Diets
for slimness & health

Thierry Hertoghe, MD

The best diet
for slimness & health

= Diet that optimizes hormone & nutritional levels

What diet makes us the healthiest?

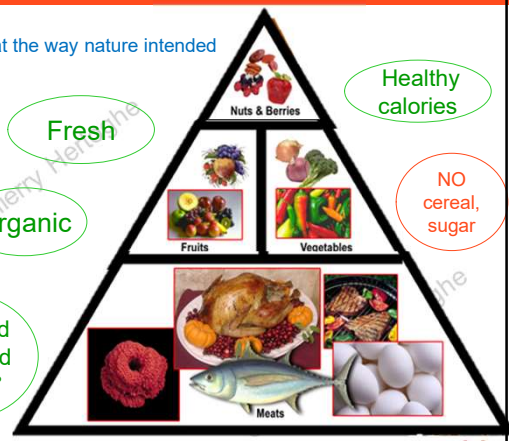
& have higher hormone & nutritional levels?

Best diet for health, slimness & hormone levels = The Paleolithic Diet

Paleo diet

Paleo diet = Diet of our ancestors wh were hunters & gatherers = adapted to our digestive system

Eat the way nature intended



Healthy calories

Fresh

NO cereal, sugar

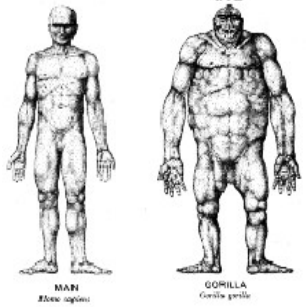
Organic

Uncooked Or cooked at low t°

Digestive evidence

Humans = Carnivores

Human digestive organs & digestive enzymes are exactly like those of the great carnivores
⇒ Unable to digest cellulose (lacks the enzymes)
⇒ Diet high in proteins & fats, & low in carbohydrates



Gorillas = Herbivores

Needs a much larger digestive system

⇒ Able to digest cellulose
⇒ Diet high in carbohydrates, & low in proteins & fat

Differences

Paleo diet

- 30% protein
- 35% carb
- 35% fat, mostly unsaturated

Modern diet

- 18% protein
- 44 % carb
- 38% fat mostly cooked fats

Ketogenic diet

- 20% protein
- 10 % carb
- 70% fat

1. Frassetto L.A., et alt. Eur. J. Clin. Nutr. 2009;63:947–95537.
2. Ryberg M., et al. J. Intern. Med. 2013;274:67–76.
3. https://www.hsph.harvard.edu/nutritionsource/healthy-weight/diet-reviews/ketogenic-diet/#:~:text=The%20ketogenic%20diet%20typically%20reduces,and%2010%2D20%25%20protein.

Differences

	Paleolithic (ancient) diet	Modern diet
PROTEIN	Very lean	Fatty
CARBOHYDRATES	Vegetables	Grains/refined sugars
FATS	Balanced intake	Pro-inflammatory
ANIMAL/FISH	65% of diet	15% of diet
VEGETABLES/FRUIT	100 different plants	Small selection
FIBER	100 grams/day	20 grams/day
VITAMINS/MINERALS	High intake	Low intake
GRAINS	None	Substantial
DAIRY	None	Substantial
PRESSED OILS	None	Substantial
TRANS FATTY ACIDS	Negligible	Substantial
ALCOHOL	None	3% of overall calories

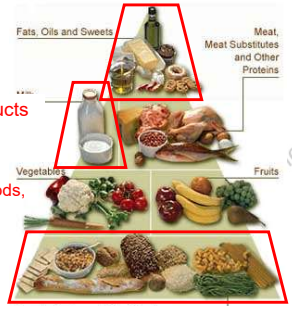
Differences

Paleolithic diet

Unprocessed foods
Organic foods

'Western' diet

Additional food groups: Sweets, alcohol, coffee



Milk products

Processed foods, Pesticides

Bread, grains & other starches (sugar, sweets)

Paleolithic diet => Essentials

Eat the following:

- Meat, chicken & fish
- Eggs
- Fruit: berries - strawberries, blueberries, raspberries etc.
- Vegetables (esp. root vegetables, but definitely not incl. potatoes or sweet potatoes)
- Nuts, eg. walnuts, brazil nuts, macadamia, almond. Do not eat peanuts (a bean) or cashews (a family of their own)

Try to increase intake of:

- Root vegetables - carrots, turnips, parsnips, rutabagas, Swedes
- Organ meats - liver & kidneys

Eat none of the following:

- Grains- incl.bread, pasta, noodles
- Beans- incl. string beans, kidney beans, lentils, peanuts, snow-peas & peas
- Potatoes
- Dairy products
- Sugar
- Salt

Do not drink: alcohol, coffee, tea, soft drinks

Paleo diet => ↓ Body weight (body mass) in the short -term

Meta-analysis of 21 human randomized controlled trials

	Paleo diet	Various healthy control diets
Anthropometric parameters	↓ in short & long term	↓ in short & long term
Weight, BMI, waist circumference	Stronger ↓, esp. short term	↓
Serum total & LDL cholesterol	Stronger ↓ short & long-term	↓ short-term but not long-term
Serum triglycerides	Stronger ↓	↓
Fasting serum glucose, insulin, HbA1c, HOMA-IR	Short term ↓	No ↓
Systolic & diastolic blood pressure	Only short term ↓	Only short term ↓
Physical performance	Improved, but less in people not exercising	improved

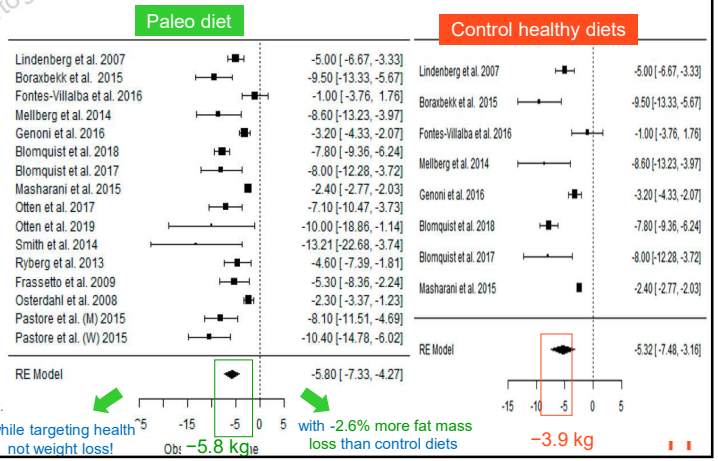
HOMA-IR = homeostasis model assessment of insulin resistance (HOMA-IR)

Frączek B, et al. Nutrients. 2021 Mar 21;13(3):1019

Paleo diet => ↓ Body weight (body mass) in the short-term

Meta-analysis of 21 human studies

Forest plot of the effect of diets on body mass (kg) in the short term (weighted mean difference)

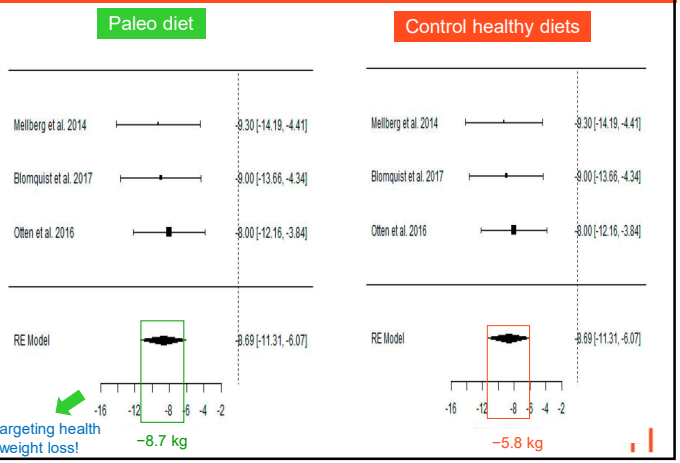


Frączek B, et al. Nutrients. 2021 Mar 21;13(3):101

Paleo diet => ↓ Body weight (body mass) in the long-term

Meta-analysis of 21 human studies

Forest plot of the effect of diets on body mass (kg) in the long term (weighted mean difference)



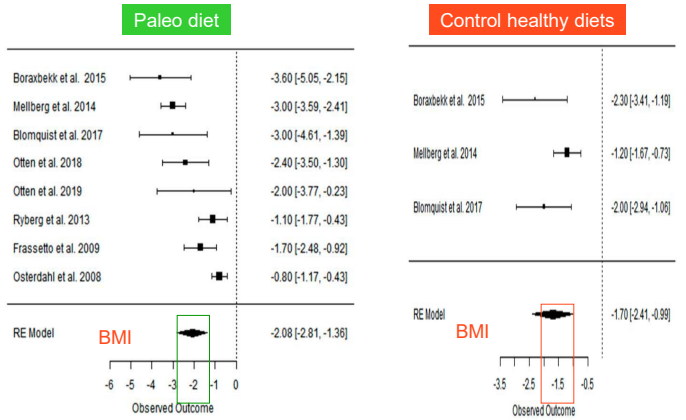
while targeting health not weight loss!

Frączek B, et al. Nutrient. 2021 Mar 21;13(3):1019

Paleo diet => ↓ BMI, esp. short -term

Meta-analysis of 21 human studies

Forest plot of the effect of diets on body mass index (kg/m²) in the short term (weighted mean difference)

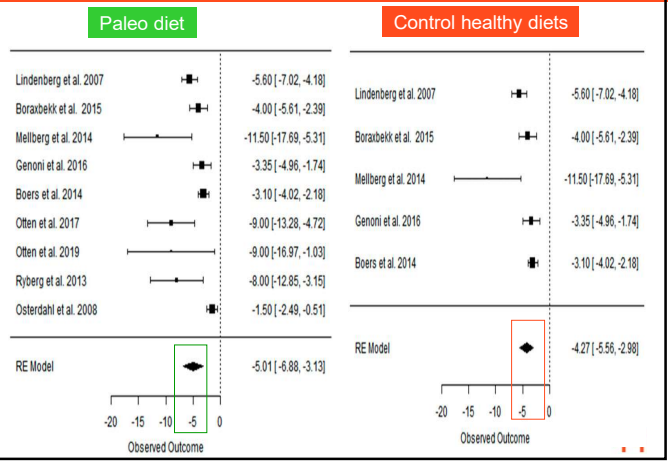


Frączek B, et al. Nutrients. 2021 Mar 21;13(3):1019

Paleo diet => ↓ Waist circumference

Meta-analysis of 21 human studies

Forest plot of the effect of diets on waist circumference (cm) in the short term (weighted mean difference)



Frączek B, et al. Nutrients. 2021 Mar 21;13(3):1019

Paleo diet => ↓ Waist circumference & fat mass

Meta-analysis of 21 human studies

Effect of diets on waist circumference (cm) in the long term

Paleo diet

Long-term impact on

Control healthy diets

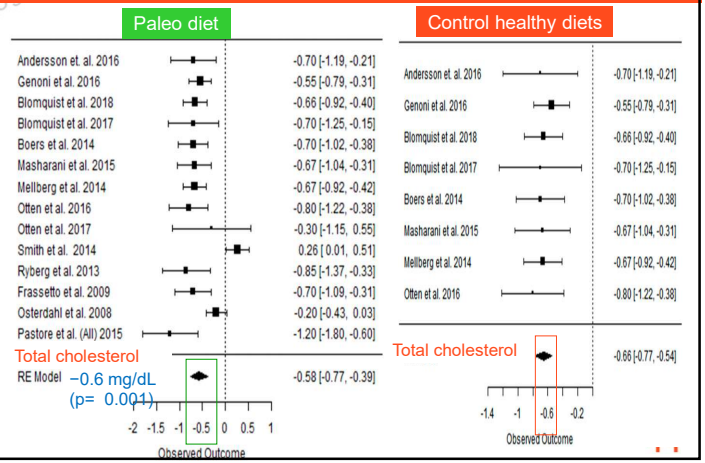
- Sign. −12.1 cm ↓ waist circumference (95% CI: −7.6; −16.6, p = 0.001)
- Sign. − 5.5 kg ↓ fat mass (95% CI: −3.4; −7.5)
- Sign. −10.9 cm ↓ waist circumference (95% CI: −7.6; −14.1)
- Sign. −4.5 kg ↓ body weight (95% CI: −2.9; −6.0)

Frączek B, et al. Nutrients. 2021 Mar 21;13(3):1019

Paleo diet => ↓ Serum total cholesterol, in the short -term

Meta-analysis of 21 human studies

Forest plot of the effect of diets on serum total cholesterol in the short term (weighted mean difference)

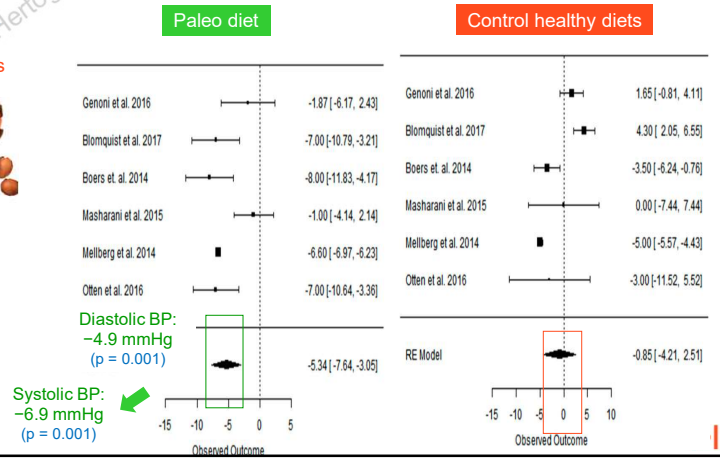


Frączek B, et al. Nutrients. 2021 Mar 21;13(3):1019

Paleo diet => ↓ Diastolic blood pressure

Meta-analysis of 21 human studies

Forest plot of the effect of diets on diastolic blood pressure in the short term (weighted mean difference)

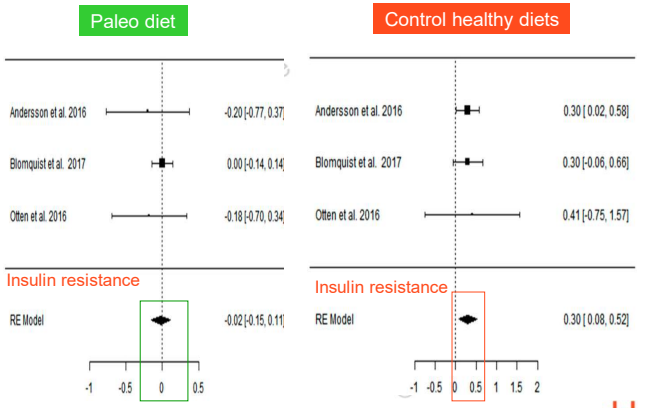


Frączek B, et al. Nutr 2021 Mar 21;13(3):1

Paleo diet => does not increase the insulin resistance

Meta-analysis of 21 human studies

Forest plot of the effect of diets on HOMA-IR in the long term (weighted mean difference)



Frączek B, et al. Nutrients. 2021 Mar 21;13(3):1019

9 Healthy, sedentary, non-obese adults

(6 M; 3 W)

> age of 18 =>

The macronutrient composition of

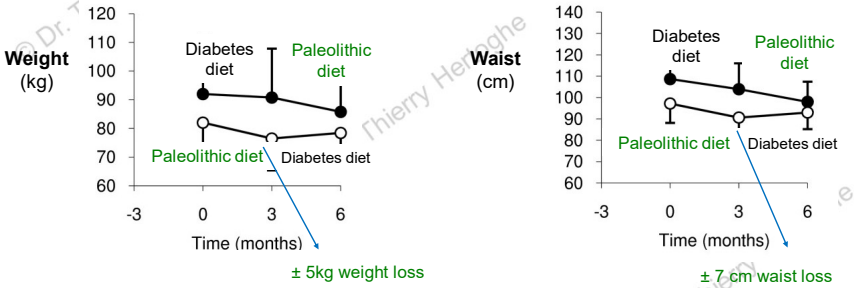
- the regular diets =>
  - 18% protein
  - 44 % carb. & 38% fat
- The Paleo diet
  - 30% protein
  - 38% carb & 32% fat, mostly unsaturated

After the 7 day ramp period & the 10 days of Paleo dieting=> large changes in most parameters

See next page

Diet	Regular diet 1	Regular diet 2	Regular diet 3	Paleo diet
Potassium content	125 mmol	180 mmol	259 mmol	339 mmol
Breakfast				
	Honey	Honey	Honey	Honey
	Fresh pineapple	Orange juice	Orange juice	Carrot Juice
	Scrambled eggs	Fresh pineapple	Fresh pineapple	Fresh pineapple
		Pork tenderloin	Pork tenderloin	Pork tenderloin
AM snack				
	Lettuce, cucumber, celery and tomatoes with oil and vinegar dressing	Celery, cucumber, red peppers and tomatoes with oil and vinegar dressing	Low salt tomato soup	
	Carrot juice			
Lunch				
	Stir-fried fresh zucchini	Carrot juice	Carrot juice	Carrot juice
	Tuna salad (tuna, radish, shallots, mayo) on lettuce	Tuna salad/mayo on lettuce	Tuna salad/mayo on lettuce	Tuna Salad (mayo, radishes, shallots) on lettuce
	Applesauce		Honey	Low-salt tomato soup with chopped tomatoes
	Honey			
Day Snack				
	Lettuce, carrot and peppers with oil and vinegar dressing	Turkey/mayo in lettuce wrap	Turkey/mayo with lettuce wrap	Turkey, guacamole and tomato lettuce roll-ups
	Canned pears	Carrots and tomatoes with oil and vinegar dressing	Carrots and tomatoes with oil nd vinegar dressing	
	Honey		Tomato juice	
Dinner				
	Chicken breast stir-fry with broccoli and garlic	Chicken breast stir-fry with fresh spinach, garlic and broccoli	Chicken breast stir-fry with fresh spinach, broccoli and garlic	Chicken breast stir-fry with fresh spinach, garlic and broccoli
	Mandarin oranges	Mandarin oranges	Mandarin oranges	Roasted parsnips and mushrooms with thyme
		Honey	Tomato juice	Low salt tomato soup
PM Snack				
	Turkey and tomatoes with mayo in lettuce wrap	Cantaloupe	Cantaloupe	Cantaloupe
		Carrot juice	Carrot juice	Carrot juice
			Honey	

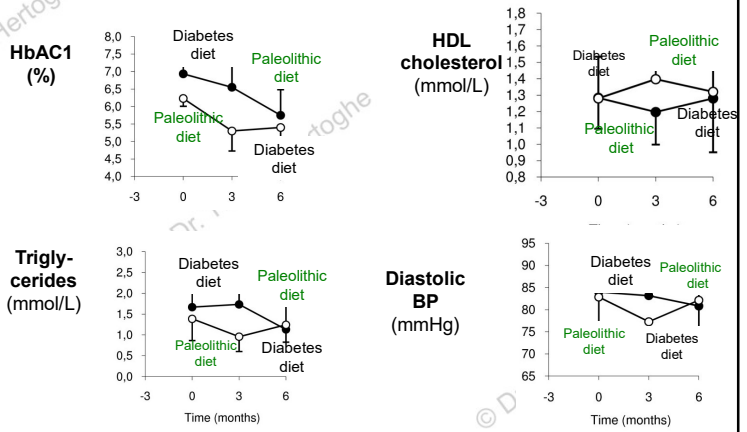
Paleolithic diet => Sign. greater weight & waist loss than diabetes diet



Jönsson et al. Cardiovascular Diabetology 2009 8:35

Paleolithic diet => Sign. ↑ Weight & waist loss, improves cardio-vascular risk factors vs Diabetes diet

Closed circles depicts individuals starting with Diabetes diet first and open circles depicts individuals starting with Paleolithic diet first. Values are group means and error bars depicts SD for group means.



Jönsson et al. Cardiovascular Diabetology 2009 8:35

Paleolithic diet => Sign. ↓ serum lipids more than the diabetes diet

Lipid changes are shown in the table

	Regular diet	Paleo diet
Total cholesterol	182 mg/dl	155 mg/dl
HDL-cholesterol	50 mg/dl	50 mg/dl
LDL-cholesterol	116 mg/dl	89 mg/dl
Triglycerides	80 mg/dl	53 mg/dl

Paleo diet

Amanda who lost weight on a combo of Paleo and Keto Diet

Paleo diet

Paleo diet
45 days

Vegetarian & vegan

diets?

What about vegetarians & vegans?

The vegan diet, which contains no animal food whatever, is too poor in fat soluble vitamins and vitamin B's, iron and some amino acids.
Only people who always have been vegans (no animal food whatever) have build up a smaller and less muscled body who requires less animal protein intake, but that is not fully adapted to a the absence of any animal foods.

The vegetarian diet that contains animal proteins as fish and milk products is better, but may still have deficiencies in iron and fat-soluble vitamins.

Alternatives for vegans

Diet: high in
- fresh fruit & vegetable
- sprouted grains & beans
- soaked nuts
- seaweed

Daily nutritional supplements:
of the missing vitamins (A, B's, D, E, & K, omega 3 fatty acids), trace elements (iron, zinc) & essential amino acids

Daily Nutrient supplementations for vegans			
Vitamin A	10 000 to 25 000 IU	**Iron**	10-80 mg/day elemental iron
Vitamin B's (esp. B12)	High-dosed vitamin B complex 3000 µg/day sublingual vit. B12	**Zinc**	20 to 40 mg per day
		Iodine	150 µg/day
Vitamin D3	3000-6000 IU/day (exc. if sun++)	Multivitamin preparation	1-2 caps/say of high-dosed preparation
Vitamin E	200-400 IU/day of mixture of tocopherols & tocotrienols		
Vitamin K	50 µg vitamin K1		
Omega 3 polyunsaturated fatty acids	1-2 g/day of fish oil, or of 1 soupspoon of rapeseed or perilla oil		
Branched amino acids: valine, leucine, isoleucin; **Sulfur-containng amino acids:** cysteine, methionine (induces lack of carnitine)	100-500 mg/day off each of these aminoacids except not of methionine Do not supplement with methionine as it produces homocysteine (risk factor for atherosclerosis)		

Paleo diet

How many meals/day?

How many meals/day?

1 meal/day → Weight loss

2 meals/day → Weight maintenance

3 meals/day → Weight gain

Paleo diet

How heavy each meal?

Paleo diet

→ Little or no food

How important each meal?

Eat breakfast like a king

Eat lunch like a prince

Eat supper like a pauper

The opposite ….

Take a breakfast => to prevent obesity

15 340 Adults

Breakfast skippers = those ate breakfast about 1x/week or less often + those who never ate breakfast

vs breakfast eaters

- Usually overweight: BMI ≥ 27
- 1.34x ↑ Obesity risk of 4 (95% CI: 1.15, 1.56) after controlling for age, sex, marital status, educational level, monthly income, smoking, alcohol, chewing & exercise habit
- Sign. worse health-related quality of life (P<0.001)
- Sign. ↓ scores in 5 out of 8 domain scores of the SF-36, namely
  - ↓ general health perceptions (P<0.001)
  - ↓ vitality (P<0.001)
  - ↓ social functioning (P=0.036), emotional role (P<0.001) & mental health (P<0.001)

↑ Frequency of breakfast consumption

↓ Obesity prevalence rate (sign. association, p=0.005)

Huang CJ, μ et al. Int J Obes (Lond). 2010 Apr;34(4):720-5.

Breakfast (vs evening meal) as single meal => ↑ Weight loss

Persons eating only breakfast as meal

vs persons + single meal per day in in the evening

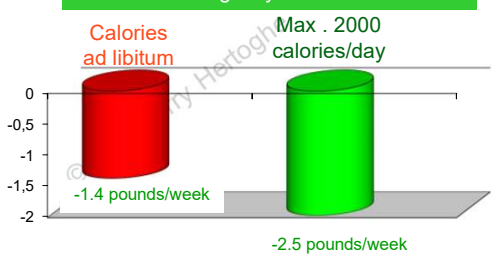
↑ Weight loss

Jacobs H, et al. Chronobiologica 1975; 1: 33;
Hirsch, et al. Chronobiologica 1975; 1: 31-32

Breakfast (vs evening meal) as single meal => ↑ Weight loss
Breakfast max. 2000 kcal (vs ad libitum) as single meal => ↑ Weight loss

Weight loss per week when only one meal per day is consumed (pounds;, compared to weight loss obtained by those only taking an evening meal)

Persons eating only breakfast as meal



- Greater weight loss in persons + single meal per day in the morning than those eating eat it in the evening
- Even greater weight loss when the meal consumed may not exceed 2000 kcal per day

Jacobs H, et al. Chronobiologica 1975; 1: 33;
Hirsch, et al. Chronobiologica 1975; 1: 31-32

Stop eating meat, poultry, fish after 2 pm.

After 2 PM => Stop eating meat, poultry, fish

Stop eating after 7 pm.

After 7 PM => Stop eating

What to eat at each meal?

Eat breakfast like a king

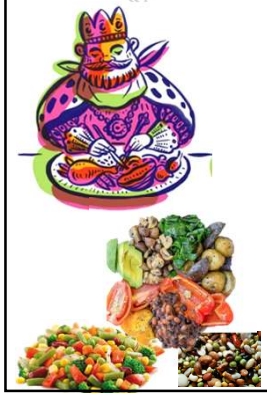
Eat lunch like a prince

Eat supper like a pauper

or … no food
(16 hours intermittent fasting

What to eat at each meal for persistent vegans?

Eat breakfast like a king



Eat lunch like a prince

Eat supper like a pauper

or … no food
(16 hours intermittent fasting

Natural plant enzymes for vegans

Natural plant enzymes

Nutritional supplements

In foods:

- Honey, especially the raw kind, has amylase and protease
- Mangoes and bananas have amylase, which also helps the fruit to ripen.
- Papaya has a type of protease called papain.
- Avocados have the digestive enzyme lipase.

https://www.webmd.com/diet/what-are-digestive-enzymes

Paleo diet

Slippers?

=> Compensate slippers with fasting

Fast each time you do slippers

Each time you do a dietary excess – eat too much of the food, drink several glasses of alcohol, get into an irresistible & major chocolate craving, compensate by skipping the next one or two meals!

When you go out to see friends in parties or have dinner with them and you know it beforehand the food will be maladapted, why not

- Fast a meal or two beforehand
- Eat something light at home – a salad or a fruit meal that fills up your stomach beforehand with abundant water intake in order not to be too hungry or too thirsty while at the party so that you can easily restrain yourself from bad foods or compensate by fasting before or after
- And/or fast (skip a meal) after

Exercice after slippers

You can also compensate by doing more physical exercise - adding a longer sports session to your program

But !!!! be aware that

1. the amount of calories consumed with even heavy exercise is often much less than

   the amount of calories eaten in one meal where you eat too much

   ⇒ A hard training session may consume 500 extra calories
   ⇔ a copious meal may be = 1200 calories or more

2. Heavy training can also make you more hungry.

Paleo diet

=> Low meal frequency,

except for underweight individuals

Adverse effects of eating meals at regular time interval for ex. 3x /day

In pre-Neolithic times, man
- ate only when he was hungry
- ate on1y as much as he required to still the pangs of hunger.
- Much of his food was raw; He did not roast his meat, nor did he boil it, as he had no pots.
- all food was unrefined.
- What little he may have grubbed from the Earth and picked from the trees, he ate as he went along.
- The whole structure of man's omnivorous digestive tract is,
  - adjusted to the continual nibbling of tidbits
  - not suited to occasional gorging.

In the early Neolithic times another change took place which may well account for the fact that today nearly all inherited dispositions sooner or later develop into manifest obesity. This change was the institution of regular meals.
- particularly of food rendered rapidly, placed a great burden on modern man's ability to cope with large quantities of food suddenly pouring into his system from the intestinal tract.
- meant that man had to eat more than his body required at the moment of eating so as to tide him over until the next meal.
- Food rendered easily digestible suddenly flooded his body with nourishment of which he was in no need at the moment. Somehow, somewhere this *surplus* had to be stored.

4-6 meals/day => Only for underweight people with malabsorption syndrome

4-6 Meals/day

for underweight people

with malabsorption syndrome

Intermediate nr of snacks in weight loss maintainers & & highest nr of snacks normal-weight individuals than in overweight individuals

257 adults
- 96 Weight loss maintainers (WLM), reduced from overweight/obese to normal weight, 83% women aged 50.0 years with BMI 22.1
- 80 with normal weight (NW) , 95% women aged 46.1 years with BMI 21.1
- 81 with overweight (OW), 53% women aged 51.4 years with BMI 34.2)

=> Meals & snacks = ≥ 50 kcal & separated by more than 1 hour

However

Weight loss maintainers

- Highest degree of self-reported physical activity was highest in followed by and then (WLM: highest: 3,097 kcal/week, NW:2,062 kcal/week, & OW: lowest: 785 kcal/week, resp; P<0.001)
- Intermediate number of daily snacks (NW: highest: 2.3 snacks/day, WLM: 1.9 snacks/day, & OW: lowest: 1.5 snacks/day, resp.; P<0.001)
- No sign. group diff.in mean number of meals consumed (2.7 meals/day)

Bachman JL, et al. J Am Diet Assoc. 2011 Nov;111(11):1730-4

↑ Eating frequency => assoc. w/ an overall healthy lifestyle in middle-aged men & women & ↓ general & central obesity in men, not in women

1355 men
& 1654 women

- ↑ Alcohol consumption
- ↓ Leisure-time physical activity

↓ Daily eating frequency

(sign. associations)

Eating 3 or fewer meals per day

↑ General & central obesity likelihood in men, not women

Holmbäck I, et al. Br J Nutr. 2010 Oct;104(7):1065-73

The frequency of meals eaten does not make an appreciable difference to the calories burned overall.

Does eating frequently, boost metabolism?

- Eating itself => requires energy; this is called "diet-induced thermogenesis", or the thermic effect of food.
- Many dieters have been told that by eating more frequently, they'll benefit from an overall increase in their metabolic rate, and will burn off more calories than if they confined their consumption to fewer meals.
- However, the Australian review cites research published => "convincingly" refutes this notion, concluding that the frequency of meals eaten does not make an appreciable difference to the calories burned overall.

http://longevity.about.com/od/healthyeatingtips/a/Snacking-For-Weight-Control.htm

Does it help to eat more frequently to lose weight?

Eating ↑ frequently => lose weight?

NO

Not efficient

Physical activity = Confounding factor of the relation between eating frequency & body composition

85 Premenopausal women (age: 49.9 y; BMI: 23.2 kg/m²)

Prospective observational study => 7-day food diaries => Mean eating frequency = 4.6 eating occasions/day

↑ Eating frequency

- ↓ BMI (r = -0.25, P < 0.05)
- ↓ Waist circumference (r = -0.32, P < 0.01)
- ↓ % Body fat (r = -0.26, P < 0.05)
- ↓ Fat mass (r = -0.27, P < 0.05)

(sign. inverse associations)

↑ Eating frequency

↑ Energy intake (sign. positive corr, r = 0.31, P < 0.01

The assoc. between adiposity & eating frequency => No longer sign. after correction for physical activity energy expenditure & physical fitness (peak oxygen consumption)

Duval K, et al. Am J Clin Nutr. 2008 Nov;88(5):1200-5.

No difference between hunger levels whether three meals, six meals, or three meals and three snacks were eaten each day.

Eat more often, keep hunger at bay?

Many people believe that eating more frequently can act as a kind of preemptive strike against hunger later in the day.

The Australian researchers found some evidence of reduced hunger at a single meal if a snack had been eaten, but not less hunger over the entire day.

In one 6-month Australian weight loss study cited, there was no difference between hunger levels whether 3 meals, 6 meals, or 3 meals & 3 snacks were eaten each day.

http://longevity.about.com/od/healthyeatingtips/a/Snacking-For-Weight-Control.htm

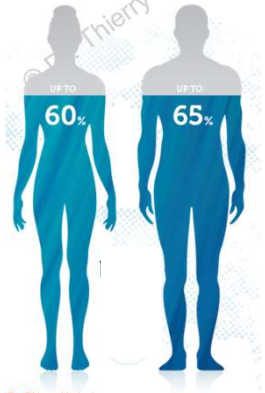
Paleo diet

What to drink?

Drink still water

Drink 2 L/day of water
(2 quaters of a gallon)

Water = Main constituent of the human body



60-65 % of the young adult body = water → Water = Main constituent of our body

What to drink? The optimal

Still water
1.5 -2.5 L/day
= Optimal

Best alternatives

- Perfumed water (fruit or veggies in water)

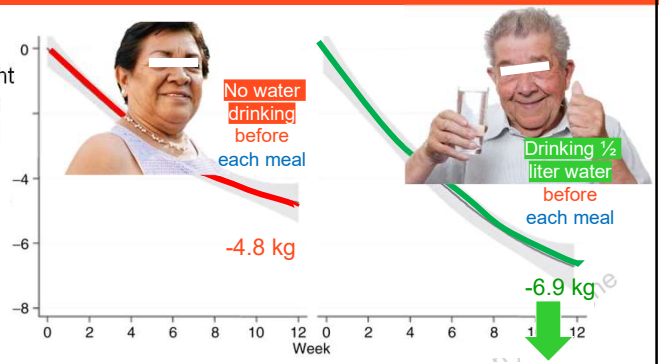
- Herbal tea with no added cream (milk) or then almond or rice milk

- Vegetable juice

- Vegetable soup: with no added salt & cream (milk)

Drinking water => ↓ Appetite & ↑ Weight loss in middle-aged & older adults

48 middle -aged & older adults (55-75 years, BMI 25-40 kg/m(2)) => 12 weeks of low-calorie diet



-2.1 kg more weight loss
-44% greater ↓ in weight over the 12 weeks
(beta = -0.87, P < 0.001 vs beta = -0.60, P < 0.001)

Dennis EA, et al. Obesity (Silver Spring). 2010 Feb;18(2):300-7

Drinking ↑ water => ↑ Weight loss in overweight dieting women

173 Premenopausal overweight women (aged 25-50 y) with <1 l/day drinking water initially

Absolute & relative (vs other drinks)
↑ in drinking water

12 months later

Sign. ↓ body weight & fat over time, indep. of diet & activity

Drinking water => promotes weight loss in overweight dieting women

Stookey JD, et al. Obesity (Silver Spring). 2008 Nov;16(11):2481-8

What to drink? The alternatives

Still water
1.5 -2.5 L/day
= optimal

Other alternatives

Decaf coffee

Decaf tea

10x diluted fresh fruit

Alcohol:
Max. 1-3 glasses /week (concentrated in 2 days)

Paleo diet

What to eat?

Eat fresh, organic fruit

> 400 g/day (≥ 3 servings, 250 calories)

Eat fresh, organic fruit

100 g watermelon = 30 calories

100 g strawberries = 33 calories

100 g orange = 47 calories

100 g pineapple = 50 calories

100 g apple = 52 calories

100 g blueberries = 57 calories

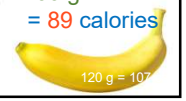
Note the indicated weight is for medium-sise fruit

100 g pears = 58 calories

100 g mango = 60 calories

100 g kiwi ≈ 61 calories

100 g banana = 89 calories



Eat fresh, organic vegetables

> 300 g/day (≥ 5 servings/day, 70 calories)

Raw vegetables => Calories

100 g beetroot = 43 calories

100 g carrots = 41 calories

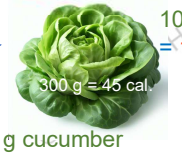
100 g broccoli = 34 calories

100 g cauliflower = 25 calories

100 g red tomatoes = 18 calories

100 g vegetables = ± 20 calories

100 g radish = 16 calories



100 g lettuce = 15 calories

100 g cucumber = 13 calories

Yellow vegetables

Green vegetables

Beans => Better if soaked a whole night before

100 g raw beans
= 154 calories
100 g Boiled beans
= 130 calories

100 g boiled lentils
= 116 calories

100 g green beans
(haricots verts)
= 31 calories

Soak them a whole night before eating them

Better grains & seeds => Sprouted

100 g soybean sprouts
= 29 calories

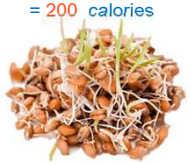
100 g broccoli sprouts
= 29 calories

100 g cauliflower sprouts
= 35 calories

100 g sprouted white rice
= 130 calories

100 g quinoa sprouts
= 160 calories

100 g sprouted wheat
= 200 calories



100 g sprouted grain bread
= 260 calories

Better nuts => Raw, soaked, & sprouted

Afttre 8 hours of soaking (with raw nuts)

100 g peanut sprouts
= 565 digestible calories

26 g protein/100 g

100 g almond sprouts
= 575 digestible calories

21 g protein/100 g

100 g soaked wall nuts
= 655 digestible calories

15 g protein/100 g

After 48 hours of soaking (with raw hazelnuts)

100 g soaked hazelnuts
= 630 digestible calories

15 g protein/100 g

Acceptable at some meals

100 g porridge
= 50 calories

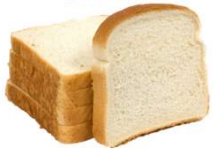
100 g unsprouted rice
= 130 calories

100 g unsprouted pasta
= 131 calories

Rarely acceptable

100 g unsprouted whole wheat grain bread = 200 calories

100 g unsprouted white bread
= 266 calories



Exceptionally acceptable

100 g unsprouted muesli = 450 calories

100 g sweets
= 400 calories

100 g chocolate
= 550 calories

Eat animal proteins

150-350g/day

Eat meat, fish, eggs, cooked at low temperature (not in oil)

For blood type O:

180-300 g/day

animal protein

- 4 days with 180-300 g red meat/week

- 1-2 days with 180-300 g poultry/week

- 1-2 days with 250-300 g fish or seafood/week

(Small fatty) fish (herring, mackerel, sardines, …) & seafood

How many calories/100 g of protein-rich foods

100 g pork bacon = 450 calories

37g protein/100 g

100 g cheese = 330 calories

30g protein/100 g

100 g beef = 270 calories

26g protein/100 g

100 g lam = 290 calories

100 g minced lam = 245 calories

100 g salmon fish = 205 calories

20 g protein/100 g

3.5 g protein /100 g

100 g whole milk = 65 calories

13g protein/100 g

100 g eggs = 130 calories

100 g chicken = 165 calories

100 g prawns = 205 calories

24 g protein/100 g

27g protein/100 g

Vegan => Protein alternatives

VEGAN

What are the protein alternatives?

Better grains & seeds => Sprouted

100 g soybean sprouts = 120 calories

13 g protein/100 g

100 g broccoli sprouts = 29 calories

3.6 g protein/100 g

100 g cauliflower sprouts = 35 calories

100 g sprouted white rice = 130 calories

3 g protein/100 g

100 g quinoa sprouts = 160 calories

14 g protein/100 g

Contains s all 9 essential amino acids

100 g sprouted wheat = 200 calories

7 g protein/100 g

100 g sprouted grain bread = 260 calories

15 g protein/100 g

Contains complete protein" meaning it contains all 9 essential amino acid

Better nuts => Raw, soaked, & sprouted

Afttre 8 hours of soaking (with raw nuts)

100 g peanut sprouts = 565 digestible calories

26 g protein/100 g

100 g almond sprouts = 575 digestible calories

21 g protein/100 g

100 g soaked wall nuts = 655 digestible calories

15 g protein/100 g

After 48 hours of soaking (with raw hazelnuts)

100 g soaked hazelnuts = 630 digestible calories

15 g protein/100 g

Vegan => Essential amino acids

2x/day

Daily Nutrient supplementation for vegans			
Vitamin A	10 000 to 25 000 IU	Iron	10 to 80 mg per day
Vitamin B's (B12 esp.)	High-dosed vitamin B complex 3000 µg oral vit. B12 per day	Zinc	20 to 40 mg per day
Vitamin D3	2000 to 4000 IU per day (except if a lot under the sun)	Iodine	100 to 150 µg per day
Vitamin E	200 to 400 IU of mixture of tocopherols and tocotrienols	Multivitamin preparation	1 to 2 capsules of high-dosed preparation /day
Vitamin K	50 µg vitamin K1		
Omega 3 polyunsatu-rated fatty acids	1 to 2 g per day of fish oil, or of 1 soupspoon of rapeseed or perilla oil		
Branched amino acids: valine, leucine, isoleucin; Sulfur-containng amino acids: cyseine, methionine (indces lack of carnitine)	100 to 500 mg per day of these aminoacids except not of methinine Donot supplement with methionine as it produces homocysteine (risk factor for atherosclero		

Paleo diet

=> During the meal: How to eat?

Paleo diet => Focusing on the food& chewing it

Focus on the food

Higgs S, et al. Appetite. 2011 Aug;57(1):202-6

Chew 35x on each bout

Kamiya K, et al. J Med Dent Sci. 2010 Mar;57(1):35-43

- ↑ Digestion & amino acid absorption
- ↑ Energy & well-being
- ↓ Appetite & food intake

Paleo diet

What NOT to drink?

What to avoid drinking => 5 days per week

Avoid preserved fruits

- Fruit juices even fresh: max. 2x1/week

Avoid alcohol

- Wine, beer
- Strong drinks

AVOID high-glycemic drinks

- Soft drinks
- Mix protein-sugar: milkshakes

AVOID some protein-rich drinks

- Milk, buttermilk
- Milkshakes

Replacing sweetened caloric beverages w/ drinking water = 8 kg of weight loss/year?

118 Overweight women (25 to 50 years) who regularly consumed sweetened caloric beverages (SCBs) (>12 ounces/day) at baseline. => estimated + three 24-hour diet recalls At baseline , 2, 6, & 12 months

Replacing sweetened caloric beverages with drinking water

- Sign. - 200 kcal/day ↓ total energy intake (= 200/9= 22 g of fat) over 12 months (= 365 x 22 g = 8 kg of fat less/year)
- Effect = sustained over time
- The caloric deficit attributable to replacing sweetened caloric beverages with water => not compensated by ↑ in other food or beverages

Stookey JD, et al. Obesity (Silver Spring). 2007 Dec;15(12):3013-22.

Paleo diet

What to avoid or reduce eating?

What to avoid eating => 5 days per week

Avoid preserved fruits

- Canned, (frozen?) fruits
- Fruits grown with pesticides

Avoid preserved vegetables

- Canned, veggies
- Vegetables grown with pesticides

AVOID high-glycemic carbs

- Sugar, sweeteners
- Mix protein-sugar: ice-cream
- Pastries, cookies, sweets
- Whole grain bread (depletes the hormones & nutrients)

AVOID some protein-rich foods

- Dairy (milk) products
- Processed preserved meats
- High temp. cooking > 100 ° C = 220 °F max
- Cooking in oil, grilling, barbecue
- Protein-rich food in the evening (supper)

AVOID some fat-rich foods

- High temperature cooking > 100 ° C = 220 °F max
- Cooking in oils,
- Margarine
- High saturated fatty acids > 5 teaspoons/day

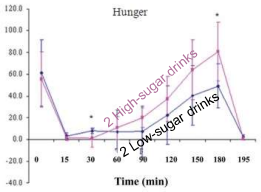
↑ Sugar intake => ↑ Hunger & food intake

16 women => a breakfast accompanied by 2 drinks sweetened ad libitum with sugar => After 3h: lunch

Women who consumed sugar to sweeten the breakfast drinks above the median (> 20 g)

vs women who consumed sugar below the median amount of sugar used (< 20 g)

- ↑ Hunger sensation in the preprandial period
- +134 g ↑ Ad libitum food intake at lunch (390 g × 256 g, *P* = 0.002)



Penaforte FR, et alwomen. Nutr Res Pract. 2013 Apr;7(2):77-81

To keep off of junk foods, esp. sweets & other carbs

=> 4 Diet advices

1° Live & work pleasantly (relaxed pace) => Take time to take care for yourself

Sweet cravings

= signals that it is time to take good care of yourself

Relaxed person => ↓ Hunger

748 Older adults (56% women, 60.0 years) => EMA (Ecological momentary assessment of eating & diet) hunger intensity => rated their current level of hunger on a scale from 1 (none) to 5 (extreme),

Distraction (−0.039 (−0.058; −0.019, p< 0.01 & Slow thinking (−0.057 (−0.080; −0.034), p< 0.01)

↓ Later hunger intensity

7 days of 4 self-report assessments

Restless (0.040 (0.018; 0.063, p = 0/01)

↑ Later hunger intensity

de Rivaz R, et aly. Nutrients. 2022 Dec 5;14(23):5167.

1° Live & work pleasantly (relaxed pace) => Take time to take care for yourself

Sweet cravings

= signals that it is time to take good care of yourself

2° Express all emotions within yourself => ↓ Emotional eating

Food cravings

= signals that is time to better react to stress by allowing all emotions to be expressed inside of yourself

https://www.realfoodwellness.com/post/overeating-triggers-for-introverts-extroverts

3° Sleep well & enough: 8-10 h/24hours

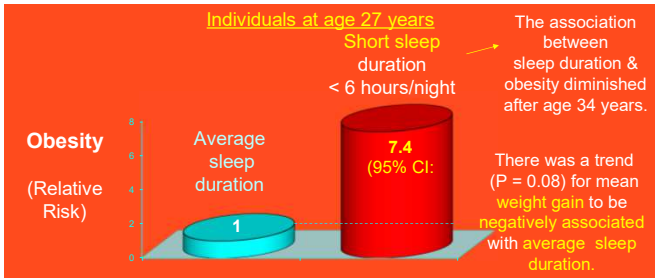
Food cravings

= signals that it is time to take a 30 min. nap

Short sleep < 6 hours/night => ↑ Obesity in young adults

496 Young adults, of ages 27, 29, 34, & 40 years

13-year prospective study: 4 interviews when participants were ages 27, 29, 34, & 40 years



The association between sleep duration & obesity diminished after age 34 years.

There was a trend (P = 0.08) for mean weight gain to be negatively associated with average sleep duration.

An association exists between short sleep duration & obesity, & a negative association between sleep duration & BMI in young adults.

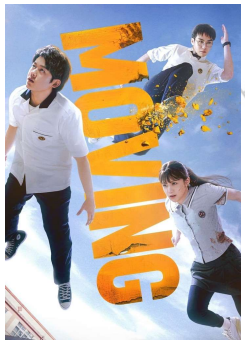
Hasler G, et al. Sleep. 2004 Jun 15;27(4):661-6 NHI, Bethesda, MD, USA

4° STOP eating & drinking sugar & sweets

Sweet cravings

= signal that it is time to stop all sweets & soft drinks

5° Move more



Hunger when sitting

= signal that it is time to move

5° Move 5 min. bouts of activity every hour => ↓ Food cravings in sedentary adults

30 Sedentary adults (office worker)

Randomized crossover trial

6 h of sitting interrupted by + 1x 30 min. of moderate-intensity treadmill walking in the morning

vs 6 h of uninterrupted sitting

No sign. effect on food cravings at the end of the day

6 h of sitting interrupted by + 6 x 5-min/hour microbouts of moderate-intensity treadmill walking throughout the day

↓ Food cravings at the end of the day

Bergouignan A, et al.. Int J Behav Nutr Phys Act. 2016 Nov 3;13(1):113

Paleo diet

=> Avoid cooking food at high temperatures

No plant cooking in Paleolithic times

FIRE: 350,000 years ago: Setting up a fire & appreciating its value became know to homo erectus around (Hawkes, 1976) ate that meat raw.

POTS: 6,800 years old: the oldest known pot is only In evolutionary terms, that was only yesterday. In the Paleolithic times, there was no container or pot to cook grains in: You cannot hang it in a chunk over the fire or lie it in the embers. To cook grain and other seeds, you need a container of some sort.

FIRE HEARTS:

- 100,000 year-old hearths have been discovered, but relatively rare. For any reliance on cooking, hearths are necessary to control fire. you also need a controlled fire
- Some 35,000 years ago. When ‚Cro-Magnon's colonized Europe,, that hearths became universal. However, even then they were used merely for warmth, not for cooking plants.
- At the time, Europe was in the grip of a succession of ice-ages. For some 70,000 years there were long, cold winters and short, cool summers. Cro-Magnon and his Eurasian ancestors cannot have eaten plants – for most of the year there weren't any! He ate meat or he died. And he ate that meat raw.

7. Bryant V. M., Williams-Dean G.. The Coprolites of Man. Scientific American, January 1975.
8. Hawkes J. G.. The Hunting Hypothesis . In: Ardrey R., ed. The Hunting Hypothesis . Collins, London, 1976.

Avoid cooking food at high temperatures

=> Or you get: Trans fatty acids, polycyclic aromatic hydrocarbons, & other toxins

Good cooking processes => Animal proteins

Oven at 85°C = 185 °F

Steamed at 90°C = 194°F

Boiled at 100 °C = 212 °F

Meat, poultry, … = OK, when cooked at low temperatures

Avoid these cooking processes => Animal proteins

Oven at > 90°C = 195 °F

Cooked in pan at 170-200°C = 340- 390 °F

Fried at 180-220°C = 355-430 °F

Grilled, barbecue, smoking at 500 – 1200 °C = 932-2192 °F

Meat, poultry, …= NOT OK, when cooked at high temperatures

Cooking t°

Barbecue, smoking	500 – 1200 °C
Toaster	500 °C
Oven	250-350 °C
Bread is baked at 220 °C	
Frying	180-220°C
Cooking pan	170 – 200 °C
Boiling	100 °C
Steaming	90 °C

Fradin J, Dumas R. La cuisine est un art qui doit rester mesuré. Alimentation hypotoxique. Institut de médecine environnementale.

Avoid cooked fats

- Cooking foods in oil or butter, or just bring fatty foods at high temperatures (above the temperature of boiling water – 100 degrees Celsius) changes the structure of the fats, making polyunsaturated fatty acids become more rigid and be called trans fatty acids.
- A high intake of trans fatty acids has been reported in a primate study to increase by four any weight gain, especially fat gain.

It is not any fat that makes you fat, but (over)cooked fat.

Trans fatty acids

At > 90 °C = 195 °F

Trans fatty acids

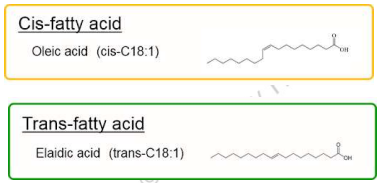
Trans fatty acids

Created at temperatures > 90 °C

for

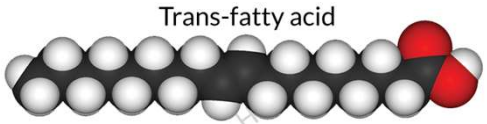
cooking of polyunsaturated fatty acids

(fish, vegetable oils)



Potatoes, 200 g portions

Daily intake in the USA = ± 6 grams/day



- Daily intake in the USA (following the FDA): 5.8 grams/day of trans fat (2.6% of energy intake) (Revealing 'trans' fats".- US FDA (Food & Drug Administration))
- The American Heart Association recommends that people limit trans fats to less than 2 grams/day based on a 2,000 calorie diet.

C18 trans fatty acid => ↑ ↑ in US population (vs China)

US residents

Chinese residents

on the average 10 x more C18 trans fatty acids in the serum

Satia JA, et al. Int. J. Cancer, 82: 28-32, 1999

Trans fatty acid labelling on packages

In the USA if a food has less than 0.5 g of trans fat per serving => the food label can read 0 grams trans fat.

Though that's a small amount of trans fat, if you eat multiple servings of foods with less than 0.5 grams of trans fat, you could exceed recommended limits.

Content in trans fatty acids

Palm kernel oil

Coconut oil

Partially hydrogenated vegetable oils made from naturally saturated palm oil, coconut oil & palm kernel oil, can be used to replace animal fats in foodstuffs for adherents to the dietary rules of Kashrut (kosher) & Halal, & for vegetarians and vegans

Up to 45% trans fats of total fat in those foods => artificial *trans* fats formed by partially hydrogenating plant fats may be *trans* fat.[1]

1. *Trans Fat Task Force (June 2006). TRANSforming the Food Supply.*
2. *Hunter, JE (2005). "Dietary levels of trans fatty acids" basis for health concerns and industry efforts to limit use". Nutrition Research **25** (5): 499–513.*
3. *http://www.nbcnews.com/id/37364783/ns/health-diet_and_nutrition/t/healthier-fries-trans-fat-limits-are-working/*

Content in trans fatty acids

Baking preparations

In general, contain 30% *trans* fats of total fat

French fries

7 ¼ grams /100 grams: samples of McDonald's collected in 2004 & 2005 found that fries served in New York City contained 2x trans fat as in Hungary => 28 x as much as in Denmark (where trans fats are restricted).

Margarines

Margarines not reformulated to reduce *trans* fats may contain up to 15% of weight = *trans* fat.[2]

Butter

Animal fats such as butter contain up to 4%.

1. *Trans Fat Task Force (June 2006). TRANSforming the Food Supply.*
2. *Hunter, JE (2005). "Dietary levels of trans fatty acids" basis for health concerns and industry efforts to limit use". Nutrition Research **25** (5): 499–513.*
3. *http://www.nbcnews.com/id/37364783/ns/health-diet_and_nutrition/t/healthier-fries-trans-fat-limits-are-working/*

Diet high in trans fat => ↑ Body weight

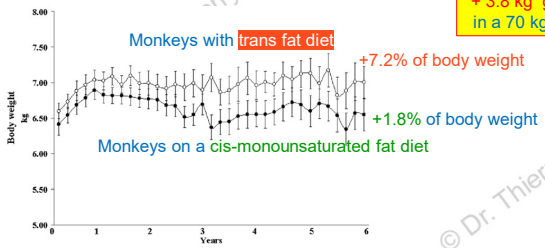
42 African green monkeys

Monkeys with trans fat diet (trans-monounsaturated fatty acids = trans-isomers = 8% of energy) for 6 years

vs diets containing an equivalent 8% of energy as cis-monounsaturated fatty acids

+ 5.4 % ↑ Body weight gain

5.4 % greater weight gain = equivalent to + 3.8 kg greater weight gain in a 70 kg man after 6 years



Kavanagh K, et al. Obesity (Silver Spring). 2007 Jul;15(7):1675-84

Diet high in trans fat => ↑ Fat mass

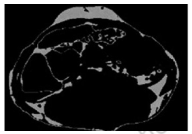
42 African green monkeys

Monkeys with trans fat diet (trans-monounsaturated fatty acids = trans-isomers = 8% of energy) for 6 years

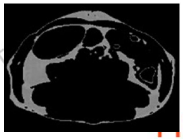
vs diets containing an equivalent 8% of energy as cis-monounsaturated fatty acids

- +26% ↑ abdominal subcutaneous fat deposition
- +33% ↑ intra-abdominal fat deposition

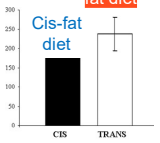
Cis-fat diet



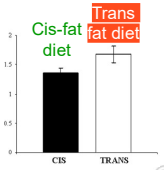
Trans fat diet



Total abdominal fat



Abdominal / subcut. fat ratio



Kavanagh K, et al. Obesity (Silver Spring). 2007 Jul;15(7):1675-84

Diet high in trans fat => ↑ Serum glucose & insulin

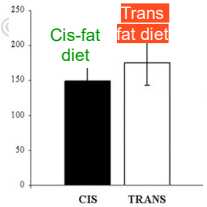
42 African green monkeys

Monkeys with trans fat diet (trans-monounsaturated fatty acids = trans-isomers = 8% of energy) for 6 years

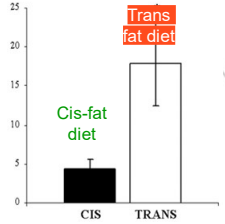
vs diets containing an equivalent 8% of energy as cis-monounsaturated fatty acids

Impaired glucose disposal was implied by significant postprandial hyperinsulinemia

Serum glucose (mg/dL)



Serum insulin (µIU/mL)



Kavanagh K, et al. Obesity (Silver Spring). 2007 Jul;15(7):1675-84

Polycyclic aromatic hydrocarbons

At > 250-500 °C = 480-930 °F

Polycyclic aromatic hydrocarbons

Created at temperatures
> 250 (grilling in the oven)
-500 °C (barbecue)
for
cooking of protein-rich foods
(meat, fish, poultry, eggs, …)
& cereals (bread, ..)

Prenatal (maternal) exposure to polycyclic aromatic hydrocarbons => ↑ Childhood obesity

422 African-American & Hispanic children,

whose mothers underwent monitoring for polycyclic aromatic hydrocarbon (PAH) exposure during pregnancy => were up to ages 5 ; 341 up to age 7

↑ Prenatal PAH exposures

↑ Childhood body size (sign. positive assoc.), after adj. for child's sex, age at measurement, ethnicity, a birth weight, prepregnancy obesity, etc.

Mothers in the highest tertile of polycyclic aromatic hydrocarbon exposure

vs children of mothers in the lowest tertile of PAH exposure

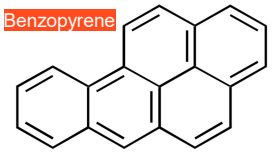
- Their children: +0.4-unit ↑ BMI (95% CI: 0.08, 0.70)
- At age 5 years => +79% ↑ obesity risk (1.79; 95% CI: 1.09, 2.96)
- At age 7 years:
  - + 0.3 unit ↑ BMI z score (95% CI: 0.01, 0.59)
  - +1.93-unit ↑ body fat % (95% CI: 0.33, 3.54)
  - 2.3 x ↑ obesity risk (2.26 ; 5% CI: 1.28, 4.00

RESULTS
At age 5 years: 21% of the children were obese
At age 7 years: 25%

Rundle A, et al. Am J Epidemiol. 2012 Jun 1;175(11):1163-72.

Benzopyrene => ↑ in grilled/barbecue

Benzopyrene



= 5-ring polycyclic aromatic hydrocarbon

- Studies have shown that dietary intake of benzo[a]pyrene (BaP), a polycyclic aromatic hydrocarbon (PAH)=> ↑ levels of tumors at several sites, esp. in the upper gastrointestinal tract
- The highest levels of benzo[a]pyrene (up to about 4 ng benzo[a]pyrene /g of cooked meat) => found in
  - grilled/barbecued very well done steaks & hamburgers
  - grilled/barbecued well done chicken with skin.

Much lower levels of benzo[a]pyrene => in meats grilled/barbecued to medium done & in all broiled or pan-fried meat samples regardless of doneness level.

- Generally ↓ benzo[a]pyrene levels in non-meat items => However, certain cereals & greens (e.g. kale,collard greens) had levels up to 0.5 ng/g.
- In our population, the bread/cereal/grain, & grilled/barbecued meat, resp., contributed 29 & 21 % to the mean daily intake of benzo[a]pyrene.

Kazerouni N, et alFood Chem Toxicol. 2001 May;39(5):423-36

Smoked foods => ↑ Carcingenic compounds

1947: Tilgner => eating regularly smoked foods causes chronic intestinal inflammation

Carcinogenic substances in smoked food:

1. Benzopyrene
2. Fluoranthene
3. Benzol (g,h,i) perylene
4. Chrysene
5. Benzol(a)anthracene
6. phenanthrene

} Aromatic polycyclic hydrocarbons

Benzopyrene:
- 1 µg/kg meat in industrial smoking
- 23 µg/kg in isolated farm smoking (longer smoking time)

Note: protective envelops as in Saxe saucissages helps

Lederer J, Alimentation et protection du cancer Ed. Nauwelaerts & Maloine; Bauvechain (B.), Paris (Fr), 1986

Avoid Cooked fats

Alternative: use other cooking methods that do not bring food and in particular fats at high temperature such as steaming, boiling in water, oven at 85° Celsius maximum (° Fahrenheit), carpacio or tartar steak, …

to stay or become slim.

Healthy meals

=> Examples

Healthy breakfast

or

Cooked slowly without oil

or

Oven at low t° (85°C or 185 °F)

?

Raw

Optimal: largest meal with most proteins & sufficent healthy fat

Snacks

Fruits

Healthy lunch or no lunch!

Or

Steamed fish & veggies

Boiled & raw

or

Boiled veggies + saus

?

Optimal: NO meal or Middle-sized meal with fewer proteins & more vegetables

Healthy supper

Or

?

Optimal: small vegan with no proteins & boiled vegetables

Acceptable bread & grains

Sprouted bread

Sprouted grains

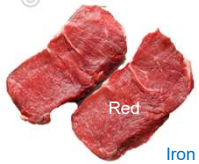
Sprouted pasta

Paleo diet
= High-protein diet

=> Consume healthy protein-rich foods (organic, non-processed, & non-burned)

Protein-rich foods to prefer: from Animal origin

Meat



Iron ++

Iron +

Fish & seafood

Iodine, omega 3 +

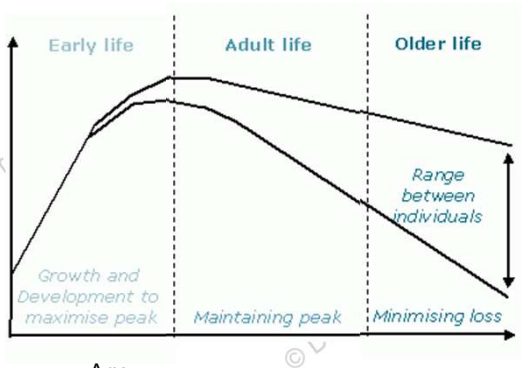
Eggs

Saturated fat, vit. A +

Make the body firm

Muscle mass

Muscle mass & strength



Meat protein => ↑ Essential amino acid availablity

2 Oz-eq portions = 56.7 grams of …

- 30 Young adults (mean age: 26 years)
- 25 older adults (mean age 64 years)

=> 4 test meals => Blood samples taken at baseline & 30, 60, 120, 180, 240, & 300 min after the meal

Unprocessed lean pork (7.36 g EAA availability)

Whole eggs (5.38 g EAA)

Black beans (3.02 g EAA)

Sliced almonds (1.85 g EAA)

No differences in EAA bioavailability between black beans and almonds.

- 2 oz-eq portions of pork & eggs => Greater EAA bioavailability than black beans & almonds in young & older adults, separately or combined ($p < 0.0001$ for all)
- Pork => Greater EAA bioavailability than eggs in young adults ($p < 0.0001$), older adults ($p = 0.0007$), & combined ($p < 0.0001$)
- Age did not affect EAA bioavailability among the four protein foods tested

Connolly G, et al. Nutrients. 2023 Jun 25;15(13):2870

9 Essential amino acids

Branched chain amino acids (BCAA)

Isoleucine
Leucine
Lysine
Methionine
Phenylalanine
Threonine
Tryptophan
Valine
Histidine

*Reeds PJ (July 2000). "Dispensable and indispensable amino acids for humans". Journal of Nutrition **130** (7): 1835S–40S*

High protein breakfast => ↓ Appetite & food intake at following meal in children

Experiment 2: 9 children (6 boys, 3 girls)

=> consumed 2 different breakfasts on 2 separate mornings

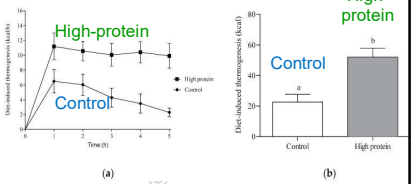
45 g (high protein) breakfast = 450 kcal

vs control breakfast (7 g of protein)

Randomized study

- Sign. 2.3x ↑ diet-induced thermogenesis (52.1 g vs 22.6 g)
- 1.3x ↑ Mean fat oxidation (3.9 vs 2.9 g)

Diet-induced thermogenesis



Bellissimo N, et al. Nutrients. 2020 Oct 2;12(10):3025

Normal-weight obesity

Normal-weight obesity syndrome

characterized by:

- Body fat excess
- with an adequate BMI (18.5-24.9 kg/m²)

Typical for hormonally untreated older adults with normal weight-BMI

Morning soy protein snack => ↓ Appetite, energy intake, fat % & ↑ Muscles

107 women with normal-weight obesity (meange: 24 yrs, BMI: 22.7 kg/m², body fat % : 38 %) => assigned to 1 of 2 groups

6 months of a snack at 10 a.m.

High-protein snack (HP) containing 50 g soybean (n= 52)

vs isocaloric low-protein snack (LP, n = 55) (protein: 18.2 g, carb: 15 g, fat: 10 g, energy: 210 kcal)

vs isocaloric 3.5 fruit servings (protein: <2 g, carb: ≈50 g, fat: <1 g, energy: ≈ 210 kcal)

- Sign. -11.4 mm ↓ appetite on visual analogue scale (HP = -12 mm & LP = -0.6 mm)
- Sign. -75 kcal ↓ calorie intake (HP = -166.2 kcal/day & LP = 91.3 kcal)
- Sign. -52 g ↓ carbohydrate intake (HP = -58.4 g/day & LP = 6.4 g/day)
- Sign. -3.4 cm ↓ waist circumference (HP = -4.3 cm & LP = -0.9 cm),
- Sign. -2.8%↓ body fat percentage (HP = -3.7% & LP = -0.9%) ($p < 0.05$)
- Sign. +0.9 kg ↑ skeletal muscle mass (HP = 1.2 kg & LP = 0.3 kg)

Haghighat N, et al. Nutrients. 2021 Jun 30;13(7):2266

Paleo diet
= High-protein diet

=> How much protein = necessary?

Diets

Normal diet

- 15 % protein
- 25 % fat
- 60 % carbohydrate

High-protein diet

- 25 % protein
- 25 % fat
- 50 % carbohydrate

Tang M, et al. Obesity (Silver Spring). 2013 Mar;21(3):E204-10

Low-fat diet

- 25 % protein
- 10 % fat
- 65 % carbohydrate

Heber D, et al. Nutrition. 1991 Mar-Apr;7(2):137-9

How much protein for a sedentary person?

US & Canadian Dietary Reference Intake guidelines => recommend

daily protein intake = 0.8 g/kg body weight

(Bilsborough S, et al.. Int J Sport Nutr Exerc Metabol 2006; 16: 129–52)

⇒ based on structural requirements, disregards use of protein for energy metabolism

⇒ Requirement is for a normal sedentary person *(Tarnopolsky MA, et al. J Applied Physiol 1992; 73 (5): 1986–95)* to avoid a deficiency:

- Women aged 19–70 => need to consume 46 g/day of protein
  = 190 g of chicken or tuna = 240 g beef = 290 g of ham = 360 g of eggs = 920 g of yogurt
- Men aged 19–70 => need to consume 56 g/day of protein
  = 235 g of chicken or tuna = 290 g beef = 350 g of ham = 440 g of eggs = 1120 g of yogurt

(Dietary reference intakes: macronutrients (PDF). Institute of Medicine)

How much protein does a physically active person /athlete need?

Studies: active people & athletes => may require elevated protein intake (vs to 0.8 g/kg) due to ↑ muscle mass & sweat losses, & need for body repair & energy source

(Bilsborough 2006; Lemon 2000; Tarnopolsky 1992)

=> Suggested amounts vary between

- 1.6 - 1.8 g/kg body weight = 112 -126 g for 70 kg person = 125 g whey protein = 140 g soy protein = 530 g chicken or tuna = 630 g beef = 750 g ham = 950 g eggs = 2.4 L yogurt
  *(Lemon P. J Am Coll Nutrit 2000;**19** (5): 513–21)*
- 2 - 2.5 g/kg body weight = 140-176 g for 70 kg person = 170 g whey pr. = 190 g soy protein = 705 g chicken or tuna = 840 g beef = 900 g ham = 1270 g eggs = 3,2 L yogurt

i. e. when a proposed *maximum* daily protein intake would be approx. 25% of energy requirements

(Bilsborough S, et al. , Int J Sport Nutr Exerc Metabol 2012; 16: 129–52)

20 grams of protein = $^1/_6{}^{th}$ to $^2/_5{}^{th}$ (15 to 40%) of daily needs for adult 60kg-woman = $^1/_7{}^{th}$ to $^1/_3{}^{th}$ for 70kg -man

Low-calorie protein

21 grams whey protein powder 83 kcal
- 20 g protein
- 0.2 g carbs// 0.2 g sugar
- 0.2 fat

80 grams turkey
- 88 kcal
- 20 g protein
- 0.0 g carbs // 0.0 g sugar
- 0.8 g fat

75 grams shrimps
- 99 kcal
- 20 g protein
- 0.9 g carbs
- 0.0 g sugar
- 1.7 g fat

182 grams egg whites = 5 egg whites
- 94 kcal
- 20 g protein
- 1.3 g carbs // 1.3 g sugar
- 0.3 g fat

87 grams chicken breast
- 91 kcal
- 20 g protein
- 0.0 carbs // 0.0 g sugar
- 1.3 g fat

80 grams canned tuna (packed in water)
- 84 kcal
- 20 g protein
- 0.0 g carbs
- 0.0 g sugar
- 0.4 fat

143 grams codfish
- 101 kcal
- 20 g protein
- 0.4 g carbs
- 0.0 g sugar
- 2.1 g fat

20 grams of protein = $^{1}/_{6}^{th}$ to $^{2}/_{5}^{th}$ (15 to 40%) of daily needs for adult 60kg-woman = $^{1}/_{7}^{th}$ to $^{1}/_{3}^{th}$ for 70kg -man

105 grams lean beef
131 kcal
20 g protein
0.8 g carbs, 0.0 g sugar
5.3 g fat

105 grams ground beef
196 kcal
20 g protein
0.5 g carbs
0.4 g sugar
12.6 g fat

125 grams ham
125 kcal,
20 g protein
2.5 g carbs,
2.5 g sugar 3.8 g fat
(but careful: ↑ sodium)

88 grams sardines
174 kcal,
20 g protein
0.1 carbs
0.0 sugar
10.4 g fat

182 grams mussels
131 kcal
20 g protein
4.5 g carbs
0.9 g sugar
3.6 g fat

222 grams surimi
278 kcal
20 g protein
26.7 g carbs
10 g sugar
10 g fat =>Surimi is fish-based food product. It is a processed food and not the healthiest choice but = cheap source of protein.

179 grams cottage cheese
159 kcal
20 g protein
4.1 carbs
4.1 sugar
7 g fat

400 grams fat-free yogurt
144 kcal
20 g protein
16 g carbs
16 g of milk sugar (lactose), 0 g fat => although fat-free yogurt contain protein, it is not a good food to rely on if you're looking to lose weight as you're also getting 16 g of milk sugar (lactose) along

20 grams of protein = $^{1}/_{6}^{th}$ to $^{2}/_{5}^{th}$ (15 to 40%) of daily needs for adult 60kg-woman = $^{1}/_{7}^{th}$ to $^{1}/_{3}^{th}$ for 70kg -man

Vegetarian protein

159 grams eggs = 3 whole eggs
225 kcal
20 g protein
1.1 g carbs
1.1 g sugar
15.7 g fat

76 grams seitan (= vegetarian meat-substitute made from gluten, the main protein of wheat.):
110 kcal
20 g protein
6.1 g carbs
0.0 g sugar
0.6 g fat

33 grams spirulina (= sea weed rich in protein => eating 33 grams of spirulina powder in one go is too much, above the recommended serving size):
123 kcal
20 g protein
6.3 g carbs
0.0 sugar
2.0 fat

103 grams tempeh (fermented soy product):
207 kcal
20 g protein
13.3 g carbs
0.0 g sugar
8.2 g fat

235 grams lentils
228 kcal
20 g protein
33.2 g carbsQ
0.0 g sugar, -
1.6 g fat

667 grams mushrooms (uncooked) (cooked mushrooms in the picture because the 667 g of raw mushrooms were taking too much volume for the plate) =>
180 kcal
20 g protein
20 g carbs, 10 g sugar
2 g fat

Paleo diet
= High-protein diet

=> ↓ Body weight

High-protein weight loss diet => Preserves lean body mass in men

43 Overweight & obese men => weight-loss diet = -750 kcal /day less than daily energy needs for weight maintenance

22 men + high-protein (= 25% fat:50 % fat: 25 % protein energy = 1.4 g protein/kg/day) weight-loss diet => 98 g for 70 kg person)

for 12 weeks

vs 21 men + normal-protein (25% fat:60% carb: 15% protein energy) weight-loss diet => 0.8 g protein/kg/day => 56 g for 70 kg person)

Randomized study

- Lost -1.1 kg less lean body mass than the NP group (-1.9 vs. -3.0 kg) => help men preserve lean body mass
- comparable body weight & fat loss
- Similar ↓ total cholesterol, HDL-c., LDL-c., total cholesterol-to-HDL-c ratio
- Similar ↓ glucose, & insulin, & HOMA-IR
- Similar ↓ resting energy expenditure & blood pressure

Tang M, et al. Obesity (Silver Spring). 2013 Mar;21(3):E204-10.

Incorrect idea: "High-protein diets cause dramatic weight loss."

The weight loss typically occurring with high-protein diets — approximately 11-16 pounds (5-7.3 kg) over the course of a year[1,2]

= not sign. different from that seen with other weight-reduction regimens or with low-fat, vegetarian eating patterns.

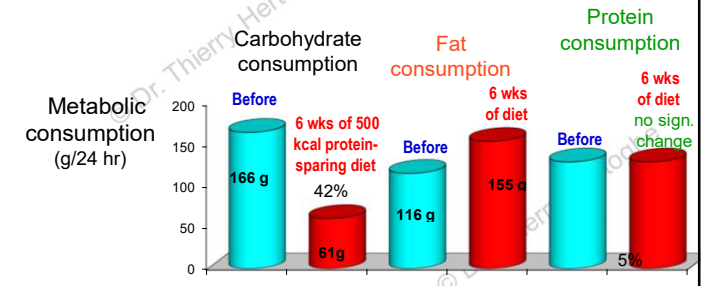
1. Foster GD, et al. N Engl J Med 2003;348:2082-90
2. Stern L, et al. Ann Int Med 2004;140:778-85.

Protein-sparing 500 kcal diet => ↑ Fat consumption & loss

15 Morbidly obese adults

6 weeks of 500 kcal/day-commercial protein-sparing modified fast preparation

- sign. -14.4 kg ↓ body weight, BMI & total body fat (from 55.8 to 41.4 kg),
- while lean body mass & arm muscle circumference remained unchanged



Van Gaal LF, et al. Am J Clin Nutr. 1985 Mar;41(3):540-4

High-protein/fat, low carbohydrate diet => ↓ Body weight

Paleo diet
= High-protein diet

=> Hormone levels

Protein => ↑ Serum IGF-1, free & tot&al testosterone, free & total cortisol

226 Healthy middle-aged & older men aged 42-76 yrs → High-protein diet (Highest vs lowest protein intake) → . + 17% ↑ serum IGF-1 (162 vs 139 µg/L)

Larsson SC, et al. Am J Clin Nutr. 2005 May;81(5):1163-7.

8 Endurance athletic men => 2 x 6 wk cross-over study → High--meat diet (High Meat diet (6 wks; 14% protein, 28 % fat) vs high milk-egg - vegetarian diet 6 wks; 15% protein,28% fat) → +27% ↑ serum total testosterone

Raben A, et al. perfMed Sci Sports Exerc. 1992 Nov;24(11):1290-7

7 Normal men → High-protein diet (High Protein diet (10 days) vs High carb diet (10 days)) → +10% ↑ serum Free testosterone index (= 100x serum testo/SHBG) + 37% ↑ serum total cortisol (also 19% ↑ serum CBG) (p < 0.05 => ↑ serum free cortisol)

Anderson KE, et al. Life Sci. 1987 May 4;40(18):1761-8

↑ Meat & fish/seafood intakes => ↑ Serum IGF-1

226 healthy middle-aged & older men aged 42-76 yrs

↑ Red meat intake

↑ Serum IGF-1 (P = 0.05) (modest positive association)

↑ Fish & seafood intakes

↑ Serum IGF-1 (P =0.07) (modest positive association)

Larsson SC, et al middle-aged and elderly men. Am J Clin Nutr. 2005 May;81(5):1163-7

In contrast to rodents, humans do not respond to calorie restriction with ↓ serum IGF-1

218 Nonobese (BMI: 22-27.8 kg m²) young & middle-aged (20-50 years age range) men & women

Randomized trial

Long-term calorie restriction for 2 years: -25% cal.
during the first 6 months: -19.5 % ↓ calories
over the next 18 months: - 9.1 % ↓ calories

2 years

- -7.6 kg weight loss averaged over the 2-years period of which 71% was fat mass loss (P < 0.0001)
- No change IGF-1 & IGF-1:IGFBP-3 ratio levels
- Sign. + 21% ↑ serum IGFBP-1
- - 42% ↓ in IGF-1:IGFBP-1 ratio at 2 years (P < 0.008)
- Serum cortisol concentrations were slightly but sign. ↑ by CR at 1 year only (P = 0.003)

In contrast to rodents, humans do not respond to calorie restriction with ↓ serum IGF-1 or with a sustained & biological relevant ↑ in serum cortisol

Fontana L, et al. Aging Cell. 2016 Feb;15(1):22-7

High-protein diet => ↑ Bioavailable testosterone in men

High-protein diet

-21% ↓ Serum testosterone

vs high-carbohydrate diet

-28% ↓ serum SHBG

+10% ↑ Free testosterone index (= 100x serum testo/SHBG)

the amount of testosterone available for the target cells is greater

Anderson KE, et al 1987;40(18):1761-8.

Protein => ↑ Serum IGF-1

Premenopausal women

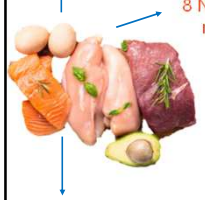
High-protein diet

+ 79% ↑ serum estradiol

Omnivorous diet vs oriental immigrant (more vegetarian)

33% ↑ serum estrone

Goldin et al, Am J Clin Nutr;1988;48:787-90



8 Normal men

High-protein diet

+ 33% ↑ 2-OH-estrone + no diff.in 16-OH-estrone =>SAFER estrogen metabolism

High protein diet (44% of calories as protein, and 35% as carb for 2 weeks), followed by a high carb diet (70% of calories as carbohydrate and 10% as protein) for 2 weeks

Anderson KE, et al. J Clin Endocrinol Metab. 1984 Jul;59(1):103-7

9 Premenopausal women

High-protein diet

↑ Protein intake => ↑ Serum progesterone

Anderson KE, al. Life Sci. 1987 May 4;40(18):1761-8

High-protein, very-low-calorie diet => ↓ Serum T3 & rT3 in obese women

15 Obese women aged 30-54 yr ≥ 126% ideal body weight => lost an average of 1.1 kg/wk until a predetermined goal weight was attained

High-protein, very-low-calorie diet (420 kcal/day)

Mean energy expenditure = -1719 kcal/day during the diet period.

- Sign. -1.1 kg/week
- Sign. ↓ resting metabolic rate
- Sign. ↓ serum T3 & reverse T3 ($p < 0.05$)
- No change in serum T4

Upon gradual realimentation

- Sign. ↑ of all metabolic parameters within 5 wk toward pre-diet baseline values
- but RMR (kcal/h) & serum T3 values remained sign. below pre-study values

Barrows K, et al. Am J Clin Nutr. 1987;45:391–398

High-protein diets => Safer estradiol metabolism

High-protein diet

vs high-carbohydrate diet

+33% ↑ 2-hydroxylation of endogenous estrogen (% oxidation of [2-3H] E2 measured as 3H2O released)

No sign. difference 16-alpha-hydroxylation

=> A high protein diet may ↓ cancer risk compared to a high carbo-hydrate diet by ↑ the metabolism of estrogen to safer metabolites

Anderson KE et al. 1984 Jul;59(1):103-7

High-protein diet => Hormones

High-protein diet

improves

- Improve muscles
- ↑ activity/levels of muscle-strengthening hormones:
  - Growth hormone, IGF-1 levels
  - Testosterone activity/free levels
  - Estrogen, progesterone
  - Cortisol, DHEA, & aldosterone

reduces

- ↓ hormone levels/activity:
  - Thyroid hormones (↓ conversion T4 to T3)
  - Insulin activity/levels
  - Serotonin, melatonin

↓ Fat & myxedema

↓ Appetite reduction
Good sleep

Eating Beef provides conjugated linoleic acid or CLA

Beneficial effects of CLA:

- Combating Cancer : In multiple research studies, CLA has been shown to both reduce the incidence of cancer and suppress the growth of existing cancers in laboratory animals; Recent studies in Europe indicated that patients with higher levels of CLA in breast tissue had less tumor growth.
- Combating Arteriosclerosis: prevents the onset of diabetes & reduces arteriosclerosis (coronary artery disease).
- Reducing Body Fat: Other studies have correlated CLA with decreasing body fat & increasing lean body mass. One study showed that humans receiving CLA had a sign; decrease in body fat as compared to the placebo group.
- Preventing or Delaying the onset of Diabetes: Yet other research has shown that CLA delays

Paleo diet
= Moderatly high-fat diet

=> Consume healthy fat-rich foods
(organic, non-processed, & non-burned)

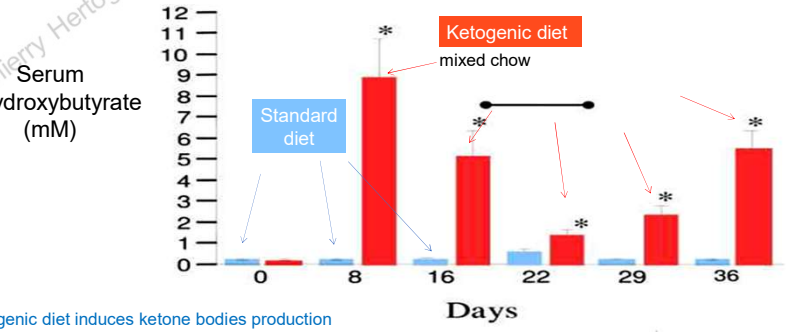
High-fat diet => Ketonic bodies

The production of ketonic bodies by the liver from fat, & their elimination by the kidneys in the urine

⇒ 2 Essential mechanisms for the efficacy in weight loss:

1. Ketonic bodies in the blood => ↓ appetite
2. Elimination of ketonic bodies in the urines => ↓ calorie
   => much less fatigue than physical exercise.

Ketone bodies in mice on ketgenic diet

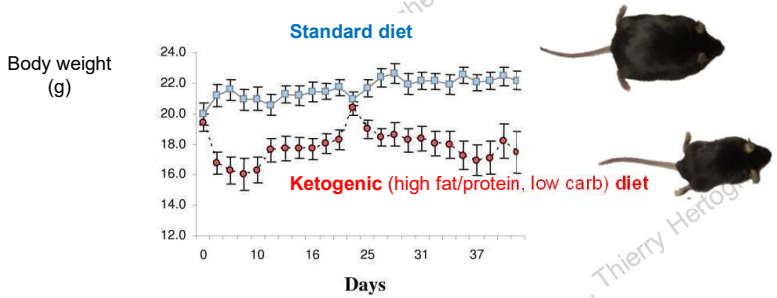


The Ketogenic diet induces ketone bodies production
The Standard diet (SD) group shown in blue, ketogenic diet (KD) group shown in red, error bars represent standard error of the mean. Serum β-hydroxybutyrate (BHB) levels in mM. * indicates $p < 0.05$ between KD and SD group. Days signify time in days from start of diet change. Serum β-hydroxybutyrate levels were significantly elevated in KD group at all time points after day 0. Bar indicates period of mixed chow for KD group

Van der Auwera et al; Nutr Metab (Lond). 2005; 2: 28

Ketogenic diet => ↓ Body weight in mice

Mice on the ketogenic diet => lost weight.



Van der Auwera, et al; Nutr Metab (Lond). 2005; 2: 28.

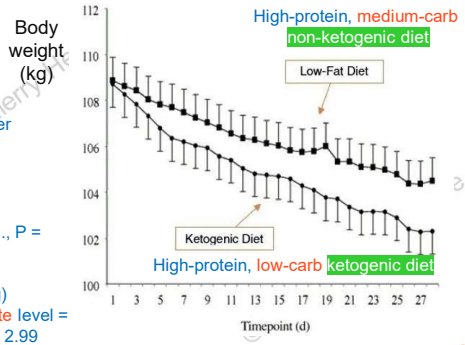
Ketogenic diet => ↓ Appetite, calorie intake, & weight

17 Obese men feeding ad libitum

Ketogenic diet ad libitum for 4 weeks, cross-over

vs non-ketogenic diet

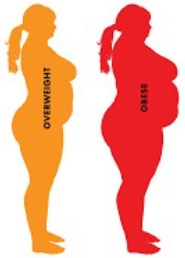
- Sign. ↓ ad libitum calorie intakes (7.25 MJ = 1.733 cal. /day vs 7.95 MJ/d = 1900 cal., P = 0.02)
- Sign. ↓ hunger (P = 0.014)
- Sign. -1.9 ↑ weight loss (P = 0.006; - 6.3 vs 4.4 kg)
- Induced ketosis with mean serum 3-hydroxybutyrate level = 1.52 mmol/L (P = 0.036 from baseline; & urinary = 2.99 mmol/L (P < 0.001 from baseline)



Johnstone AM, et al. Am J Clin Nutr. 2008 Jan;87(1):44-55

Mediteranean diet => Better than ketogenic diet for body composition & firmness

268 Adults with obesity or overweight



Very low-calorie ketogenic diet

for a maximum of 3 months until reaching 5% body weight loss

- -5%↓ body weight achieved after 1 month
- ↓ Fat mass
- ↓ waist circumference
- ↑ Body water

Mediterranean diet

- -5%↓ body weight achieved after 3 months

In people under 50, the MD was more efficient than the VLCKD

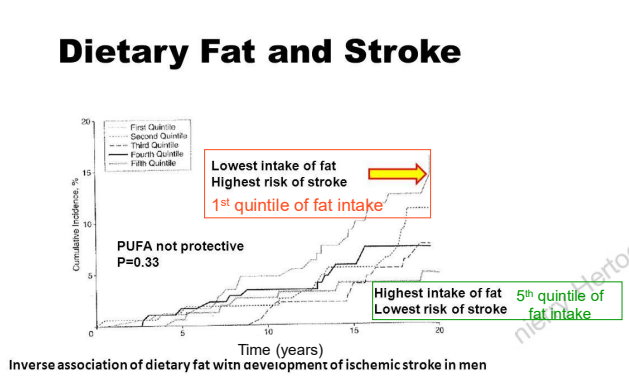
- Greater ↓ Waist circumference (-7.0 vs. -5.8 cm; p = 0.0076)
- Greater ↓ fat mass % (-3.33 % vs. -2.2 %, p = 0.002)
- Greater ↑ total body water % (+2.4 vs. +1.5% ; p = 0.004)
- Greater ↑ fat-free mass % (+3.1 vs. +2.3 %, p = 0.033)

BUT No diff. in people > 50 years with very low C KD

Both diets were effective to lose body weight (p < 0.0001) & fat mass loss (p < 0.0001), but the mediterranean diet reached a higher ↓ in waist circumference (p = 0.001) & fat mass (p = 0.0006) & a greater ↑ in total body water (p = 0.002) & fat free mass (p = 0.04)

Di Rosa C, et al. Int J Environ Res Public Health. 2022 Oct 11;19(20):13040

Dietary fat => ↓ Stroke



Inverse association of dietary fat with development of ischemic stroke in men

JAMA. 1997 Dec 24-31;278(24):2145-50 Gillman MW

Egg consumption => ↓ Serum cholesterol

27,378 Adults from the most recent National Health and Nutritional Examination Survey (NHANES III, 1988-94)

People who reported eating ≥ 4 eggs/week

vs those who reported eating ≤ 1 egg/week

Sign. -4 mg/dl ↓ serum cholesterol (193 mg/dL vs. 197 mg/dL, p < 0.01, negatively associated with

↑ Egg consumption

↓ Serum cholesterol level (beta = -6.45, p < 0.01)

Song WO, et al. J Am Coll Nutr. 2000 Oct;19(5 Suppl):556S-562S.

Whole egg intake => ↓ Insulin resistance, ↑ Serum HDL-cholesterol to total cholesterol

26 Young, healthy adults (18-35 y)
BMI < 30 kg/m² or <30% body fat for men
& <40% body fat for women, n = 26)
=> consuming an egg-free diet, 3 egg whites per day, & 3 whole eggs per day for 4 weeks

Randomized, crossover intervention trial

3 Whole eggs/day for 4 weeks

vs egg-free diet for 4 weeks

vs 3 egg whites/day for 4 weeks

- ↓ Insulin resistance risk, without altering other markers of glucose sensitivity or inflammation.
- ↑ Subset of large HDL particles (H6P, 10.8 nm)
- ↑ Serum HDL cholesterol to total cholesterol ratio

Andersen CJ, et al. Nutrients. 2023 Aug 27;15(17):3747

Egg consumption => No effects on serum cholesterol

Framingham Heart study

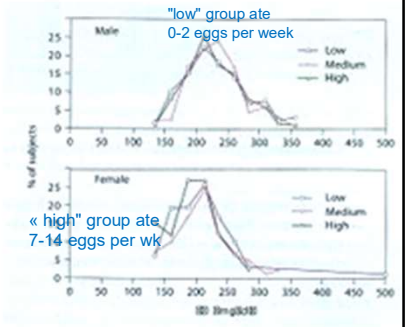
Eggs = the most concentrated source of cholesterol in the American diet.

The distribution of blood cholesterol levels between the 3 groups = virtually identical. The study also found no association between egg consumption & heart attack risk.

Dietary cholesterol does not raise serum cholesterol in the long term, because humans are adapted to eating cholesterol


Fig. 3
TC profiles in the three groups of egg intake in Framingham were similar – A long-term effect

« medium" group ate 3-7 eggs per week

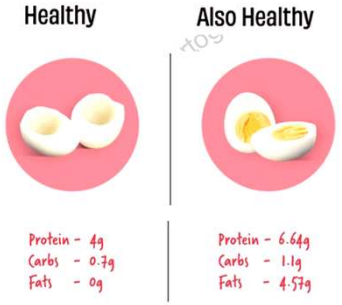


"low" group ate 0-2 eggs per week

« high" group ate 7-14 eggs per wk

Prevention of Coronary Heart Disease, by Dr. Harumi Okuyama et al.)

Egg white ⇔ Whole egg



1 egg white = 17 cal.

1 whole egg = 70 cal.

Cooked whole egg consumption => no diff. in serum cholesterol

For study 1, 16 men consumed raw vegetables with 75 g or 150 g cooked whole egg

For study 2, 17 women consumed cooked vegetables with 100 g cooked whole egg

Medium egg = 60 g

vs raw vegetables with no egg

No diff. in serum total-cholesterol areas under the curve (AUC)0⁻10h in triacylglycerol-rich lipoprotein fractions (TRL) isolated from collected blood

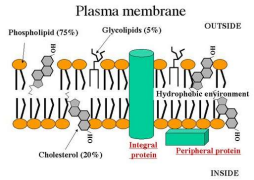
In both studies, whole egg consumption did not affect serum total-cholesterol AUC0⁻10h,

2 Randomized Controlled Crossover Studies

Kim JE, et al. Nutrients. 2018 Sep 9;10(9):1272

Higher cholesterol => Decreasing mortality in the Framùngham study

Cholesterol
Harmful alien substance?

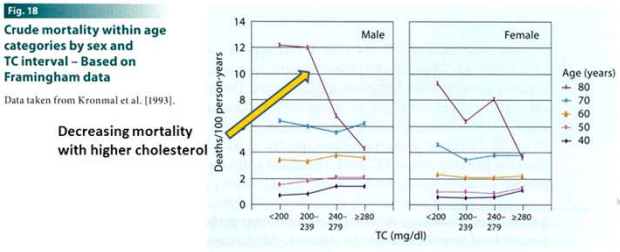


Daily Cholesterol needs
20% dietary (animal products)

80% manufactured by the body

Higher cholesterol => Decreasing mortality in the Framùngham study

Cholesterol and Age



Prevention of Coronary Heart Disease, by Dr. Harumi Okuyama et al

Total serum cholesterol levels and mortality risk as a function of age. A report based on the Framingham data

Arch Intern Med. 1993 May 10;153(9):1065-73 Kronmal RA

Serum total cholesterol = 240-279 mg/dl => Lowest all-cause mortality n Japan

The Japanese Experience
High Cholesterol is Not an Important Risk Factor of All-Cause Mortality

Tomohito Hamazaki and Harumi Okuyama

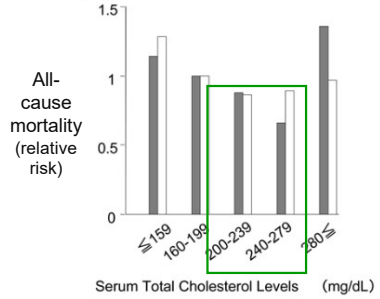


Fig. 1. Relationship between the total serum cholesterol levels and relative risk of all-cause mortality (Osaka). Residents of Osaka-hu were followed for 10.7 yr on average. Deaths in the first 2 yr were not counted. The group with160–199 mg/dL of total cholesterol was the referent group. Gray columns: men, open columns: women.

(Saturated) fat => ↑ Serum E2, E1, progesterone in women, total testosterone in men

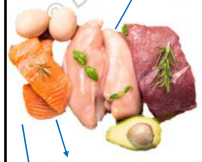
30 Healthy men

High saturated fat diet

+ 18% ↑ serum total testosterone (6538 vs 5558 ng/L)

6 wks of a diet high in fat (40% of cal., esp. saturated fat: milk, butter, fatty meat, cheese & sausages) vs 6 weeks of a diet low in fat (25%, rich in polyunsaturated fatr) high fat diet (skimmed milk)

Hämäläinen E, et al. J Steroid Biochem. 1984 Jan;20(1):459-64.



13 Postmenopausal women

Normal -fat diet

+93% ↑ serum estradiol (p < 0.05)

vs low-fat (<10% of cal) high-fiber (35-45 g per .1000 kcal/day) … 22 days

Heber D, et al. Nutrition. 1991 Mar-Apr;7(2):137-9

90 premenopausal women

Higher saturated fat diet

+7.6% ↑ serum estradiol (= 100x serum testo/SHBG)
+ 6.8% ↑ serum estrone

for each -0.1 ↑of the ratio of saturated fat to polyunsaturated fat in the diet on days 14-20 of the menstrual cycle.

Dorgan JF, et al, Am J Clin Nutr. 1996, 64(1): 25-31

286 healthy, prepubertal girls, 8-10 yr-olds

Normal -fat diet vs moderately low-fat during puberty

Follicular phase: +42% ↑ serum estradiol (p = 0.01)
+40% serum estrone sulfate (p = 0.02), luteal phae:
+112% serum progesterone (p = 0.007)

Dorgan JF, et al. 2003 Jan 15;95(2):132-41

↑ Consumption of fats, oils => ↑ serum IGF-1, ↑ IGF-1/IGFBP-3 ratio

115 Healthy adults

Cross-sectional study

↑ Consumption of fats, oils, & red meats

↑ Serum IGF-1 levels

↑ Calorie intake from saturated fats

↓ Serum IGF-1 BP-3

↑ Calorie intake from lipids

↑ Serum IGF-1 levels

↑ Calorie intake from saturated fats

↑ Serum IGF-1 /IGF-1 BP-3

Kaklamani VG, et alJ Clin Oncol. 1999 Oct;17(10):3291-8

High-fat diet (ketogenic diet) => ↓ Serum T3

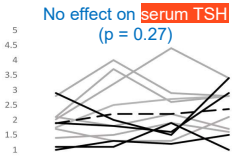
11 Healthy, normal-weight adults (mean age: 30(9) yrs)

Ketogenic diet (15% carbohydrate, 60% fat, 25% protein) for a minimum of 3 weeks

vs high-carbohydrate low-fat diet (55% carbohydrate, 20% fat, 25%protein)

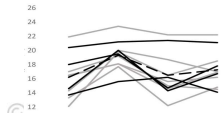
- Sign. greater - 2.9 kg ↓ body mass (p<0.05, 95%CI: -3.5, -2.4 kg) than the -0.4 kg did with the HCLF diet (-1.0, 0.1, p < 0.0001).
- The resting metabolic rate remained constant

No effect on serum TSH (p = 0.27)



Sign. -15% pmol/L ↓ serum T3, which was not different with the HCLF diet (4.1 pmol/L vs 4.8 pmol/ p<0.0001, between the 2 diets (p = 0.003)

Sign. +12% pmol/L↑ serum T4 from pre-diet levels following the KD diet but not following the HCLF diet (19.3 vs 17.3 pmol/L, p < 0.0001)



Randomized crossover-controlled study

Iacovides S, et al. PLoS One. 2022 Jun 3;17(6):e0269440

Low fat diet => ↓ Serum DHEA sulfate

Low fat diet , esp. low in saturated fat

-22% ↓ serum DHEA sulfate

Adlercreutz 1988

Low fat diet => ↓ Serum DHEA sulfate

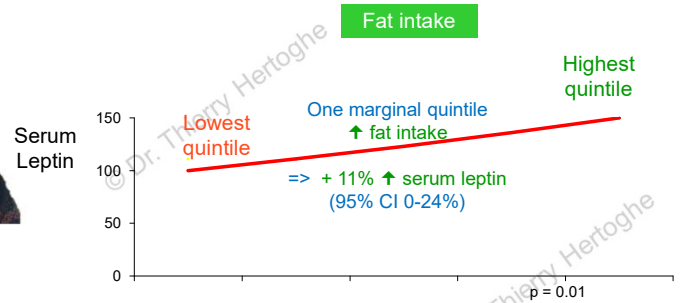
Low fat diet , esp. low in saturated fat

-22% ↓ serum DHEA sulfate

Adlercreutz 1988

Fat intake => ↑ Serum leptin

48 Healthy older Greek men



Serum leptin => positively associated with excess fat intake indep. of obesity

Lagiou P, et al. Ann Nutr Metab. 1999;43(1):23-9 Athens, Greece

High-fat diet => Hormones

High-fat diet

improves

↑ Activity/levels of muscle-strengthening hormones:
- IGF-1
- Testosterone
- Estrogen, progesterone
- Cortisol, DHEA, & aldosterone
- Leptin

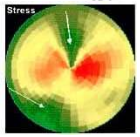
reduces

↓ Hormone levels/activity:
- Thyroid hormones (↓ conversion T4 to T3)
- Insulin sensitivity => ↑ Insulin resistance/levels

Health Concerns of high protein/fat low carb diets: Heart disease

Blood flow measurements byRichard M. Fleming MD, published in J Angiology, J. Vascular Disease, Oct. 2000

Before low fat



Low-fat diet

Red areas = ↑ Blood flow in healthy areas

The top 2 images came from a patient who adopted a low-fat diet and thus reversed heart disease and damage.

They show blood flow before & after diet modification to a low-fat diet. The image on the right shows sign. ↑ blood flow.

Before high protein

High protein diet

The bottom 2 images are those of a patient who went on [the Atkins Diet] a popular high-protein/high-fat diet. Images indicate reasonable blood flow before following the high-protein diet & compromised ↓ blood flow & heart damage after adopting the high-protein diet.

Red areas: ↑ blood flow in healthy areas

Green areas: ↓ blood flow or heart damage

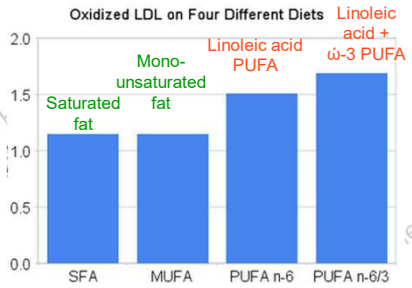
↓ Blood flow or heart damage

PUFA-rich diets => ↑ Oxidized LDL cholesterol

42 volunteers =>
1 of 4 diff. diets
for 5 weeks each:

- rich in saturated fat
- rich in monounsaturated fat
- rich in linoleic acid PUFA
- rich in linoleic acid + omega-3 PUFA

TBARS
(expressed as nanomoles per mg of LDL protein) => determined in freshly isolated LDL



LDL oxidation in the two PUFA groups was increased by more than 31%. The difference between the left most 2 groups & the rightmost two was stat. sign..

As one would expect, oxidized LDL is proportional to the amount of PUFA in LDL, which is proportional to dietary PUFA.

1996: P. Mata & colleagues

Eat a high fat diet

in periods of eating of intermittent fasting

Intermittent feeding + high-fat diet => ↑ Lipid breakdown, oreserves lean mas

After 3 weeks of intermittent fasting, mice fed both a standard laboratory diet & a high-fat diet

- Hyperphagic
- ↑ Amount of glycogen storage in the liver

Intermittent feeding + high-fat diet

vs intermittent feeding + standard diet

- ↑ Lipid oxidation => prevails over lipogenesis
- Preserved & maintained constant protein levels in the liver & skeletal muscle

Krizova E, et al. Physiol Res. 1996;45(5):379-83 Masaryk University, Brno, Czech Republic

Paleo diet = Low-carb diet

=> Consume healthy carb-rich foods (organic, non-processed, & non-burned)

Consume Fruits & Vegetables

Healthy carb-rich food

Eat vegetables, roots, …



Root vegetables

Radish

= underground plant parts used as vegetables.

They include both

- True roots such as tuberous roots & taproo
- Non-roots such as tubers, rhizomes, corms, & bulbs. Several types contain both taproot & hypocotyl tissue,

& it may be difficult to distinguish the 2.

- Regardless of anatomical type, root vegetables are generally storage organs, enlarged to store energy in the form of carbohydrates.
- They differ in the concentration & the balance between sugars, starches, & other types of carbohydrate.

Cassava tuberous roots

Yam tubers

Taro corms

Wikipedia, the free encyclopedia

Consume low-sugar containing berries

Raspberry

The term "berry" refers generically to any small, sweet fruit; in this sense, the strawberry is a berry & the tomato is not. Other berries in this, but not the botanical, sense include aggregate fruits such as the blackberry, raspberry & boysenberry, as well as the false berries such as blueberry, cranberry, & gooseberry & its currant relatives (e.g. black currant, red currant).

Cranberry

Blackberries on a bush

A boysen-berry

Woodland Strawberry, *Fragaria vesca*

Several types of "berries" from the market, but none of these are true berries.

Blueberry fruit

↑ intake of vegetables & fruits during 6 months => ↑ Weight loss in overweight adults

80 Overweight Brazilian adults
(M. age: 46.5 years
M. BMI: 29 kg/m²)

Nutritional counseling program during 6 months

↓

After 6 months

- +109 g daily fruit/vegetable intake
- -1.4 kg body weight

Associated with a greater weight loss:

- ↑ Dietary fiber from fruits/vegetables (beta1 [95% CI) = -0.180)
- ↑ Vegetable intake (beta1 [95% CI] = -0.00497)
- ↑ Fruit intake (beta1 [95% CI] = -0.0029)

↓

- Every 100 g/day ↑ of vegetables => after 6 months: -500g ↓body weight (P < .05)
- Every 100 g/day ↑ of fruits => after 6 months: -300 g ↓ body weight (P < .05)

=> ↑ Fruit & vegetable intakes => may help avoid weight gain in overweight adults

Sartorelli DS, et al. Nutr Res. 2008 Apr;28(4):233-8

↑ Vegetable & fruit intake for 10 years => ↓ Weight gain in adults

206 Healthy Spanish participants aged 15-80 years
=> 10-year follow-up

Fourth (highest) quartile in vegetable intake (>333 g/day)

↓ vs lowest quartile < 166 g/day

5.6x ↓ risk of weight gain ≥ 3.41 kg
(OR = 0.18, 95% CI, 0.05-0.66; P = 0.017)

Third quartile of fruit intake (249-386 g/day)

↓ vs lowest quartile < 149 g/day

3.2x ↓ risk of weight gain ≥ 3.41 kg
(OR = 0.31, 95% CI: 0.11-0.85; P = 0.044)

Fourth (highest) quartile in combined vegetable & fruit intake (> 698 g/day)

↓ vs lowest quartile < 362 g/day

4.5x ↓ risk of weight gain (OR = 0.22, 95% CI, 0.06-0.81; P = 0.022)

Vioque J, et al. Obesity (Silver Spring). 2008 Mar;16(3):664-70

Paleo diet

=> NO or little seeds

No seeds in Paleolithic man

Before fire was harnessed, the only means by which the seeds could have been rendered digestible would have been by pounding them and breaking down the plant cell walls, but no archaeologist has ever found a Stone Age tool for this job. If chewing were the method used to do the job, a very large proportion of the seeds would escape and, passing through the body undigested, end up in the faeces.

Older hominid faeces or coprolites from Africa contain no plant material.

Relatively recent ones from north America have included just about everything that could remotely be called edible: from eggshells & feathers to seeds and vegetable fibres. But these remains occur only *after* the Paleoindians had mastered fire, and even then, seeds had passed through undigested and unharmed.

Thus there is no doubt that seeds cannot have been a natural part of their diet.

7. Bryant V. M., Williams-Dean G.. The Coprolites of Man. Scientific American, January 1975.
8. Hawkes J. G.. The Hunting Hypothesis . In: Ardrey R., ed. The Hunting Hypothesis . Collins, London, 1976.

Avoid (unsprouted) cereals => Consume sprouted grains

Although cereal-based foods (bread, pastas, & junk foods) have no or poor fat content

- they ↑ fat production by elevating the level of the fat-increasing hormone, insulin:
- try to avoid them at least 5 days per week.

As alternative: sprouted grains, sprouted bread, sprouted muesli, sprouted rice that you can find in some health food stores or through the Internet.

Nuts to eat: soaked, not roasted, nor raw

Korean pine nuts

Hazel nuts

Brazil nut fruit

Walnut nut

Brazil nut

Pistachio nuts

A nut = a seed of a plant

A nut in botanyis a *simple dry fruit* with one seed (rarely two) in which the ovary wall becomes very hard (stony or woody) at maturity, and where the seed remains unattached or unfused with the ovary wall.

Most nuts come from pistils with *inferior* ovaries (see flower) and all are *indehiscent* (not opening at maturity).

True nuts are produced - for ex. - by some plants-families of the order Fagales.

Shell, seed,
& the cavity inside

Coconut

Wikipedia, the free encyclopedia

Nuts to avoid

Peanut leaves &
freshly dug pods

Peanuts = beans
showing legumes, one split open revealing
2 seeds with their brown seed coats

Note that not all true nuts are edible; some (e.g. birch, alder, hornbeam, wingnut) are too small to be worth eating, while others (e.g. tanoak) are too bitter to be

Cashews = a family of nuts of
their own
ready for harvest in Guinea

Cashew nut snack,
roasted & salted

Paleo diet

=> NO sugar intake

Obese persons => Eat ↑ sugar

Obese individuals

↓

Eat frequently foods ↑ in sugar

Drewnowski A, et al. Am J Clin Nutr. 1991; 54: 635–641

Diets high in sugar => ↑ Weight

Diets ↓ in sugar

↓

have been associated + ↓ weight (weight loss) in some ad libitum dietary studies

REMARK: perhaps as a result of ↓ total calorie consumption?

Colditz GA, et al. Am J Clin Nutr. 1990; 51: 1100–1105

© Dr. Thierry Hertoghe

Paleo diet

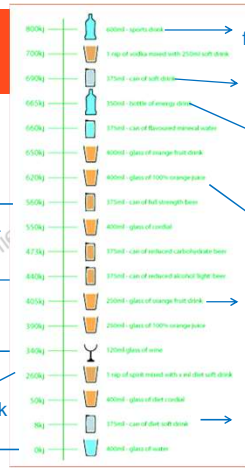
=> NO soft drinks

© Dr. Thierry Hertoghe

Drinking soft drinks, coffee and alcohol => ↑ Calorie intake

© Dr. Thierry Hertoghe

Drinking habits => ↑ Appetite for solid foods



190 calories for 600 ml sports drink

165 calories for 1 soft drink 250 ml

160 calories for bottle of energy drink

150 calories for 400 ml orange juice

100 (97) calories for 1 glass orange juice 250 ml

2 calories for can of diet soft drink 375 ml

135 calories for full strength beer 375 ml

130 calories for whisky 400 ml

105 calories for light beer 375 ml

80 calories for 1 glass wine 120 ml

62 calories for a nip of spirit with diet soft drink

O calories for water

Diet drinks => ↑ Obesity risk

↑ Obesity risk in people who drink diet drinks than in regular soft drink consumers

+ 41% ↑ overweight risk for every can or bottle of diet soft drink a person consumes each day

Sugar drinks

Diet drinks

Amount drunk	↑ Risk of overweight or obesity		
	Regular soft-drinkers	Diet/light Soft drinks	Additional risk due to the light drink
Up to ½ can each day	+ 26%	+ 37%	+ 11%
½ to one can each day	+ 30%	+38%	+ 8%
1 to 2 cans each day	+ 33%	+ 55%	+ 22%
For > 2 cans each day	+ 47%	+57%	+ 10%

Avoid sugar, sweet foods, & soft drinks

Sugar, sweet foods, & soft drinks

- ↑ Appetite & fat production: to avoid.
- Weight gain has been shown to be greater with soft drinks containing artificial sweeteners such as aspartame, cyclomates, etc. than with drinks containing regular sugar, because these sweeteners offer generally a stronger sweet flavor than sugar that creates addiction.

Alternative: Stevia, add a spoon of fresh fruit juice to sweeten

↑ Sucrose intake => ↓ Serum HDL cholesterol

3335 Young adults: black men, black women, white men & white women, ages 18-30 yrs, in 1985-86 (baseline); then at year 7

↑ Energy intake from sucrose

↓ Serum HDL cholesterol (inversely associated with for each race-gender group at baseline, year 7, & longitudinally from baseline to year 7. This association was significant at baseline for black men, & white men & women ($p < 0.01$); at year 7 for white men & black women ($p < 0.01$), & longitudinally for white men, white women, & black women ($p < 0.05$).

Archer SL, et alAdults. Ann Epidemiol. 1998 Oct;8(7):433-8. Northwestern University Medical School, Chicago, USA.

Soft drinks & high-carb diets

=> Hormone levels

Oral glucose tolerance test (= sugar-rich soft drinks) => ↓ Hormone levels

Oral glucose tolerance tests

40 minutes later:

- ↓ growth hormone — Anxiety, lack of recovery
- ↓ cortisol — Stressed feelings, irritable ↓ energy, punch, combativity
- ↓ DHEA — Moderately ↓ mood
- ↓ androstenedione — Moderately ↓ energy
- ↓ aldosterone — ↓ Blood pressure, emptiheadedness
- ↓ estradiol — Constant tiredness ↓ sexuality, droopy breasts
- ↓ testosterone — Constant tiredness, esp. with sports ↓ sexuality, ↓ muscles

Takeuchi T, et al. Int J Gynaecol Obstet. 1998 May;61(2):171-8..
Hubert GD, et al. J Clin Endocrinol Metab. 1991 Oct;73(4):781-4
Vasarhelyi B, et al. Endocr J. 2003 Dec;50(6):689-95

Glucose-drink => ↓ Serum total testosterone in women

in 53 men & 47 women
75 grams of glucose

- ↓ Serum Cortisol in each individual of both genders
- ↓ Serum DHEAS to a minor (but sign. extent only in low birth weight women (p<0.05)

Vasarhelyi B, Bencsik P, et al. 2003 Dec;50(6):689-95

Oral glucose tolerance test

7 healthy women
75 grams of glucose

- ↓ Androstenedione & DHEAs

Hubert GD, et al. J Clin Endocrinol Metab. 1991 Oct;73(4):781-4

75 grams of glucose
12 normal women & 16 women with amenorrhea

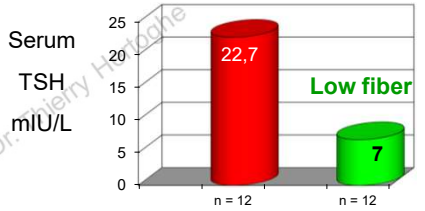
Sign. progressive

- ↓ serum GH
- ↓ Serum DHEA sulfate
- ↓ Serum estradiol
- ↓ Serum testosterone

Takeuchi T, et al. Int J Gynaecol Obstet. 1998 May;61(2):171-8

Whole grains, High Fiber => ↑ Serum TSH of T_4-treated hypothyroid patients

High fiber



↑ Intake of dietary fiber
=> nonspecific adsorption of T_4 to dietary fibers

=> ↓ T_4 bioavailability by dietary fiber
=> need for ↑ doses of T_4 in some hypothyroid patients

Liel Y et al. Et al. J Clin Endocrinol Metab. 1996; 80: 857 - 859

↑ Consumption of carbs => ↓ Serum IGF-1

115 Healthy adults

↑ Calorie intake from carbohydrates

↓ Serum IGF-1 levels

Cross-sectional study

Kaklamani VG, et alJ Clin Oncol. 1999 Oct;17(10):3291-8

High carbs => ↓ Serum cortisol

High carb diet

High-carb diet

Diets = equal in total calories & fat

vs high-protein diet

-27% ↓ Serum cortisol (7.74 vs. 10.6 µg/dL)

Anderson KE., et al., 1987 May 4;40(18):1761-8

High-carb diet => Hormones

High-carb diet

improves

- ↑ Activity/levels of
  - Thyroid hormones (conversion T4 to T3)
  - Insulin
  - Serotonin, Melatonin
- Improve explosive performance (sprint, 800 m, jumping, ….)

reduces

- ↓ Hormone levels/activity:
  - GH, IGF-1 levels
  - Testosterone levels
  - Estrogen, progesterone
  - Cortisol, DHEA, & aldosterone
- ↓ Muscles & bones (density)
- Induce muscle cramps in endurance performance (marathon, ..)

Intermittent fasting

as in the Paleo diet

= Alternating periods of eating with periods of fasting

(as in the Paleo diet)

Intermitent fasting

Intermittent fasting => -2.6 kg weight loss within 4 weeks

10 Overweight, sedentary older adults (≥65 years) at risk for, or with mobility impairments, defined by slow gait speed (<1.0 m/s)

Fast for ± 16 h/day for 4 weeks

- High adherence levels (mean = 84%) based on days goal was met
- -2.6 kg mean weight loss ($p < 0.01$)
- clinically meaningful improvements in walking speed
- improvements in quality of life
- few reported adverse events

Anton SD, et al. Nutrients. 2019 Jun 30;11(7):15

Intermittent fasting => ↓ Obesity (meta-analysis)

Meta-analysis of 27 trials addressed weight loss in overweight & obese patients:

- 18 small randomized controlled trials (level I evidence)
- 9 open trials comparing weight after IF to baseline weight with no control group (level II evidence)

- Studies were often of short duration (2 to 26 weeks)
- Low enrolment (10 to 244 participants)
- 2 were of 1-year duration
- Only 5 studies included type 2 diabetic patients

Intermittent fasting => ↓ Obesity

- All 27 IF trials found weight loss of -0.8% to -13.0%↓ of baseline weight with no serious adverse events
- 12 studies comparing intermittent fasting to calorie restriction found equivalent results
- -3 to 8 cm ↓ Waist circumference in studies longer than 4 weeks that recorded
- Most of the weight loss with IF is fat loss.
- Improved glycemic control in the 5 studies that included patients with type 2 diabetes

Welton S, et al. Can Fam Physician. 2020 Feb;66(2):117-125

Intermittent very-low-calorie diet (short periods of relative fasting) vs low calorie diet => More efficient to lose weight => ↑ Weight loss

54 Adults with type 2 diabetes
+20% ≥ ideal body weight

Very low-calorie diet for 5 days
in week 2 => intermittent very low-calorie for
- 1 day/week for 15 weeks
- or 5 days every 5 weeks + 1,500-1,800 kcal/day on other days

vs standard moderate low-calorie diet = 1,500-1,800 kcal/day

After 20 weeks => both intermittent very low calorie diet groups => Greater weight loss (P = 0.04)

Williams KV, et al. Diabetes Care. 1998 Jan;21(1):2-8 University of Pittsburgh USA

Intermittent feeding + ↑ glucose supply during exercise, maintenance of protein % in carcass in rats

10 Weeks of chronic intermittent fasting
(= repetitive alternance of 3 days fasting & 3 days refeeding)

Adult male rats

- - 20% ↓ food consumed
- maintain their initial body weight
- sign. ↓ carcass fat but maintained the % contribution of proteins to total carcass weight
- No effect on relative mass of liver, heart, kidney, & muscles
- In response to exercise (2 h of swimming), control rats displayed hypoglycemia, whereas IF rats were able to maintain serum glucose level in spite of a ↓ energy supply from liver (low glycogen stores) & adipose tissue (low plasma free fatty acid levels) => obtained by accumulating glycogen & triglycerides in muscles and by deriving energy for muscular contraction from the in situ breakdown of these energetic substrates
- a markedly reduced liver protein content
- the liver exercise-induced protein breakdown was abolished

Favier RJ, Kouet al. Am J Physiol. 1988 Jun;254(6 Pt 2):R877-84

Intermittent fasting

Intermittent fasting

Total fasting

=> as in periods of famine in the Paleolithic times

Total food fasting =Water fasting with nutritional supplementation

Stop consumption of solid foods eating for 3-5-10-15 or more days

- without hunger feelings
- with good energy for moderate sports & professional tasks.

Includes: amino acids + high dosed minerals (magnesium, potassium, calcium but also some sodium + multivitamin (longer life) pills

Indication: Rare patients

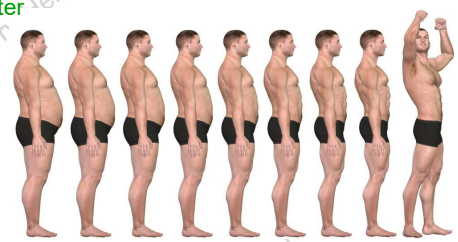
- With digestive troubles, patients who may benefit from providing their gut a rest
- People who want to make a spiritual experience while losing weight

Total fasting with nutritional supplementation => Aims

Aims of this type of diet + amino acids + high dosed minerals (magnesium, potassium, calcium but also some sodium)

- maintain or ↑ muscle mass & body water
- while only ↓ fat mass

in absence of the uptake of any food!



= The ideal as it rejuvenates the body composition up to 10 years back in time

Total fasting with nutritional supplementation: Safety

Safety: to follow under guidance of a health professional, preferably physician

Restriction: Total fasting = mainly for

- healthy patients
- under strict doctor's or other experienced health professional's supervision
- with the intake of a large amount of supplements, including amino acid supplementation.

Total fasting with nutritional supplementation

Weight loss to expect:

- 5 days: -2 to -3 kg
- 10 days: -3 to -5 kg
- > 10 days: -4 to -7 kg

depending if

- daily physical exercise or not
- intake of 3 to 5 grams/day of amino acids as purified general mixture, enriched in branched chain amino acids, or not

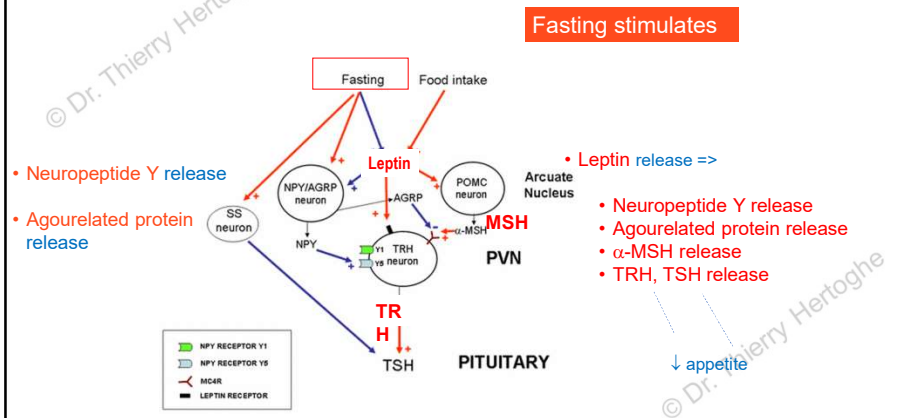
Quicker & healthier weight loss

Slower, but healthier weight loss

Water fasting = Total fasting with water & nutritional supplementation

Water fasting

Fasting => Stimulates the release of appetite-reducing peptides & proteins



Watanobe H, et al. J Neuroscience 2002; 22(14):6265-71

NOT EATING: How many calories & g fat /day is lost?

Amount of **calories/day** necessary **to maintain weight**				
Gender	**Age**	**Sedentary***	**Moderately Active***	**Active***
Women	19-30	1800-2000	2000-2200 cal./day	2400 calories
	31-50	1800	2000	2200
	51+	1600	1800	2000-2200
Males	19-30	2400-2600	2600-2800	3000 calories
	31-50	2200-2400	2400-2600	2800-3000
	51+	2000-2200	2200-2400	2400-2800

WOMEN: 1800 to 2000 cal/day burned = 200 to 220g/day of fat lost
⇒ runs at 1 hour at 7.5km/hour = 500 cal/hour burned => 55 g of fat /hour => TOTAL: -250 to -270g/day lost
⇒ if runs 4h: 4 x – 55 g = 220 g/day => -420 to 440 g fat lost/day

MEN: 2400 to 2600 cal/day burned = 270 to 290 g /day of fat lost
⇒ runs at 8 km/h => 563 cal/hour burned = 63 g/hour of fat burned => TOTAL: -330 to -350 g of fat lost/day
⇒ if runs 4 h => 252 g of fat lost /day => TOTAL: -500 g of fat lost/day

Fasting: references

- Attina A, et al. (2021). Fasting: How to guide.
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8151159/
- Bagherniya M, et al. (2018). The effect of fasting or calorie restriction on autophagy induction: A review of the literature.
- https://pubmed.ncbi.nlm.nih.gov/30172870/
- Losing weight. (2023).
- https://www.cdc.gov/healthyweight/losing_weight/index.html
- Ogłodek E, et al. (2021). Is water-only fasting safe?
- https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8369953/
- Persaud-Sharma D, et al. (2022). Refeeding syndrome.

Alternate day fasting

=> as in periods of famine in the Paleolithic times

Alternate day fasting

Alternate-day fasting => Calorie restriction to 75% of calorie needs every day

One day: fasting: with 25% of energy needs

Other day: alternating "feast days": 125% of energy needs

Day 1

Day 2

Alternate day fasting => Inferior or superior than low-calorie diet?

Healthy adults: Alternate day fasting = inferior to low-calorie diet

Templeman I, Smith HA, Chowdhury E, Chen YC, Carroll H, Johnson-Bonson D, Hengist A, Smith R, Creighton J, Clayton D, Varley I, Karagounis LG, Wilhelmsen A, Tsintzas K, Reeves S, Walhin JP, Gonzalez JT, Thompson D, Betts JA. A randomized controlled trial to isolate the effects of fasting and energy restriction on weight loss and metabolic health in lean adults. Sci Transl Med. 2021 Jun 16;13(598):eabd8034. (3 weeks in 12 lean, healthy adults… Alternate-day fasting less effectively reduces body fat mass than a matched degree of low-calorie diet) and without evidence of fasting-specific effects on metabolic regulation or cardiovascular health

Metabolic syndrome patients: Alternate day fasting = superior to low-caloire diet

Razavi R, Parvaresh A, Abbasi B, Yaghoobloo K, Hassanzadeh A, Mohammadifard N, Clark CCT, Morteza Safavi S. The alternate-day fasting diet is a more effective approach than a calorie restriction diet on weight loss and hs-CRP levels. Int J Vitam Nutr Res. 2021 Jun;91(3-4):242-250. (80 metabolic syndrome patients for 4 months, modified alternate-day fasting diet led to a greater -2.2 kg ↓ body weight (-6.43 vs -4.11 kg; P = 0.02), -1.76 ↓ BMI (kg/m²) (-3.19 vs -1.43; P = 0.01), - 1.16 kg ↓ fat mass (-4.88 vs -3.72 kg; P = 0.03), - 3.25 cm ↓ WC (-5.57 vs -2.32 cm; P = 0.01) & WHR (-0.05 vs -0.02; P = 0.04). Also, a greater -1.09 mg/L↓ serum hs-CRP (-2.06 vs -0.97 mg/L; P = 0.03)

Obese adults: Alternate day fasting = similar or inferior to low-calorie diet

Trepanowski JF, Kroeger CM, Barnosky A, Klempel MC, Bhutani S, Hoddy KK, Gabel K, Freels S, Rigdon J, Rood J, Ravussin E, Varady KA. Effect of alternate-day fasting on weight loss, weight maintenance, and cardioprotection among metabolically healthy obese adults: a randomized clinical trial. JAMA Intern Med. 2017 Jul 1;177(7):930-938. (6 months, 100 obese adults (18 to 64 years of age; mean body mass index, 34), Alternate-day fasting did not produce superior adherence, weight loss, weight maintenance, or cardioprotection vs daily calorie restriction. Weight loss was similar, but LDL cholesterol higher)

Intermittent fasting

=> Hormone benefits?

Fasting => 2- to 3-fold ↑ GH secretory pulse frequency => 2- to 3-fold ↑ serum cortisol

Rhesus macaque

Fasting =>

- +142% ↑ serum GH secretory pulse frequency (control: 5.3 => fasted: 12.8 pulses/15 h) => not affected by rrhLep infusion (12.5 pulses/15 h).
- ↑ ApEn (approximate entropy, denotes greater irregularity of secretion) of pulsatile GH secretion => not relieved with rhLep infusions.
- 2- to 3-fold ↑ serum cortisol than those observed in control studies, particularly pronounced at the time when the animals expected their first meal of the day => not affected by rrhLep infusion.

Lado-Abeal J, et al.. Neuroendocrinology. 2000 Mar;71(3):196-208.

Avoid very low calorie intake

Very low-calorie diet => ↓ Serum hormones

6 weeks of very low-calorie diet
300 kcal/day
vs pretreatment levels

- - 30% ↓ serum T3
- + 80% ↑ serum rT3 in 6 obese adults

Visser TJ et al, Metabolism, 1978;4: 405

4 months of low-calorie diet
1500 kcal/day

24 Obese women (BMI > 25 kg/m²)

- -32% ↓ serum bioavailable testosterone (non-SHBG-bound T)
- + 36% ↑ serum SHBG

8 weeks of very low-calorie diet → -20% ↓ serum IGF-1 in 8 moderately obese men & women

Drent ML, Eur J Endocrinol, 1995, 132(5): 565-72

Increase calorie intake if insufficient

=> ↑ Serum hormone levels

↑ Calorie intake => ↑ serum progesterone in premenopausal women

90 premenopausal women

In the luteal phase (days 14-20 of the menstrual cycle)

For each + 1 MJ (239 kcal) ↑ calorie intake in the diet

+ 60 % probability of sign. ↑ serum progesterone in the luteal phase

Dorgan JF et al, Am J Clin Nutr, 1996, 64(1): 25-31

Paleo diet

=> Do physical exercise

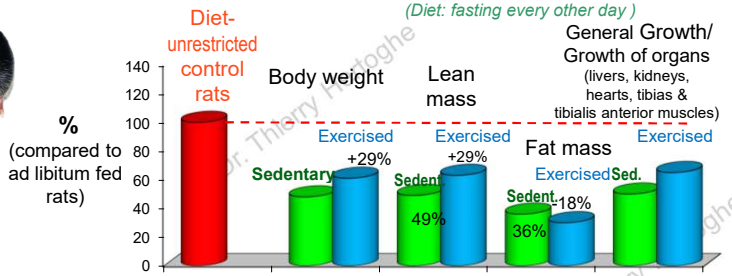
during wieght loss program

Exercise => ↑ Growth of a long-term intermittent calorie-restricted rats

4-week old male rats

8-wk intermittent fasted rats

(Diet: fasting every other day)



Fasting on alternate days markedly reduced the growth rate of the young rats

=> Exercise may be beneficial where feed restriction is episodic, allowing some capacity for catch-up growth

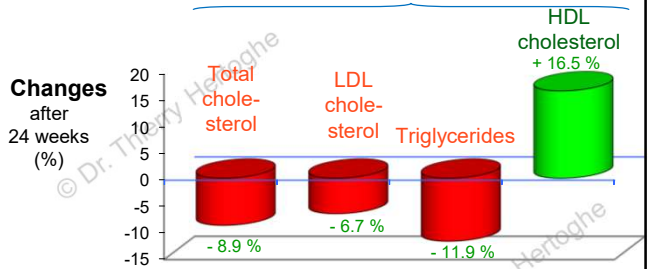
Sakamoto K, et al. J Nutr. 1987 Feb;117(2):390-5

Exercise + diet => Improves serum lipids during diet

231 Group A patients with risk factors of CHD + moderate exercise such as brisk walking & spot running + min. 400 g/day of fruits & vegetables that are rich in dietary fibre & antioxidants such as vit. A, C, E, carotene & Cu, Se & Mg)

232 Group B patients with risk factors of CHD

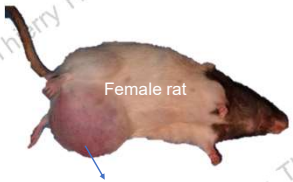
Exercise (added to diet) for 24 weeks



Adding exercise to diet sign. reduced total & LDL cholesterol, TG, mean BP, fasting glucaemia, body weight, BMI, waist-to-hip ratio & subcut. fat, & markedly ↑ HDL cholesterol, leading to a sign. ↓ in 12-year coronary heart death risk.

Singh RB, et ks. Acta Cardiol. 1992;47(6):543-57 , Morabadad, India

Physical exercise or ↓ Calorie diet => Delays & ↓ risk of cancer in rats



Sedentary rats with ad libitum diet

vs rats + low caloric diet & rats + physical exercise

6x ↑ Mammary tumor in female rats

Rats at age 50 days => DMBA injections

=> pratically only rats fed an ad libitum diet & sedentary developed mammary tumors

Moore C,1973 Mar;73(3):329-32

Fasting cures + amino acids

Eat raw foods

as in the Paleo diet

=> ↓ Weight

Raw food => ↓ Weight & diastolic BP

Increased raw, uncooked foods (62% of calories of diet)

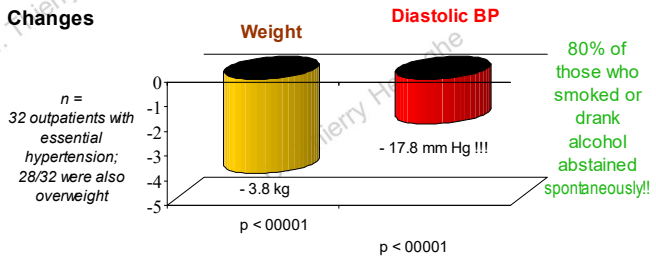


Figure: Beneficial effects of a raw food diet on hypertension & obesity

Douglass JM, Rasgon IM, Fleiss PM, Schmidt RD, Peters SN, Abelmann EA. Effects of a raw food diet on hypertension and obesity. South Med J. 1985 Jul;78(7):841-4.

Accept low calorie intake

In case of sedentarity

Caloric Restriction => ↓ Cancer in primates

2 x 30 Macacus Rhesus apes, 11 years

Calorie restriction

↓

vs ad libitum

5x ↓ Cancer incidence

Don Ingram (NIA, Baltimore, MD) personal communication

Stop Coffee

=> Not in the Paleo diet

Is coffee good to drink??

Caffeine => ↓ Bioavailable testo, ↑ E1 & SHBG in postm. women

Coffee for ≥ 14 cups/wk → ↑ Caffeine intake

-37% ↓ Serum DHEA sulfate in 52 healthy, older Greek men

Hsieh CC, et al. J Clin Epidemiol. 1998 Oct;51(10):837-41

↑ Caffeine intake

↓ Serum estradiol (green tea intake) & ↑ serum SHBG in 50 premenopausal women

Nagata C, et al. Nutr Cancer. 1998;30(1):21-4

↑ Caffeine intake

↓ Serum bioavailable testosterone in postmenopausal women (sign. inverse association, r = -0.10, p = 0.02)

Ferrini RL, et al. Am J Epidemiol. 1996 Oct 1;144(7):642-4

↑ Caffeine intake

↓ Serum IGF-1 in young & older women aged 25-64 years (sign. inverse association)

Landin-Wilhelmsen K, et al. Clin Endocrinol (Oxf). 1994 Sep;41(3):351-7

Caffeine => ↓ Bioavailable testo, ↑ E1 & SHBG in postm. women

1h after caffein. coffee (vs placebo) → ↑ Caffeine intake

+ 33% ↑ Serum ACTH (+5.2 pg/ml) &
+ 30% ↑ Serum cortisol (+2.7 µg/dl) in 47 healthy young men at res

Lovallo WR, et al. Pharmacol Biochem Behav. 1996 Nov;55(3):365-9

1h after caffein. coffee (vs placebo) → ↑ Caffeine intake

=> ↑ Insulin resistance, +60% ↑ serum insulin, +24% ↓ glycemia at the OGTT in 18 healthy men

Graham TE, et al. Can J Physiol Pharmacol. 2001;79(7):559-65

Coffee ≥ 14 cups/wk → ↑ Caffeine intake

+60 % ↑ Serum estradiol in 52 healthy, older Greek men

Hsieh CC, et al. J Clin Epidemiol. 1998 Oct;51(10):837-41

Caffeine => ↓ Bioavailable testo, ↑ E1 & SHBG in postm. women

The following night → ↑ Caffeine intake

↓ Urinary excretion of (weight-reducing) 6-sulfatoxy-melatonin the next whole night in 6 adults

Shilo L, et al. Sleep Med. 2002 May;3(3):271-3.

↑ Caffeine intake

↓ Serum IGF-1 (sign. negative association) in 195 women aged 25-64 years

Landin-Wilhelmsen K, et al. Clin Endocrinol (Oxf). 1994 Sep;41(3):351-7

↑ Caffeine intake

↓ Serum GH, T3, T4, TSH (sign. negative associations) in rats

Spindel E, et alrat. J Pharmacol Exp Ther. 1980; 214 (1): 58-62

Normal thyroid

Cofffee

Low thyroid

Avoid

Chronic Alcohol

=> Not in the Paleo diet

Is alcohol good??

Stop daily alcohol

-20 % ↓ Serum nighttime melatonin

Röjdmark S, et al. Metabolism. 1993 Aug;42(8):1047-51

Acute use => -70 % ↓ Serum growth hormone
Chronic use => -75% ↓ Serum GH

Prinz PN, et al. J Clin Endocrinol Metab. 1980 Oct;51(4):759-64

Chronic use ⇒ ↓ serum T3 & T4

Balhara YP, et al. Indian J Endocrinol Metab. 2013 Jul;17(4):580-7

-7 to -30% ↓ Serum testosterone

Sierksma A, et al. Alcohol Clin Exp Res. 2004 May;28(5):780-5
Maneesh M, et al. Indian J Physiol Pharmacol. 2006 Jul-Sep;50(3):291-6

+ 65% ↑ Serum estradiol in men with ≥ 7 glasses/week

Hsieh CC, et al. J Clin Epidemiol. 1998 Oct;51(10):837-41

+ 33% ↑ Serum estrone sulfate in 227 women at ≥ 30 g/day

Hankinson SE et al. J Natl Cancer Instit, 1995, 87(17): 1297-302

↑ Alcohol intake => ↓ Serum IGF-1

5 Healthy young men, aged 21-26 yrs

Alcohol in the evening: 1x 0.8 g/Kg
⇒ 70 kg: 56 g = 2-3 glasses wine

Acute: for 1 night (1st night)	Chronic: for 9 nights	No alcohol: 1st night withdrawal
vs no alcohol		
Sign. -70% ↓ serum IGF-1	Sign. -75% ↓ serum IGF-1	No sign. diff. in serum IGF-1

Prinz PN, et al. J Clin Endocrinol Metab. 1980 Oct;51(4):759-64

Alcohol => Estrogen overload

Estrogens	Phytoestrogens from the plant from which alcohol is take (not detecable in lab tests)	NOT detectable in lab tests
Estrogens	Mycoestrogens from the yeast that produces the alcohol from the plant leaves or seeds (not detecable in lab tests)	
Estrogens	Xenoestrogens from the pesticides that are spread on the plants in the fields (not detecable in lab tests)	
Estrogens	↑ Estrogen production in the body by stimulating the conversion of testosterone to estradiol and androstenedione to estrone in the liver	Detectable in lab tests

Stopping alcohol => ↑ Serum testosterone in men

29 previously alcoholics

2 weeks of abstinence from unlimited alcohol intake

After 2 weeks

Sign ↑ serum testosterone back to normal levels

Persky H, et al. Am J Psychiatry. 1977 Jun;134(6):621-5

Men + 3 weeks of alcohol-free beer intake with dinner

After 3 weeks

vs 3 weeks of alcoholic beer intake with dinner (30-40 g/day)

+8% ↑ Serum testosterone

Sierksma A, et al. Alcohol Clin Exp Res. 2004 May;28(5):780-5

Alcohol
Caffeinated drinks

Paleness
(low testosterone)

Breast development
(high estrogens)

Abdominal fat
(low GH, low thyroid, low testosterone)

Muscle flabbiness
(low GH, low testosterone)

Normal

Seductive

Alcohol

High estrogens
vs
low progesterone

Excessive breast development

Avoid dairy, milk products

=> Not in the Paleo diet

Avoid dairy

Only calves are made to digest cow's milk …

Avoid dairy

↑ 45% casein diet → -70% ↓ serum T3 in rats

vs low (8%) casein diet

Tyzbir RS, et al. J Nutr. 1981;111(2):252-9

↑ Intake of dairy products → Hashimoto's thyroiditis (82 patients p = 0.004)

vs 119 controls

Ruggeri RM, et al. Thyroid. 2021 Jan;31(1):96-105

Lacto-ovo vegetarian diet → -20% ↓ serum total testosterone in 8 healthy men

vs mixed diet with ↑meat

Raben A, et al Med Sci Sports Exerc. 1992 Nov;24(11):1290-7

Milk/dairy => Statist. signif.associated with

- ↑ Total, breast, prostate, rectal, colon,& lung cancers (using 1979-1981 FAO data from 36 countries).[1]
- ↑ Colon cancer death[2]
- ↑ Ischemic heart disease (with milk (thus lactose) not with butter & inversely with unsaturated fatty acids).[3]
- ↑ Coronary heart disease mortality (sign. positive correlation with milk consumption coefficient: R=0.600).[4]
- ↑ Type 1 diabetes[5-6]

Kesteloot H, Lesaffre E, et al. 1991 Mar; 20(2): 226-36.[1]

Hara N, Sakata K, et al. 1984 Oct; 30(13): 1665-74.[2]

Segall JJ. 1994 Oct; 46(3): 197-207.[3]

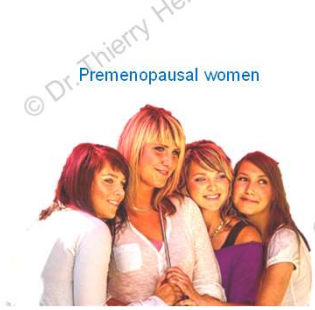
Menotti A, Kromhout D, et al.1999 Jul; 15(6): 507-15[4]

Fava, Diabetes Care. 1994 Dec;17(12):1488-90[5]

Gerstein HC. Diabet Med. 1996 Jan;13(1):23-9[6]

Avoid excessive vegetarian foods!!

Vegetarian diet => ↑ Fecal estrogens



vs omnivorous diet

↑ Fecal excretion of estrogens

- 2.3x↑ serum estrone (E1)
- 2.4x↑ serum estradiol (E2)
- 2.5x↑ serum estriol (E3)

Soy phytoestrogens => ↓ Serum sex hormones

1 month of Soy milk feeding: 12-oz portion of soymilk + each of 3 meals daily for 1 month (Isoflavones: approx. 100 mg/day of daidzein (mostly as daidzin) & approx. 100 mg/day of genistein (mostly as genistin)

vs without soy milk

- -31% ↓ serum estradiol follicular phase (days 5-7)
- -81% ↓↓ serum estradiol preovulatory peak (days 12-14)
- -49%↓ serum estradiol in luteal phase (days 20-22)

vs without soy milk

-35%↓ serum progesterone

-14 to -30%↓ serum DHEA

Lu LJ, Anderson KE, et al. 1996 Jan;5(1):63-70

Conclusion:

Paleo diet

for weight loss
&
to maintain weight loss

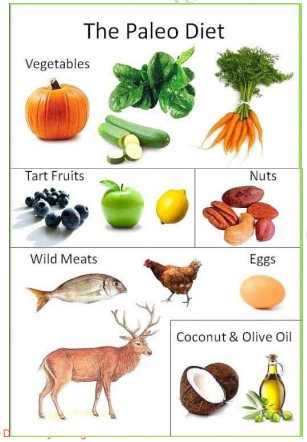
How many meals/day?

1 Meal/day => Weight loss

2 Meals/day => Weight maintenance

3 Meals/day => Weight gain

Paleo diet



ADVICE: a healthy diet = fundamental for success in hormone therapies

Boosts the activity of
most hormone activities & therapies

Drink & eat

Protein-rich meat > 100-180 g/day
- > 2x/week fish
- > 2x/week poultry
- Fresh, unprocessed
- In the morning, at lunch
- Cooked at low temp.: ≤ 80-100 ° C = ≤ 175-220 °F
- Cooking in water or oven: 1-2 meals/day

Vegetables
> 2 servings
or > 230 g/day
Fresh & organic

Fat-rich foods 1-2 soupspoons/day
- Uncooked or at low temp.: ≤ 50-60 ° C = 1 ≤ 20-140 °F
- Mono-& polyunsaturated fatty acids
- Moderate saturated fatty acids: uncooked butter 1-3 teaspoons/day
- 250 mg/day of cholesterol (1 big eg)

Fruits
> 2 servings
or > 300 g/day
Fresh & organic

What to avoid => 5 days per week

Avoid preserved fruits
- Canned, (frozen?) fruits
- Fruits grown with pesticides

Avoid preserved vegetables
- Canned, veggies
- Vegetables grown with pesticides

AVOID high-glycemic carbs
- Sugar, sweeteners
- Mix protein-sugar: ice-cream
- Pastries, cookies, sweets
- Whole grain bread (depletes the hormones & nutrients)

AVOID some protein-rich foods
- Dairy (milk) products
- Processed preserved meats
- High temp. cooking > 100 ° C = 220 °F max
- Cooking in oil, grilling, barbecue
- Protein-rich food in the evening (supper)

AVOID some fat-rich foods
- High temperature cooking > 100 ° C = 220 °F max
- Cooking in oils,
- Margarine
- High saturated fatty acids > 5 teaspoons/day

+I

Thank you for your attention

+I