

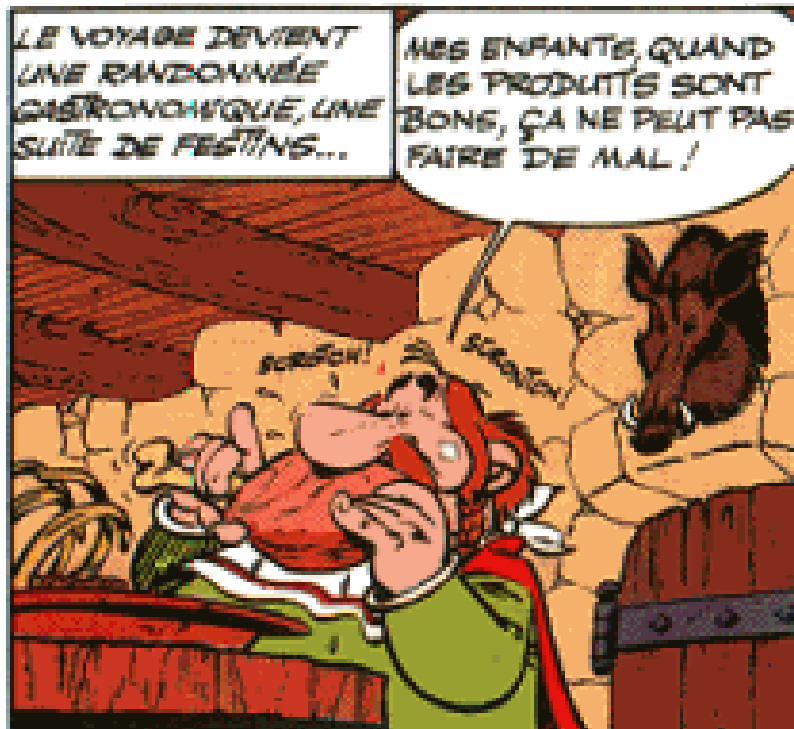


29 novembre 2024 09:45-10:15

ALIMENTATION ET MASLD

Quelle stratégie diététique

Prof. Jean-François DUFOUR



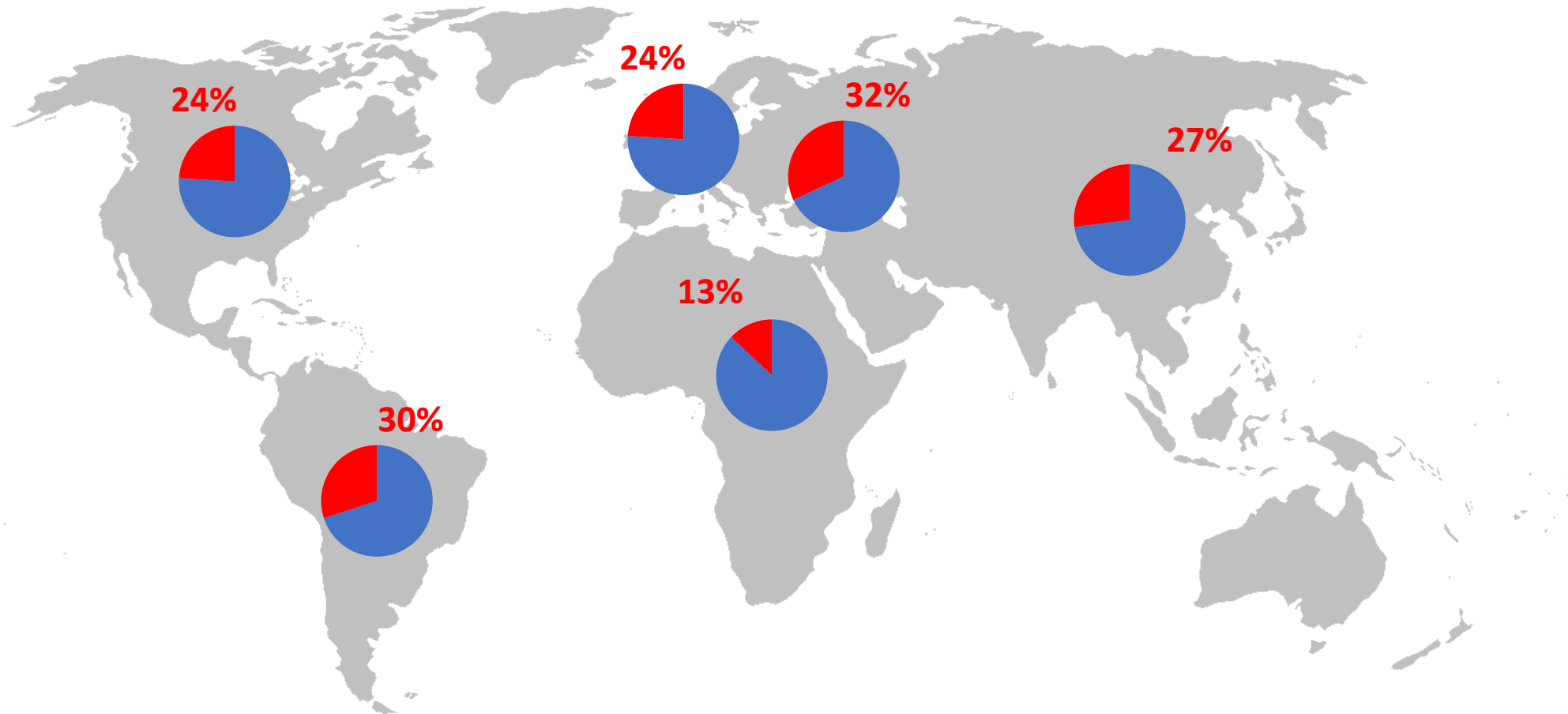
Conflits d'intérêts

- **Advisory committees:** Alentis, Astra-Zeneca, Bristol-Myers Squibb, Engimmune, Esai, Genfit, Inventiva, Ipsen, Madrigal, MSD, Novartis, Novo-Nordisk, Resolution Therapeutics, Roche.
- **Speaking and teaching:** Astra-Zeneca, Ipsen, Novo Nordisk, Roche.

Points essentiels

- 25% de la population a un foie gras
- Eviter les acides gras saturés
- Eviter le fructose (sodas)
- Diète méditerranéenne
- Eviter les aliments ultra-transformés
- Jeun intermittent

25% de la population mondiale a un foie gras



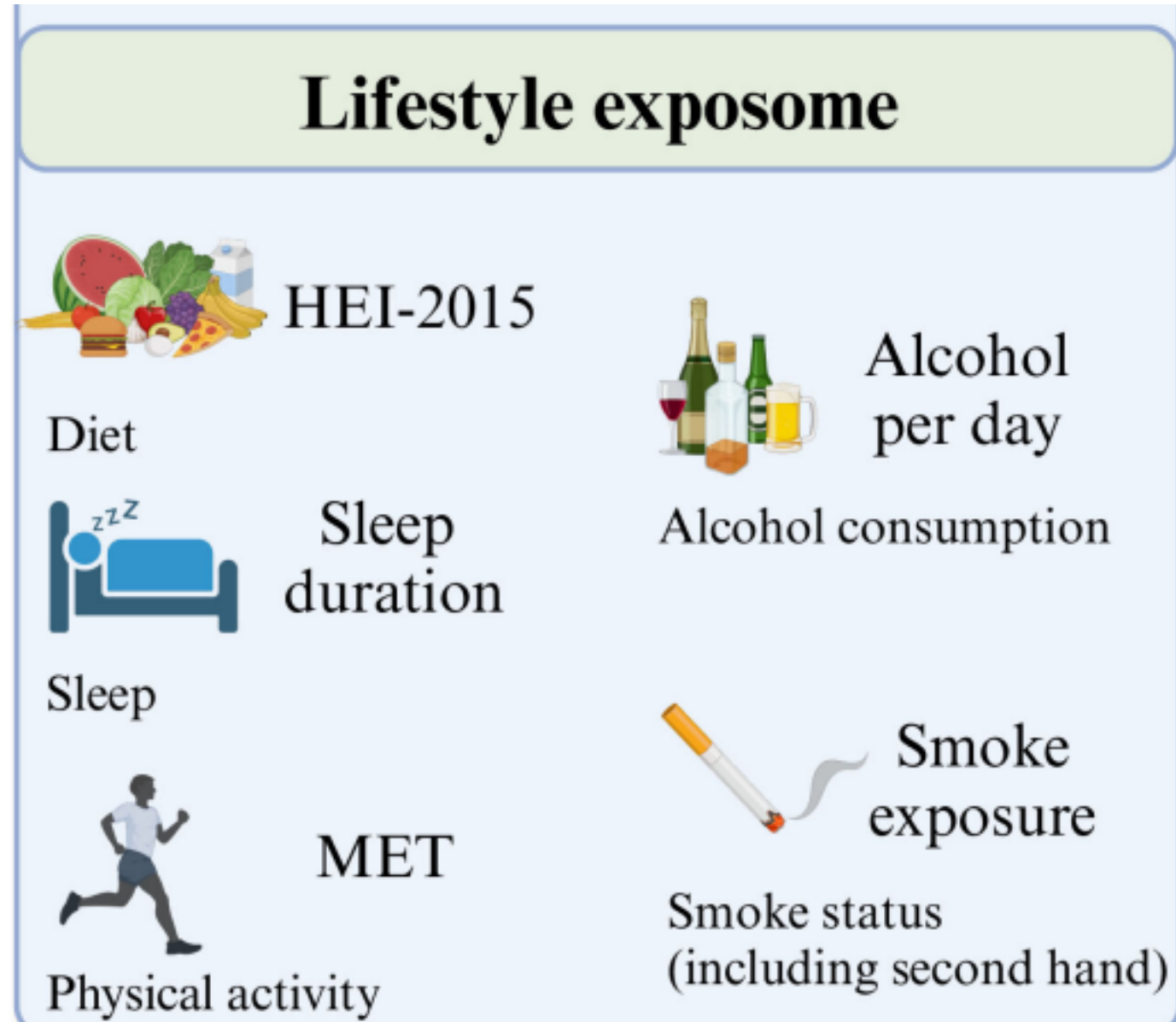
Modes de vie associés avec MAFLD

Study population:

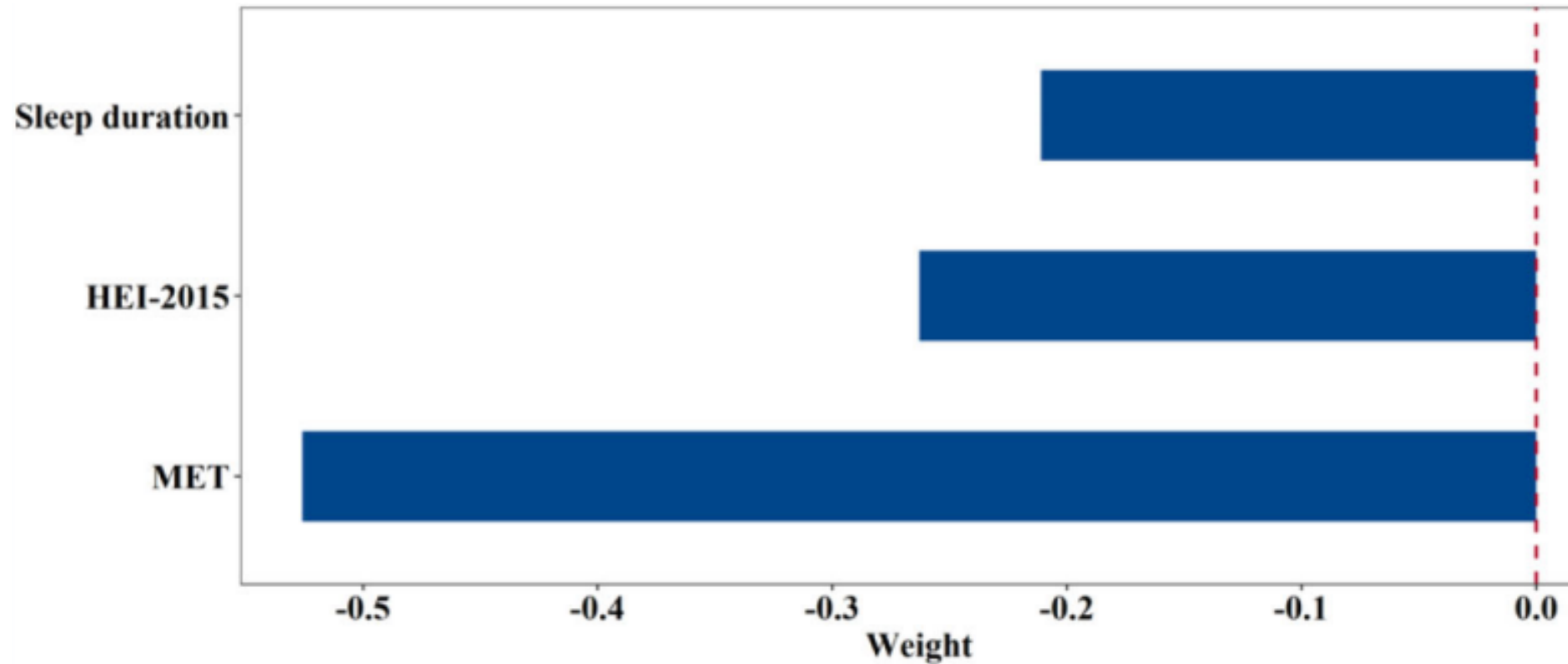
5,002 participants

NHANES 2017-2020

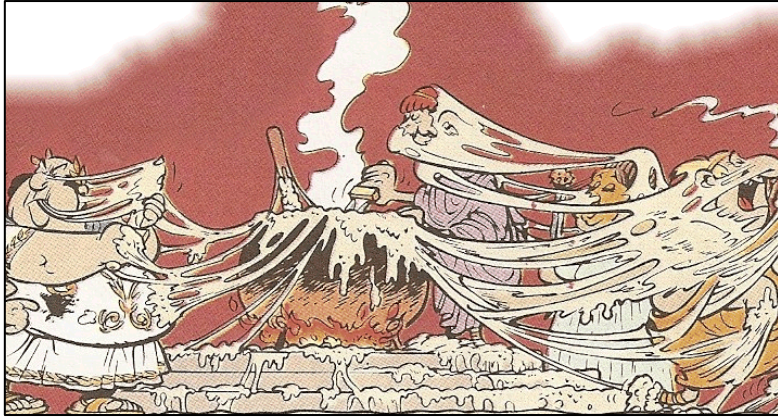
1,861 (37.2%) with MAFLD



Modes de vie associés avec MAFLD



Que choisir en



Graisses

Protéines



Sucres



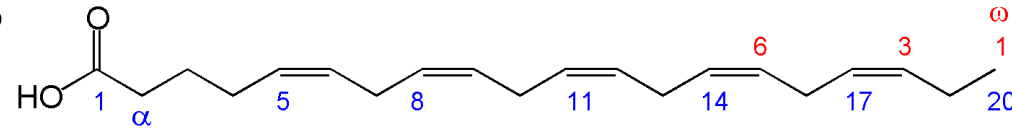
Diètes



Different Fatty Acids

PolyUnsaturated Fatty Acids (PUFAs)

Omega-3 or n-3



Eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA)

Upregulation of PPAR- α

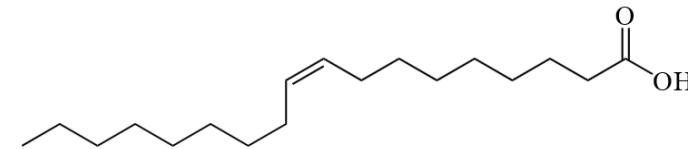
Increase FA oxidation

Reduce Lipogenesis

Antiinflammatory and insulin-sensitizing effects

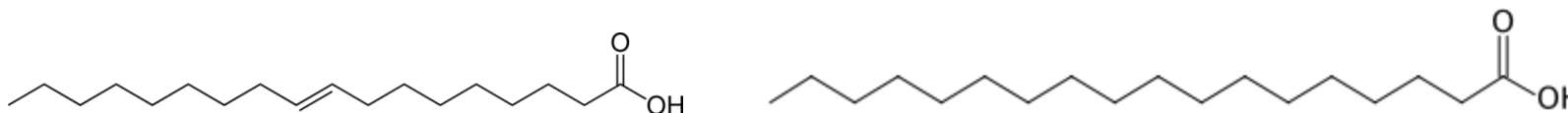
MonoUnsaturated Fatty Acids

Palmitoleic acid, oleic acid (cis)

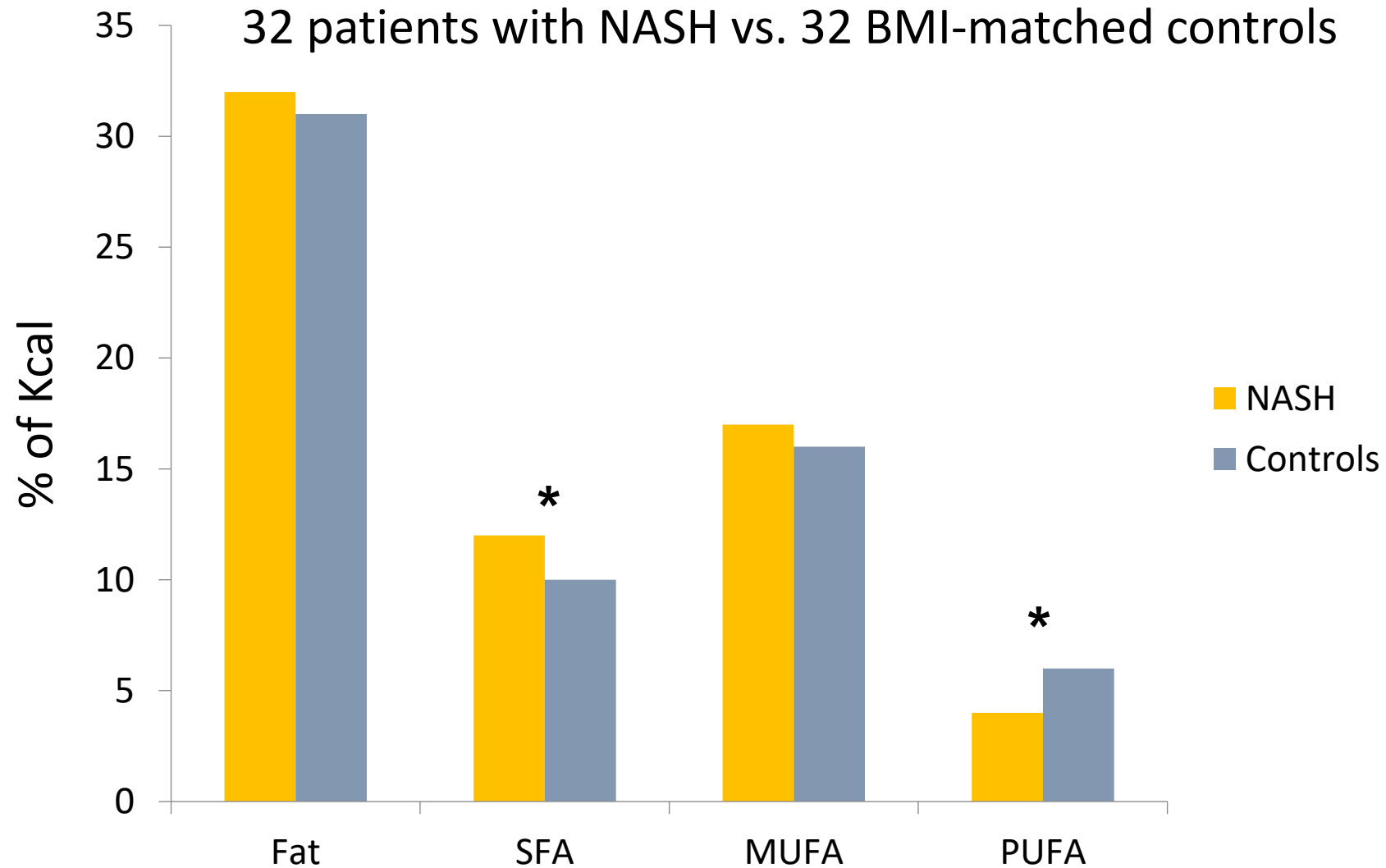


Trans and Saturated Fatty Acids

Associated with elevated cardiovascular risk



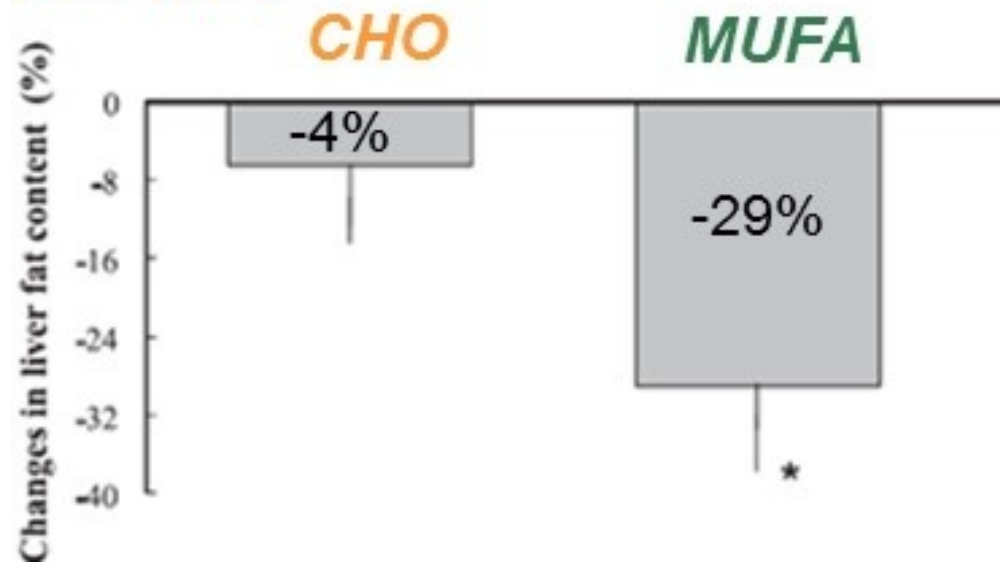
Daily intake of fats



MonoUnsaturated Fatty Acids (MUFAs)

45 patients with diabetes randomized to 8-week iso-caloric high MUFAs diet (28% vs 16% calorie intake) vs high-carbohydrate (52% vs 40%)

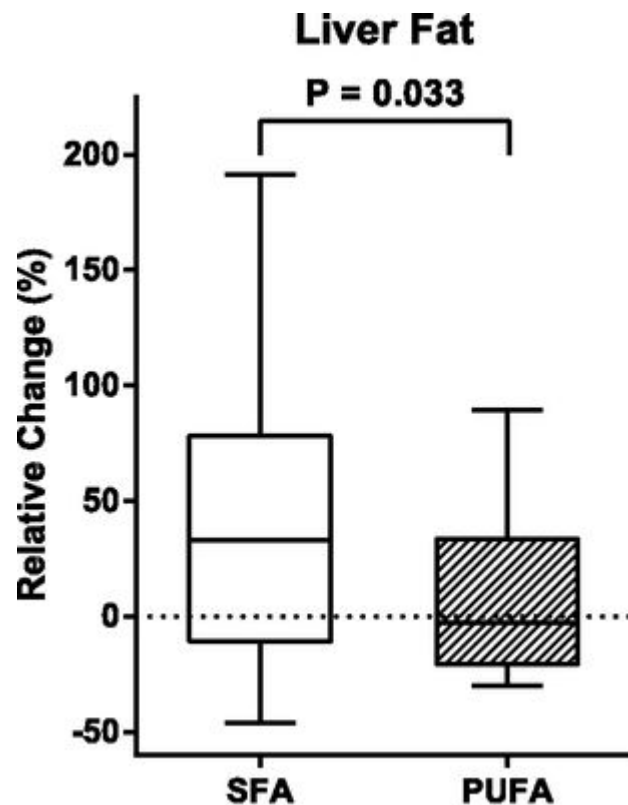
Relative changes in liver fat (measured by ^1H NMR)



No change in
Body weight

Hypercaloric high fat-diet: SFA vs. PUFA

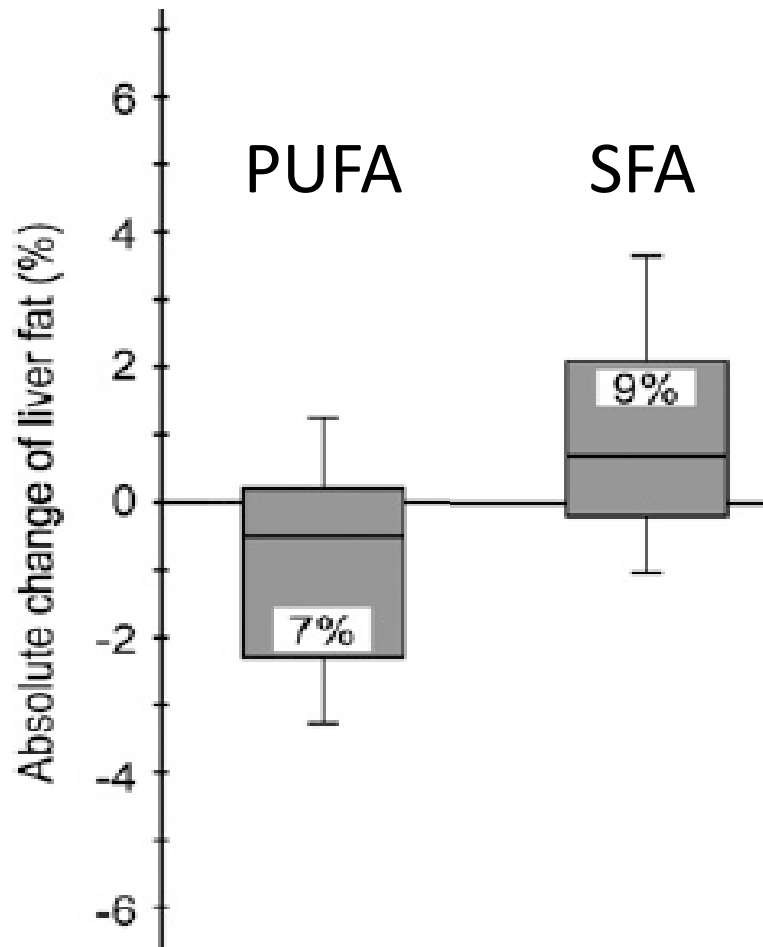
39 young and normal-weight individuals overfed muffins high in SFAs (palm oil) or n-6 PUFAs (sunflower oil) for 7 weeks. Liver fat measured by ^1H NMR



Body weight +1.6kg
no difference between
the groups

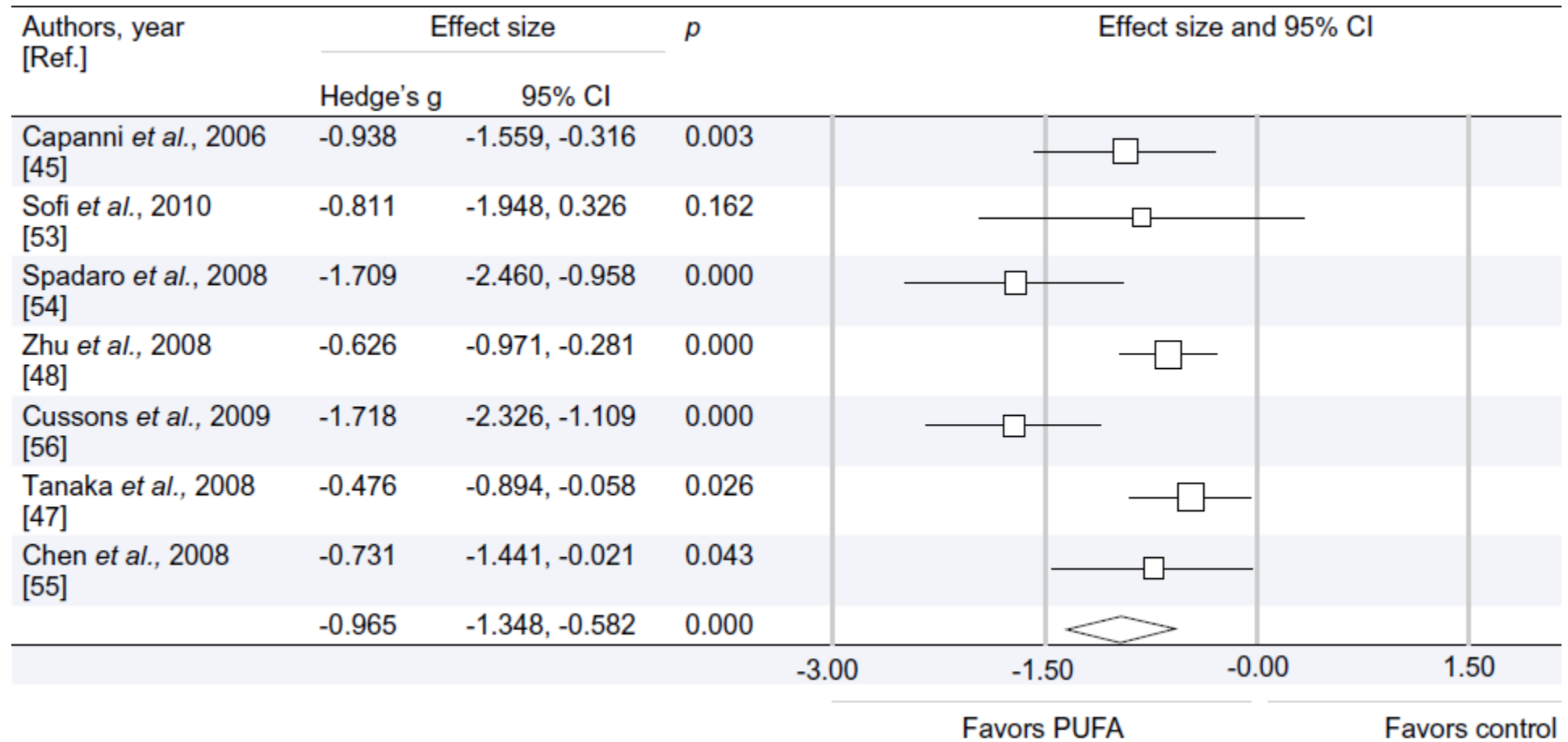
Isocaloric high fat-diet: SFA vs. PUFA

67 obese individuals fed a diet rich in n-6 PUFA or SFA for 10 weeks. Liver fat measured by ^1H NMR



Body weight $\pm \approx 0.6\text{kg}$
no difference between
the groups

Omega-3 PUFA and Liver Fat



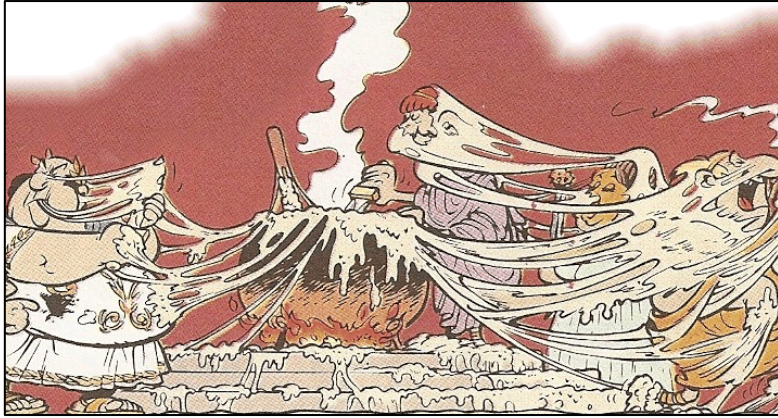
Phase 2 RCT with Ethyl-Eicosapentanoic Acid on Histologic Features of NASH

| End point | Placebo (n=55) | EPA 1800 mg/d (n=55) | EPA 2700 mg/d (n=64) | P values |
|----------------------|----------------|----------------------|----------------------|----------|
| % of responders | 40 | 37 | 36 | NS |
| Secondary | | | | |
| NAS | -1 | -1 | -1 | NS |
| Steatosis | 0 | 0 | 0 | NS |
| Lobular inflammation | 0 | 0 | 0 | NS |
| Ballooning | 0 | -0.5 | 0 | NS |
| Fibrosis | 0 | 0 | 0 | NS |

Double blind RCTs with Omega-3 supplementation in NAFLD

| RCT | Population | Intervention | Steatosis | NASH | Fibrosis |
|---|----------------------|--------------------------------|-----------|------|----------|
| Nobili et al. 2011 Arch Dis Child | 60 children NAFLD | 250 or 500 DHA For 6 months | Yes | - | - |
| Scorletti 2014 Hepatology | 91 NAFLD | 400 EPA+DHA 15-18 months | Yes | - | No |
| Argo 2015 J Hepatol | 34 NASH | 3000 EPA+DHA 12 months | Yes | No | No |

Que choisir en



Graisses

Protéines



Sucres



Diètes

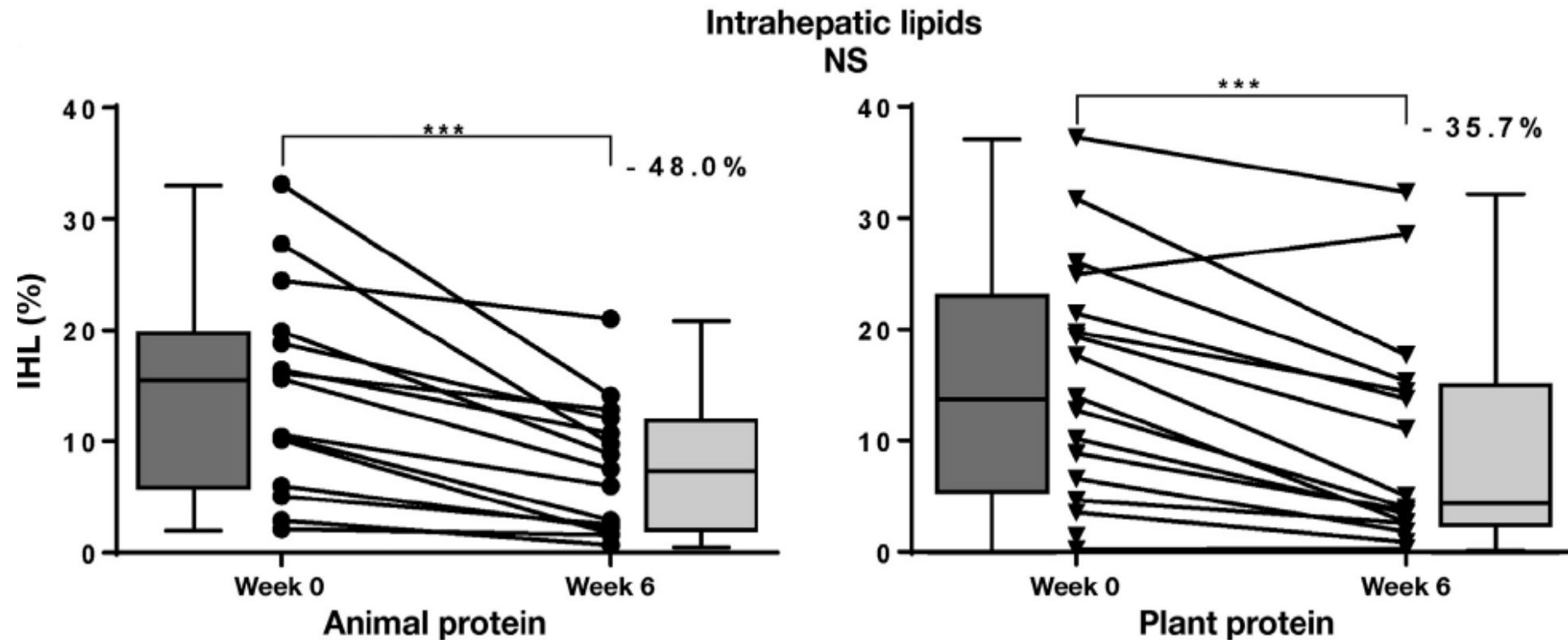


Isocaloric Diets High in animal vs. plant proteins

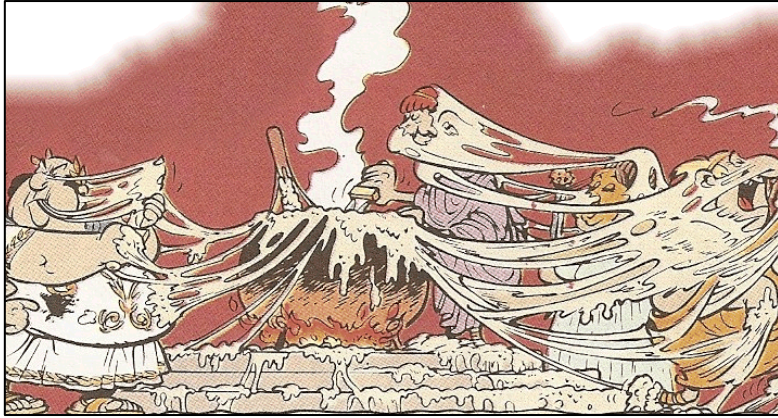
Randomized open-label trial (30% energy from protein, before 17%)

18 patients with DM II to diet high in animal protein

19 patients with DM II to diet high in plant protein for 6 weeks



Que choisir en



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Protéines



Sucres

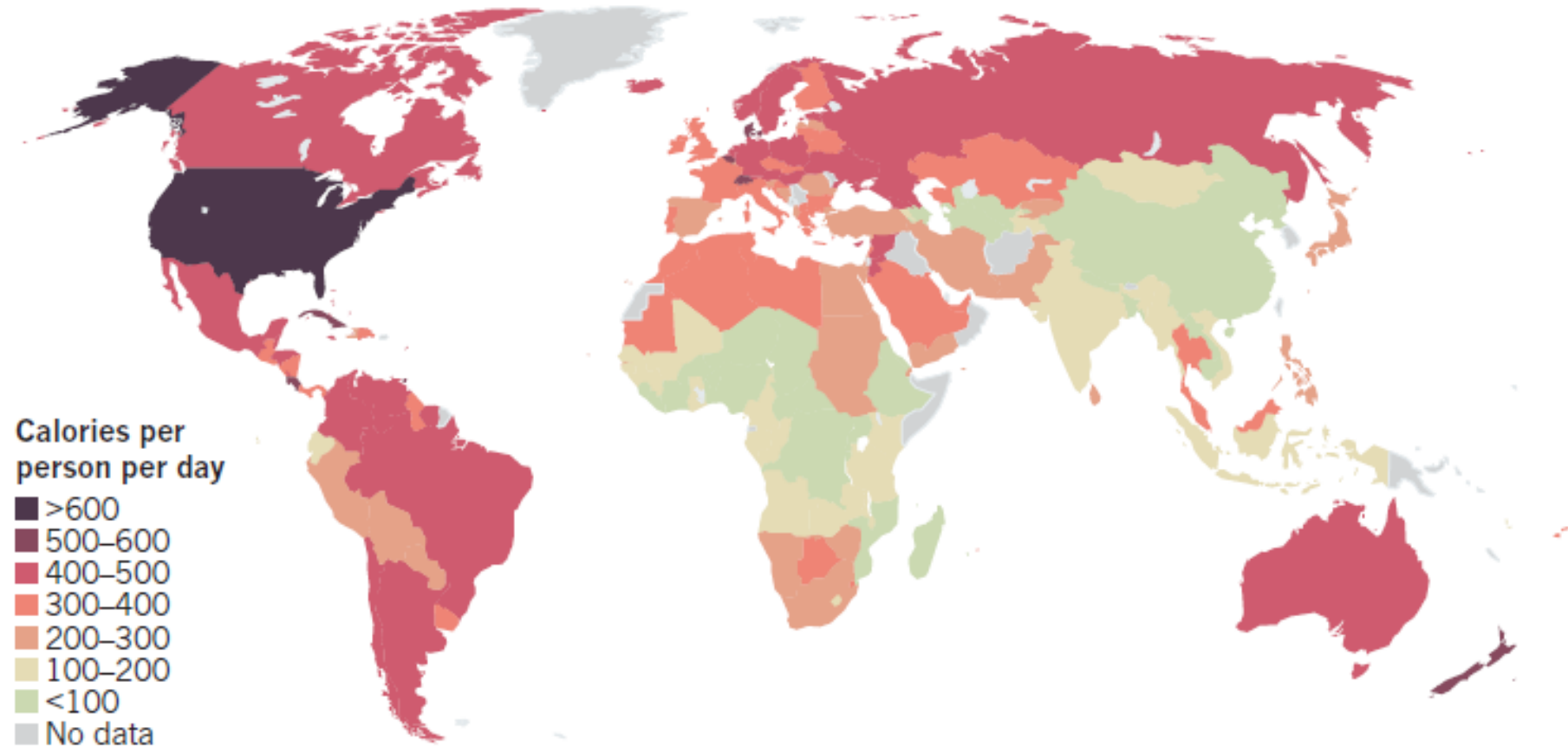


Diètes



‘Nature made sugar hard to get; man made it easy’

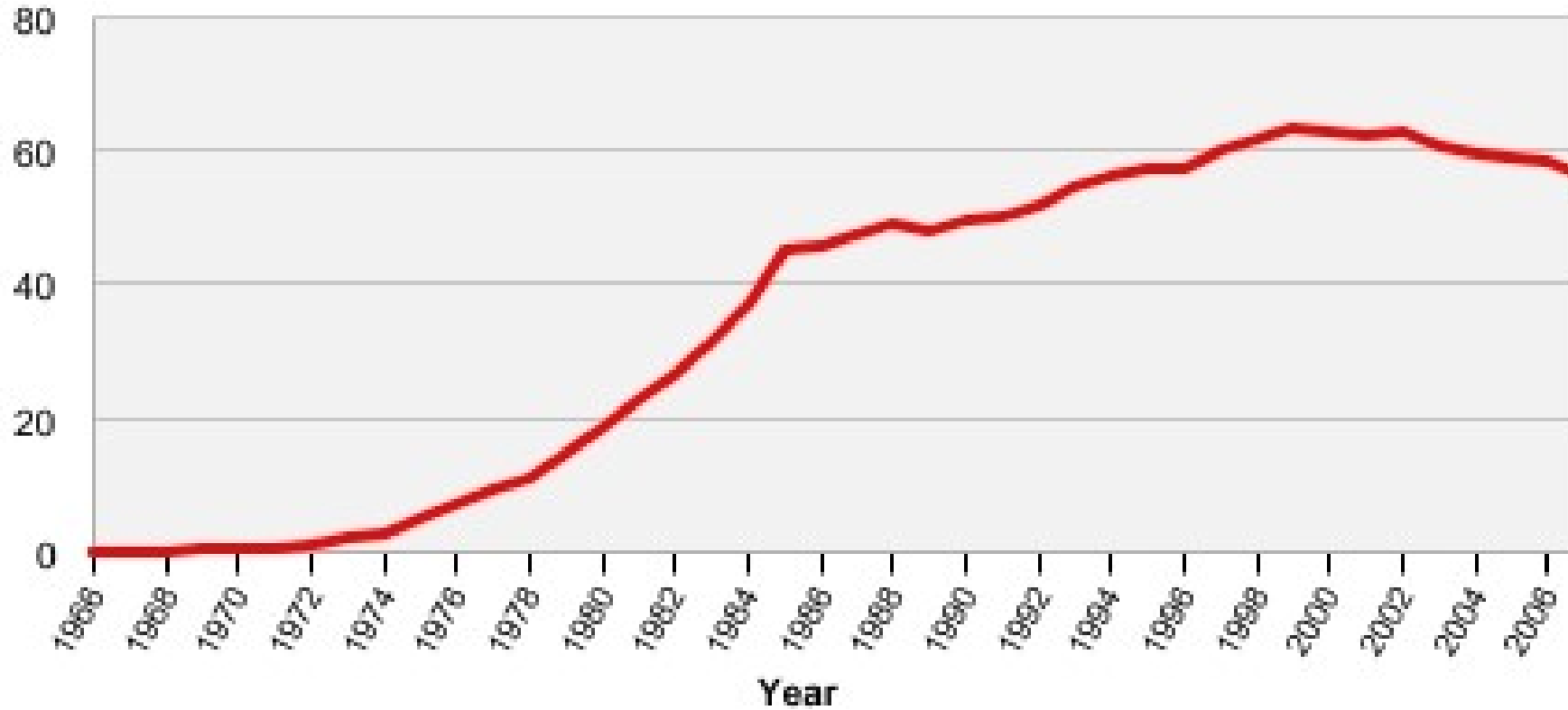
Global sugar supply (in the form of sugar and sugar crops, excluding fruit and wine) expressed as calories per person per day, for the year 2007.



Lustig et al. Nature 2012

High Fructose Corn Syrup (HFCS)

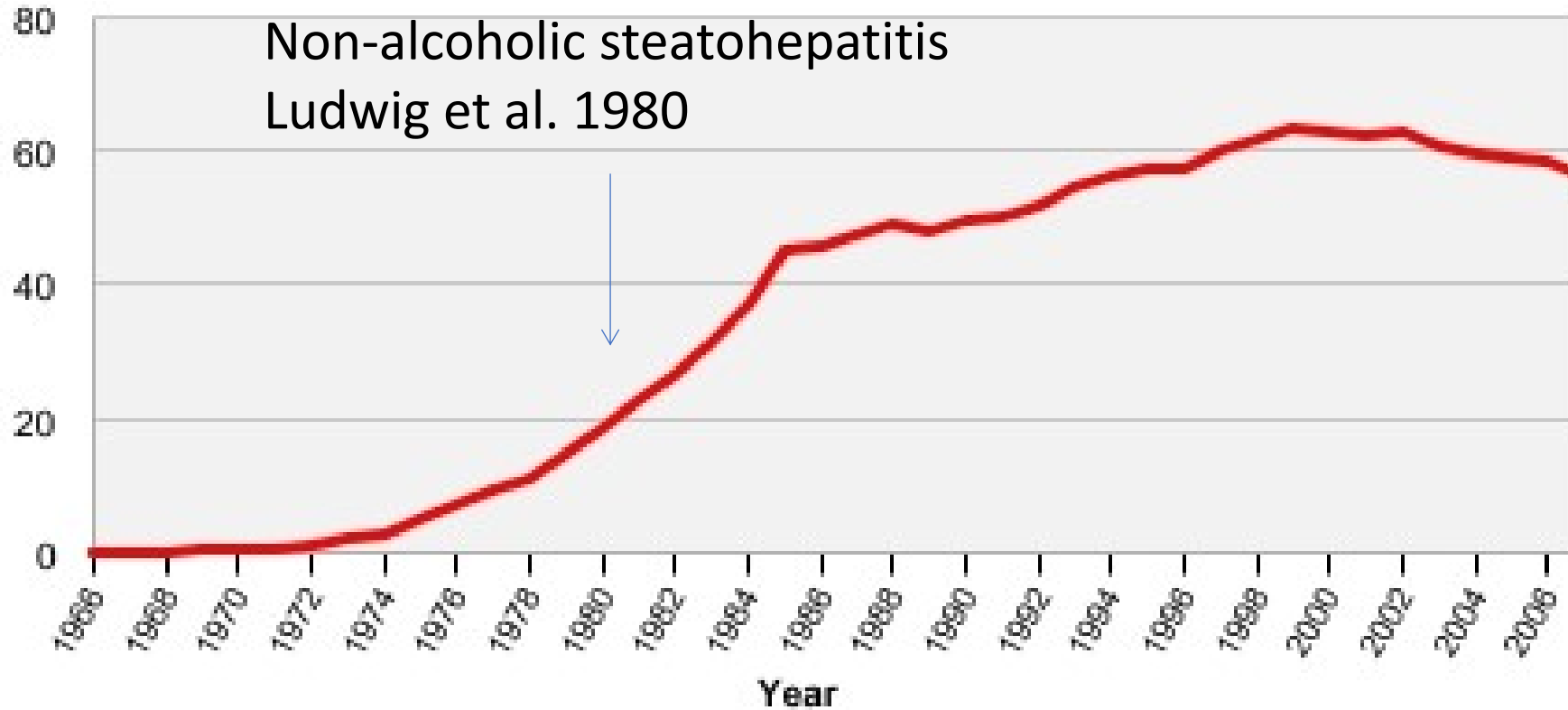
Dry weight, pounds per capita per year



USDA/Economic Research Service. Feb. 27. 2009

High Fructose Corn Syrup (HFCS)

Dry weight, pounds per capita per year



Fructose

Reduces satiating effect

Is taken up into hepatocytes

Increases lipogenesis

Reduces lipid oxidation

Increases production of ROS

Increases uric acid

Chronic Fructose Exposure

Hypertension

Myocardial infarction

Dyslipidemia

Pancreatitis

Obesity

Malnutrition

Hepatic dysfunction (NASH)

Habituation

Chronic *Alcohol* Exposure

Hypertension

Cardiomyopathy

Dyslipidemia

Pancreatitis

Obesity

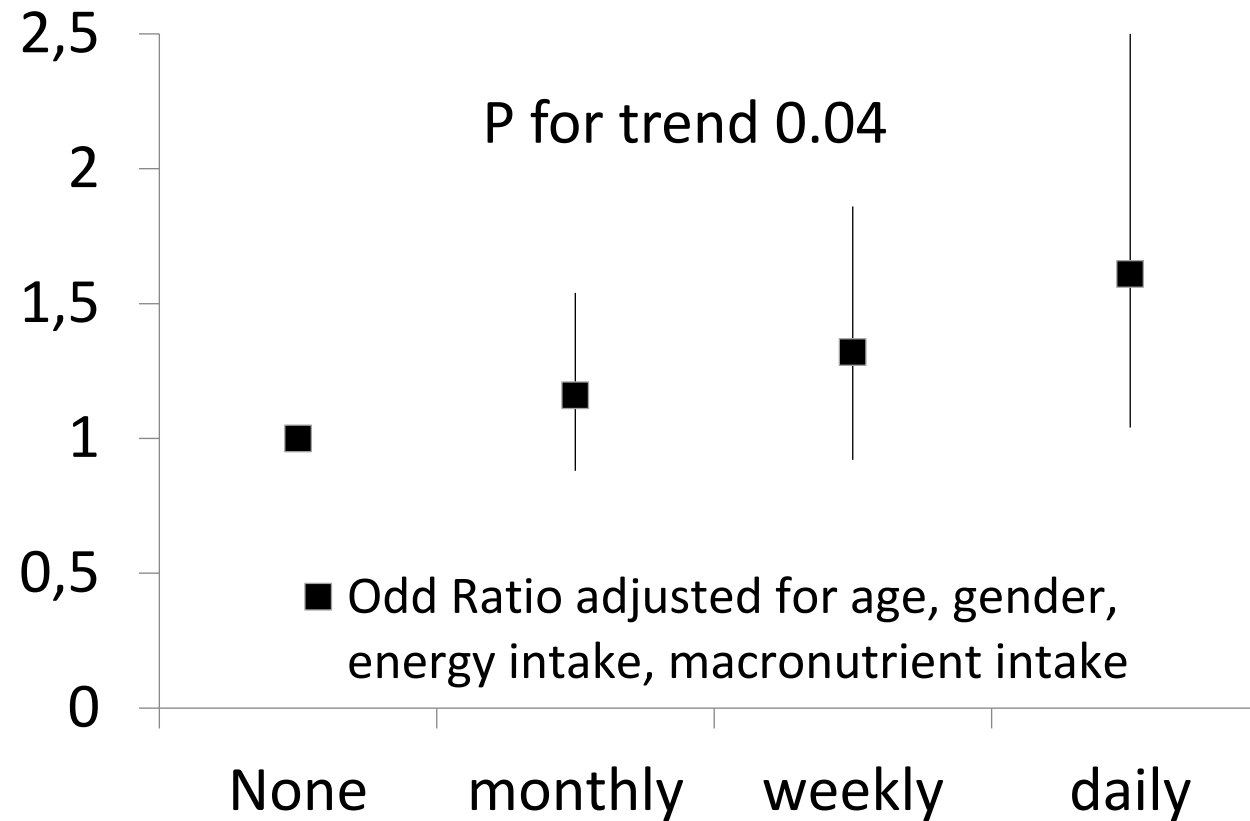
Malnutrition

Hepatic dysfunction (ASH)

Addiction

Sugar-sweetened beverages and NAFL

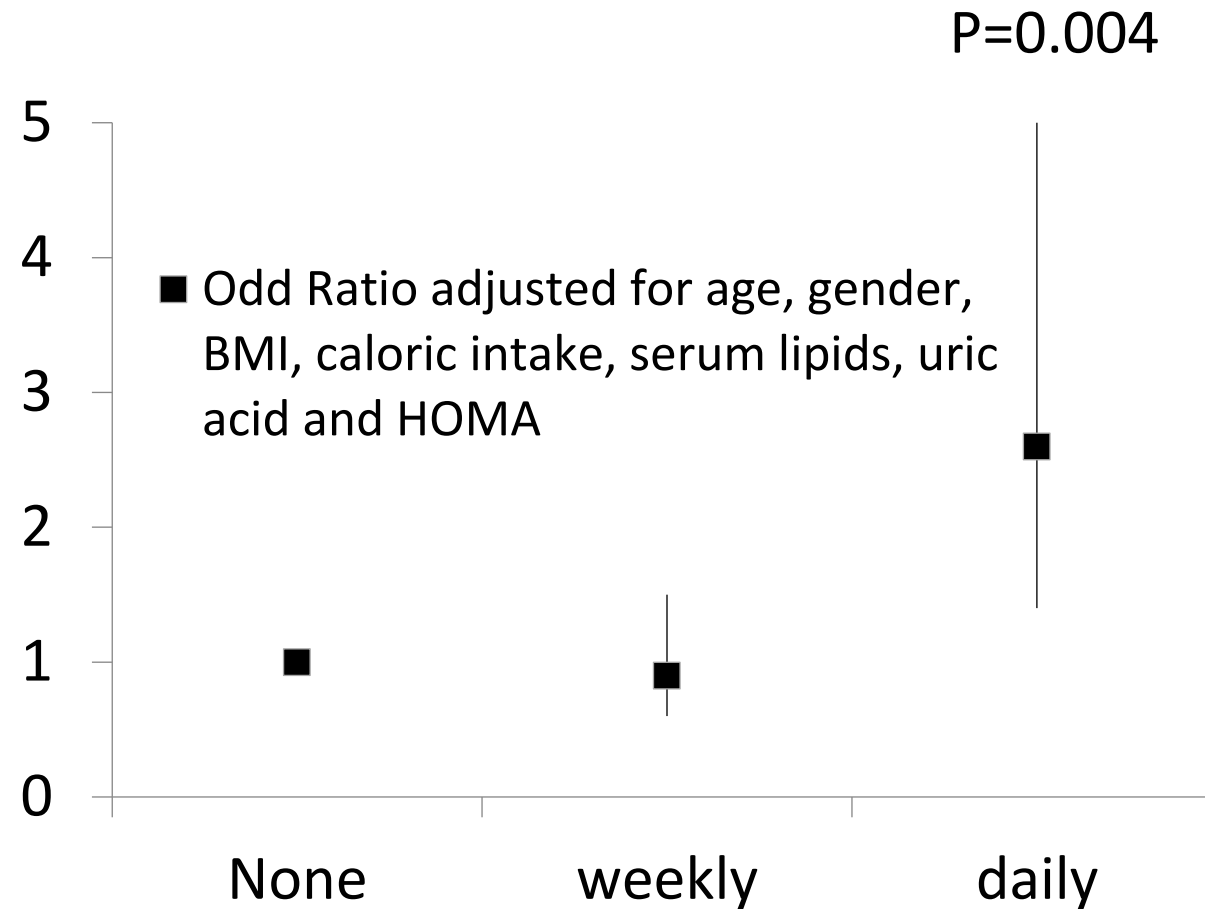
2634 participants of the Framingham cohort
Fatty liver defined on CT
Food frequency questionnaire



Sugar-sweetened beverages and fibrosis

427 patients with NASH

Block food questionnaire within 3 months of liver biopsy

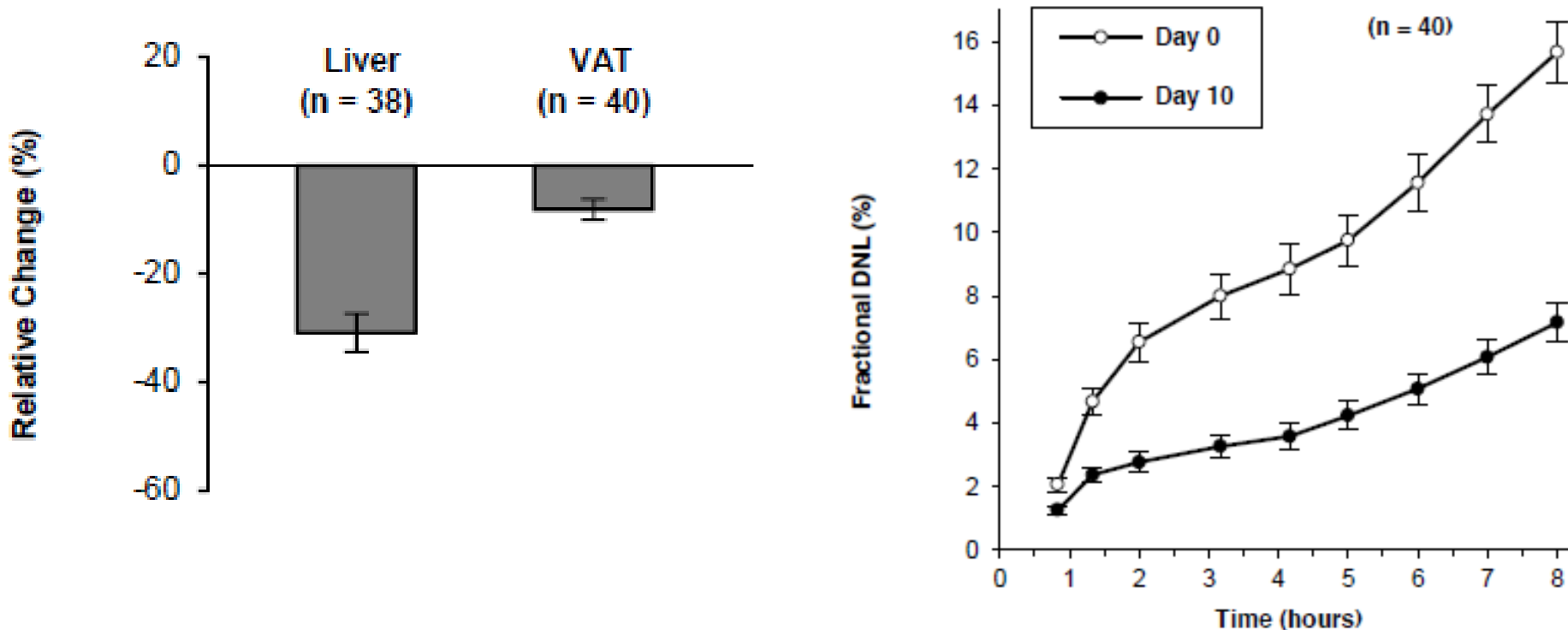


Sugar Content in sodas

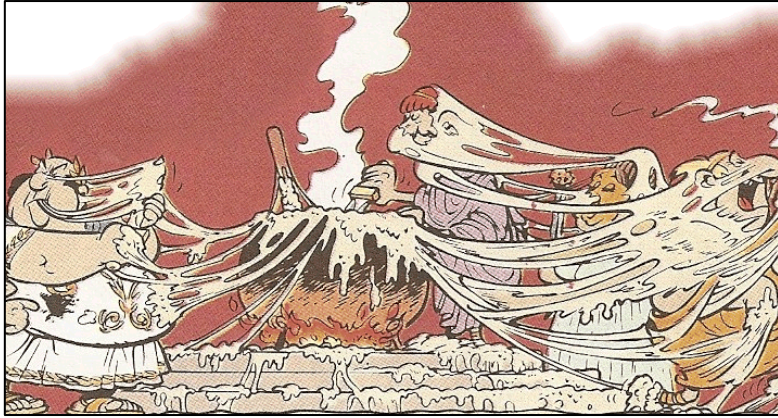


Dietary Fructose restriction

41 obese children (9–18 years old) had all meals provided for 9 days with the same energy and macronutrient composition as their standard diet, but with starch substituted for sugar, yielding a final fructose content of 4% of total kcal.



Que choisir en



Graisses

Protéines



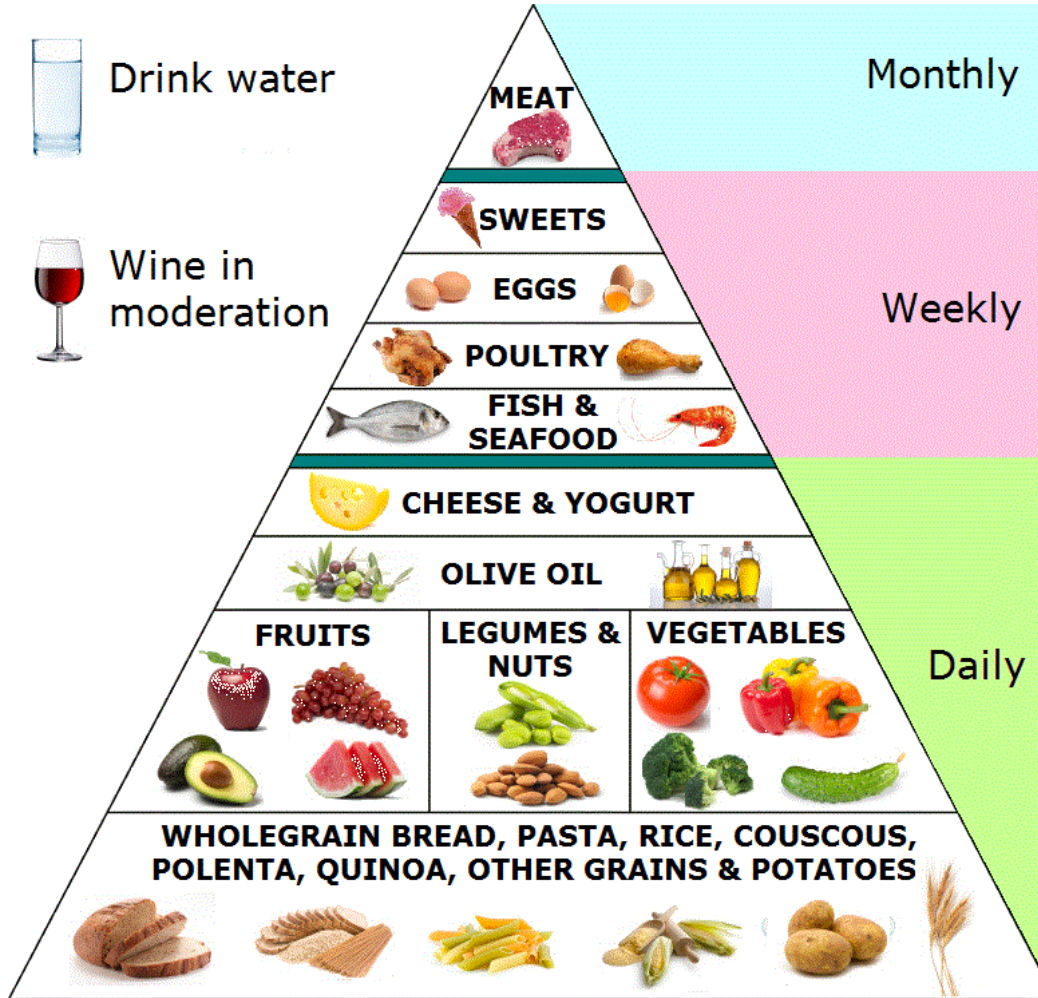
Sucres



Diètes



Mediterranean Diet



Fat mostly MUFA and Ω -3 PUFA:

↑ hepatic fat oxidation

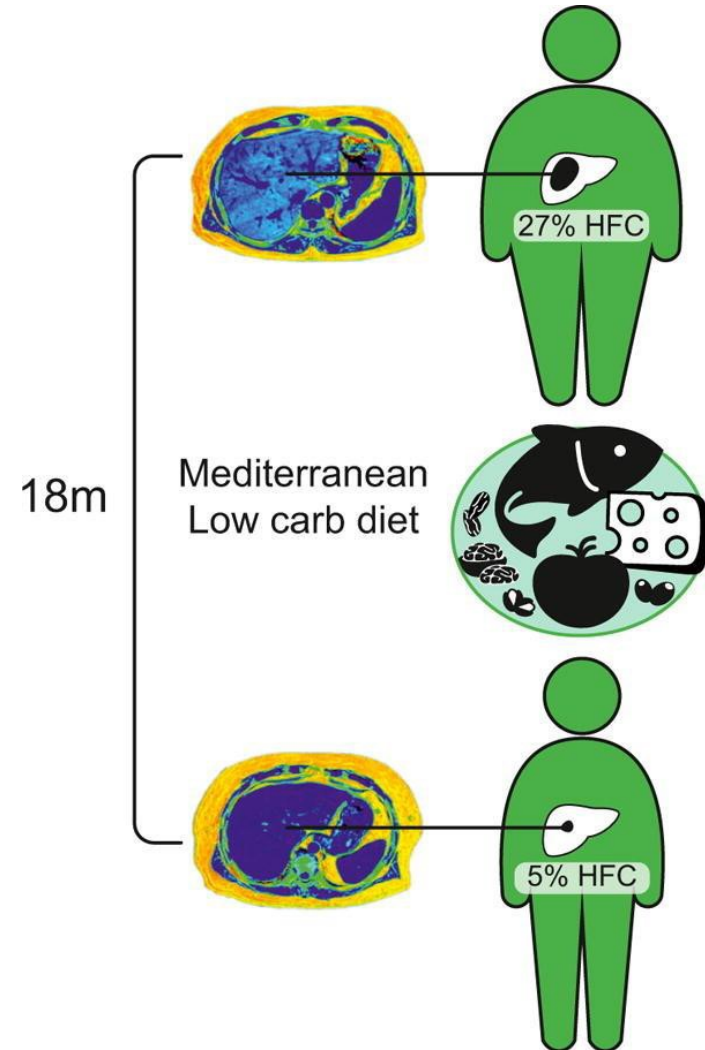
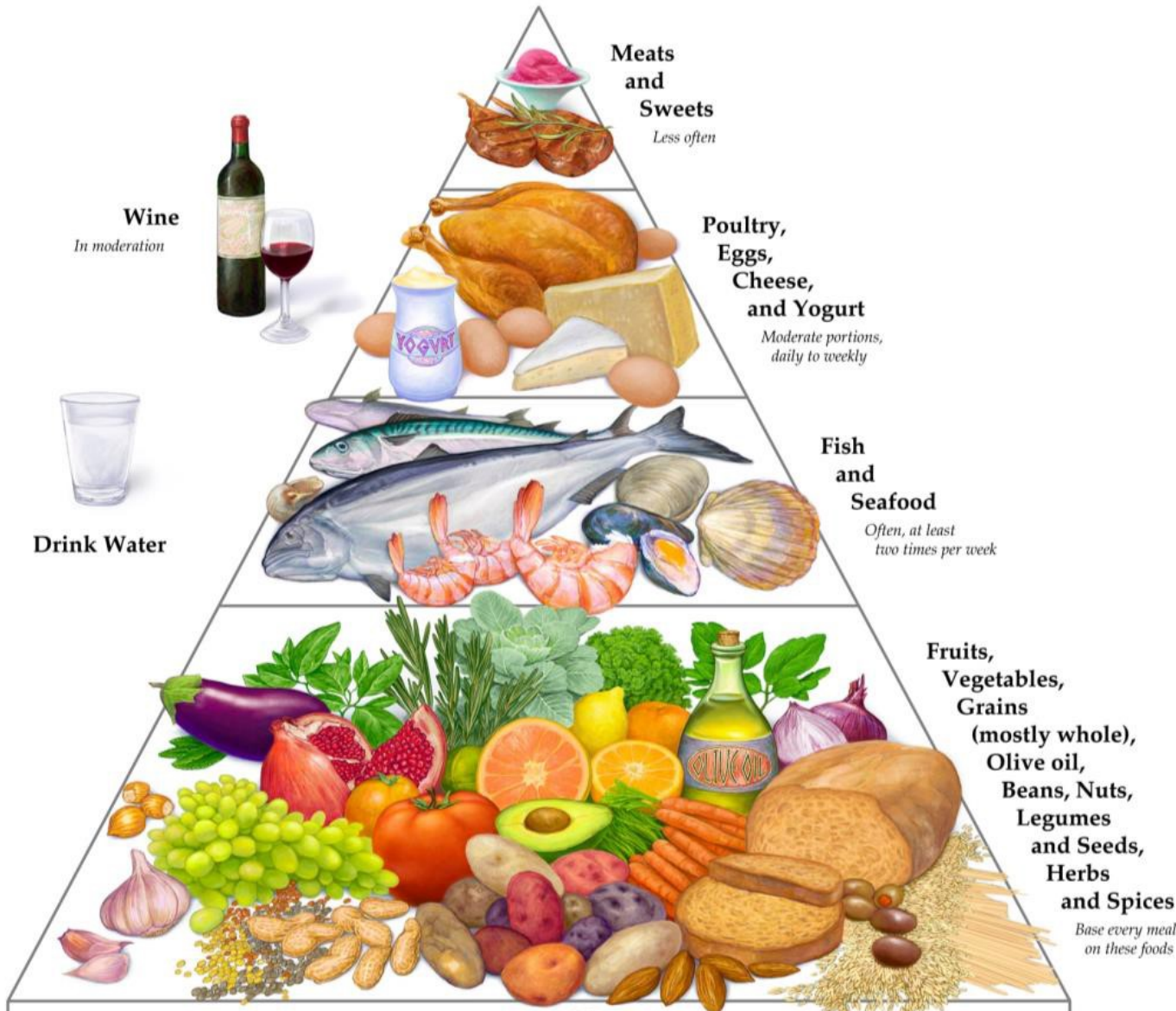
↓ hepatic lipogenesis

↓ serum TG levels

↓ inflammatory cytokines

Improve insulin sensitivity

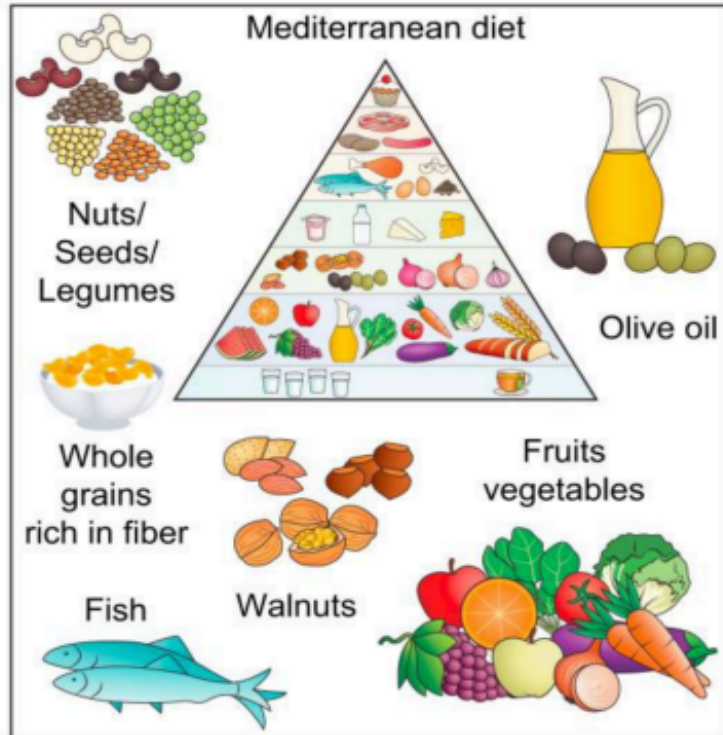
Mediterranean Diet



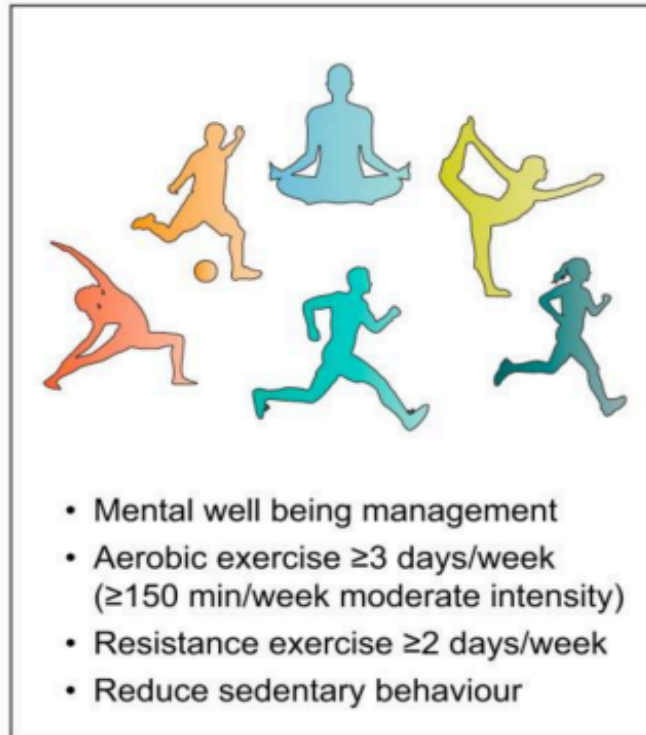
EASL NAFLD/NASH patient guide

Lifestyle advice for ALL patients with NAFLD

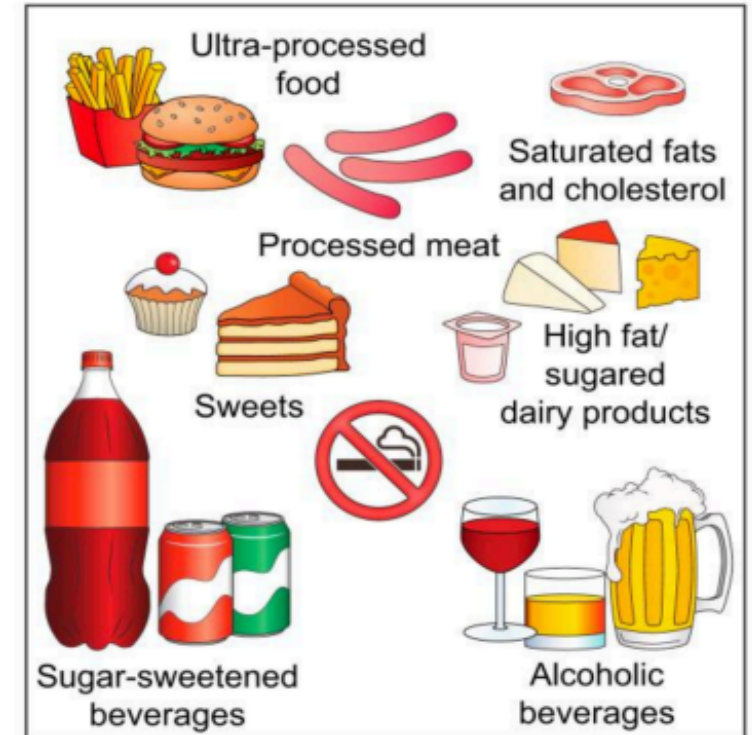
Recommended foods



Recommended activity



Non-recommended foods/ Minimize consumption



- Reduce added sugar (e.g. by reducing sweets, processed foods, sugared dairy products, etc.)
- Avoid sugar-sweetened beverages
- Reduce saturated fat and cholesterol (e.g. by eating low fat meat

- Increase n-3 fatty acids found in fish, and walnuts; utilize olive oil over other oils more often
- Minimize "fast food" and ultra-processed food
- Home-cooked meals are preferable
- Try to follow the Mediterranean dietary pattern

Identification d'aliments ultra-transformés

Food substances not used in kitchens appear in the beginning or in the middle of the lists of ingredients of ultra-processed foods. These include hydrolysed proteins, soya protein isolate, gluten, casein, whey protein, 'mechanically separated meat', fructose, high-fructose corn syrup, 'fruit juice concentrate', invert sugar, maltodextrin, dextrose, lactose, soluble or insoluble fibre, hydrogenated or interesterified oil. The presence in the list of ingredients of one or more of these food substances identifies a product as ultra-processed.



Food and Agriculture
Organization of the
United Nations

Ultra-processed foods,
diet quality, and health
using the NOVA
classification system

Prepared by

Carlos Augusto Monteiro
Geoffrey Cannon
Mark Lawrence
Maria Laura da Costa Louzada
and
Priscila Pereira Machado

Identification d'aliments ultra-transformés

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Aliments préparé industriellement pour enrichir leurs fabricants.



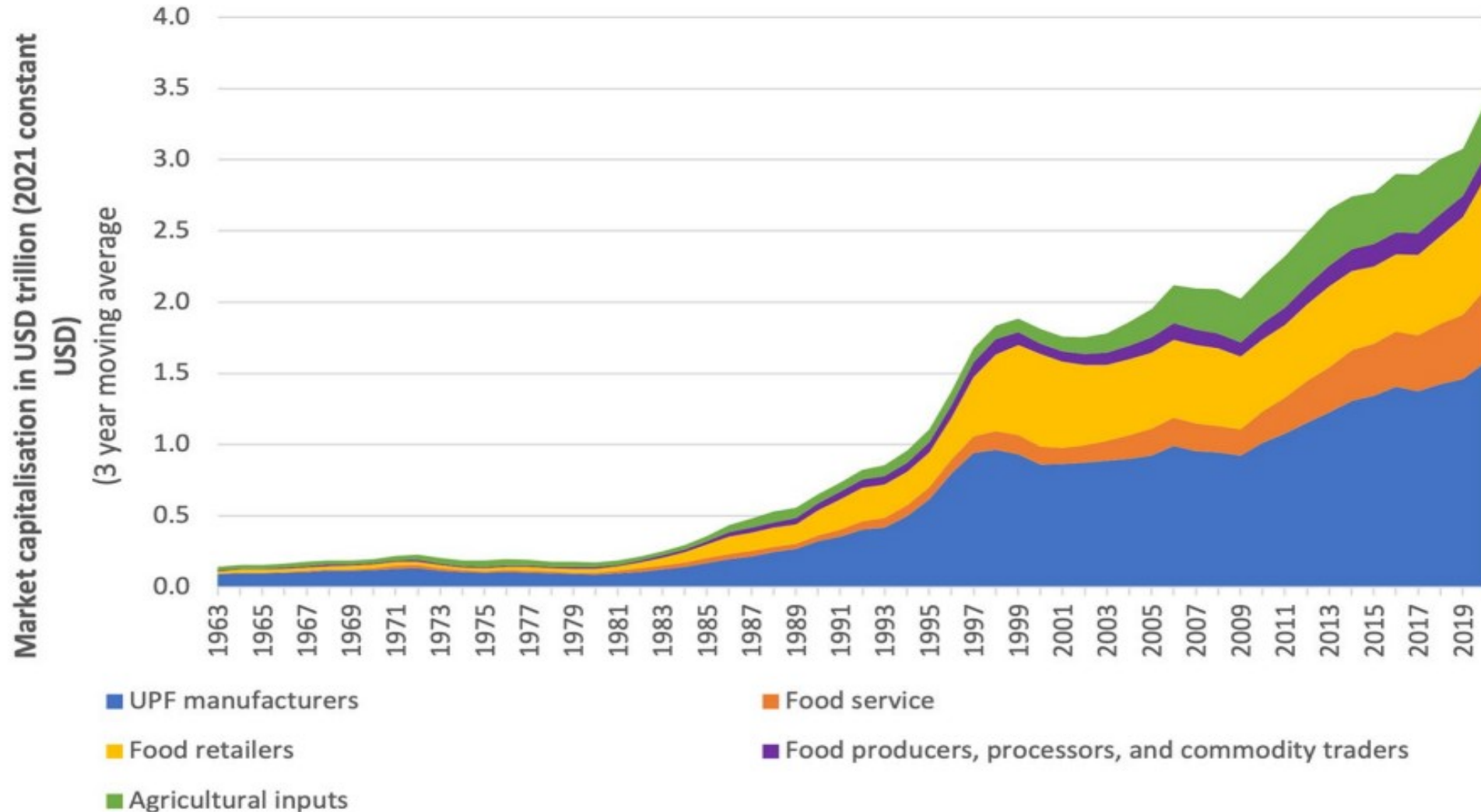
Food and Agriculture Organization of the United Nations

Ultra-processed foods, diet quality, and health using the NOVA classification system

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Industrie agro-alimentaire



Aliments ultra-transformés

Plus de la moitié de l'apport énergétique de l'alimentation

- USA (Baraldi et al. BMJ Open 2018)
- Canada (Moubarac et al. Appetite 2017)
- UK (Rauber et al. Nutrients 2018)

Entre un cinquième et un tiers

- Brésil (Louzada et al. Public Health Nutr 2018)
- Mexico (Marron-Ponce et al. Public Health Nutr 2018)
- Chili (Ceiel et al. Public Health Nutr 2018)

Aliments ultra-transformés

- Sont des produits à haut apport calorique
- Sont riches en sucres, mauvais acides gras et sel
- Sont pauvres en fibres, protéines, vitamines et minéraux
- Induisent une importante réponse glycémique
- Ont peu d'effet sur le sentiment de satiété
- Se consomment rapidement

Fast food diet

16 healthy young individuals aimed
for a body weight increase of 5–15%
by eating at least 2 fast-food-based meals a day
in combination with adoption of a sedentary lifestyle
for 4 weeks
Ethics Committee of Linköping University

weight gain 6.5 kg
70% increased their ALT above normal
doubling liver fat content

Association entre 'manger vite' et MAFLD

Multicenter cross-sectional Chinese study of 1965 participants

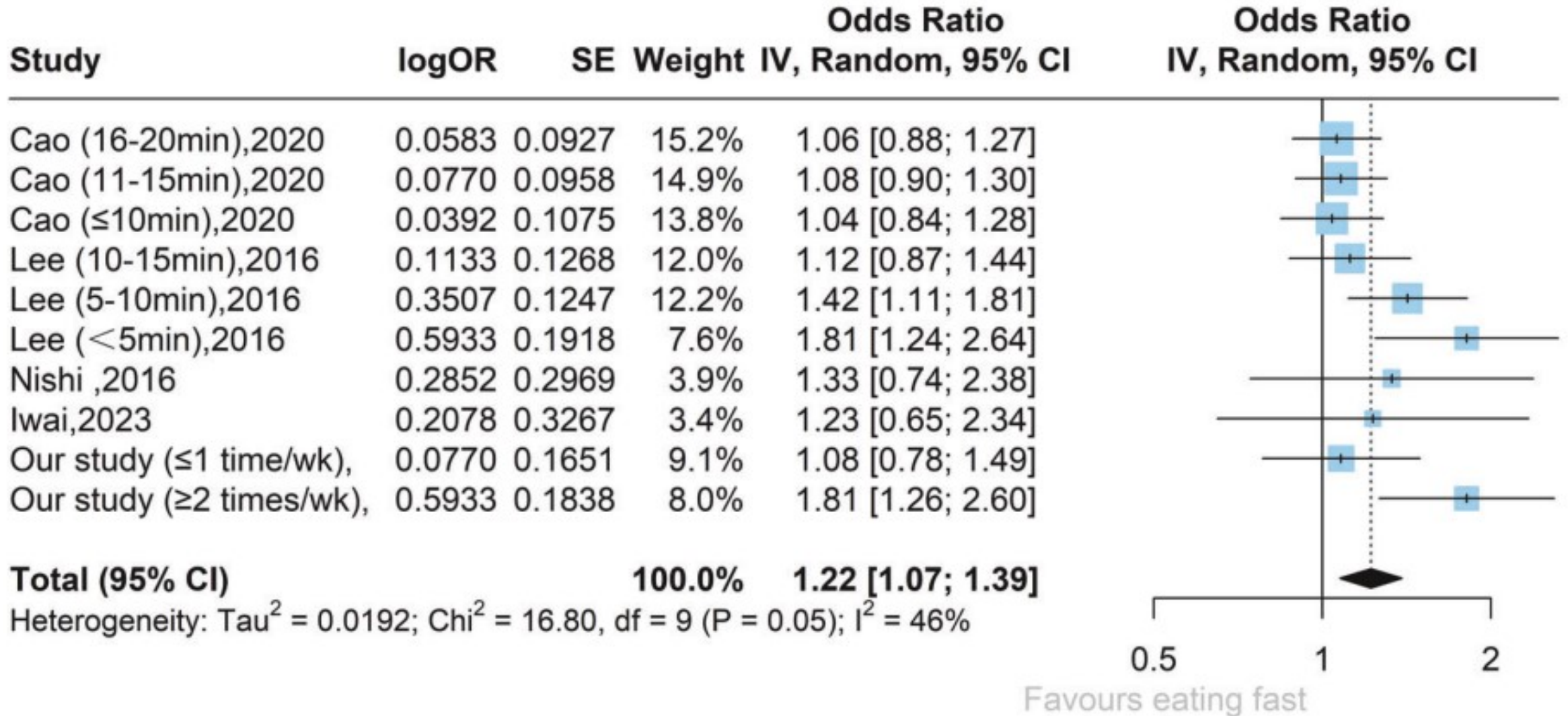
Fatty liver based on ultrasound

Fast eating was defined as meal time less than five minutes

Self-reported frequency fast eating: ≤ 1 time/mo, ≤ 1 time/wk and ≥ 2 times/wk

| Logistic regression models | Categories of fast eating frequency | | |
|----------------------------|-------------------------------------|--------------------------------|---------------------------------|
| | ≤ 1 time/mo ($n = 1362$) | ≤ 1 time/wk ($n = 313$) | ≥ 2 times/wk ($n = 290$) |
| Unadjusted ORs (95%CI) | Reference | 1.19 (0.93–1.52) | 1.70 (1.31–2.20) |
| <i>P</i> value | | 0.17 | < 0.001 |

Association en manger vite et MAFLD



Addiction aux aliments ultra-transformés

The image shows a collage of news headlines. At the top, a CBS News Boston article headline reads: "Ultra-processed foods could be as addictive as smoking, study says". Below it is a Fox News article headline: "HEALTH: Ultraprocessed foods with 'feel-good chemicals' could be as addictive as cigarettes and drugs, study suggests". Underneath the Fox News headline is a sub-headline: "Compulsive eating of foods high in carbs and fats could meet criteria for substance use disorder, researchers say" and the byline "By Melissa Rudy · Fox News". At the bottom left is the USA Today News logo, and to its right is another headline: "Study: Foods like ice cream, chips and candy are just as addictive as cigarettes or heroin".

WBZ CBS NEWS BOSTON NEWS WEATHER SPORTS VIDEO MORE 41° Live TV Später ans

Ultra-processed foods could be as addictive as smoking, study says

FOX NEWS U.S. Politics World Opinion Media Entertainment Sports Lifestyle Video AI More Watch TV

HEALTH

Ultraprocessed foods with 'feel-good chemicals' could be as addictive as cigarettes and drugs, study suggests

Compulsive eating of foods high in carbs and fats could meet criteria for substance use disorder, researchers say

By *Melissa Rudy* · Fox News

Published October 19, 2023 5:30am EDT

USA TODAY NEWS

Study: Foods like ice cream, chips and candy are just as addictive as cigarettes or heroin

Addiction to Highly Processed Food Among Older Adults

January/February 2023



INSTITUTE FOR HEALTHCARE
POLICY AND INNOVATION
**NATIONAL POLL
ON HEALTHY AGING**
UNIVERSITY OF MICHIGAN

- Phone Survey in July 2022 to a randomly selected, stratified group of U.S. adults age 50–80 (n=2,163).
- Yale Addiction Scale
- The sample was subsequently weighted to reflect population figures from the U.S. Census Bureau.

Addiction to highly processed food AMONG ADULTS AGE 50–80

13%

met criteria for an addiction to highly processed food in the past year

44%

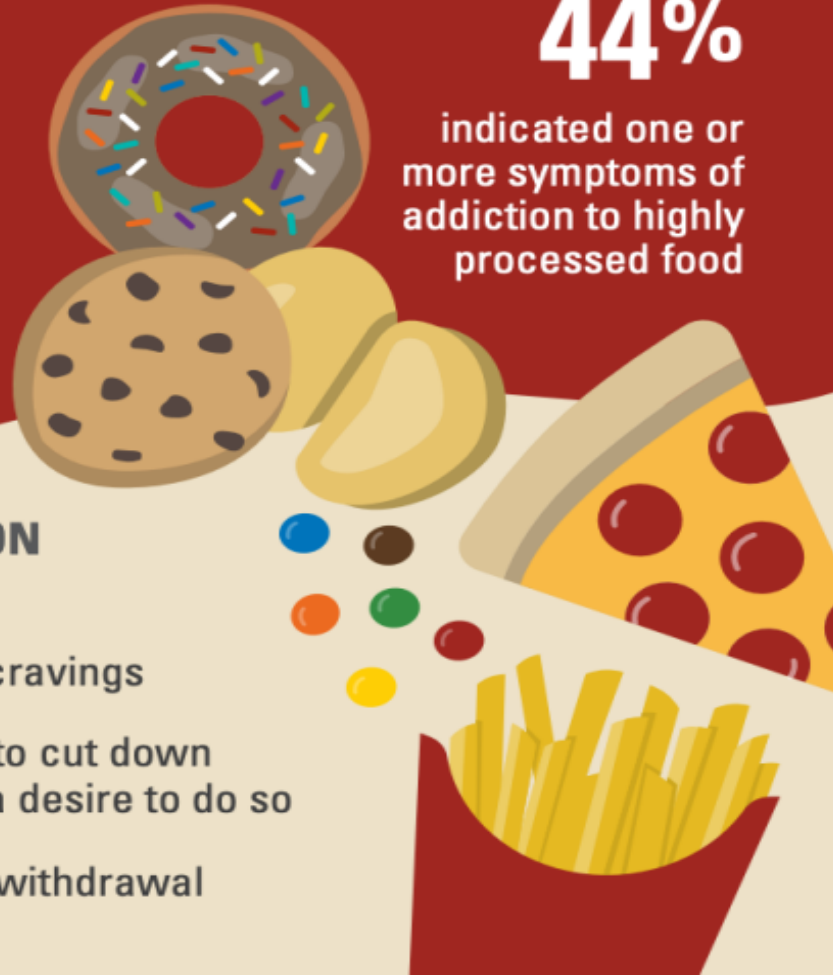
indicated one or more symptoms of addiction to highly processed food

MOST COMMON SYMPTOMS:

24% intense cravings

19% inability to cut down despite a desire to do so

17% signs of withdrawal



Aliments ultra-transformés et insomnie

Participants français à NutriNet-Santé (âge moyen 50 years, 77% femmes)

19.4% avec symptômes d'insomnia chronique,

UPF 16% de l'apport alimentaire

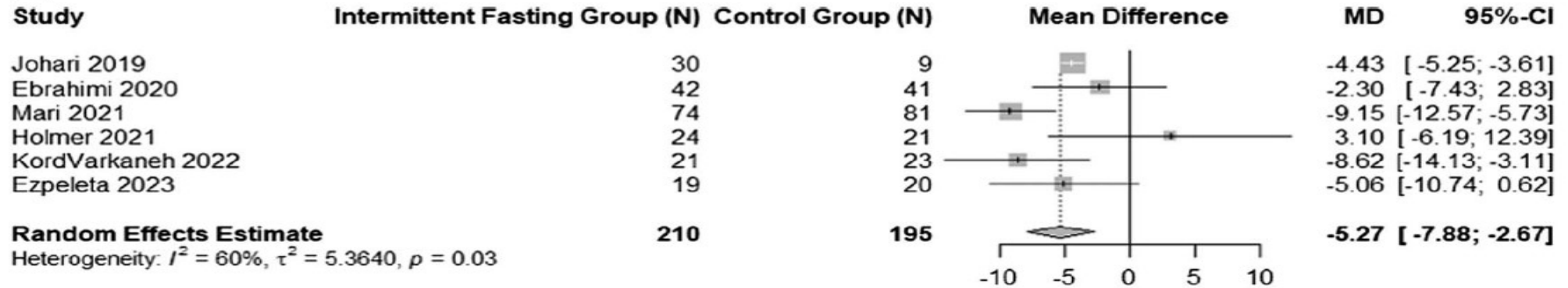
| | OR ^a (95% CI ^b) | P |
|-------------------------------|--|-------|
| Full sample (n=38,570) | | |
| Chronic insomnia | | |
| n = 7,467 | 1.12 (1.08–1.15) | <.001 |

multivariable logistic regression adjusted for sex, age, and socio-professional category.

Jeûn intermittent

AST

(B)



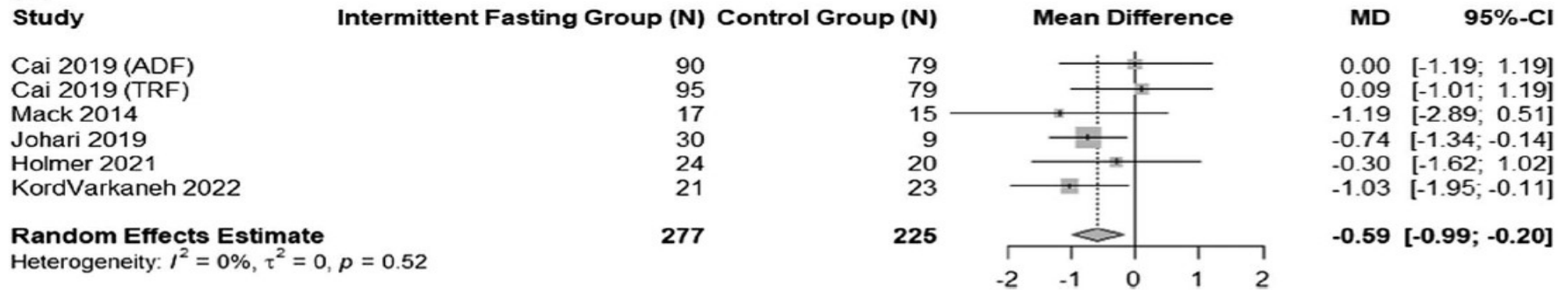
Stéatose

(C)

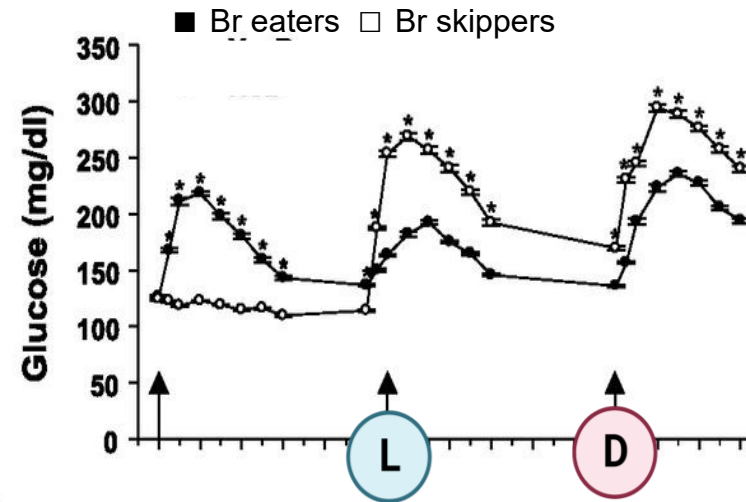


Elasticité

(D)



Importance du petit-déjeuner

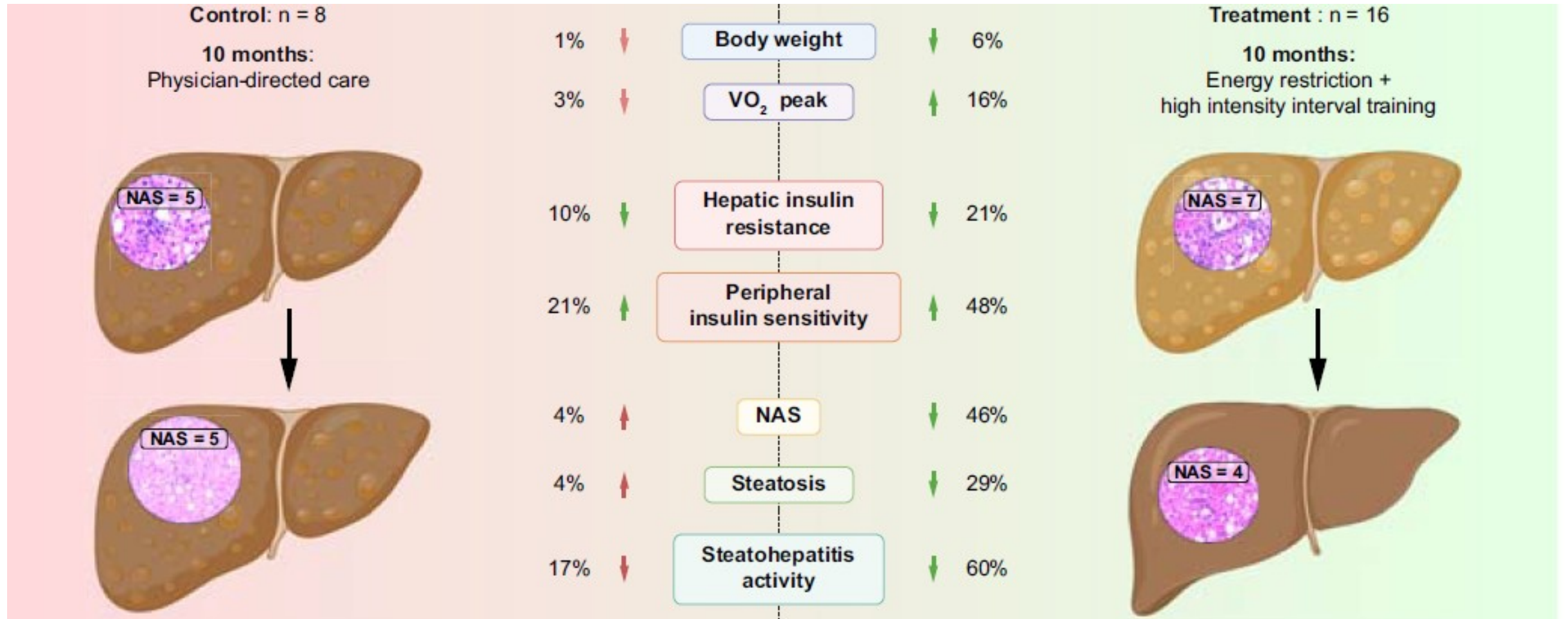


Incidence rates and hazard ratios of T2DM incidence according to breakfast consumption

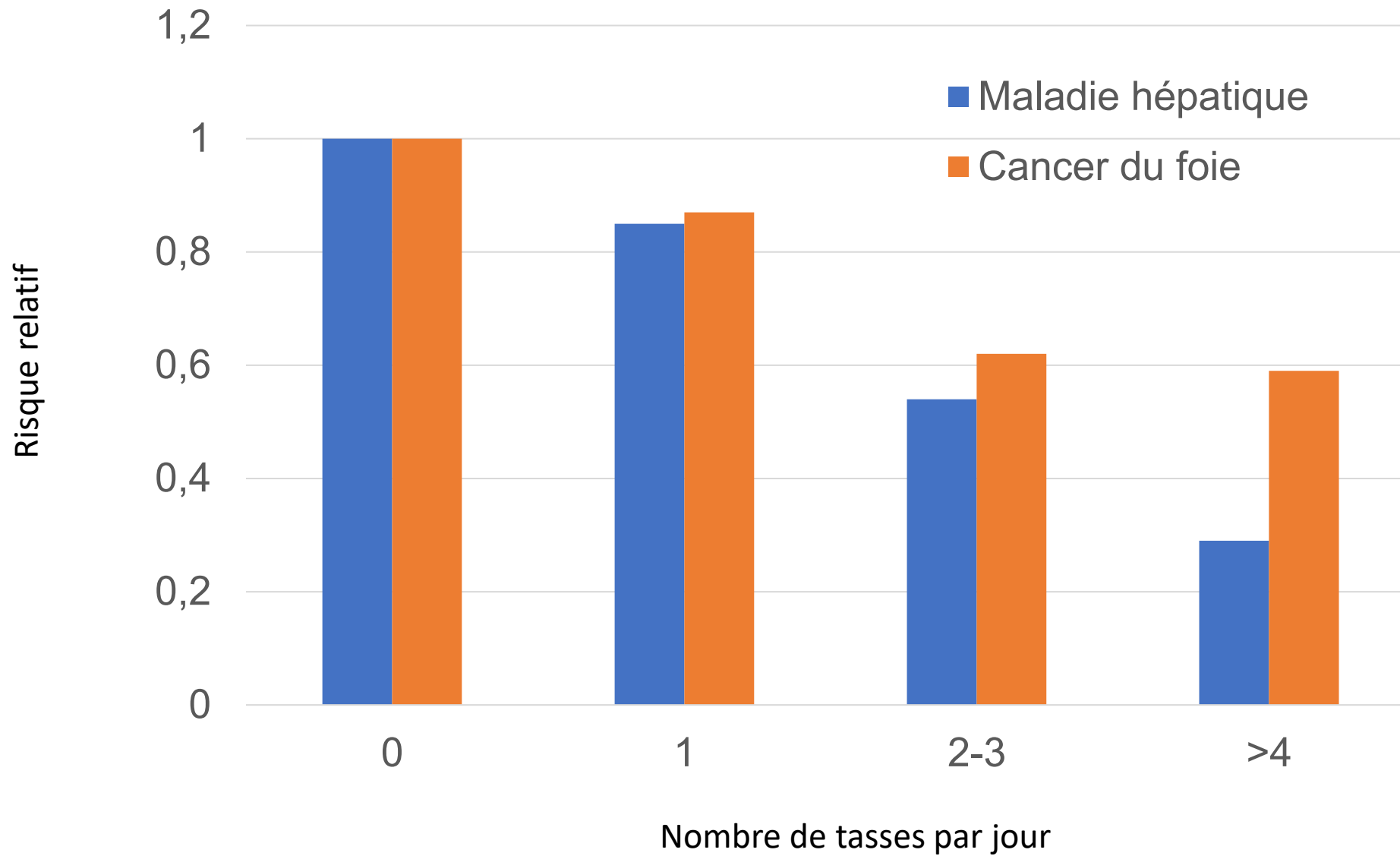
| | Breakfast eaters ^e | Breakfast skippers ^f |
|----------------------------------|-------------------------------|---------------------------------|
| <i>n</i> of cases/ <i>N</i> | 239/4188 | 46/443 |
| Crude incidence rate | 7.5 | 13.9 |
| Crude HR (95% CI) | | 1.85 (1.35–2.54) |
| Model 1 ^b HR (95% CI) | 1 (reference) | 1.72 (1.23–2.40) |
| Model 2 ^c HR (95% CI) | | 1.74 (1.24–2.43) |
| Model 3 ^d HR (95% CI) | | 1.73 (1.24–2.42) |

Exercise + restriction calorique

Patients avec MASH randomisés pour control ou 4x30 min/sem exercice et 500 kcal/j



Le café



Points essentiels

- 25% de la population a un foie gras
- Eviter les acides gras saturés
- Eviter le fructose (sodas)
- Diète méditerranéenne
- Eviter les aliments ultra-transformés
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