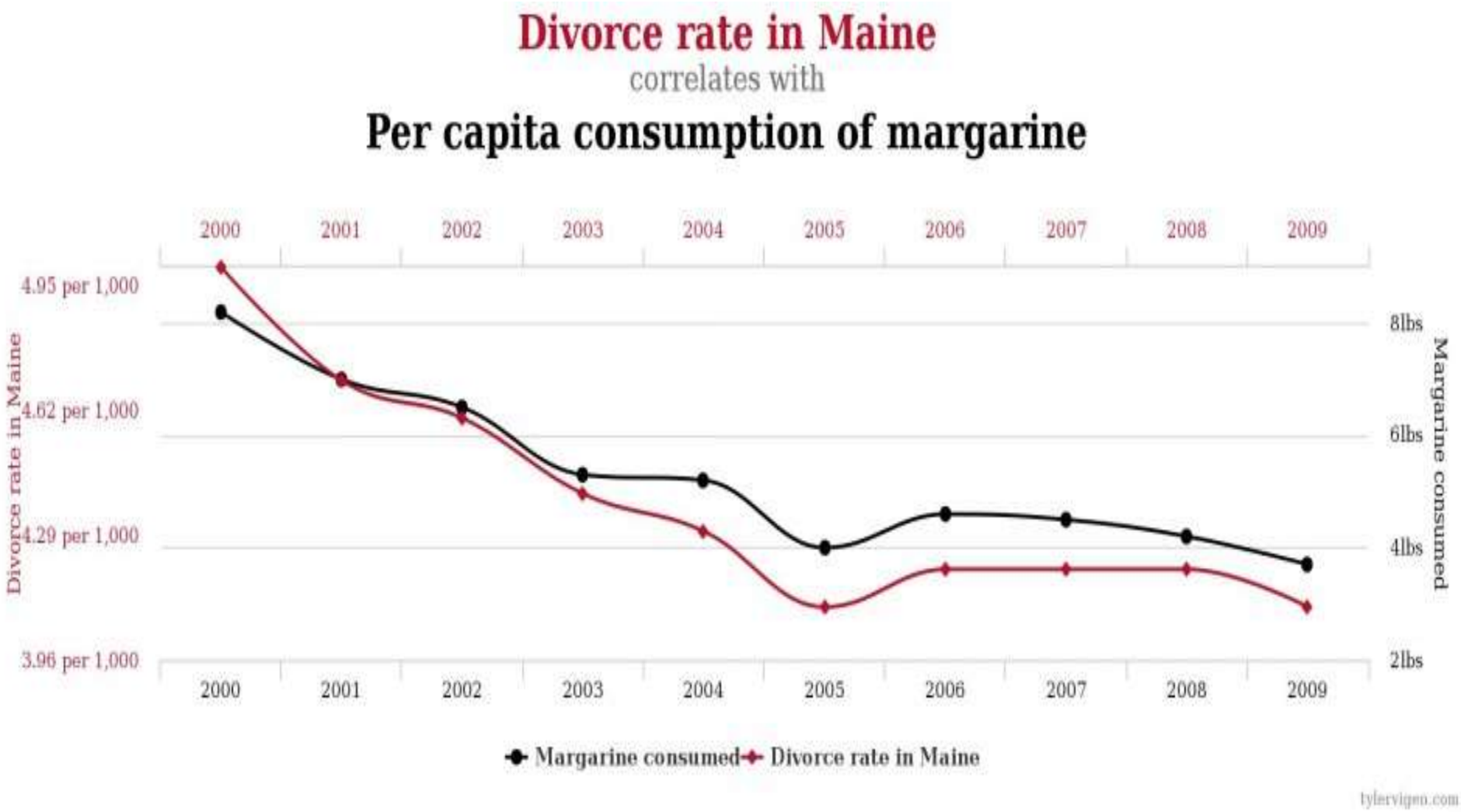
Microbiota and diet

Feeding the Microbiota: Transducer of Nutrient Signals for the Host Fergus Shanahan et al Gut. 2017

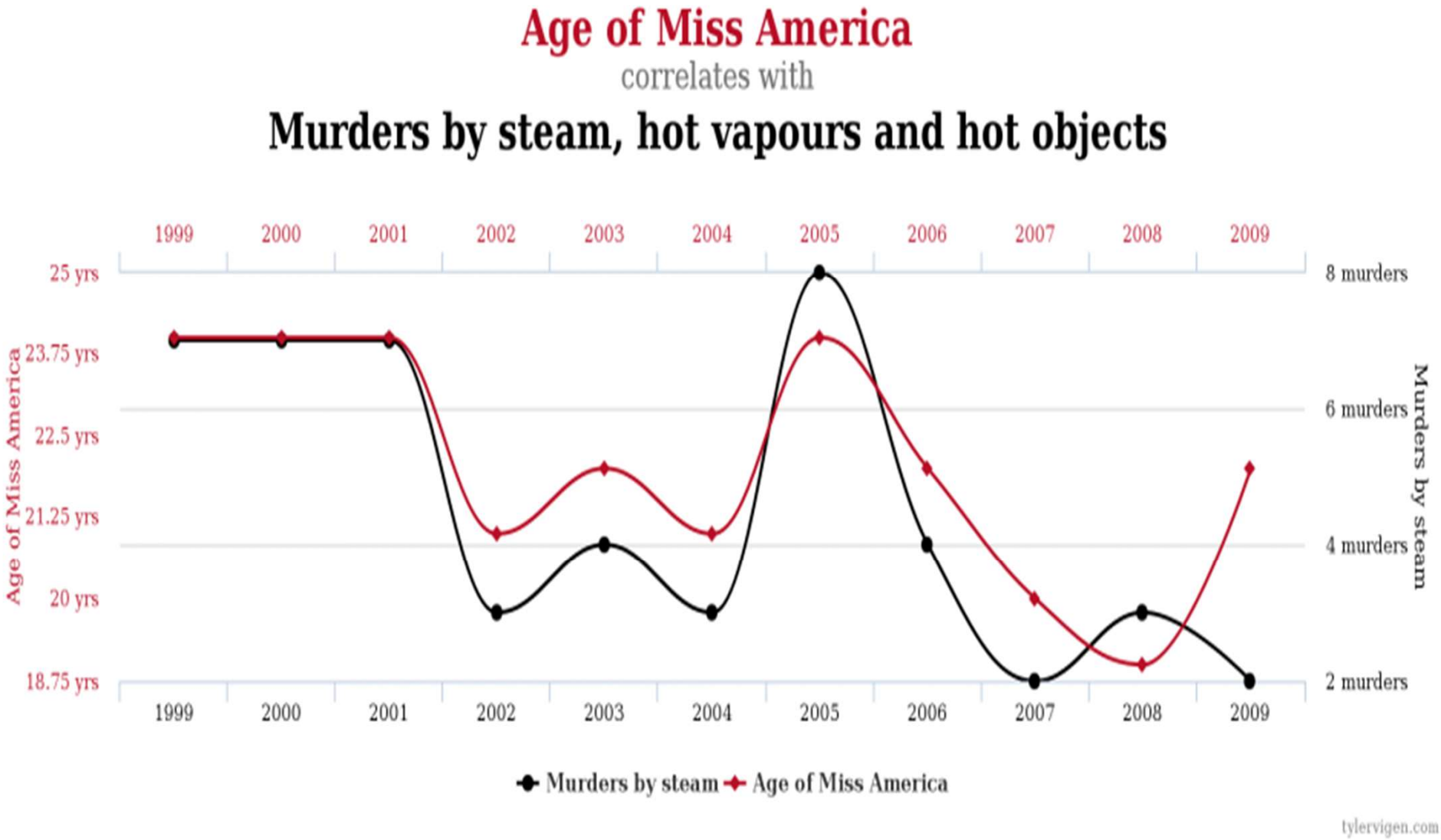


Diversity as staple, not simply spice of life. Diversity of dietary intake correlates with microbial diversity in the gut which is inversely linked with inflammatory tone and risk of frailty in the elderly. Thus, a monotonous or restricted diet (although with adequate calories and essential nutrients) which is often liquidised and convenient in the case of the elderly is linked with loss of microbial diversity, and perhaps more importantly, with loss of key microbial functions and a risk of a gain in pathobionts, including susceptibility to overgrowth of *Clostridium difficile*. CRP, C-reactive protein; IL-6, interleukin-6; TNF-α, tumour necrosis factor-α.

Information vs Disinformation



Vigen T. Spurious correlations 2015



Vigen T. Spurious correlations 2015

Obesity Epidemic

CHO restriction is one of the most frequent nutritional behaviors

Spread of high-protein diets aimed to weight-loss.

Widespread belief that western diets are excessively sugar-rich.

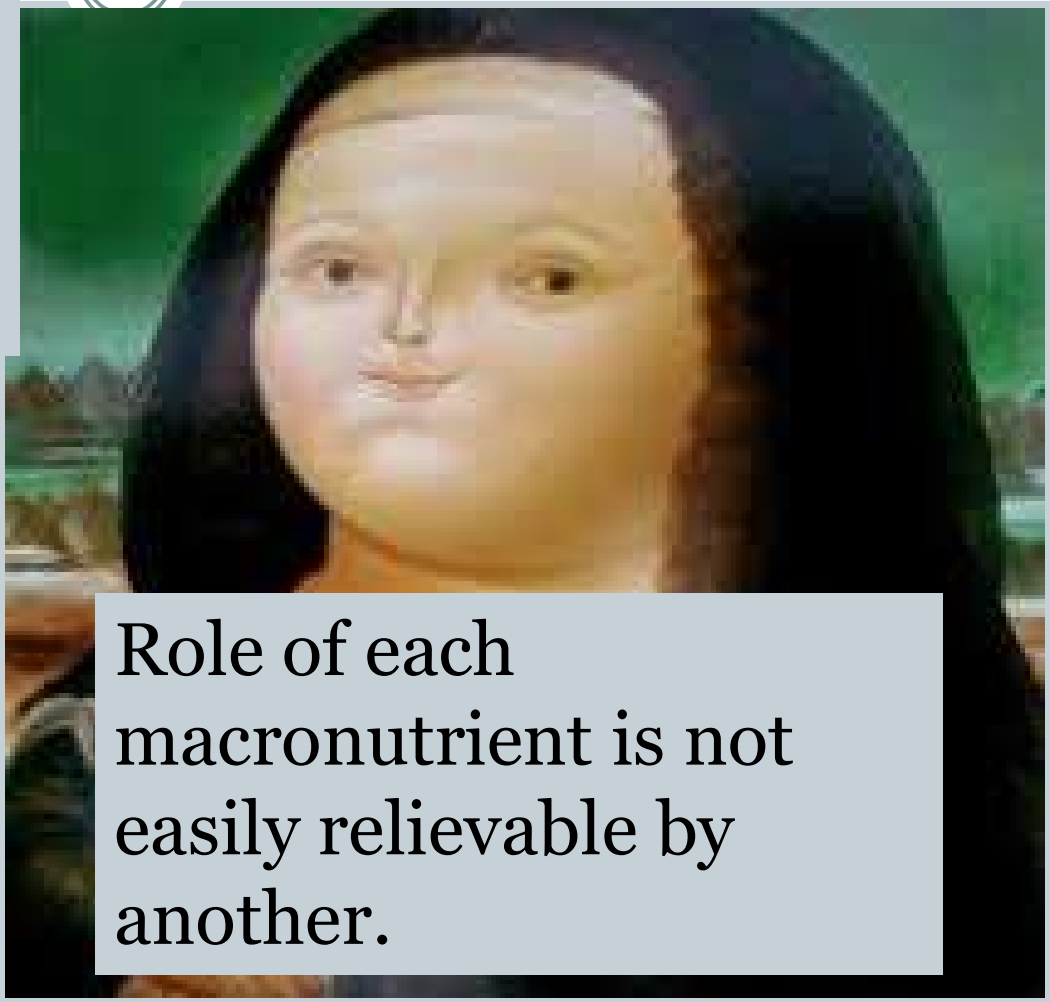
"Carbophobia" a term indicating the phylosophy of all low-carb diets (Atkins, Zone, Dukan, paleolitic)

Lose weight or lose fat

Not only “weight loss” but mainly decrease fat mass preservating free fat mass.

Brain feeds almost exclusively with glucose

Low carb diet= free fat mass loss to synthesize glucose from proteins (neoglucogenesis)



Role of each macronutrient is not easily relievable by another.

Risk of “normal weight” obesity

Role of Macronutrients

- CHO and lipids

ENERGY
FUNCTIONALITY

- Proteins

FUNCTIONALITY’

PLASTICITY

Carbohydrates: Sugar or starch

Starches of pasta and other cereals represent the best way to introduce glucose with diet, even for diabetics.

Sugars must not exceed 10% of daily calories (Italian Guidelines LARN)

LARN 2014 (Italian nutrients intake reference)

Based on epidemiological evidence of risk for the Italian population were established reference intervals (RI) (pointing to the middle of the range) for carbohydrates and lipids

- CHO 45-60% of calories (healthy adult)
  (<15% free sugars)

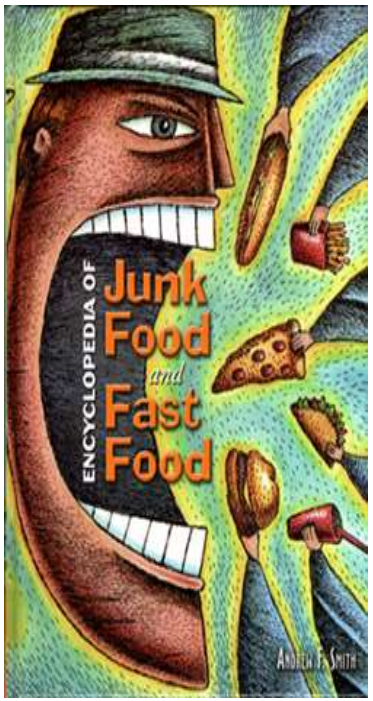
- Lipids 25-30% of calories (healthy adult)
  (<10% saturated fats)

For proteins it has been established a population recommended intake value (PRI) which corresponds to the level of intake sufficient to meet the nutrient requirements of nearly all (97.5%) healthy individuals in a specific population group.

- Proteins 0,90 gr/kg/die (healthy adult)

Ntrition and inflammation

Chronic inflammation is, therefore, likely to negatively affect aging, disease susceptibility, and people's healthy life expectancy. Such chronic diseases are also increasing globally, with the World Health Organization (WHO) collectively naming lifestyle-related diseases, allergies, and cancers as noncommunicable diseases (NCD) and highlighting them as key issues for future medicine, healthcare, and public health ***Katsuhiko, Biomolecules 2019***



Modern society has entered an age that is characterized by high fat diets, food satiation, and exercise deficiency due to automation and convenience. Overeating and/or sedentary lifestyles can cause an accumulation of fat tissue in the body, and the infiltration of inflammatory cells such as macrophages into such tissues.

• . 2011

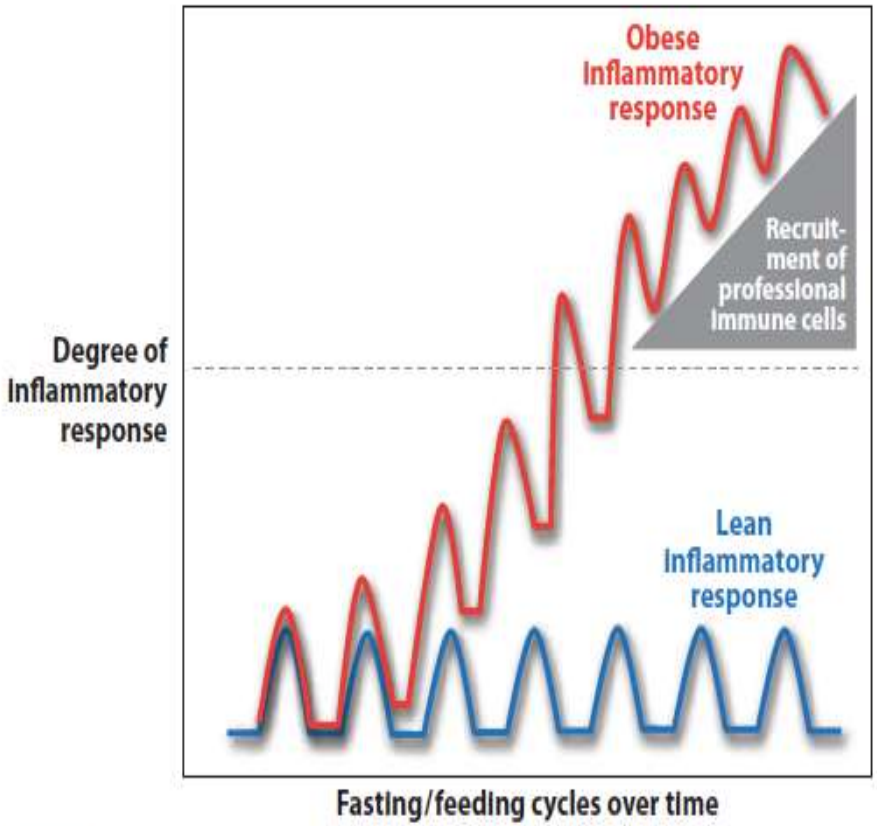
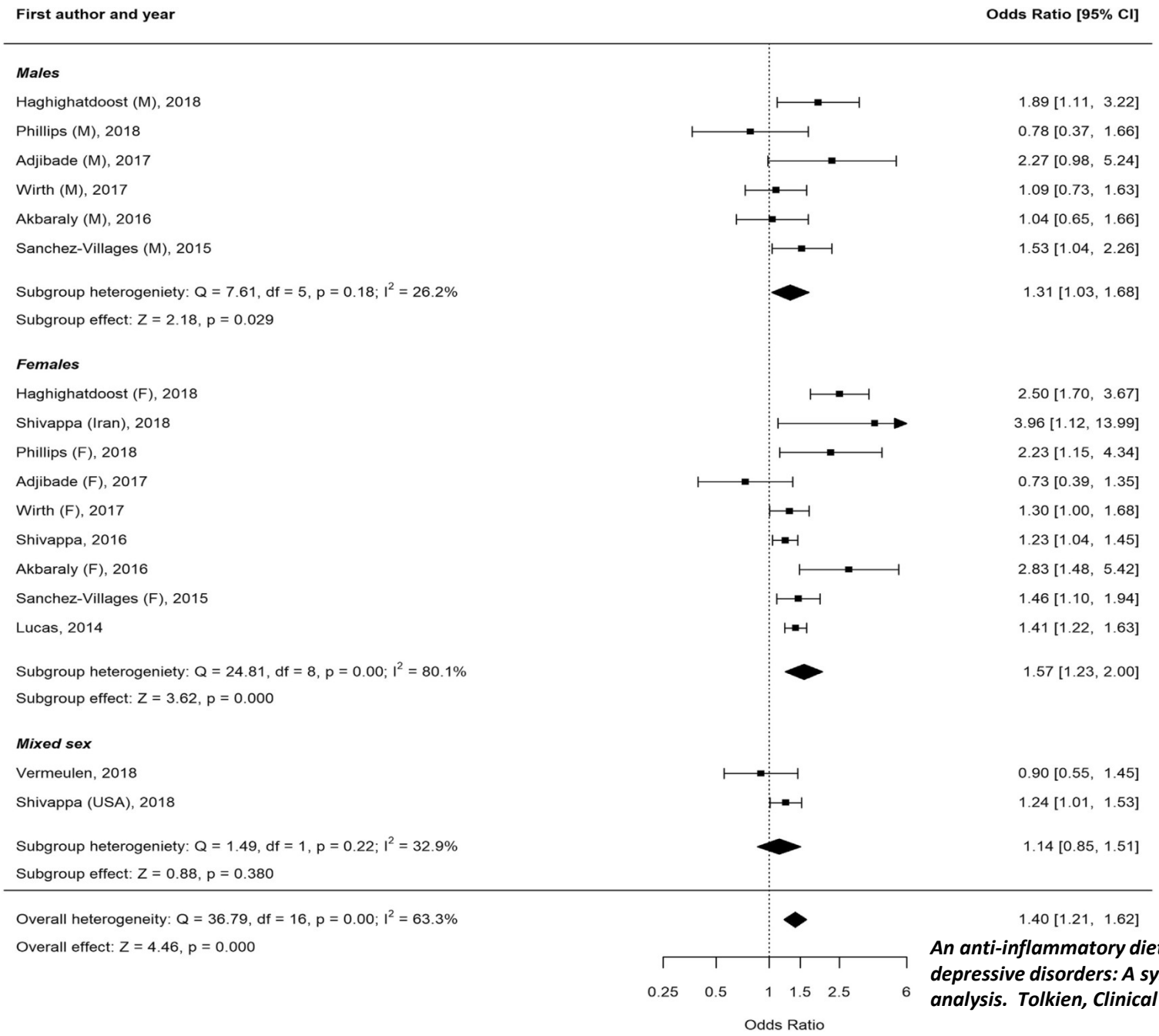


Figure 3

Pulsatile inflammatory response during feeding: normal versus obese reactions over time. Fasting/feeding cycles induce low-level inflammatory responses in metabolic cells of lean, healthy animals that are easily resolved. During the high-fat diet or excess feeding of obesity, responses to food become more intense and frequent, and resolution of the inflammatory response becomes less efficient, raising the baseline of inflammation in metabolic tissues. Once the level of inflammatory response reaches a certain threshold in the metabolic cells, professional immune cells such as macrophages, mast cells, and T cells are recruited and activated. Their participation in the inflammatory response alters the tissue environment toward a proinflammatory milieu and exacerbates the inflammation even further.

Gregor, Hotamisligil, Inflammatory mechanisms in obesity. Annu Rev Immunol 2011

Dieta infiammatoria e depressione



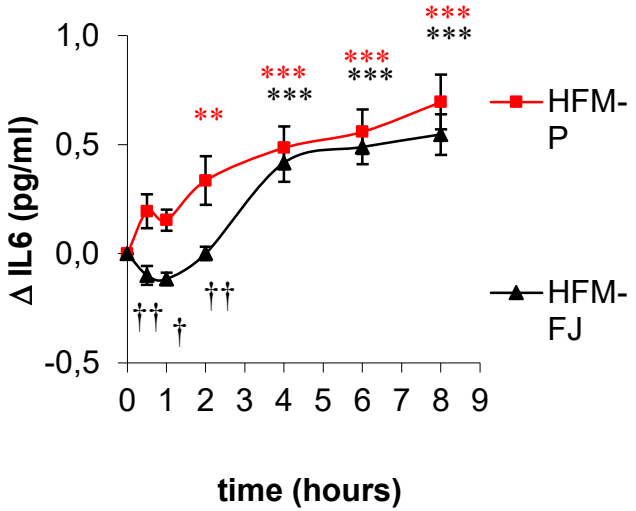
Random effects meta-analysis and forest plot for the association between a pro-inflammatory diet (Dietary Inflammatory Index, cytokines) and depression diagnosis or depressive symptoms. Results are also subgrouped by sex-specific populations

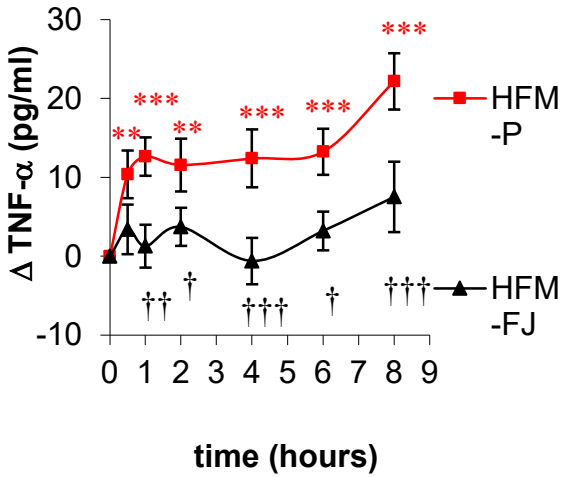
An anti-inflammatory diet as a potential intervention for depressive disorders: A systematic review and meta-analysis. Tolkien, Clinical Nutrition 2019

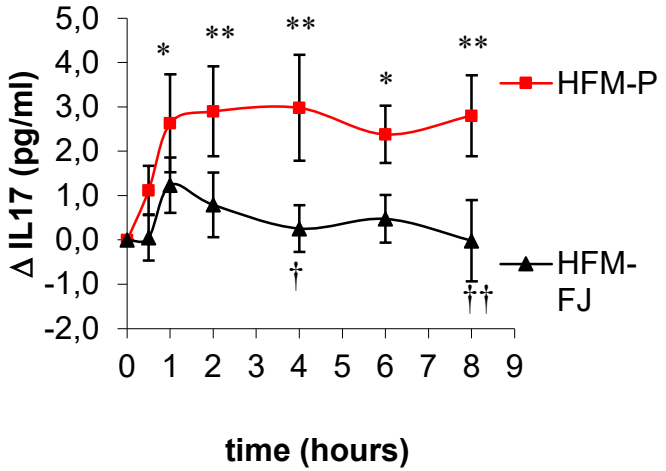
Current Pharmaceutical Design, 2012, *18*, 85-90

High Fat Meal Increase of IL-17 is Prevented by Ingestion of Fruit Juice Drink in Healthy Overweight Subjects

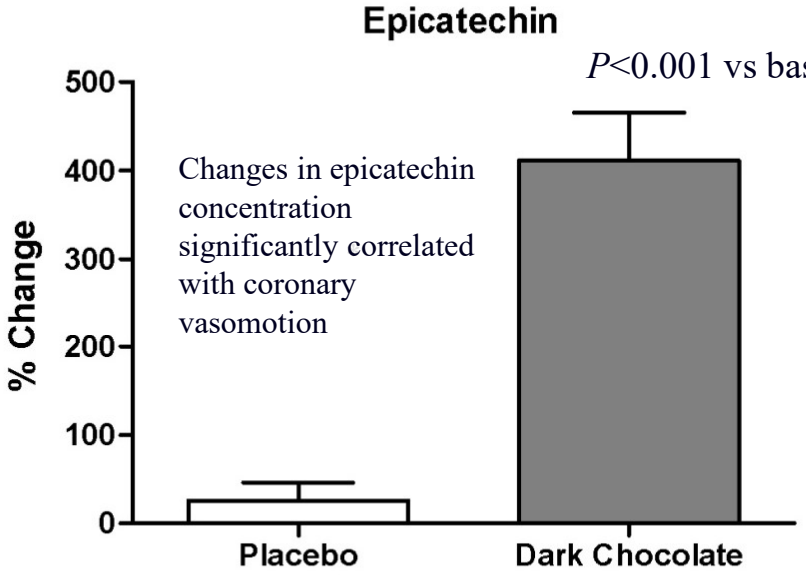
Ilaria Peluso[1], Anna Raguzzini[1], Debora V Villano[2], Eleonora Cesqui[1], Elisabetta Toti[1], Giovina Catasta[1] and Mauro Serafini[1,*]

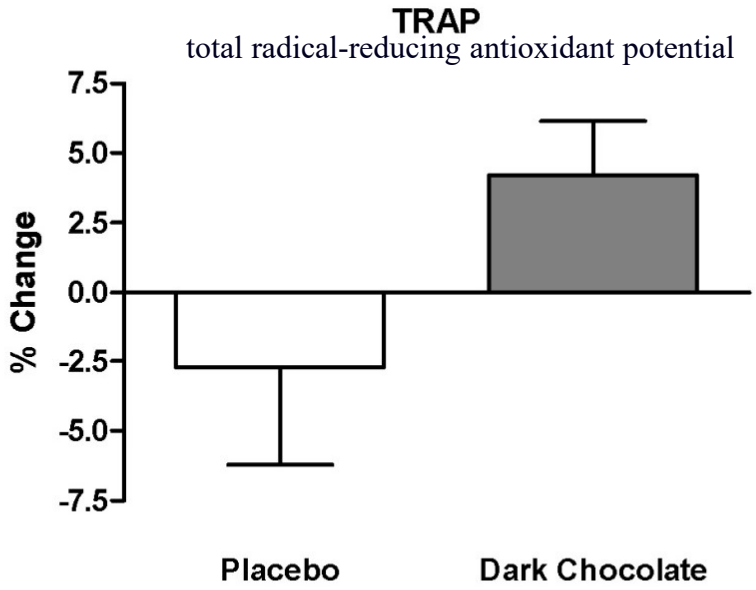


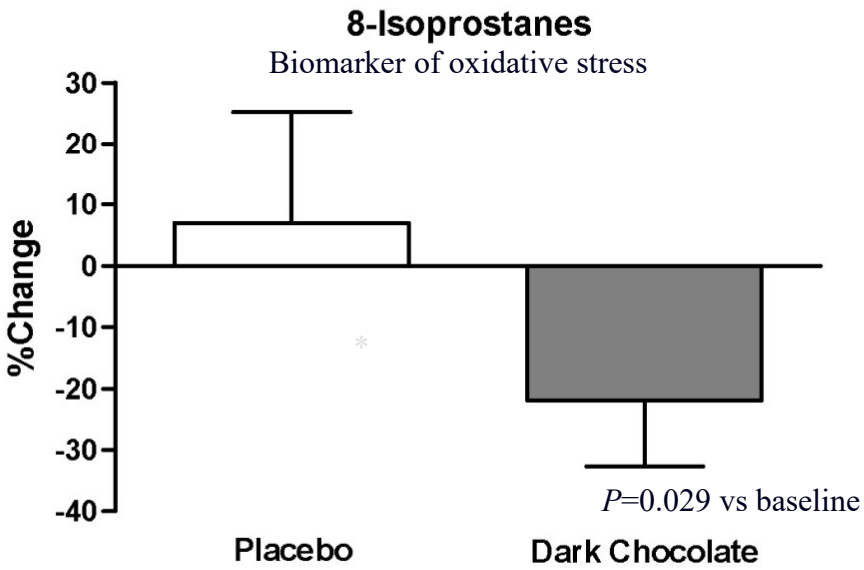


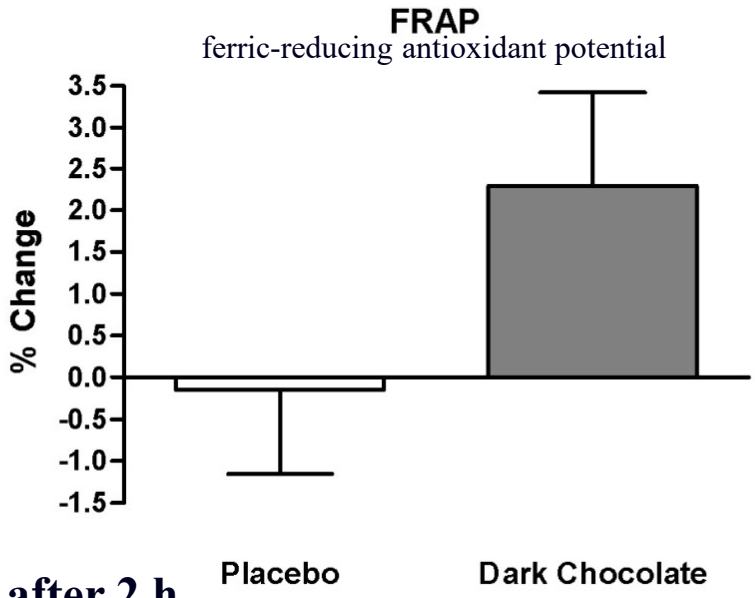


Dark chocolate and oxidative stress





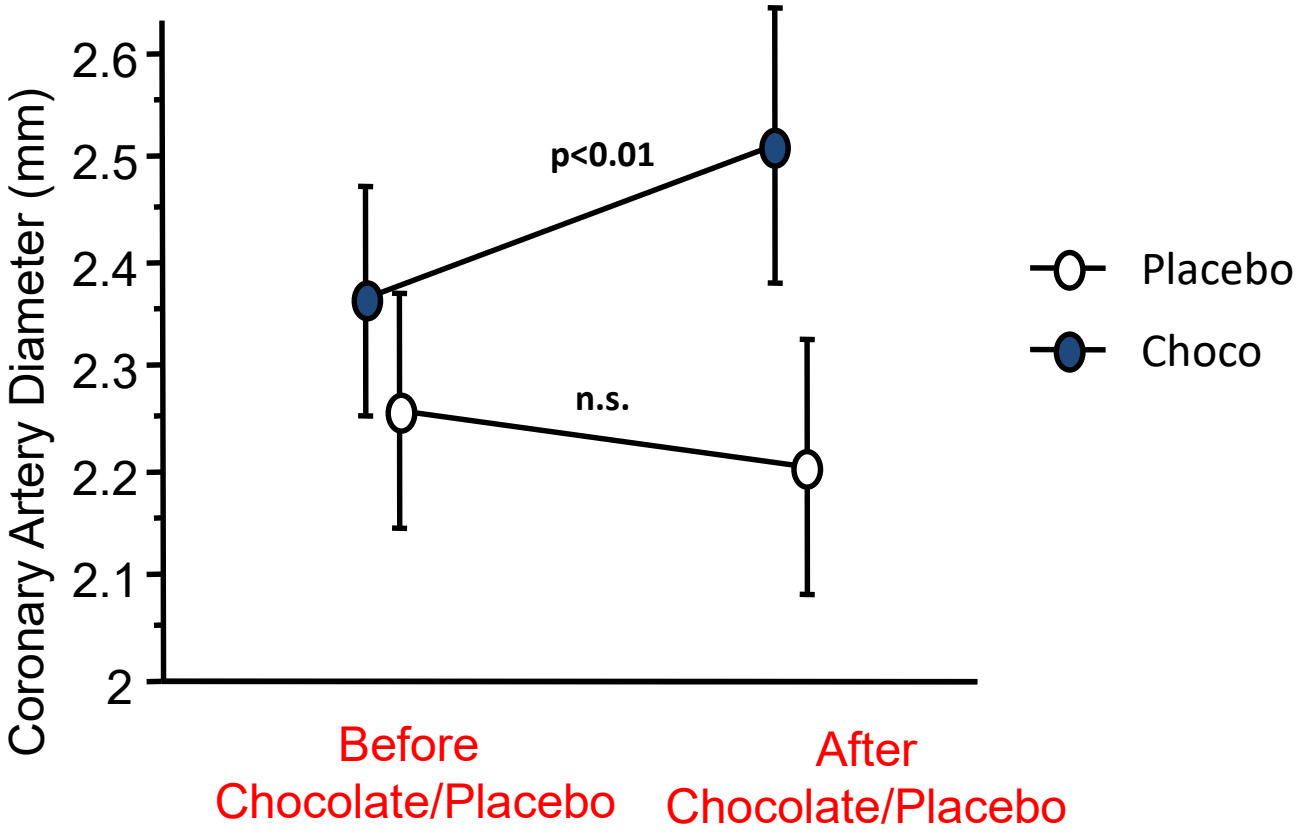




Flammer et al. Circulation 2007

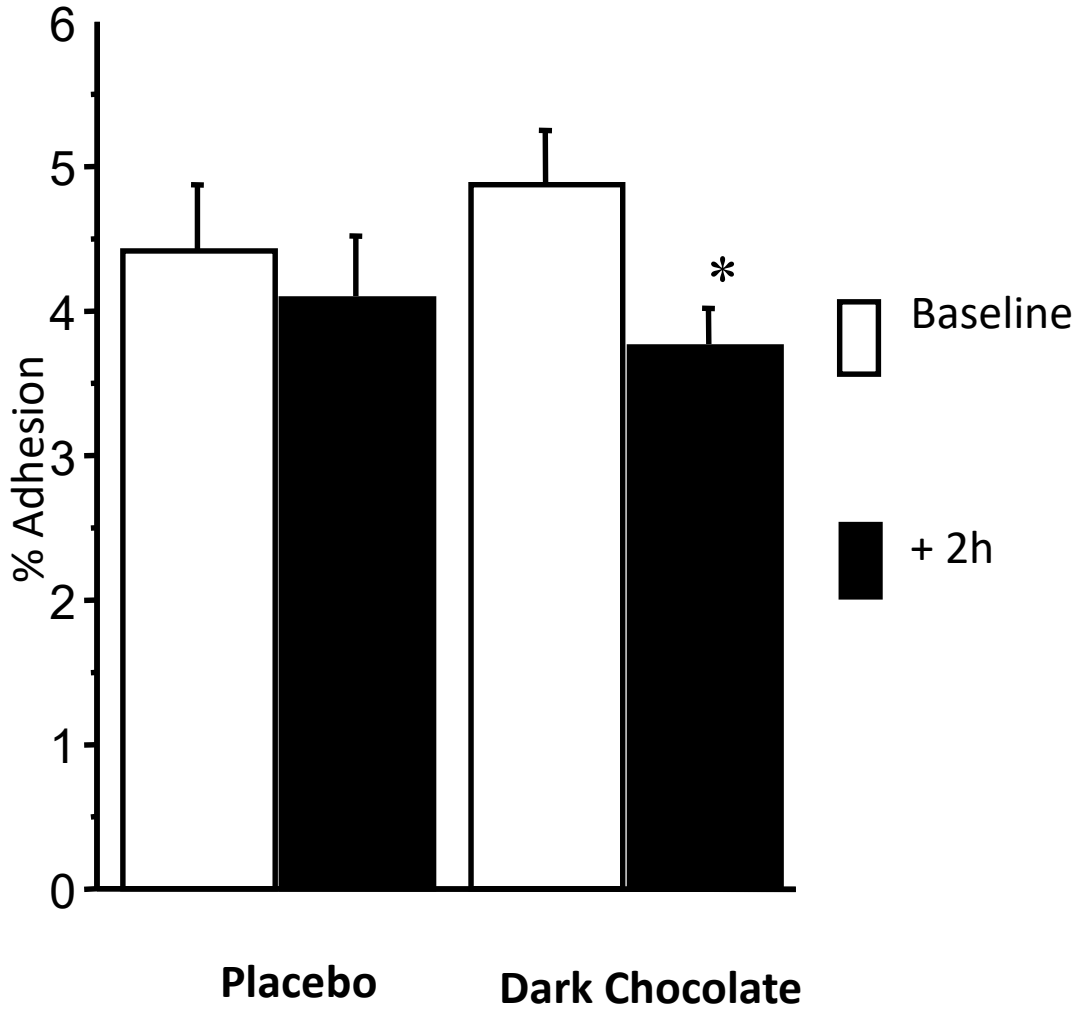
Basal and after 2 h

Coronary Artery Diameter before and 2 hours after chocolate ingestion

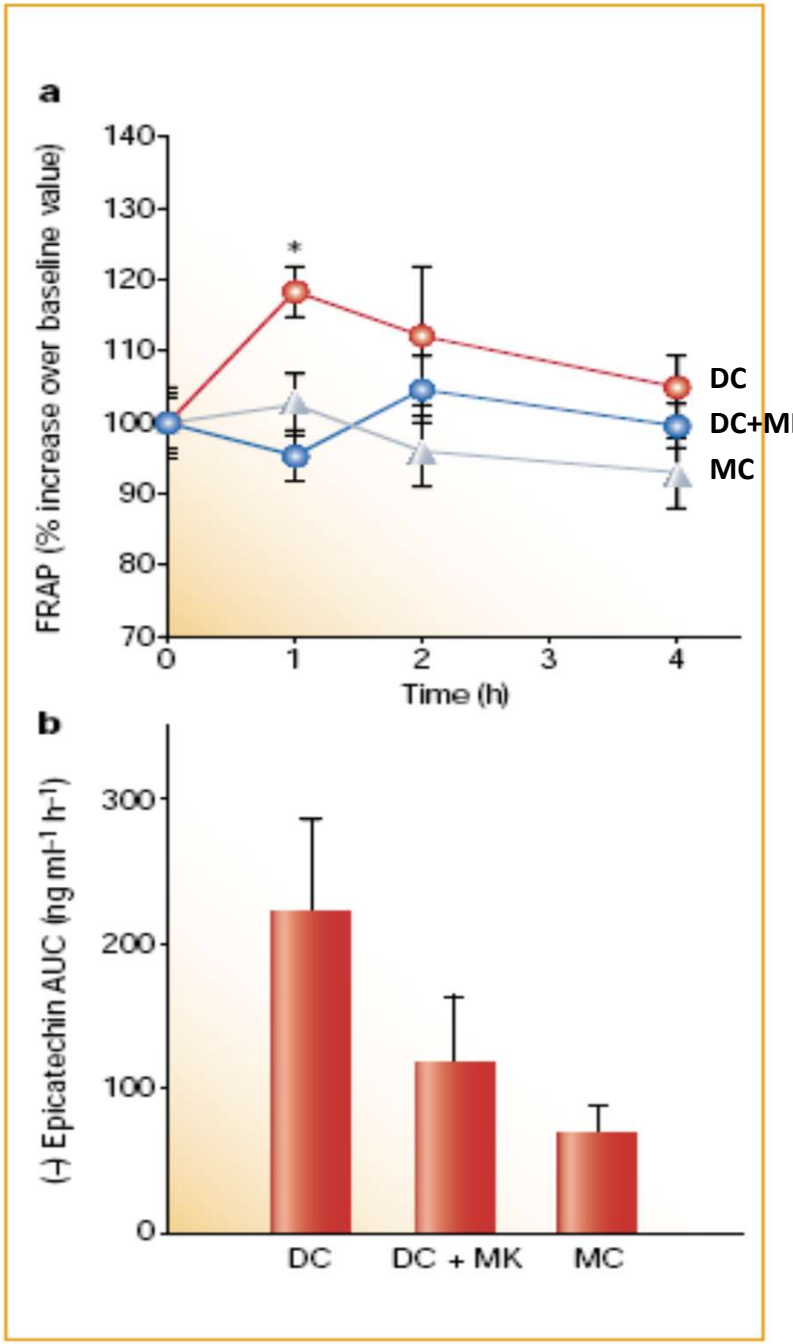


Flammer et al. Circulation 2007

Platelet aggregation before and 2 hours after chocolate ingestion



Flammer et al. Circulation 2007



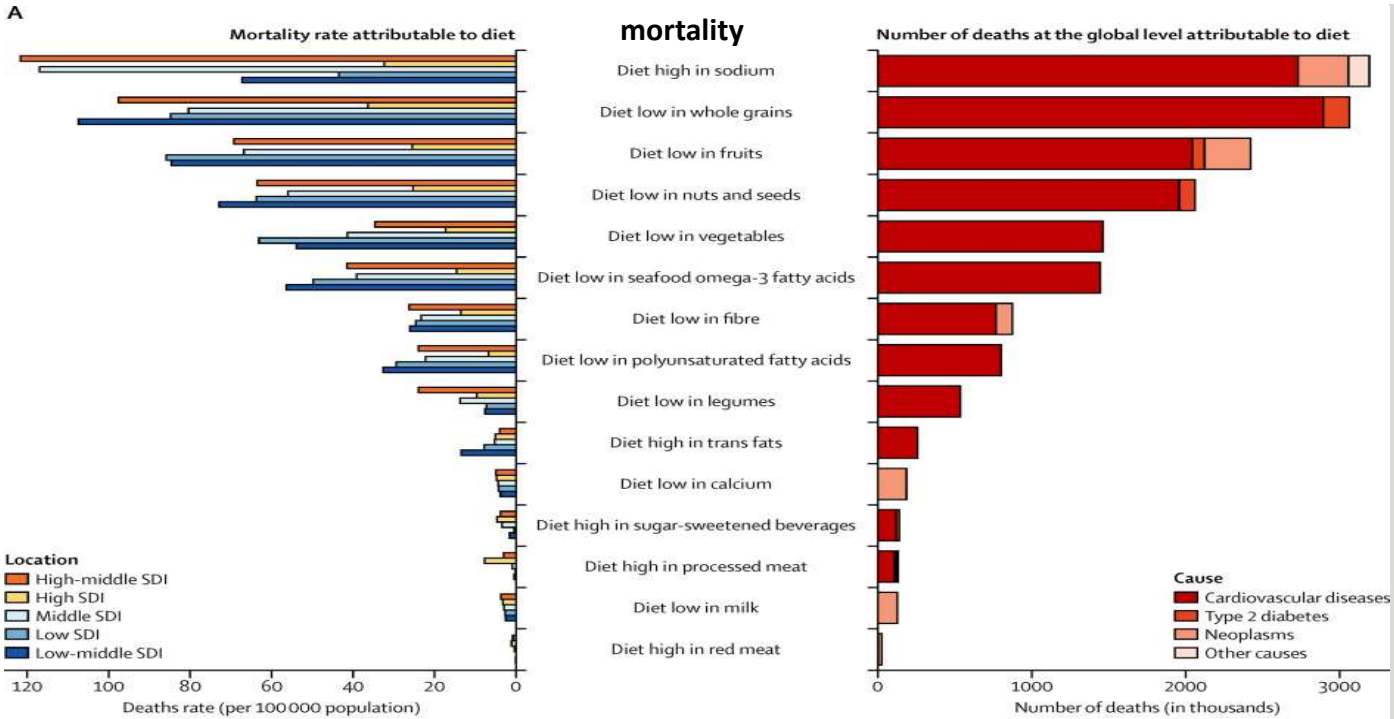
Effects of acute ingestion of 100 g dark chocolate (DC),100 g dark chocolate with 200 ml milk (DC+MK) or 200 g milkchocolate (MC) on the total antioxidant capacity (TAC) and (‖)epi-catechin content of human plasma.

a) Mean TAC of plasma samples at the indicated times after chocolate consumption,expressed as ferric-reducing antioxidant potential (FRAP). Values are mean percentage increases relative to baseline values. Red circles, DC; blue circles, DC+MK; grey triangles, MC. Asterisk denotes $P<0.001$.

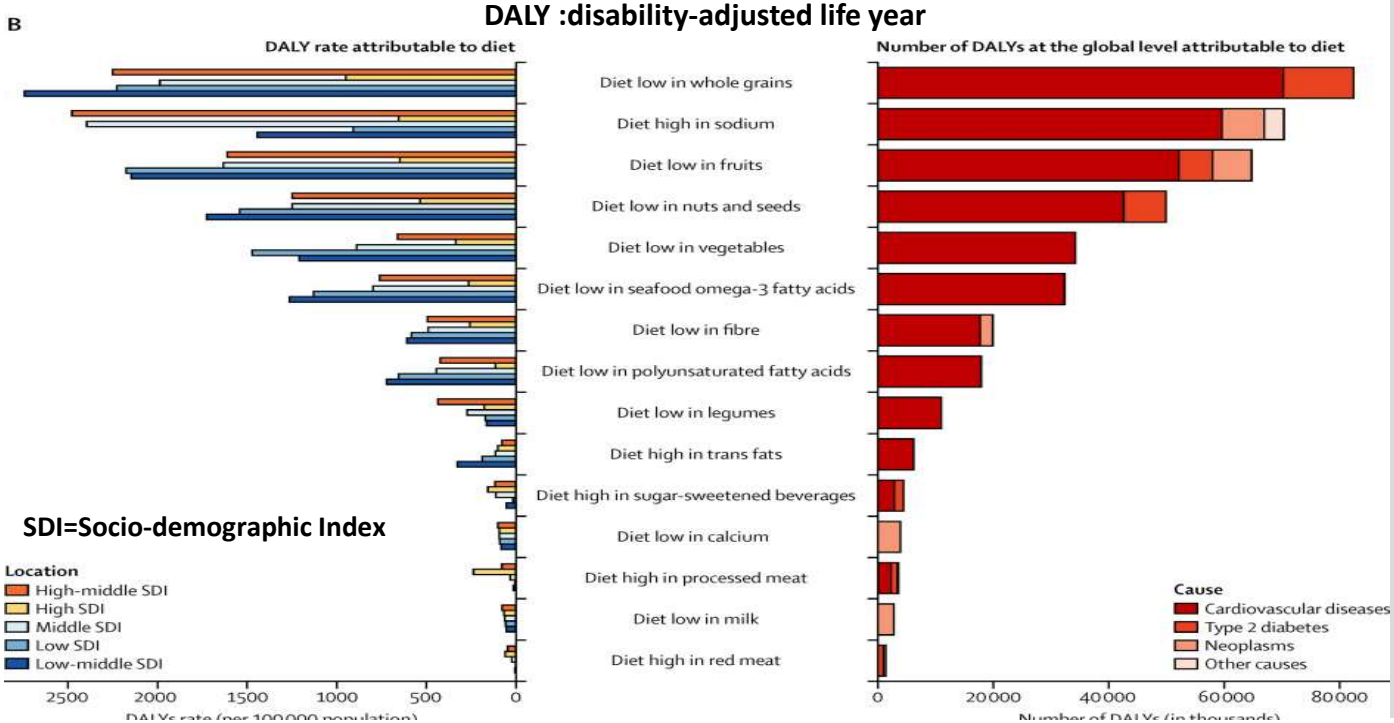
b) Mean epicatechin levels in plasma, expressed as the area under the curve for the 4-h period after chocolate consumption. Values are significantly different from one another

Serafini et al, Nature 2003

NATURE | VOL 424 | 28 AUGUST 2003 | www.nature.com/natu



DALY :disability-adjusted life year

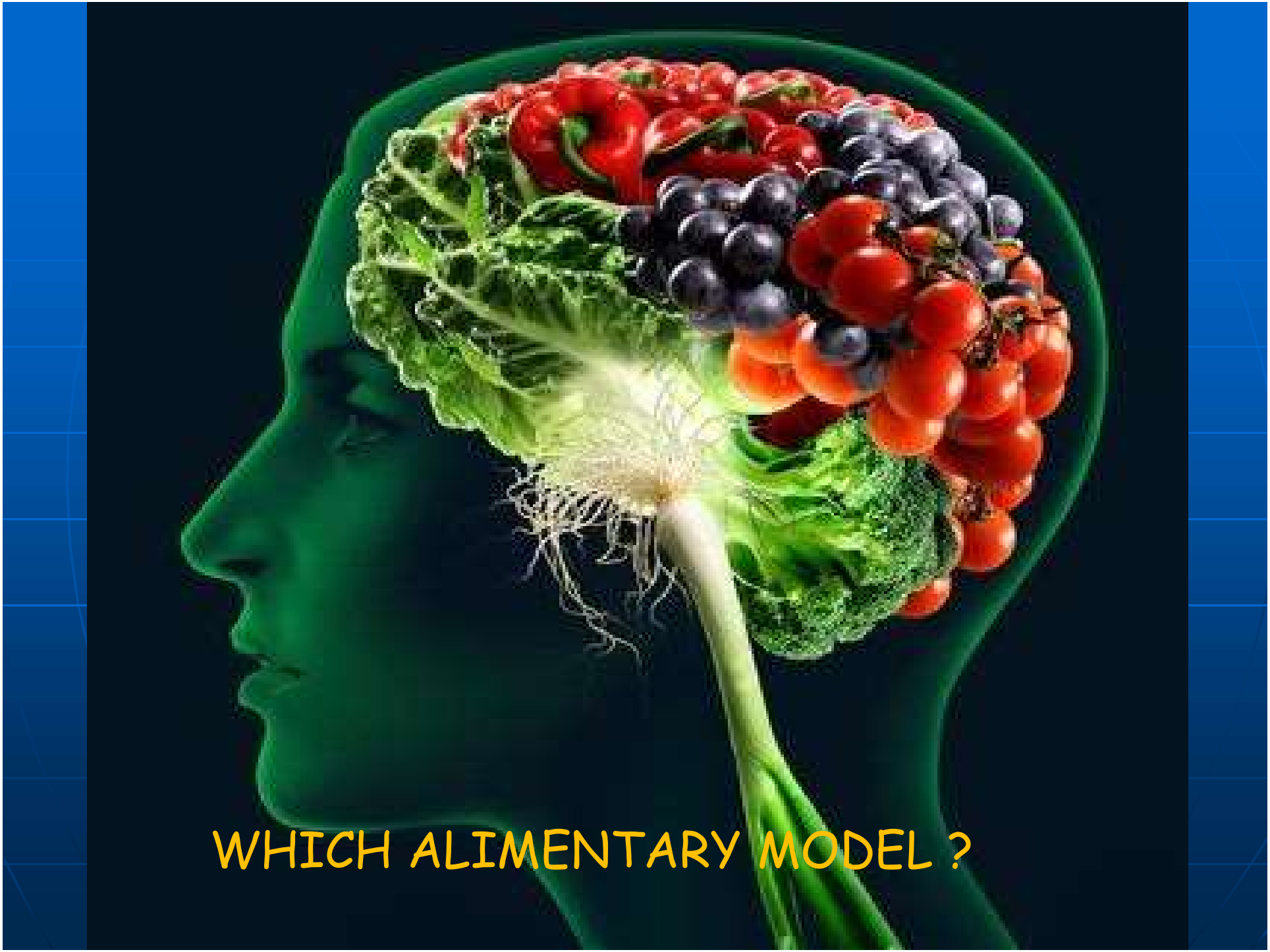


SDI=Socio-demographic Index

Health effects of dietary risks in 195 countries, 1990–2017: a systematic analysis for the Global Burden of Disease Study 2017

GBD 2017 Diet Collaborators

The Lancet Open AccessPublished:April 03, 2019
doi: 10.1016/S0140-6736(19)30041-8


WHICH ALIMENTARY MODEL ?

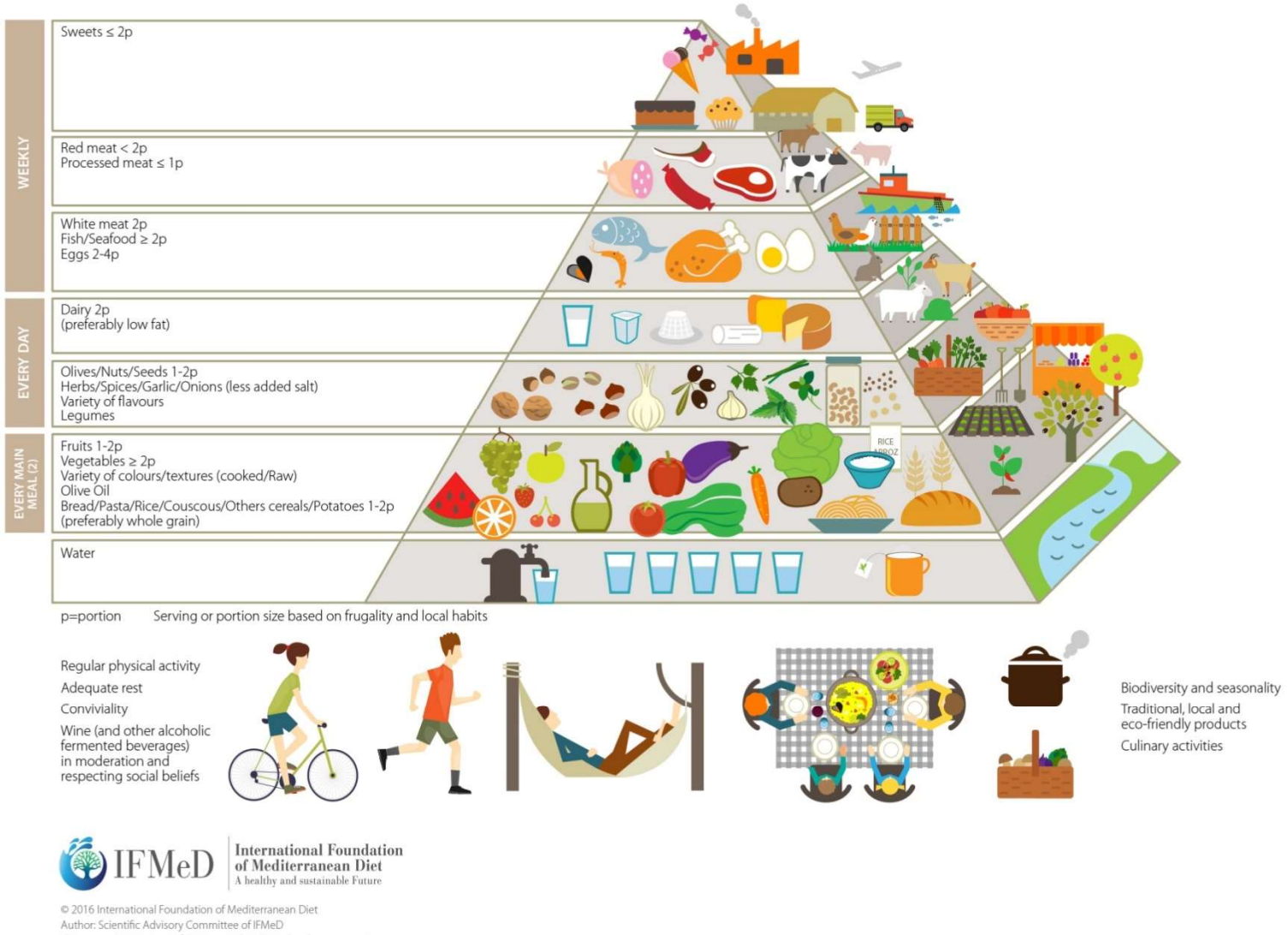
Different Views of Nature Exposed By Our Method of Questioning

- Reductionism: A necessary step in determining specific causal agents at the basic science level.
  - For example: a specific nutrient has antioxidant properties.
  - But people don't eat nutrients, they eat foods.
  - Furthermore, they eat foods in complex dietary patterns
- The Problem: Integrated functions at a higher biological level cannot necessarily be deduced from the properties found at a lower level.

The mediterranean diet

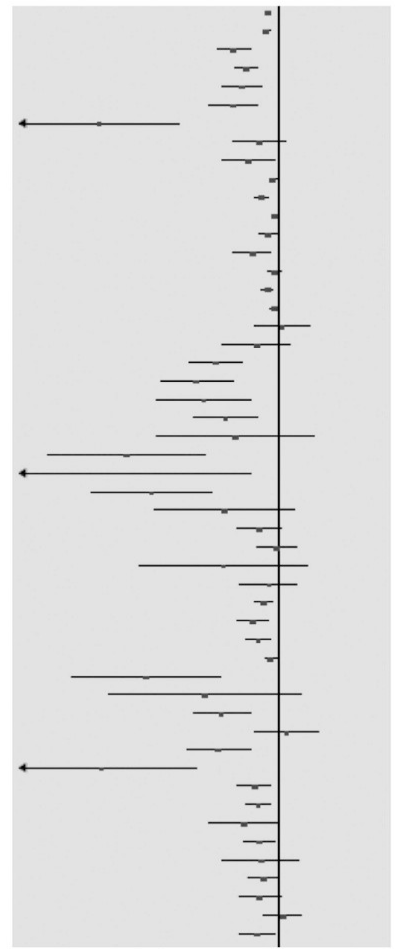
Mediterranean diet has been recognized by **UNESCO** as an Intangible Heritage of Humanity in 2010

More than a diet… an educational model

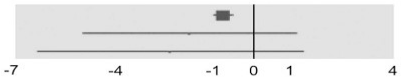


MD: evidence of health

Outcome	n of studies	Study design	n of events (cases) / total (controls)	Comparison	Relative risk (95% CI)
Overall mortality [3]	15	cohort	49 860 / 771 211	2 point increase	0.91 (0.89, 0.93)
CVD incidence/mortality [3]	17	cohort	16 566 / 775 081	2 point increase	0.89 (0.87, 0.92)
CVD incidence [15]	13	cohort	13 434 / 275 162	high vs low	0.67 (0.58, 0.77)
CVD mortality [15]	13	cohort	9 563 / 778 510	high vs low	0.75 (0.68, 0.83)
CHD incidence [15]	4	cohort	2 943 / 153 502	high vs low	0.72 (0.60, 0.86)
MI incidence [15]	3	cohort	1 364 / 44 428	high vs low	0.67 (0.54, 0.83)
Stroke [17]	2	case-control	297 / 296	high vs low	0.20 (0.10, 0.41)
Stroke [17]	2	cross-sectional	950 / 10 847	high vs low	0.84 (0.66, 1.06)
Stroke [17]	5	cohort	2 444 / 159 995	high vs low	0.76 (0.60, 0.96)
Cancer incidence/mortality [3]	10	cohort	82 198 / 2 720 221	2 point increase	0.95 (0.93, 0.97)
Cancer mortality [19]	13	cohort	49 819 / 591 002	high vs low	0.86 (0.82; 0.91)
Cancer incidence [19]	3	cohort	48 683 / 534 058	high vs low	0.96 (0.95; 0.97)
Colorectal cancer [19]	9	cohort	12 819 / 1 415 995	high vs low	0.91 (0.84; 0.98)
Colorectal cancer [18]	4	case-control	4 744 / 36 099	high vs low	0.79 (0.67, 0.93)
Breast cancer [19]	13	cohort	33 111 / 988 736	high vs low	0.96 (0.90; 1.03)
Breast cancer [18]	8	case-control	6 867 / 8 694	high vs low	0.90 (0.85, 0.95)
Prostate cancer [18]	2	cohort	29 806 / 366 037	high vs low	0.96 (0.92, 1.00)
Prostate cancer [18]	1	case-control	1 482 / 1 108	high vs low	1.03 (0.81, 1.31)
Gastric cancer [18]	1	cohort	1 382 / 980 012	high vs low	0.82 (0.61, 1.10)
Gastric cancer [18]	1	case-control	999 / 2 628	high vs low	0.57 (0.45, 0.72)
Pancreatic cancer [18]	1	case-control	688 / 2 204	high vs low	0.48 (0.35, 0.66)
Liver cancer [18]	1	case-control	518 / 772	high vs low	0.51 (0.34, 0.77)
Liver cancer [18]	1	cohort	509 / 494 942	high vs low	0.62 (0.47, 0.82)
Esophageal cancer [18]	1	cohort	488 / 494 968	high vs low	0.68 (0.34, 1.36)
Esophageal cancer [18]	1	case-control	304 / 743	high vs low	0.26 (0.13, 0.52)
Respiratory cancer [18]	1	cohort	124 / 4 336	high vs low	0.09 (0.01, 0.77)
Head/neck cancer [18]	4	case-control	2 065 / 4 851	high vs low	0.32 (0.19, 0.55)
Head/neck cancer [18]	1	cohort	1 868 / 49 4967	high vs low	0.61 (0.33, 1.14)
Bladder cancer [18]	1	cohort	1 425 / 477 312	high vs low	0.84 (0.69, 1.02)
Endometrial cancer [18]	1	cohort	1 392 / 84 415	high vs low	0.98 (0.82, 1.17)
Endometrial cancer [18]	2	case-control	2 058 / 4 001	high vs low	0.61 (0.29, 1.29)
Ovarian cancer [18]	1	case-control	696 / 82 948	high vs low	0.91 (0.71, 1.17)
Neurodegenerative diseases [3]	5	cohort	1 074 / 136 235	2 point increase	0.79 (0.70, 0.90)
Neurodegenerative diseases [20]	9	cohort	3 627 / 34 168	high vs low	0.87 (0.81, 0.94)
Cognitive impairment [20]	9	cohort	2 328 / 27 567	high vs low	0.83 (0.75, 0.93)
Cognitive impairment [21]	5	cohort	709 / 6 878	1 point increase	0.92 (0.88, 0.97)
Cognitive impairment [16]	1	case-control	282 / 1 880	high vs low	0.31 (0.16, 0.59)
Cognitive impairment [16]	3	cross-sectional	459 / 3 345	high vs low	0.52 (0.22, 1.22)
Alzheimer's disease [20]	5	cohort	637 / 6 111	high vs low	0.60 (0.48, 0.77)
Dementia [20]	3	cohort	662 / 8 873	high vs low	1.07 (0.81, 1.42)
Depression [16]	1	cohort	480 / 10 094	high vs low	0.58 (0.44, 0.77)
Depression [16]	1	case-control	111 / 345	high vs low	0.21 (0.09, 0.48)
Depression [16]	7	cross-sectional	1 718 / 7 406	high vs low	0.80 (0.69, 0.93)
Diabetes [24]	10	cohort	19 663 / 136 846	high vs low	0.83 (0.74, 0.93)
MetS [23]	4	cohort	1 752 / 16 457	high vs low	0.73 (0.54, 0.98)
MetS [23]	8	case-control	4 590 / 17 390	high vs low	0.84 (0.73, 0.97)
MetS [17]	4	cross-sectional	NA / 4 500	high vs low	0.85 (0.61, 1.19)
HDL-cholesterol [23]	4	cross-sectional	NA / 11 868	high vs low	0.87 (0.77, 1.00)
Triglycerides [23]	4	cross-sectional	NA / 11 868	high vs low	0.84 (0.70, 1.01)
Glucose [23]	4	cross-sectional	NA / 11 868	high vs low	1.03 (0.87, 1.22)
Waist circumference [23]	4	cross-sectional	NA / 11 868	high vs low	0.82 (0.70, 0.96)



					Mean Difference (95% CI)
HOMA-Index [17]	3	cross-sectional	NA / 4 804	high vs low	-0.86 (-1.13, -0.59)
Systolic pressure [17]	4	cross-sectional	NA / 14 734	high vs low	-1.81 (-4.83, 1.21)
Diastolic pressure [17]	4	cross-sectional	NA / 14 734	high vs low	-2.36 (-6.12, 1.40)



M Dinu, GPagliai A Casini and F Sofi Mediterranean diet and health outcomes , European Journal of Clinical Nutrition (2018)

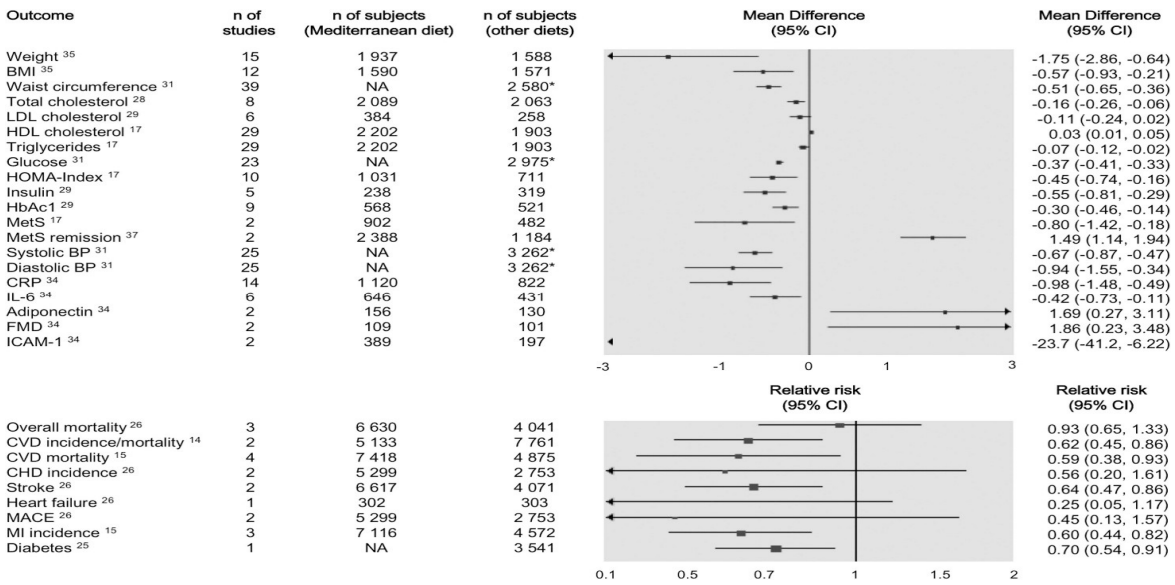


Figure 3. Forest plot of all non-overlapping meta-analyses of RCTs reporting Mediterranean diet versus other diets intervention in relation to different health outcomes.

MD vs other diets

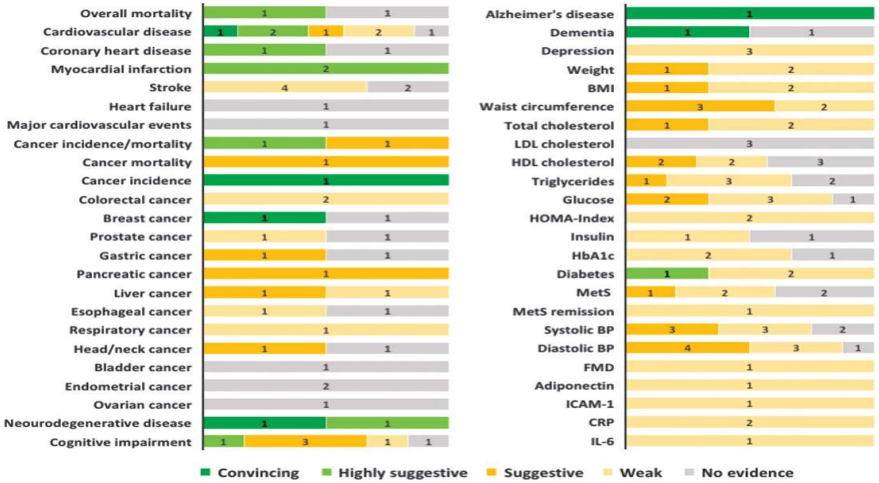
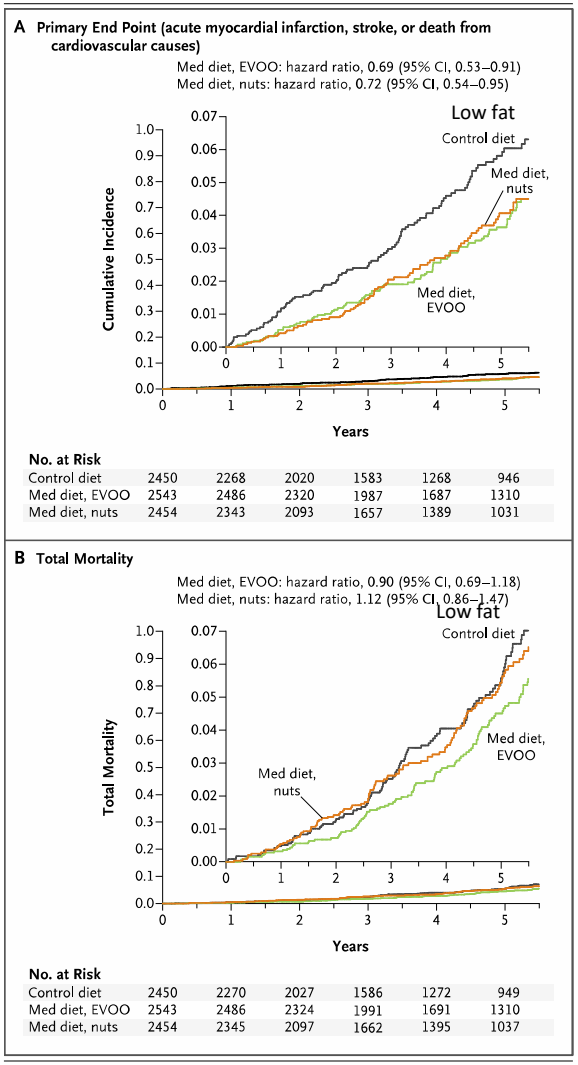


Figure 4. Summary of the strength of evidence for the evaluated health outcomes. Numbers indicate the number of meta-analyses with convincing, highly suggestive, suggestive, weak or no evidence for each outcome.

Strenght of evidence

M Dinu, GPagliai A Casini and F Sofi Mediterranean diet and health outcomes , European Journal of Clinical Nutrition (2018)

The PREDIMED study



In this study involving 7447 persons at high cardiovascular risk, the incidence of major cardiovascular events after 5 years was lower among those assigned to a Mediterranean diet supplemented with extra-virgin olive oil or nuts than among those assigned to a reduced-fat diet.

N ENGL J MED 378;25 NEJM.ORG JUNE 21, 2018

The NEW ENGLAND JOURNAL *of* MEDICINE

ORIGINAL ARTICLE

Primary Prevention of Cardiovascular Disease with a Mediterranean Diet Supplemented with Extra-Virgin Olive Oil or Nuts

R. Estruch, E. Ros, J. Salas-Salvadó, M.-I. Covas, D. Corella, F. Arós, E. Gómez-Gracia, V. Ruiz-Gutiérrez, M. Fiol, J. Lapetra, R.M. Lamuela-Raventos, L. Serra-Majem, X. Pintó, J. Basora, M.A. Muñoz, J.V. Sorlí, J.A. Martínez, M. Fitó, A. Gea, M.A. Hernán, and M.A. Martínez-González, for the PREDIMED Study Investigators*

Effect of the Mediterranean Diet with and Without Weight Loss on Markers of Inflammation in Men with Metabolic Syndrome
Richard et al, Obesity 2012

Intervention studies on the Mediterranean Diet (MedDiet) have often led to weight loss, which may have contributed to the purported anti-inflammatory effects of the MedDiet. To investigate the impact of the MedDiet consumed under controlled feeding conditions before (−WL) and after weight loss (+WL) on markers of inflammation in men with metabolic syndrome (MetS).

Design and Methods:

Subjects (*N* = 26, male, 24–65 years) with MetS first consumed a North American control diet for 5 weeks followed by a MedDiet for 5 weeks both in isocaloric feeding conditions. After a 20-week weight loss period in free-living conditions (10 ± 3% reduction in body weight, $P < 0.01$), participants consumed the MedDiet again under isocaloric-controlled feeding condition for 5 weeks.

Results:

MedDiet − WL significantly reduced plasma C-reactive protein (CRP) concentrations (−26.1%, $P = 0.02$) and an arbitrary inflammatory score (−9.9%, $P = 0.01$) that included CRP, interleukin-6 (IL-6), IL-18, and tumor necrosis factor-α (TNF-α) compared with the control diet. The MedDiet + WL significantly reduced plasma IL-6 (−20.7%) and IL-18 (−15.6%, both $P \leq 0.02$) concentrations compared with the control diet but had no further significant impact on plasma CRP concentration. Participants with a reduction in waist circumference ≥8.5 cm after MedDiet + WL showed significantly greater reductions in inflammation markers than those with a change in waist circumference <8.5 cm.

Conclusions:

Thus, consuming MedDiet even in the absence of weight loss significantly reduces inflammation. However, the degree of waist circumference reduction with weight loss magnifies the impact of the MedDiet on other markers of inflammation associated with MetS in men.

Mediterranean diet and inflammation markers

TABLE 3 Plasma concentrations of pro-inflammatory markers at the end of each experimental diet

Variables[a]	Control ($N = 26$)	MedDiet – WL ($N = 26$)	% Vs. control	P^b	MedDiet + WL ($N = 19$)	% Vs. control	% Vs. MedDiet – WL	P^c
Weight (kg)	98.4 ± 18.3	97.2 ± 18.3[d]	−1.3%	<0.001	89.4 ± 18.2[d,e]	−10.2%	−9.1%	<0.001
Waist circumference (cm)[f]	111.5 ± 12.0	110.9 ± 11.7	−0.5%	0.056	104.3 ± 13.4[d,e]	−7.6%	−7.0%	<0.001
CRP (mg/l)	4.01 ± 2.34	2.97 ± 1.98[d]	−26.1%	0.019	2.68 ± 2.36[d]	−34.5%	−15.0%	0.013
IL-6 (pg/ml)[f]	1.38 ± 1.67	1.31 ± 1.75	−4.8%	0.318	1.27 ± 1.40[d]	−20.7%	−16.4%	0.111
IL-18 (pg/ml)	280.2 ± 90.9	272.2 ± 89.1	−2.9%	0.097	254.5 ± 83.2[d,e]	−15.6%	−13.0%	<0.001
TNF-α (pg/ml)[f]	0.90 ± 0.35	0.86 ± 0.39	−4.1%	0.290	0.88 ± 0.33	−2.6%	−2.4%	0.925
Inflammation score[g]	8.0 ± 1.9	7.3 ± 1.9[d]	−9.9%	0.012	7.0 ± 1.9[d]	−12.9%	−4.2%	0.003

CRP, C-reactive protein; IL, interleukin; TNF, tumor necrosis factor; WL, weight loss.
[a]Values are presented as mean ± s.d. and percentage of change from values on the control diet or the MedDiet without weight loss. Analyses presented here are based on the PROC MIXED procedure in SAS. [b]*P* value from the main effect of diet adjusted for body weight variation in the mixed model ($N = 26$). [c]*P* value from the main effect of diet in the mixed model ($N = 19$). Values for these 19 completers on the control diet and on the MedDiet without weight loss were comparable to values from the entire group of subjects ($N = 26$), not shown. [d]Significantly different from the control diet, $P < 0.05$ from the Tukey adjustment in the MIXED model. [e]Significantly different from the MedDiet without weight loss, $P < 0.05$ from the Tukey adjustment in the MIXED model. [f]Analysis was performed on log-transformed values. [g]The inflammation score was calculated based on the sum of points for each tertile of CRP (<2.2, 2.2–4.9, ≥4.9 mg/l), IL-6 (<0.79, 0.79–1.35, ≥1.35 pg/ml), IL-18 (<232.6, 232.6–324.7, ≥324.7 pg/ml), and TNF-α (<0.72, 0.72–0.97, ≥0.97 pg/ml) and had a theoretical range of 4–16 points.

Richard et al, Obesity 2012

Mediterranean diet and inflammation markers

Table 3. Inflammation and Coagulation Markers by Tertile of the Mediterranean Diet Score

	Tertile of Diet Score			3rd vs 1st
	1st (0–20)	2nd (21–35)	3rd (36–55)	p Value*
White blood cell (×1,000 counts)	7.4 ± 1.3	6.9 ± 2.7	6.2 ± 1.4	0.001
C-reactive protein (mg/l)	2.0 ± 1.8	1.8 ± 2.1	1.6 ± 1.5	0.01
Fibrinogen (mg/dl)	319 ± 79	309 ± 76	302 ± 74	0.02
Interleukin-6 (pg/ml)	2.1 ± 0.9	1.84 ± 1.1	1.45 ± 0.99	0.02
Homocysteine (μmol/l)	12.4 ± 5.8	11.7 ± 6.4	10.5 ± 6.0	0.03
Tumor necrosis factor-alpha (pg/ml)	5.8 ± 1.3	5.5 ± 1.4	5.1 ± 2.1	0.07
Amyloid A (mg/l)	5.2 ± 6.2	4.4 ± 4.6	3.6 ± 5.4	0.19

*Unadjusted p values by analysis of variance. Data are presented as the mean value ± SD.

The Attica study, Chrysohoou et al, JACC, 2004

BMJ open

Adherence to a Mediterranean diet is associated with a better health-related quality of life: a possible role of high dietary antioxidant content

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ABSTRACT

Objectives: Mediterranean diet (MD) is associated with a reduced risk of major chronic disease. Health-related quality of life (HRQL) is a valid predictor of mortality. The aim of this study is to investigate the association between MD and HRQL and to examine the possible role of dietary antioxidants, fibre content and/or fatty acid components.

Design: Cross-sectional study on a sample of Italian participants enrolled in the Moli-sani Project, a population-based cohort study. Food intake was recorded by the Italian European prospective investigation into cancer and nutrition study food frequency questionnaire. Adherence to MD was appraised by a Greek Mediterranean diet score (MDS), an Italian Mediterranean diet index (IMI) and by principal component analysis (PCA). HRQL was assessed by the 36-Item Short Form Health Survey.

Setting: Molise region, Italy.

Participants: 16 937 participants of 24 325 Italian citizens (age≥35).

Main outcomes: Dietary patterns and HRQL.

Results: *Mental* health was associated consistently and positively with MDS, IMI and an 'Olive oil and vegetable' pattern (PCA1), but negatively with an 'Eggs and sweets' pattern (PCA3). *Physical* health was associated positively with MDS and PCA1, but negatively with a 'Meat and pasta' pattern. Subjects with the highest MD adherence had 42% (MDS), 34% (IMI) or 59% (PCA1) statistically significant multivariable odds of being in the uppermost level of mental health, as compared with subjects in the lowest category. The associations disappeared after further adjustment for either total food antioxidant content or dietary fibre, while they were not modified by the inclusion of either monounsaturated or polyunsaturated fatty acids. Individuals in the highest PCA1 or PCA3 had significantly higher odds of being in the top level of physical health.

Conclusions: Adherence to an MD pattern is associated with better HRQL. The association is stronger with mental health than with physical health. Dietary total antioxidant and fibre content independently explain this relationship.

ARTICLE SUMMARY

Article focus

- Investigating the association between adherence to the Mediterranean diet and health-related quality of life.
- Examining the possible role of dietary antioxidants, fibre intake and/or fatty acid components in explaining the association.

Key messages

- Mental health is positively associated with a Mediterranean diet and inversely linked to 'Eggs and sweets' dietary pattern.
- The association is mainly accounted for not only by the total antioxidant content but also by the fibre dietary content.
- Fatty acid compounds do not explain the association between the Mediterranean diet and health-related quality of life.

Strengths and limitations of this study

- This study is apparently the first to provide a likely account of dietary antioxidants for the direct association between the Mediterranean diet and health-related quality of life.
- For the first time, this topic was addressed by using simultaneously two a priori Mediterranean scores and the a *posteriori* dietary patterns obtained by principal component analysis.
- The present study was cross-sectional and shares all the limitations of this study type; in particular, the inference of possible causality is unwarranted.

INTRODUCTION

Mediterranean diet (MD) is a healthy eating pattern associated with reduced risk for cardiovascular and neurodegenerative diseases and some types of cancer.[1 2] This dietary pattern is characterised by the wide consumption of plant foods, cereals, legumes, fish and olive oil as the main source of fat

Sáez-Almendros *et al. Environmental Health* 2013, 12:118
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ENVIRONMENTAL HEALTH

RESEARCH Open Access

Environmental footprints of Mediterranean versus Western dietary patterns: beyond the health benefits of the Mediterranean diet

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Abstract

Background: Dietary patterns can substantially vary the resource consumption and environmental impact of a given population. Dietary changes such as the increased consumption of vegetables and reduced consumption of animal products reduce the environmental footprint and thus the use of natural resources. The adherence of a given population to the Mediterranean Dietary Pattern (MDP) through the consumption of the food proportions and composition defined in *the new Mediterranean Diet pyramid* can thus not only influence human health but also the environment. The aim of the study was to analyze the sustainability of the MDP in the context of the Spanish population in terms of greenhouse gas emissions, agricultural land use, energy consumption and water consumption. Furthermore, we aimed to compare the current Spanish diet with the Mediterranean Diet and in comparison with the western dietary pattern, exemplified by the U.S.A. food pattern, in terms of their corresponding environmental footprints.

Methods: The environmental footprints of the dietary patterns studied were calculated from the dietary make-up of each dietary pattern, and specific environmental footprints of each food group. The dietary compositions were obtained from different sources, including food balance sheets and household consumption surveys. The specific environmental footprints of food groups were obtained from different available life-cycle assessments.

Results: The adherence of the Spanish population to the MDP has a marked impact on all the environmental footprints studied. Increasing adherence to the MDP pattern in Spain will reduce greenhouse gas emissions (72%), land use (58%) and energy consumption (52%), and to a lower extent water consumption (33%). On the other hand, the adherence to a western dietary pattern implies an increase in all these descriptors of between 12% and 72%.

Conclusions: The MDP is presented as not only a cultural model but also as a healthy and environmentally-friendly model, adherence to which, in Spain would have, a significant contribution to increasing the sustainability of food production and consumption systems in addition to the well-known benefits on public health.

Keywords: Mediterranean diet, Environmental footprints, Western pattern, Sustainable diets, Spain, Sustainability, Environment

MD vs WD: environmental footprint

Table 1 Environmental footprints for MDP, WDP and SCP, and current real pressure for each footprint

	MDP	SCP_{FB}	SCP_{CS}	WDP	*Current real pressure*
Agricultural land use (10^3 Ha $year^{-1}$)	8 365	19 874	12 342	33 162	15 400
Energy consumption (TJ $year^{-1}$)	239 042	493 829	285 968	611 314	229 178
Water consumption (Km^3 $year^{-1}$)	13.2	19.7	13.4	22.0	19.4
Greenhouse gas emissions (Gg $CO_{2\text{-eq}}$ $year^{-1}$)	35 510	125 913	72 758	217 128	62 389

The subscripts FB and CS refer to estimates derived from food balance sheets and from consumption surveys, respectively.

MDP: Mediterranean Dietary Pattern

SCP: Spanish Current Pattern

WDP: Western Dietary Pattern

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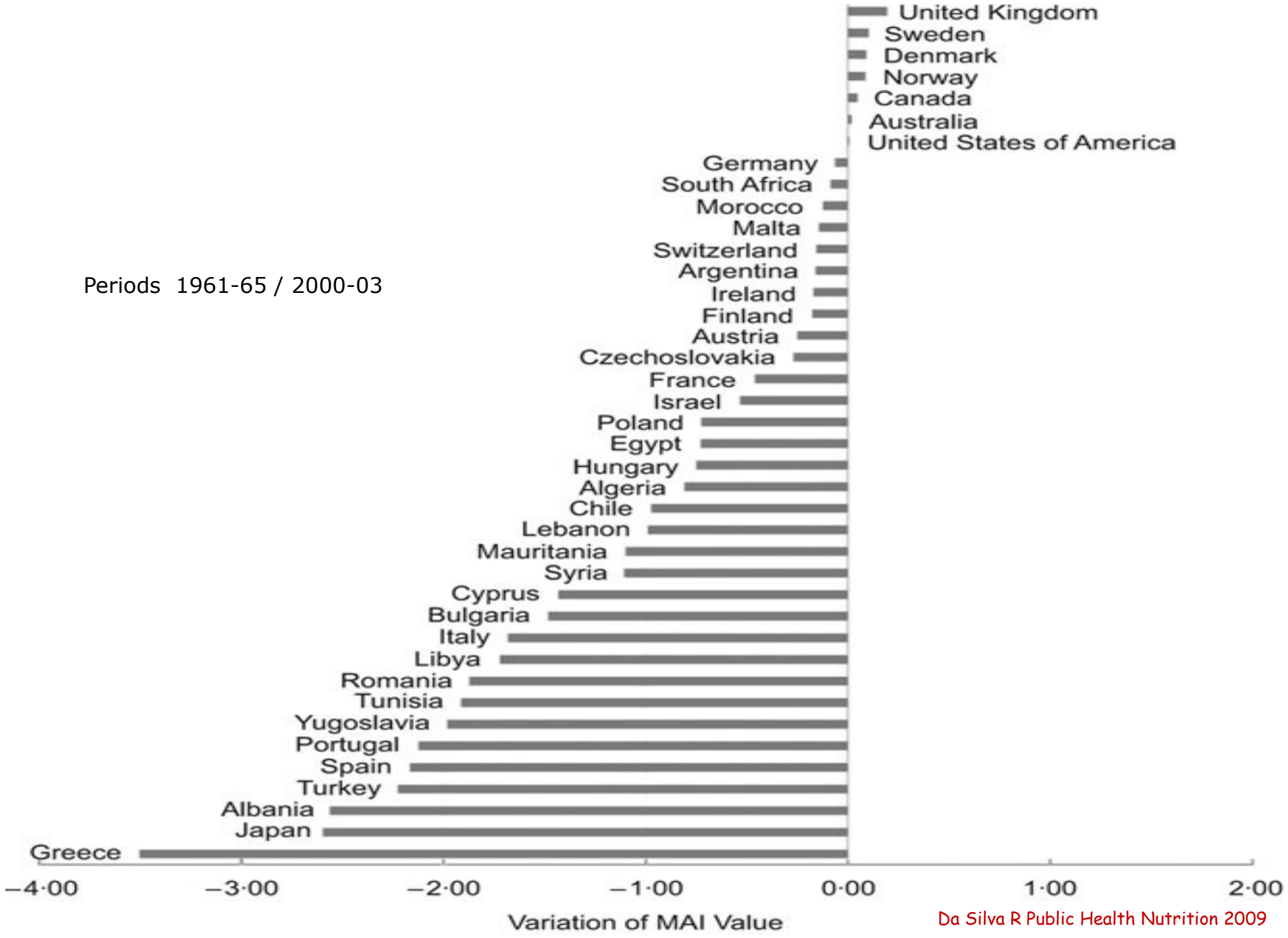
Periods 1961-65 / 2000-03



Da Silva R Public Health Nutrition 2009

Thank you for your attention