HUMAN DIETARY EXTREMES

HUMAN DIET THROUGH HISTORY

Changes in the Evolutionary Diet from Homo erectus to modern man. (Modified from Eaton et al 1985,1988, Singh Chauhan 2015)

	- 300.000.000 y	- 4.000.000 y	- 100.000 y	1850	1950	2000
Total fat (Dietary)	25%	25%	30%		35%	40%
P:S (Dietary)	1:1	1:1	0.9:1		0.75:1	0.5:1
ω6:ω3-PUFA (Dietary/Serum)	1:1	1:1			10:1	20:1
%ω6 in HUFAs (Blood)	25%	25%			50%	75%
Aminoacids Polyphenolics	33% ++++	33% +++	16-20% +++		14% ++	12% +
Inflammatory Index (Blood vessels)	-/+	-/+			+	++
Degenerative Chronic Diseases	Absent	Absent			Endemic	
Blood Cholesterol	Neutral	Neutral			Atherogenic	
Diet	GREENS + GAME				GRAINS + LIVESTOCK	

THE PAST

- Until agriculture was developed around 10,000 years ago, all humans got their food by hunting, gathering, and fishing.
- Archaeology tells us the earliest humans ate an omnivorous diet similar to chimpanzees- fruits, vegetables, animal products like honey, insects and other animals
- Very quickly, early humans began to eat more meat than chimps. Many groups got about 30% of their calories from proteins.
- Cooking may have developed anywhere from 2 million to 30,000 years ago. First definitive evidence is earth ovens from 30 000 years ago.

THE AGRICULTURAL REVOLUTION

- About 12 – 10, 000 years ago, when the last ice age was coming to an end, evidence can be seen of domesticated crops and animals, starting in the "fertile crescent" in the Middle East & spreading to other places around the world near water
- Pros: Allowed humans to stay in one place, more time & socializing to develop culture, more children because less needing to carry them while foraging
- Cons: Disease spread from livestock to humans, disease spread more quickly between humans, less variety of diet, dependance on monotonous sources of food sometimes led to deficiencies in certain nutrients, life expectancy decreased at first

VEGETARIANISM IN INDIA

- Dating back to our paleolithic ancestors, as hunter gatherers who may not always be successful with the hunt, our ancestors likely survived on plants alone for periods of many days to weeks
- First historical references were in Jain and Buddhist followers in India, as early as the 6th century BCE
- Jains preached non-violence in general, towards animals as well as humans
- In Buddhism, they also wished to abstain from hurting or killing of animals, but they may have accepted and eaten gifts of meat
- Later (around 1500 – 500 BCE) many Hindu texts asserted that all creatures manifest the same life force. Many Hindus today follow a vegetarian diet & the killing of a cow is traditionally considered a sin.

VEGETARIANS IN EUROPE

- In Ancient Greece of the Classical period (8th century BCE – 6th Century AD), the vegetarian diet was referred to as "Abstinence from beings with a soul". It was not a common practice but some philosophers such as Pythagorus and some subsets of religious orders.
- Many early Christians, esp. Monks and hermits, abstained from the meat of four legged animals but fish was never prohibited as Jesus himself had eaten it.

VEGETARIANISM IN ASIA

- China – Chinese Buddhism & Taoist monks and nuns eat an egg-free, onion-free vegetarian diet. Some even avoided root vegetables to avoid hurting plants.
- It was a fairly common Chinese folk religion or cultural practice for Chinese people to eat vegan on the 1st & 15th of the month.
- Many vegetarian/vegan products developed in China as a result of the popularity of these fasts- tofu, seitan & meat alternatives made from seaweeds
- In Japan, from 675 – 1872, red meat was banned due to the prevalence of Buddhism and the diet was primarily pescatarian.

VEGETARIANISM CONT.

- Vegetarianism or the "Pythagorean Diet" became popular in the Renaissance period (15th & 16th centuries). Leonardo da Vinci was one "celebrity" endorser.
- The first vegetarian society was formed in England in 1847.
- In the USA, Benjamin Franklin was a vegetarian for a time & introduced tofu to North America.
- The American Vegetarian Society was formed in 1850 by the inventor of the Graham cracker, Sylvester Graham.

- In the USA, the Seventh Day Adventist Church was founded in 1863. They have advocated a meatless diet from the beginning & many studies comparing their dietary habits to people of other religious traditions have provided solid nutritional information. John Kellogg (founder of the cereal company) formed Sanitariums that promoted vegetarianism for health.
- The great Russian author Leo Tolstoy, who died in 1910, was a vegetarian.
- Today, the majority of vegetarians live in India & most consume dairy.
- In North America, studies from 2005-2010 found <3% of people are vegetarian.

TYPES OF VEGETARIANS

- **Lacto-ovo vegetarians:** Eat both dairy & eggs
- **Lacto vegetarians** : Eat dairy
- **Pescatarian:** Consume fish
- **Pollo vegetarian:** consume chicken

VEGANISM

- The word was invented in 1944, at first to describe a non-dairy vegetarian.
- It came to mean abstaining from milk, butter & cheese, as well as animals, eggs, gelatin and honey.
- Veganism has become much more popular since 2010, with new vegan certifications emblems on grocery products such as:

HEALTH BENEFITS of VEGETARIANISM

- Studies of Seventh Day Adventists (who also avoid alcohol & caffeine) and other groups of vegetarians seem to indicate the following benefits:
  - - lower blood cholesterol - lower blood pressure
  - Approx 20% less risk of death from heart disease
  - Reduced risk of diabetes
  - - reduced risk of certain cancers, such as colorectal & esophageal

  - HOWEVER, this depends upon which foods are staples of the diet. Remember that "noodles and coke" is also a vegetarian diet that no one would believe to be health promoting.
  - A 2021 review (in Cochrane) found "insufficient information" to draw conclusions about the effects of a vegan diet on CVD risk.

DRAWBACKS

- In a strict vegan diet, people are more likely to become deficient in B12, D, Calcium, Iron and Omega 3 fatty acids. A 2014 study found that 80% of vegans became B12 deficient without supplementation.
- Lack of Omega 3 fatty acids may contribute to depression
- Lack of fats/fat soluble vitamins can contribute to hormone abnormalities – low thyroid, low estrogen/testosterone, etc thereby affecting fertility, energy etc
- Low iron can cause anemia
- Eating too many packaged foods can cause weight gain

THE CHINA STUDY & CONTROVERSY

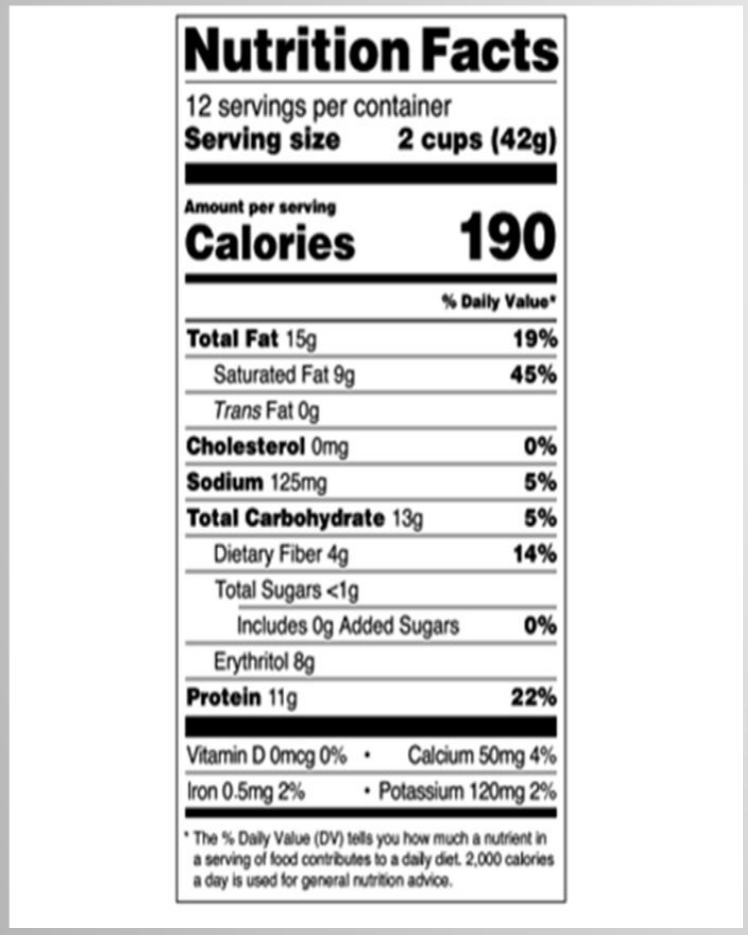
- T. Colin Campbell looked at the diet of villagers all across China in the 1980s. Some villages ate much more meat than others. One of his conclusions was that eating more meat is associated with higher cancer rates and overall higher incidence of chronic disease.
- The book was highly influential when published (2005) & T. Colin Campbell continues to appear in many pro-vegan movies, incl. Forks Over Knives
- Some have been critical of his science and statistics, suggesting that he cherry picked the data that supported his hypothesis-
  See www.deniseminger.com

THE KETO DIET

- In contrast to the vegetarian diet, which can be any composition of macronutrients, the **Ketogenic diet is defined by its macronutrient ratios.**
- Usually: **60-70% fat/10 -20% protein/5-10% carbohydrate**
- Initial ketogenic prescriptions called for a ratio of 4 g of fat to every 1 g of protein & carbohydrates
- Some other metrics that people will use are total or net carbohydrates under 30g/40g/50g per day
- Recall **NET carbohydrates** equals

total carbohydrates – (fiber + sugar alcohols) = net carbohydrates

Net Carbohydrates on Food Labels



Nutrition Facts

12 servings per container
Serving size **2 cups (42g)**

Amount per serving
Calories **190**

	% Daily Value*
Total Fat 15g	**19%**
Saturated Fat 9g	**45%**
Trans Fat 0g	
Cholesterol 0mg	**0%**
Sodium 125mg	**5%**
Total Carbohydrate 13g	**5%**
Dietary Fiber 4g	**14%**
Total Sugars <1g	
Includes 0g Added Sugars	**0%**
Erythritol 8g	
Protein 11g	**22%**

Vitamin D 0mcg 0% • Calcium 50mg 4%
Iron 0.5mg 2% • Potassium 120mg 2%

* The % Daily Value (DV) tells you how much a nutrient in a serving of food contributes to a daily diet. 2,000 calories a day is used for general nutrition advice.

Nutrition Facts
Valeur nutritive

Per 1 bar (39 g)
pour 1 barre (39 g)

Calories 190

Amount / Teneur	**% DV / % VQ***
Fat / Lipides 14 g	**22** %
Saturated / saturés 8 g + Trans / trans 0 g	**40** %
Cholesterol / Cholestérol 5 mg	
Sodium / Sodium 50 mg	**2** %

Amount / Teneur	**% DV / % VQ***
Potassium / Potassium 95 mg	**3** %
Carbohydrate / Glucides 14 g	**5** %
Fibre / Fibres 9 g	**36** %
Sugars / Sucres 2 g	
Protein / Protéines 6 g	

* **% Daily Value / % valeur quotidienne:** Vit A 0 % • Vit C 0 % • Calcium 4 % • Iron / Fer 4 %

- ***Suzie's Good Fat Bar – Total Carbs (14g) – Fibre (9g) = Net Carbs (5g)***

- ***Quest Peanut Butter Cups***
- ***Total Carbs – (fibre + sugar alcohols/erythritol) = net carbs***
- ***13 g – (4g + 8 g) = 1g net carb***

HISTORY OF KETO FOR EPILEPSY

- Fasting had been described as a treatment for epilepsy since 500 BCE
- In the early 1920s, Dr Russell Wilder of the Mayo Clinic began to investigate what part of the fasting process was responsible for the reduction in seizures. He determined that depleting the body of sugars & forcing it to run on ketone bodies instead, from the breakdown of lipids, allowed a similar improvement in epilepsy as total fasting.
- This epilepsy treatment regimen continues today throughout the world, see ilae.org for a list of participating centres
- Other important organizations are charliefoundation.org & Matthew's friends
- Supplements are often prescribed: Calcium & Vit D, B vitamins, & Selenium
- https://youtu.be/X_LnpGuFa6U

MANITOBA'S CONNECTION TO KETO

https://www.atlasobscura.com/articles/all-meat-diet

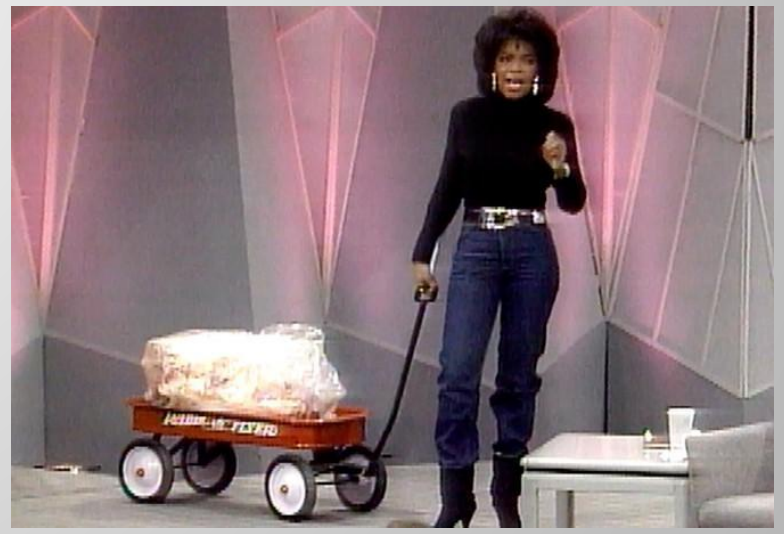
Read the above article on Gimli, Manitoba's own Vilhjalmur Stephansson's extreme ketogenic/carnivorous diet as inspired by the Inuit people.

ATKINS DIET

- Dr. Robert Atkins, a cardiologist, published his namesake diet in a book in 1972.
- It became enormously popular in the 70s, faded in the fat conscious 80s & 90s & then had a massive resurgence in the early 2000s. In 2004, almost 1 in 10 Americans was on the low carb diet.
- Never well accepted by the medical & nutritional science communities who were very focused on cholesterol and saturated fat as dietary problems.
- Some researchers such as Dr. Stephen Phinney PhD continued to investigate low carb/ketogenic diets.

THE OPRAH EFFECT

- After Oprah lost 67 lbs on a liquid, ketogenic type supplement called Optifast, interest in that dietary plan began to translate to a surge of research in the 1990s.
- Quality research is produced in the 2000s – one study showed anti-oxidant and anti-inflammatory genes were activated by one type of ketone body produced when you limit carbs. The authors suggested that keto may slow the aging process.



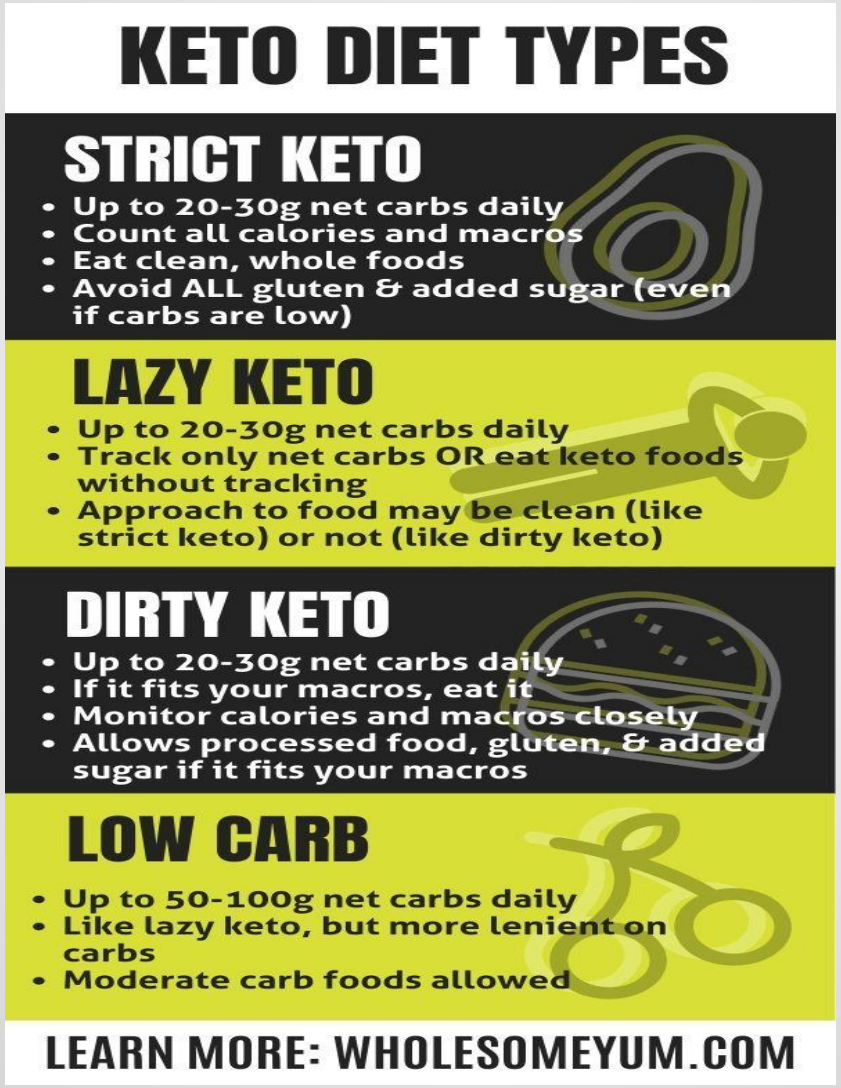
BIOHACKERS & PODCASTS

- “Biohackers” such as Tim Ferriss & Dave Asprey (Bulletproof Diet) began to popularize research into keto being done by doctors and scientists such as Dom D’Agostino & Peter Attia.
- Keto benefits: weight loss without feeling deprived
  - Reduction in diabetes medications & possible reversal of disease
  - May be beneficial in helping to treat cancers, prevent Alzheimers
  - Reduction in metabolic syndrome
  - Decrease in IBS or digestive symptoms for some
  - May contribute to increases in longevity
  - https://youtu.be/UMhLBPPtlrY

POSSIBLE PROBLEMS WITH KETO DIETS

- Kidney stones (need to increase water intake when eating lower carbs)
- Constipation (lack of fibre) or diarrhea (if trouble digesting fats)
- May be deficient in nutrients such Calcium, Vit D, selenium & B vitamins
- May be prone to dehydration & electrolyte imbalances (carbohydrates hold more water in your body)
- May affect athletic performance: https://youtu.be/LVSrNEqBkDg

VARIETIES OF KETO DIET



EXAMPLES OF KETO DIET MEALS

- Strict Keto: Bulletproof Coffee (coffee with MCT oil or butter &no sweetener OR better sweetener such as stevia, erythritol & monk fruit), steak salad with greens and butter, eggs, cheese in all varieties, “fathead” dough (made with cheese, cream cheese & almond flour) for pizza, buns etc. Keto bars- homemade or brands such as Suzie’s Good Fats, Good to Go
- Dirty Keto – All of the above plus convenience products using sweeteners that are considered not as healthy such as sucralose, maltose - like Atkins Diet products or Skinny Syrups, diet pops etc. Relying more on things like Fast-food hamburgers without the buns than home-cooked meals
- Vegan Keto – Curried tofu scramble, tomato mushroom spaghetti squash, cauliflower “fried rice”, Thai curry cauliflower soup, guacamole with homemade keto crackers
- See http://www.dietdoctor.com for reputable keto & low carb information

Carnivore Diet

The Carnivore Diet consists of eating only meat and animal products, including some (lower sugar) dairy products.

Proponents report the benefits as: mood stabilization, reduced inflammation, obesity & Diabetes, and IBS.

The medical establishment have concerns about the lack of fibre, vitamins and antioxidants.

Very little research has been done on the carnivore diet, but there have been observations of cultures that at times followed a similar diet such as the Kalahari Bushmen and the Inuit (see the Stephansson example a few slides ago)

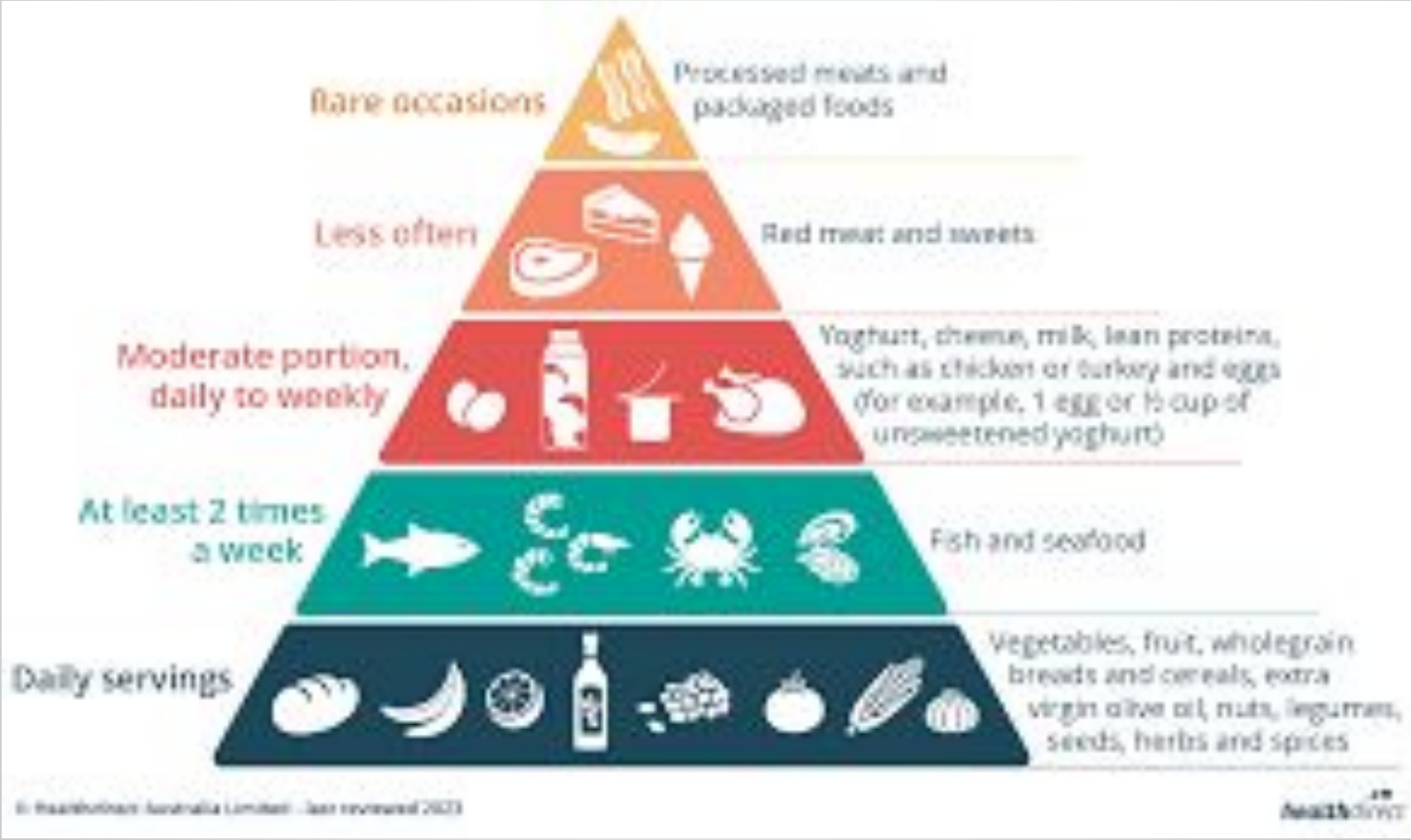
Mediterranean Diet-
One Diet to Rule Them All

If you have read any information about a connection between how you eat and your health, you have heard the advice to eat a "Mediterranean Diet".

This scientific interest in the diet of people living in Greece, Italy, Spain, France & Northern Africa dates back to the 1950s and an observation made by Ansel Keys of the University of Minnesota. He noticed that poor people in remote Italian villages had better cardiovascular health that wealthy residents of New York City. He went on to study the connections between lifestyles, nutrition and cardiovascular disease. The Mediterranean countries had the lowest rates of cardiovascular disease.

https://youtu.be/qNQE-R04vYo?feature=shared

What to Eat on the Mediterranean Diet?

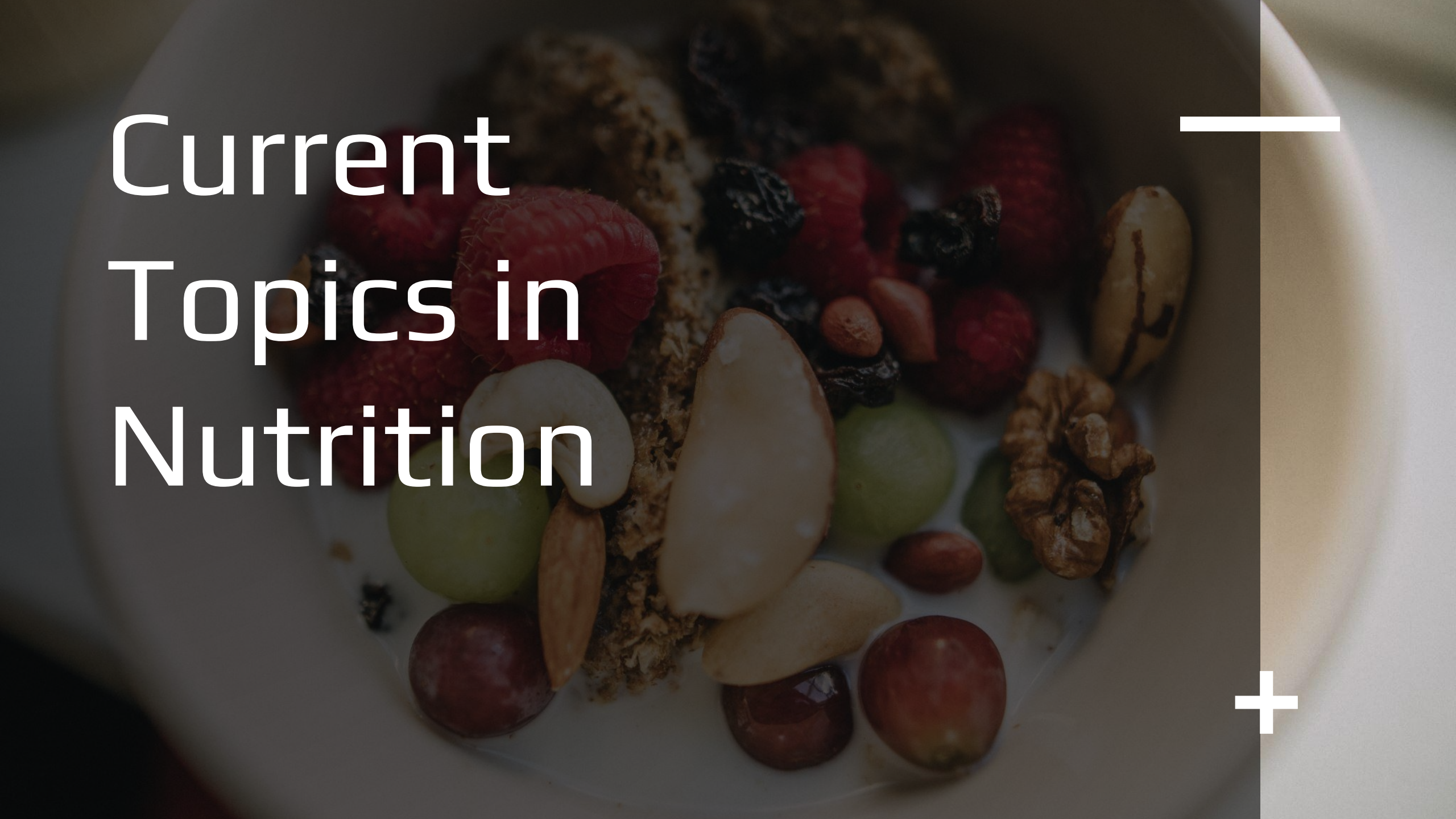


Mediterranean Diet Research

PubMed lists over 68,000 studies on the Mediterranean diet, consistently showing benefits in:

- reducing metabolic diseases: insulin resistance, diabetes, dyslipidemia, non-alcoholic fatty liver disease
- reduction in cardiovascular disease: less atherosclerosis, fewer heart attacks and strokes
- less overweight & obesity
- decreased incidence of some cancers: breast, prostate, lung, colorectal

Benefits seem to mostly relate to the high amounts of antioxidants, polyphenols, and good fats from the abundance of fresh fish and olive oil.



Current Topics in Nutrition

Fasting/Caloric Restriction/ Intermittent Fasting/Time Restricted Eating

Fasting: A voluntary restriction of food and drinks for health, religious, ritual or other reason.

Can be defined in different ways – water only (most commonly), water/tea/coffee, juice fasting, fat fasting etc.

Can also refer to 24 hr fasting or fasting between certain hours of the day, such as in Ramadan – a month of fasting sunup to sundown observed by Muslims.

Calorie Restriction

- Calorie Restriction: consuming less than the recommended amount of calories per day, usually about 10 –30% less
- Research on its connection to improved health and longevity has been ongoing for over 100 years
- 1914 study showed reduced tumour growth in mice
- 1935 study found mice almost doubled their lifespan with calorie restriction
- A 2014 review of animal studies found that not only did multiple animal species live longer, but a significan number of them showed none of the usual age-related pathologies

Calorie Restriction – Human Studies

- Human studies are limited, due to ethical considerations
- Connected to some of the "Blue Zones" - Okinawa, Japan & Loma LInda, California. Studies found they consumed less calories, more nutrient dense diet than surrounding populations
- CALERIE study tracked 218 people over 2 years, with average 11.9% calorie deficit. Significant reduction in Cardiovascular health markers such as: blood pressure, insulin sensitivity, C-reactive protein, etc.
- BUT, not all information has been positive
- Minnesota Starvation study in 1944 put people on a poor-quality, low-calorie diet with insufficient protein and limited fruits and vegetables. Participants experienced high levels of depression, & declines in cognitive and sexual functioning
- How calorie restriction might work is a little unclear because the mechanisms of aging are still not very well understood
- https://www.crsociety.org

Intermittent Fasting

- Definition: Intermittent Fasting is an umbrella term referring to several different styles of voluntarily alternating between restricting food and drink for periods of time with periods of non-fasting.
- Most common types:
  - 5:2 Popular in the UK & Australia. Involves eating normally for 5 days & restricting food intake to very low-calorie diet (ie 500-600 cal/day) for the other 2 days. Research published this month in the journal Plos One showed that it was as effective as other weight loss recommendations from their MD, but patients preferred that strategy to others
  - Alternate day fasting – either water only or modified
  - Time Restricted Eating (see next slides)

  - Youtube: Dr Jason Fung Intro to Intermittent Fasting

Time Restricted Eating

– Definition: Restricting calorie intake to a period lasting anywhere from 6- 10 hours. The schedule that seems most advantageous is 16:8 (16 hrs fasting & 8 hours of eating)

- Overall calorie intake may or may not be a feature of TRE. Benefits have been shown even without an on overall calorie restriction.

- HUGE topic of research currently

- Many studies show benefit in terms of decreased cardiovascular risk factors, increased insulin sensitivity, reversal of type 2 diabetes, and weight loss

- Promising studies showing TRE may lower risks &/or improve outcomes for certain cancers such as breast cancer and some autoimmune conditions such as MS

- There seems to be a relationship between the body's circadian rhythms and TRE- disruptions to normal circadian rhythms ie irregular or insufficient sleep, shift work etc. Increase our risk of many conditions, including overweight and metabolic disorders. TRE may help counterbalance some of those risks. See the work of Dr. Satchin Panda of the Salk Institute for Biological Sciences. Youtube video.