Community notes

Guest: Dr Sarah Berry

Disclaimer 1: The literature presented here, directly (or as closely as possible), looks at statements made by the guest. In order to fully understand each topic mentioned, an extensive literature review (beyond the scope of this document) would be required.

Disclaimer 2: The information provided in this podcast and any associated materials is not intended to replace professional medical advice. For any medical concerns, it is essential to consult a qualified health professional.

Contents

Sleep and food choices

“We've always known that, for example, sleep can impact, or rather, not always We've known for some time that sleep can impact our food choices.”

References 1, 2.

Stress and metabolism

“We know that stress can impact how we metabolize a food”

Studies showed that stress can affect how we metabolise food by affecting eating habits, energy expenditure, and metabolic responses, resulting in weight gain or reduction depending on the type and duration of stress (3).

Most of our energy is coming from ultraprocessed foods

“60% of our energy is coming from ultraprocessed food.”

This data is from the United States in 2012 for purchases of highly processed foods and beverages (4).

Processing of food affecting eating rate, energy density and nutrient profile of food

“how processing can affect your eating rate, the energy density of food, the nutrient profile of a food”
“Kieran Ford, who's dedicated many years to researching this and looking at how changing the structure and texture of a food can modulate your eating rate and how also your eating rate can modulate how you metabolise the food and how many calories you go on to eat.”

“if you change the speed in which you eat your food by about 20% you reduce your calorie intake by about 15% and that's due to where you're releasing your hunger hormones, how many fullness hormones you're releasing, etc.”

Increased food processing is linked to higher energy intake rates, with ultra-processed foods having the highest energy density, eating rates, and intake (5-9).

Processing of food affecting eating rate, energy density and nutrient profile of food

- Foods that can be consumed rapidly lead to higher food and energy intake, potentially risking overconsumption (10).
- Texture manipulations, such as increasing hardness and elasticity in solid foods, can reduce eating rate and food intake by affecting bite sizes and chewing behaviour (11).
- Food matrix integrity, influenced by processing, affects nutrient absorption (12).
- The more food is processed, the lower its satiety potential and nutrient density, and the higher its glycaemic impact (13).

“once we adjust for lots of other confounders, there's a difference of 120 calories between what Fast eaters have over a day versus slow eaters, with the Fast eaters eating more calories compared to slow eaters.”

Research shows fast eaters consume approximately 105-120 more calories per day than slow eaters (14, 15).

Time until we feel full

“There's different hormones that are released from different areas of our gut, for example, that feedback signals to say either you're full or you're hungry. On average, I would say it takes about 10 to 20 minutes for the fullness to really properly kick in.“

Satiation, the feeling of fullness during and shortly after eating, is a complex process involving sensory, hormonal, digestive, and cognitive signals. The development of satiation typically occurs within 20-30 minutes after meal initiation (16). However, research suggests that the time to feel full varies depending on individual characteristics, meal composition, and eating speed, rather than being a fixed duration. Interesting finding: a thick but low-calorie shake can induce greater fullness than a thin, high-calorie shake, a phenomenon termed "phantom fullness" (17).

Satiation signals across the gastrointestinal tract

“It doesn't take 20 minutes for all of the fullness signals to kick in, because as soon as you start chewing something, you start to release different hormones and different sensory characteristics of the food will also trigger some sort of fullness. But what we do know is that you have more of these fullness receptors saying, Hey, you're full lower down in your gastrointestinal tract. And so if you can get food to the lower gastrointestinal tract, that's when it says, Hey, Steven, you're full now.”

Satiation signals originate from multiple sites along the gastrointestinal tract, including the stomach, small intestine, and colon (18). The process involves an integrated response to food intake, encompassing gastrointestinal motility, secretion, and hormone release (19). Hormones such as cholecystokinin (CCK), glucagon-like peptide-1 (GLP-1), and peptide YY (PYY) play significant roles in

this process (19). Gastric satiation is primarily volumetric, triggered by stomach distension, while intestinal satiation is nutritive, responding to food content (20).

Eating rate and losing weight

"Those people who are intentionally slowing down the rate at which they eat their food lose more weight than those people who continue to eat at their normal rate."

Studies have found that individuals who eat at a decelerated rate consume less food compared to those eating at a linear or increased rate (21). Additionally, people who eat quickly tend to consume more and have higher body mass indices, while those who eat more slowly feel satiated earlier and eat less (22).

Unprocessed versus ultraprocessed foods: eating rate

"So there's some great research that's been conducted that shows that heavily processed, soft, textured type food can be eaten 50% more quickly than the unprocessed, harder, textured equivalent."

Softer textures and higher levels of processing lead to faster eating rates and increased energy consumption. Teo and colleagues (23) found that soft, ultra-processed meals resulted in the highest energy intake, while hard, minimally processed meals led to the lowest. Forde et al. (24) reported that energy intake rates increased from unprocessed (35.5 kcal/min) to ultra-processed foods (69.4 kcal/min).

Apple versus apple puree

"So we can use an example from a study that was actually conducted in 1977 and this was published in The Lancet. It was one of the first nutrition studies published in The Lancet, and it's one of the first studies to show the importance of the food matrix, and it kind of got buried for many years. And it's a study by the scientist called haber where he fed individuals whole apples. He fed individuals the equivalent amount of carbohydrate from apple puree. It was exactly the same, ie, same nutrient, same fiber, same everything else in it all that's different is the apples are hard, the puree is soft. And what he found was that those people who were given the puree, even though they were given exactly the same amount of calories, ate that puree, or rather, drank that puree, three to four times more quickly than when they had the apples the equivalent amount of calories. So they were eating the same amount of calories, but three to four times more quickly.So when they measured their fullness, and they monitored that for quite a few hours, so going up to quite a few hours, those that were having the apples continue to feel full for longer. Those that having the pure A didn't feel full this long. And what also happened, interestingly, is those that were having the pure A had what we call a blood sugar dip."

Reference 25.

Blood glucose dip and next meal

"And so we know from our research, if you are a dipper, I'm a dipper, hence, I get hungry quite often. So in about two hours, I'm going to be eating one of these. If you're a dipper, you know your blood glucose is going below your baseline levels. And so you get hungry, you go on to eat 180 calories, on average, more at your next meal because of that."

The PREDICT 1 study, involving over 1,100 participants, found that glucose dips 2-3 hours after meals were associated with increased hunger, reduced time until the next meal, and higher energy consumption at the next meal and over 24 hours (26, 27).

Size of particles during mastication

"We know from these lovely chew and spit studies, or mastication studies that we do that at the point at which you swallow a nut, the particles are the size of the bits that you're swallowing, that you've you've chewed are about maybe half a millimeter, sorry, yeah, half a millimeter to one millimeter in size. Now, given that this cell within of a almond nut is about 50 microns. That means, when you're swallowing within that, what we call a macro particle, you've still got 1000s of cells. They're intact, where you've got this lovely cell wall containing all of this fat, and so you're swallowing these intact cells containing encapsulating the fat. So they're what we call very low by accessibility."

Nut mastication studies indicate that different nuts will have varying particle sizes at swallowing (28). Studies showed that mastication of whole almonds results in a high proportion of large particles (>500 µm), leading to low lipid bioaccessibility (8.5-11.3%) due to intact cell walls encapsulating lipids (29-31). The almond cell wall acts as a barrier, regulating nutrient release during digestion.

Metabolisable energy of nuts

"if you are worried about eating nuts because of their high calorie value, actually 20 to 30% of the calories are just coming out the other end."

Recent studies have shown that the metabolisable energy of nuts is consistently lower than predicted by Atwater factors. For walnuts, the metabolisable energy was found to be 21% lower than Atwater predictions, while cashews provided 16% fewer calories than typically reported on food labels (32, 33).

Large versus ground oats

“so we've done clinical trials where, on one occasion, people come in and they'll have 50 grams carbohydrate for breakfast of these large oats. Then they'll come in another day and they'll have exactly the same oats where we ground them. Literally, we've got students just grinding them down, so they're more like a powder. And the difference in the metabolic response in that following six hours after having either the large traditional oats or these finely ground oats is enormous,”
“You see about a 40% difference in the postprandial glucose response. So this is the increase in circulating blood glucose after you've had these oats, we see about a 50% higher response from the ground oats versus the large oats, and that has subsequent impacts on hunger hormones, fullness hormones, insulin release, etc,”

Intact oat kernels and thick oat flakes (>0.6 mm) significantly reduce postprandial blood glucose and insulin responses compared to refined grains, whereas thin/quick/instant oat flakes (≤0.6 mm) show no such effects (34, 35).

Fiber consumption

“so we should be getting at least 30 grams of fiber in the UK, and it's similar in the US, we get, on average, about 20 grams of fiber. ”

In the UK, only 13% of men and 4% of women meet this recommendation (37).

Reference 36.

Fiber

“Fiber is the one nutrient that we know consistently is associated with beneficial health effects, reduce reduction in many cancers, reduction in cardiovascular disease, reduction in levels of obesity, type two diabetes, etc.”

<u>On fiber and cancer</u>

A high intake of dietary fiber has been associated with a reduced risk of several types of cancer, including esophageal, gastric, colon, rectal, colorectal adenoma, breast, endometrial, ovarian, renal cell, prostate, and pancreatic cancers (38). Higher dietary fiber consumption has been associated with a 22% lower cancer risk and also lower mortality (39, 40).

Breast cancer

A meta-analysis of prospective studies found an inverse relationship between dietary fiber intake and breast cancer risk, particularly in studies with high fiber intake levels (41). Fiber's potential protective role in breast cancer may be due to its influence on estrogen

metabolism and excretion, as well as the endocrine effects of lignans formed in the intestine from fiber-associated precursors (43). Fiber may protect against cancer through multiple mechanisms, such as entrapping harmful compounds, producing short-chain fatty acids, and modulating intestinal microbial activity (42).

Pancreatic cancer

Dietary fiber intake seems to reduce the risk of pancreatic cancer, with a meta-analysis showing 60% reduction in women (44).

Gastric cancer

A 10-g/day increment in fiber intake seems to be associated with a significant reduction in gastric cancer risk (45).

Colon and rectal cancers

Increased fiber intake has also been inversely related to risk of colon and rectal cancers, with a 31% reduction in the U.S. population by an average increase of about 13 g/d.

References 46-49.

Fiber and cardiovascular disease

References 50-54.

Fiber and obesity

Studies suggest that dietary fiber, particularly soluble and viscous types, can reduce obesity by improving body weight, body composition, and metabolic outcomes, potentially through mechanisms involving enhanced satiety, altered gut microbiota, and increased energy expenditure (55-60).

Soluble and cholesterol

"soluble fiber, and that's great for us because it impacts things like cholesterol absorption"

Research suggests that certain dietary fibers, particularly soluble fibers with high viscosity, can significantly reduce cholesterol absorption and lower blood cholesterol levels (61-63).

Insoluble fiber and microbiome

“So most cell walls of plants are just fiber that's great for us, because it's food for our microbiome.”

References 64-67.

Artificially-added versus wholefoods fiber

Wholefood fiber, particularly from whole grains and insoluble cereal fibers, is more consistently associated with health benefits, such as reduced risk of type 2 diabetes, cardiovascular disease, and liver cancer (68). On the other hand, artificial or synthetic fibers showed some benefits but lack long-term safety and consistent epidemiological confirmation (68).

Snacks and cardiovascular disease

“I was reading that there's been some studies done where they took sort of two groups and gave them typical snacks versus healthy snacks, and they found a pretty significant reduction in cardiovascular disease”

Consuming healthy snacks, particularly those rich in polyunsaturated fatty acids like nuts and almonds, may improve cardiovascular health by lowering LDL cholesterol and enhancing endothelial function (69-71).

“we know that about 25% of our energy comes from snacks.”

Snacking plays a significant role in dietary intake, contributing approximately 25% of total daily energy for both children and adults in the United States (72).

“we asked people to change 20% of their energy from either having typical UK snacks or having 20% of their energy from almond nuts for six weeks. And then we looked at various health outcomes at the beginning of that six weeks, and then at the end of that six weeks, we said, Keep everything else the same. We provided all of these snacks to them. We provided the typical UK snacks. We spent a lot of time designing these, so we did lots of research where we looked in the UK, and it's the set very similar in the US.”

“what we found was the improvement in blood vessel function following having almond nuts versus having typical UK snacks equated to a 30% reduction in cardiovascular disease.”

Reference 73.

"You highlighted one of the stats there, that in the UK and in the US, about 25% of our energy comes from snacks. 75% of the energy that's coming from those snacks is coming from unhealthy snacks. This was taken from the ZOE podcast in meditation. In Mediterranean countries, only 14% of energy comes from snacks, which is half of the UK. And 85% of British people report snacking, compared to 10% in France and in the UK, we have 2.5 to three snacks per day, which translates to six or seven eating events a day."

- Snacks account for 10-20% of daily energy intake in Mediterranean countries, lower than the 23-35% in Central/Northern Europe (74).
- In the UK, studies show that snacks account for about 20-28% of daily energy intake (75).
- Snacking is prevalent in France, with 68% of adults consuming at least one snack daily, primarily in the morning or afternoon (76).
- Interestingly, in hospital retail units, only 30% of available snacks and 25% of commonly purchased snacks were healthy options (77).
- Adolescents in the UK have been found to consume 2.6 snacks per day, or 2.0 when excluding low-energy events (78).

Refined carbs

"If you have a really refined carbohydrate breakfast or snack, then you're more likely to have a blood sugar dip, which we know from our research, is more likely to make you more hungry, eat more calories, have lower mood, have lower energy and be less alert"

Reference 79-81.

Meal frequency

"So we looked at this in our cohort of 1000 individuals, where we take lots of measures related to what they're eating, when they're eating, how they're eating it, as well as lots of different health outcomes. And what we found was that the frequency of eating within reason was not a problem."

There is little robust evidence that reducing meal frequency is beneficial. It is also reported that there were no effects on energy intake with reduced meal frequency (82).

Snacking at night

"The timing of when we eat is really important. And what we found was, interestingly, 30% of people were snacking after nine at night. And we found that if you snack late at night, and this is a lot in line with, you know, other published research from very tightly controlled clinical trials, we found that if you snack late at night that that was associated with unfavorable health outcomes. So worse adiposity, so worse kind of fat around your belly, for example, higher levels of inflammation, worse levels of blood lipid, so you know, cholesterol, that sort of thing. And we found that this was even if you were snacking on healthy snacks, really."

Late evening snacking is common among adults, with studies showing 67% of U.S. adults consuming food or beverages between 8:00 PM and midnight (83).

Adiposity:

Increased adiposity from nighttime snacking may be due to changes in fat metabolism, increased energy intake, and poor snack choices, although the relationship may vary based on individual factors such as BMI status and snack type (84, 85).

Inflammation:

Systemic inflammation may be decreased by eating more often, consuming less calories in the evening, and fasting for longer periods of time each night, though more randomised trials are needed to validate this (86, 87). Research shows a complex relationship between nighttime eating, sleep patterns, and inflammation, suggesting that the effects may vary depending on individual health conditions and specific eating behaviours.

Cholesterol and other markers

Eating late at night has been associated with increased levels of total and LDL cholesterol, triglycerides, and dyslipidemia, which may contribute to a higher risk of cardiovascular disease and metabolic disorders (88-93).

Early time-restricted eating

"interesting is you said that you'll feel different the next day if you eat late at night. There's some really fascinating research that came out about one or two years ago where they looked at giving exactly the same calories and foods over the day within the same time period, but in one group of individuals having most of the calories earlier and in another group having most of them later in the day."

“the evidence shows early time restricted eating. So time restricted eating, where you're eating within a particular time window, those people who are practicing earlier in the day tend to do better in terms of the health outcomes, whether it's weight, inflammation, cholesterol, than those practicing later.”

“I think there's great evidence around time restricted eating. Now, much of it comes from very tightly, metabolically controlled studies you know that are done in clinic where people you know eat within a five or six hour window. So they have their first meal at 10, their last meal at four in the evening. Reduces inflammation, reduces body weight, improves blood cholesterol, etc, etc, etc.”

Research suggests early time-restricted eating may be effective for weight loss and improving certain cardiometabolic health markers, such as insulin sensitivity and blood pressure, compared to eating over a longer period. Early time-restricted eating may improve cholesterol profiles, particularly by increasing HDL cholesterol and altering lipid metabolism, although more research is needed.

References 94-101.

Sleep and diet

“there's a study that was conducted at King's College London by my colleagues, called the slumber study. And this really nicely illustrates how just changing how much you sleep can change your dietary choices. And in the slumber study, they asked people who were short sleepers to practice sleep hygiene. They gave them no dietary advice. They just said, practice good sleep hygiene. I you know, no screens. Late at night, no physical activity, caffeine, alcohol, etc. Late at night, darkened room. And then they just monitored lots of different things in these individuals, and what they found was that those who were able to extend their sleep actually made healthier choices such that they reduced without being told to their intake of free sugar by about 10 grams.”

Reference 102.

“what we found was within the same individual, if they'd had a bad night's sleep, their post meal glucose response, so after breakfast was a lot higher than if they'd had a good night's sleep.”

Reference 103.

Diet and mental health

“what you eat impacts your mental health. You know, there's great research now showing how important it is.”

A healthy diet, rich in fruits, vegetables, fiber, and certain nutrients like omega-3 fatty acids, has been associated with improved mental health outcomes, while poor dietary habits and food insecurity may exacerbate mental health issues such as depression and anxiety (104-106).

Time-restricted eating and energy intake

“I think there's great evidence around time restricted eating. Now, much of it comes from very tightly, metabolically controlled studies you know that are done in clinic where people you know eat within a five or six hour window. So they have their first meal at 10, their last meal at four in the evening. Reduces inflammation, reduces body weight, improves blood cholesterol, etc, etc, etc.”

“just by limiting their eating window, on average, reduce their energy intake by about 300 calories on average”

Studies have found that time-restricted eating can lead to unintentional reductions in energy intake of approximately 300-500 kcal/day (107, 108). Although time-restricted eating can lead to a reduction in energy intake and weight loss, it is not necessarily more effective than traditional calorie restriction (109, 110).

Isocaloric time-restricted eating

“there have been some studies that actually control the amount of calories that people eat, but have some people having it in a bigger eating window, some in a smaller eating window. And what these studies have shown that if you have the same amount of calories, but you change the period in time in which you're eating your food, there is an additional benefit on metabolic health. There is a benefit in terms of blood lipids, in terms of inflammation, independent of calories”

A recent 12-week randomised trial found that time-restricted eating did not significantly enhance weight loss when calorie intake was controlled (111). Though a systematic review (112) reported that fat loss relating to time-restricted eating was observed even when there was no caloric restriction and the beneficial metabolic effects were observed even when there was no weight loss.

Irregular meal frequencies

“there's research showing that if one day you're having three meals, and then the next day you're having nine meals, and the next day you're having six meals, and the next day you're having four meals that troubles your body”

Reference 113.

Social jet lag

"And what we know is, and we've published on this from our own zooplatic research, people who experience social jet lag, so have this inconsistent sleeping pattern, make poor dietary choices. They have more inflammation. They have a different gut microbiome composition."

Inflammation

Social jet lag is associated with increased inflammation, as indicated by elevated levels of inflammatory markers like IL-1 and IL-6, and is linked to complications in conditions such as inflammatory bowel disease (114-116).

Microbiome

References 117, 118.

Seed oils

"There is absolutely no evidence that is credible evidence when interpreted in the correct way to show seed oil so harmful."

"Seed oils are going to give you Alzheimer's. Seed oils are going to give you cancer, seed oils are going to kill you. You look at the evidence, it's totally the reverse."

Benefits and concerns of seven plant seed oils have been summarised in a comprehensive review (119). More randomised controlled trials are needed to better understand seed oil effects on the human body.

"42 randomized control trials, where they can play as seed oils to other fats, showing consistently that there is no harmful benefit, that actually there's a reduction in cardiovascular disease, because the particular fat that's in seed oil has a really potent cholesterol lowering effect. So it's actually beneficial for our health"

Research suggests that oils rich in unsaturated fats, such as olive (120-123) and canola oil (124-126), are generally preferred over saturated fats for cardiovascular health (127). A meta-analysis that included 54 trials found that safflower and rapeseed oils were most effective in reducing LDL cholesterol compared to butter (128). However, they may not significantly affect cholesterol levels when added to an average diet without other dietary modifications. An animal study comparing safflower to fish oil and control diets found that the safflower oil-fed rats were insulin resistant and showed reduced insulin-stimulated glucose disposal, resulting in increased triglyceride content in intramuscular muscle (129). Additionally, while medium-chain fatty acids appear not to affect serum cholesterol levels, lauric and myristic acids found in coconut and palm kernel oils can increase blood

cholesterol (130). It is important to consider that there is a paucity of clinical trials analysing the effects of seed oils in humans, with most studies being *in vitro* or animal studies.

"Sydney Heart Study, and in this study, this was done in the 70s, and this is a study that's used often to advocate for the toxic effects of seed oils."

Reference 131.

Trans fats

"Trans fats increase cholesterol, trans fats increase inflammation. Trans fats are bad for us."

References 132-137.

Beef tallow and seed oils

"There has been studies, and these studies were done many years ago when beef tallow was actually used, comparing seed oils with beef tallow, seed oils always work. Came out better. Seed oils always reduced cholesterol compared to beef tallow, reduced inflammation, etc, reduced cardiovascular risk factors"

In some studies, beef tallow diets increased the incidence of pancreatic tumors, while in others, they were linked to fewer precancerous lesions and higher apoptosis in colon tissue (138). Beef tallow diets have also been associated with greater body fat accumulation and lower uncoupling protein expression compared to safflower or soybean oil diets (139). More research is needed to understand the impacts of both beef tallow and seed oils on the human body.

Infesterified fats and trans fats

"So infesterified fats are now used by the food industry in place of trans fats"

Reference 140.

Post-menopause and risk of heart attack

“post menopausally, women are we've done some research in 70,000 individuals, where we've looked at how prevalent these symptoms are, we see that 99% of perimenopausal women experience at least one menopausal symptom. We see that 66% of perimenopausal women have 12 symptoms or more, and this has a huge burden. of having a heart attack”

Postmenopausal women seem to have an increased risk of cardiovascular disease, particularly if they experience early or premature menopause, with factors such as type of menopause and hormone replacement therapy influencing this risk (141-143).

Menopause: The ZOE PREDICT study

Reference 144.

Menopause and cholesterol

Multiple other studies report increases in total cholesterol and low-density lipoprotein (LDL) cholesterol following menopause (145-147).

Perimenopause symptoms

“we've done some research in 70,000 individuals, where we've looked at how prevalent these symptoms are, we see that 99% of perimenopausal women experience at least one menopausal symptom. We see that 66% of perimenopausal women have 12 symptoms or more, and this has a huge burden.”

Reference 148.

Perimenopausal and postmenopausal women leaving the workforce

“We know from other surveys, 10% of women leave the workforce during the perimenopause and postmenopausal phase because of the burden that these symptoms have on their quality of life.”

In the 2022 Fawcett Society report, 10% of women who worked during menopause left their jobs due to symptoms (149).

Menopause and brain fog

“So we see that 85% of women are saying they have brain fog, they have anxiety, they have memory loss.”

Longitudinal studies have found small but reliable declines in objective memory performance during perimenopause, not explained by age alone (150).

HRT and diet: management of perimenopausal symptoms

“HRT, so hormone replacement therapy, therapy or MHT, can help reduce many of these symptoms, but we also know that diet can help as well”

HRT

“I don't think HRT is the answer for everyone, and some people can't take it if they're contraindicated with certain risk related to cancer, and some people choose not to take it. And it certainly doesn't solve everything. I do think the evidence is very compelling for reduction in many symptoms.”

Hormone replacement therapy (HRT) is effective in alleviating menopausal symptoms such as hot flushes, night sweats, and vaginal dryness. However, HRT should be considered on an individual basis (151-153).

Diet

A low-fat diet has been shown to improve specific symptoms related to perimenopause (146). Nutrition counselling and intervention during perimenopause can effectively change dietary habits and reduce the risk of obesity, metabolic syndrome, cardiovascular diseases, and osteoporosis. Key nutrients for menopausal health include vitamin D, calcium, vitamin C, B vitamins, and protein.

Reference 154.

Microbiome of perimenopausal and post menopausal women

“gut microbiome composition of post menopausal and perimenopausal women is different to premenopausal women,”

References 155-158.

Supplements for menopausal symptoms

“the evidence is very, very weak, except for a supplement called soy isoflavones, there is very weak evidence that any Other supplements will work consistently. They might work for some people, but consistently. Soy isoflavones, yep.”

References 159-161.

Obesity and menopausal symptoms

References 162, 163.

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