



Healthy Ageing: beyond the usual advice to eat well and stay active

# Healthy Ageing: beyond the usual advice to eat well and stay active



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# Introduction

Healthy ageing. Who doesn't want to age with good health to continue doing things you enjoy? Whether it is gardening, travelling, or participating in your favourite sporting activity, optimal ageing requires a healthy cardiorespiratory system, strong bones and muscles, and a sharp mind. And, of course, underpinning these functions are nutrient-rich foods incorporated into a healthful eating pattern. Beyond, the usual advice to eat well and move well, functional ingredients supported by solid research, such as isomalt, isomaltulose, and chicory root fibre, can also be incorporated into a healthy eating pattern to promote optimal ageing.

## Functional ingredients for healthy ageing

**Chicory root fibres Orafit® Inulin and Oligofructose** are proven prebiotics and as such support the gut microbiome by promoting the growth of beneficial gut bacteria, they promote digestive health and strengthen the immune system, reduce blood glucose response, help in weight management, and promote calcium absorption for bone health.

**Isomalt** is a sugar replacer made from pure beet sugar, it is tooth-friendly with natural sweetness. It has half the calories of beet sugar and a very low glycaemic response.

**Isomaltulose Palatinose™** is a fully available yet slowly digested and low-glycaemic carbohydrate (GI=32).<sup>1</sup> It delivers energy in a balanced and sustained way and it is tooth-friendly. Palatinose™ is derived from sucrose and has a mild taste with a similar taste profile to sugar yet just about half as sweet.

**You can explore all the research-supported benefits of these functional ingredients throughout this monograph.**

Now, more than ever, healthy ageing is critical. Healthy ageing is defined by the World Health Organization (WHO) as *“the process of developing and maintaining the functional ability that enables well-being in older age”*.<sup>2</sup> Advances in medical care allow many to live long lives. The number of older people, those over the age of 60 years, is 13.5% of the world's population or just over 1 billion people. Projections are that the number will be 2.1 billion by 2050.<sup>2</sup> In the U.S., a new milestone is in the eminent future. It is estimated that by the year 2034 older adults will edge out children in population size. The number of people aged 65 and over are expected to number 77.0 million, while those under age 18 will number 76.5 million.<sup>3</sup>





## An ageing nation – Projected number of children and older adults

For the first time in U.S. history older adults are projected to outnumber children by 2034

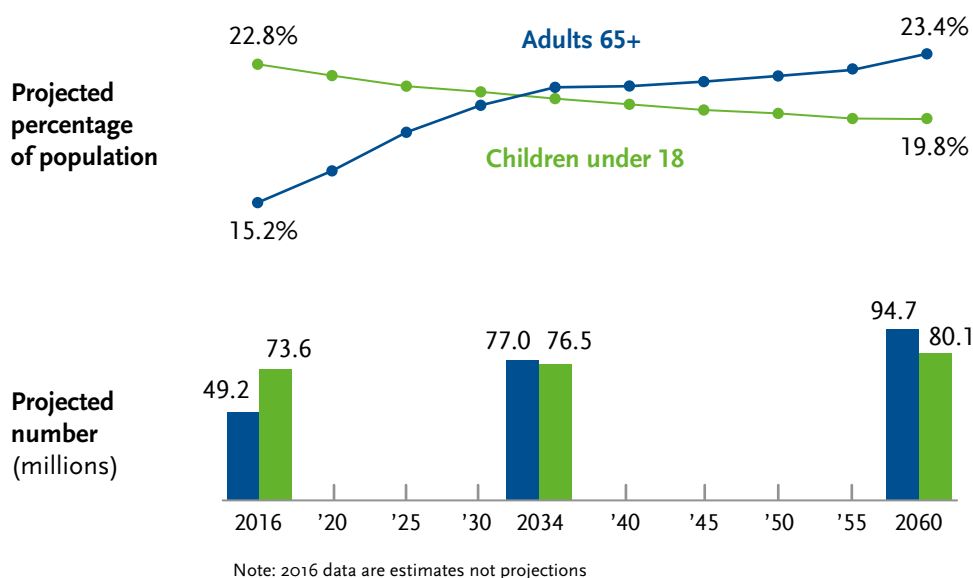


Figure 1. An ageing nation – Projected number of children and older adults

These facts led the WHO to declare 2021-2030 as the Decade of Healthy Ageing.<sup>4</sup> The goal is not to increase the number of years lived, but to live well in the number of years you have. Our healthspan, the years of healthy, independent living, is more important to our wellbeing than life span. How can such an ambitious goal be achieved? We must:

- Change how we think, feel and act towards age and ageing
- Develop communities to foster the abilities of older people
- Deliver primary, integrated health services that are responsive to the needs of older people
- Provide older people who need it with access to long-term care.<sup>2</sup>

Big goals, to be sure, but what can you do right now to start on the path of optimal ageing for you and your loved ones? It comes down to how well you eat, how well you move, and how you care for yourself. This monograph will break it down to achievable steps to guide you to optimal ageing. This isn't about anti-ageing... no pill, powder, or supplement will prevent ageing. But we can age well starting at any age. It is never too late!



# Nutrition and activity strategies to meet health challenges.

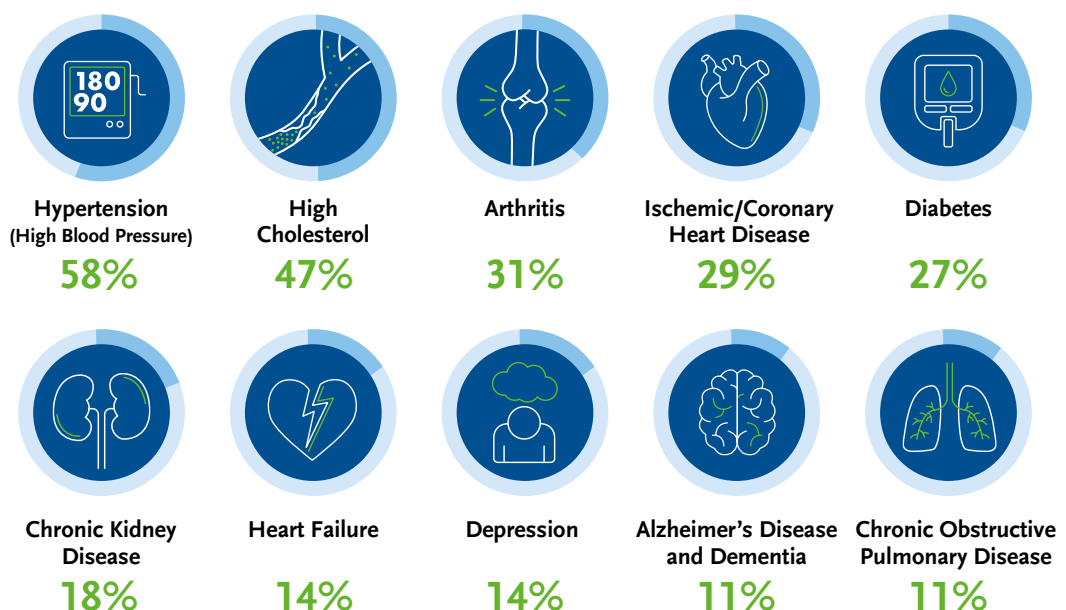
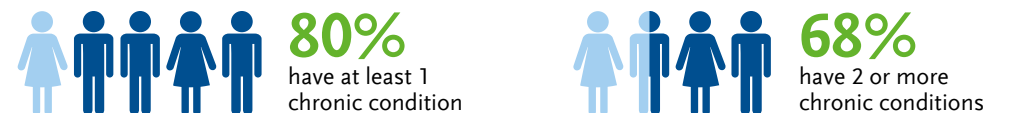
When you meet older friends and family what is the first thing you talk about? Health problems and doctor's appointments usually dominate the conversation! Many think that genetics or heredity is responsible for all ills, but genetics isn't destiny. Your environment, what you eat and how you care for your body can keep you healthy, even if you have a chronic health condition. Public health experts talk about three levels of disease prevention:

- Primary Prevention or intervening before health effects occur, through measures such as vaccinations and changing risky behavior (such as poor eating habits or smoking) known to be associated with a disease or health condition.
- Secondary Prevention or screening to identify diseases in the early stages, before the onset of the disease. Examples familiar to older adults include mammography, blood pressure testing, and blood sugar testing.
- Tertiary Prevention or managing disease after it occurs to slow or stop its progression through medical management and dietary interventions.<sup>5</sup>

Since 80% of adults 65 and older have at least one chronic condition, while 68% have two or more, this paper will focus on secondary and tertiary prevention through lifestyle changes.<sup>6</sup> First, let's look at how dietary choices affect the most common conditions of older adults before tackling the important role of physical activity that pairs with nutrition to promote healthy ageing.

## 10 Common Chronic Conditions for Adults 65+

### Quick facts



Source: Centers for Medicare & Medicaid Services, Chronic Conditions Prevalence State/County Table: All Fee-for-Service Beneficiaries

Figure 2. 10 Common Chronic Conditions for Adults 65+

# Blood glucose management.

Diabetes might be the first thing you think about when hearing the words blood glucose or blood sugar management. For good reason as impaired glucose tolerance increases with age and diabetes is one of the fastest growing health challenges of the 21st century. The number of adults living with diabetes has more than tripled over the past 20 years. The continued rise is largely due to type 2 diabetes and related risk factors, including increased levels of body fat, unhealthy diets, and lack of physical activity.<sup>7</sup>

However, diabetes isn't the sole reason to manage your blood sugar. Fatigue and tiredness are key concerns for older adults. Balanced blood sugar levels over the course of the day could lead to steady and balanced energy during the day. Incorporating foods with Palatinose™ (isomaltulose) could help achieve sustained, balanced energy.<sup>8-10</sup>

Managing cardiovascular disease prevention and treatment is another concern of ageing individuals. Cardiovascular disease frequently calls to mind blood lipids, such as cholesterol and triglycerides, but blood sugar management also impacts CVD. Reducing glycaemic index and glycaemic load in the diet may favorably impact CVD risk.<sup>11</sup> While low carbohydrate diets are popular with some consumers, a better strategy is thinking of carbohydrates based on their quality and the ability to keep blood sugar levels in a healthy range. One way to do that is to consider the impact that foods or a meal has on your blood sugar. Using a tool called the glycaemic index (GI), or glycaemic load (GL), can help keep your blood sugar levels in check. GI is a measure of carbohydrate quality. Carbohydrate foods that are digested, absorbed, and metabolized rapidly are classified as high GI (sometimes called “fast” carbs) whereas those processed more slowly are considered low GI foods (or “slow” carbs). The glycaemic load considers the effect of foods eaten as part of a meal. The impact of a single food with high GI can be lessened when consumed with a meal that contains fat or fibre.<sup>12,13</sup>

The benefits of managing your blood sugar using the GI and GL and the glycaemic response (GR) of a food are many. A scientific committee of experts from across the globe published a consensus paper detailing what is known about the benefits of lower blood sugar levels on health.<sup>12</sup> They concluded that:

- There is convincing evidence that diets low in GI/GL
  - improve glycaemic control in people with both type 1 and 2 diabetes
  - Reduce the risk of type 2 diabetes
  - Reduce the risk of coronary heart disease
- There is probable evidence that diets low in GI/GL reduce total body fat mass and support weight management.

A recent systematic review found that that low GI/GL dietary patterns result in small, but important improvements in glycaemic control, blood lipids, body fat levels, and inflammation beyond usual treatment with medications in adults with moderately controlled type 1 and type 2 diabetes.<sup>14</sup>

What does this mean for you? Even if you don't have diabetes, managing your blood sugar is a smart move. Smart food choices can help you do that by including high fibre foods like vegetables, legumes and fruits but also learning how to choose the right prepared foods. As we saw during the COVID-19 pandemic, shelf-stable foods became a necessity and can sometimes include an indulgent treat like a candy or cookie with the right functional ingredients.

Learning to read the ingredient list to identify the type of sugar is a smart strategy when trying to eat healthfully. Look for foods and beverages that use a unique carbohydrate called isomaltulose (brand name, Palatinose™). It is derived from sugar beets and provides the same energy (calories) as table sugar while being tooth-friendly, evidenced by an approved FDA and EU health claim. When digested, absorbed, and metabolized it breaks down four to five times more slowly than table sugar, leading to a lower blood sugar response while being fully available and providing the carbohydrate energy needed in a balanced and sustained way.<sup>15</sup> This way of digestion also means that there is no need to be concerned about gastrointestinal disturbances. Isomaltulose can be used in the field of clinical nutrition serving as a low glycaemic nutritive carbohydrate to help manage blood glucose levels as it supplies energy in a more steady and sustained way with less impact on blood glucose and insulin levels. Its low-glycaemic properties are well established for conditions of impaired glucose tolerance and diabetes. Isomaltulose has unique properties that make it a functional ingredient to support healthy ageing. It has a low GI and many research studies show it is beneficial in helping manage blood sugar levels and improving metabolic health. You can find isomaltulose as an ingredient in foods and drinks, such as powder applications in clinical nutrition (e.g. as meal replacer), energy bars, cereal, tea, and baked goods, sports nutrition products, and more. A plethora of studies find that replacing higher GI sugars with isomaltulose helps improve blood sugar control in healthy adults, as well as those with diabetes.<sup>16-18</sup>

### Look at physiology, not just chemistry.

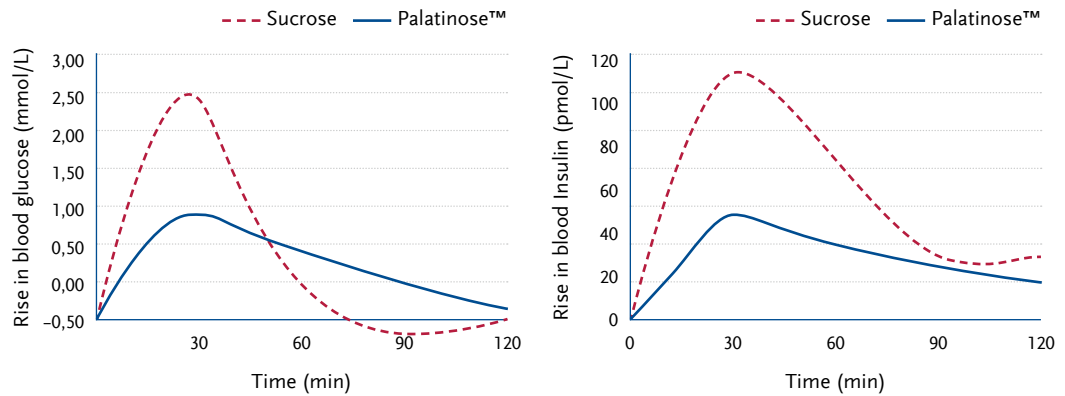
Not all sugars are alike in their metabolic profile. It's the physiological carbohydrate quality that matters. A carbohydrate that is available to the body and is digested slowly, leading to a low blood glucose response and low insulin response and allows for fat oxidation in energy management is a carbohydrate of good physiological quality, no matter if it is a monosaccharide, disaccharide, oligosaccharide or polysaccharide. In addition, if it is not used as substrate by oral microorganisms, confirmed by an FDA approved health claim, this sugar has a quality bonus. This sugar exists and it is called isomaltulose (brand name Palatinose™). Isomaltulose is a 'sugar' in that it is a disaccharide with 4 calories per gram like regular sugar, yet it does not have the same impact on insulin and blood sugar: it has a lower glycaemic index and its digested 4-5 times more slowly.

The current food labelling system does not differentiate the physiological benefits of carbohydrates that are classified as sugars. Consumers view sugars as "bad" therefore, food labelling systems need to provide a better way to identify those sugars, like isomaltulose, that have positive health benefits, in the Nutrition Facts Panel. For example, beneficial carbohydrates such as isomaltulose could be excluded from the "total sugars" and "added sugars" definition and counted as carbohydrates.

It makes sense that the FDA in their recent invitation for comment is considering physiological effects rather than only chemical structure when it considers whether to classify an ingredient as a sugar.<sup>19</sup> Looking at physiology is a very important step in the right direction of evaluating ingredients for labelling as we need to look at what happens in the mouth, small intestine and large intestine when you eat a particular functional ingredient. How does it impact blood glucose levels? How quickly and how is it absorbed and excreted?



**Figure 3. Typical blood glucose and insulin curves in response to Palatinose™ and sucrose**



The totality of data from over 30 blood glucose response trials, consistently finds a lower blood glucose response to Palatinose™ compared to sucrose, maltodextrin or other reference carbohydrates.<sup>1,18,20-26</sup> Isomaltulose has a big advantage in that it is fully and slowly absorbed, resulting in a low blood sugar response as well as providing sustained energy. It also promotes fat oxidation which leads to less fat storage. It's an ideal carbohydrate that just happens to be a disaccharide.

Isomalt is another ingredient to look for when choosing foods to manage blood sugar. Isomalt is made from beet sugar and can be used as a traditional sugar replacer, replacing sucrose cup for cup. Very little is absorbed in the small intestine and therefore it provides only half the calories of sugar and it has a positive effect on lowering blood sugar. Isomalt is found in sugar-free candies and chewing gum as well as in bakery items, fruit spreads, chocolate, confectionary sweets, yogurt, ice cream, fillings and even supplements.

Consumer research shows that a large percent of those over 50 years of age are trying to balance food health with some indulgences in their daily food choices. While they want good health, they also want to enjoy their foods and have an occasional treat.<sup>27</sup>

Individuals with diabetes can improve their blood sugar response by using isomalt. When 30g of isomalt per day (in sweetened foods like candies, chocolates and biscuits) was consumed for 12 weeks, a significant decrease in HbA1c and insulin resistance was seen and the researchers found there was no adverse effects on blood lipids, such as cholesterol.<sup>28</sup>

Chicory root fibres such as inulin and oligofructose will be discussed in more detail later in this monograph but incorporating this prebiotic fibre into the diet not only increases fibre intake but also helps lower blood sugar and insulin response.<sup>29</sup>

# Cardiovascular disease.

Cardiovascular disease is an umbrella term that includes any diseases that affect the heart ("cardio") and the blood vessels ("vascular".) The most common disorders experienced by older adults are high blood pressure and coronary heart disease.

High blood pressure affects 67% of men and 74% of women over the age of 65, making it the most prevalent condition with ageing.<sup>30</sup> High blood pressure puts you at risk for heart disease and stroke so knowing your blood pressure number and controlling it with diet (i.e. DASH eating plan) and exercise, and medications if prescribed, goes a long way to keep you healthy even if you live with high blood pressure.<sup>31</sup>

Heart disease, specifically coronary artery disease, is a disorder of the small blood vessels that encircle your heart. When they become blocked, insufficient blood reaches the heart muscle and can lead to a heart attack. You probably know someone who has had a coronary bypass operation, or perhaps you have had the procedure. This life saving surgery allows many older adults to live long, active lives, but diet (i.e. Mediterranean style eating pattern) and exercise are still important in both prevention and management of the disease. You might think that family history dictates your risk for heart disease. Heredity plays a role but there are many risk factors you can control including smoking, high blood pressure, high cholesterol levels, excess body fat, and physical activity. A Mediterranean style eating pattern includes foods with a low GI/GL. And low GI/GL diet isn't just good for diabetes; it can also reduce inflammation and cholesterol levels thereby being a good choice for managing heart disease.



## Palatinose™ preserves blood vessel relaxation after a meal.

Consumption of high glycaemic carbohydrates leads to a rise in blood glucose. Hyperglycaemia causes oxidative stress and impairs endothelial function. On long term, this may lead to insulin resistance. It is hypothesized that Palatinose™, with its lowered blood glucose response will also impact oxidative stress and allow for improved endothelial function in the postprandial phase. A randomized, controlled, double-blind, cross-over study with 80 adults with overweight or obesity with mildly elevated blood pressure consumed 50g Palatinose™ vs 50g sucrose.<sup>32</sup> The primary outcomes were blood vessel relaxation (FMD= Flow Mediated Dilation), blood glucose and insulin.

- 2 hours after Palatinose™ intake, blood vessel relaxation was significantly better, i.e. higher compared to sucrose.
- Overall the blood vessels remained more elastic with Palatinose™.
- In a subgroup, looking specifically at insulin sensitive vs insulin resistant adults, the difference between Palatinose™ and sucrose was more pronounced. Compared to sucrose, Palatinose™ maintained blood vessel elasticity after a meal. This effect was especially beneficial to individuals with impaired glucose tolerance.
- Potential mechanisms include: reduction of Hyperglycaemia, improved insulin action, the effects of GLP-1 improving insulin sensitivity and endothelial function.

These results strengthen the evidence for beneficial effects of Palatinose™ on metabolic health.

The risk of cardiovascular disease (CVD) in individuals with type 2 diabetes is about 2-4 times greater than in people without diabetes and appears to be independent of other risk factors including age, smoking, elevated serum cholesterol levels, and blood pressure. An analysis of cohorts from the Asia Pacific region (237,468 participants, and during 1.2 million person-years of follow-up) clearly indicated a positive continuous association between usual blood glucose and CVD risk. This association extends down to about 4.9 mmol/l, well below the usual fasting glucose cutoff levels for diagnosis of diabetes and impaired glucose tolerance. The associations were very similar for males and females and across age subgroups. There was no strong evidence of regional differences. The clinical and public health practice implications that we can infer from this study are many yet from a very practical perspective: this association suggests that many individuals may benefit from lowering their blood glucose, not just those with diabetes or impaired glucose tolerance.<sup>33</sup>

# Overweight and obesity.

Managing body weight is a concern for many ageing adults. In addition to genetics, physiological changes contribute to alterations in body composition and overweight. Decreasing hormone levels, diminishing muscle mass, and lack of physical activity contribute to increased body fat. As you age, basal metabolic rate, the biggest contributor to how many calories your body burns each day remains stable until about the age of 60 and then declines.<sup>34</sup> Much of the decline is due to decreased muscle mass, which will be discussed later in this monograph. The environment, one that encourages the intake of high calorie, high sugar foods, while discouraging physical activity, can push our weight up as we age.

Obesity is a chronic disease of increased levels of body fat that impairs health. Obesity is underpinned by genetics, in fact 40 to 70% of obesity is determined by genetics. Yet obesity doesn't have a purely genetic basis; changes to our lifestyle over the past century have created an obesity-prone environment in which any underlying individual genetic factors can be triggered or exposed.<sup>35</sup> Yet many, including health care professionals, still think obesity is a lifestyle choice. The simple advice to "eat less and move more" undermines the seriousness of the disease. Personal choice is important but should be viewed in the context of the disease; your genes might set the table, but the environment serves it up.

What can you do to prevent weight gain with age? First, monitor your weight to avoid gaining a couple of pounds per year. One or two pounds a year does not sound like much, but 20 years later it can add up to a 20-to-40-pound weight gain. We can halt weight gain. Preventing weight gain is easier than losing weight. Give up the cycle of dieting and searching for the "best" weight loss diet. Aim to eat for good health, not a number on the scale.

## Every calorie counts!

Small imbalances in energy intake and energy output have big effects:

Positive energy balance can lead to excess body weight and eventually obesity!<sup>36</sup> As little as 30 additional calories a day can make a difference. A simple calculation shows how much calories you save by eating 5 sugar free Isomalt candies, instead of 5 regular candies:

<b>Sugar candies</b>	$5 \times 3 \text{ g} \times 4 \text{ kcal/g} = 60 \text{ kcal}$
<b>Isomalt candies</b>	$5 \times 3 \text{ g} \times 2 \text{ kcal/g} = 30 \text{ kcal}$
<b>Difference in energy intake</b>	<b>30 kcal</b>

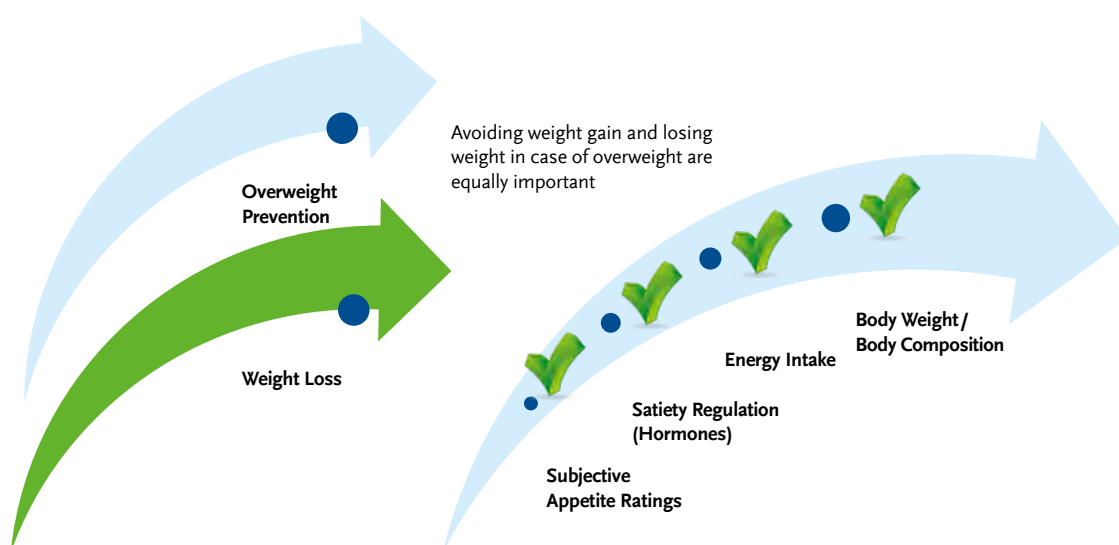
Hard candies are an interesting category for older adults as they often experience a dry mouth feel so including hard candies with isomalt can also be a little treat allowing for indulgence in their daily diet. Yet, indulgence and health need to be carefully balanced. A hard candy with isomalt instead of sugar can be beneficial in many ways:

it can help to keep a fresh and hydrated mouthfeel while it provides less calories, does not increase your blood sugar levels and is kind to teeth compared to regular sugar candies.

## Chicory root fibres help you eat less calories, naturally!

Chicory root fibre has gained more and more attention for its supporting role in helping to eat less, naturally. Chicory root fibre has supporting scientific evidence in animal and human intervention studies as part of weight management.

**Figure 4. Steps on the ladder of Weight management.**



Further human research suggests that chicory root fibre intake helps you to eat less calories, naturally. A systematic review of 26 intervention studies confirms an increased self-reported feeling of satiety after chicory root fibre supplementation.<sup>37</sup> Results from an isocaloric study in ten healthy (normal to slightly overweight) adults show that people consumed about 5% less calories with 16 g of oligofructose added to their diet compared to the control group.<sup>38</sup> A similar reduction in energy intake has been observed after the consumption of 12 g Orafiti® Synergy1 (a dedicated combination of inulin and oligofructose) for 3 weeks.<sup>39</sup>

These effects were confirmed in a study from Parnell and Reimer where 21 g of oligofructose per day were given to 48 healthy, overweight adults for three months. Those in the oligofructose group had a significantly reduced energy intake and lost body weight while the control group gained weight. Weight loss was primarily associated with reduction of trunk fat mass. The study participants receiving the oligofructose supplementation also experienced suppressed ghrelin and higher PYY levels increasing the satiety feeling.<sup>40</sup>

Energy intake (caloric intake) is a strong variable when assessing the strength of the data for weight management support. It is stronger than subjective appetite ratings and stronger than measurements of hormonal changes although those two elements are important “steps” on the ladder of weight management.



The foods we choose and portion sizes we eat have an impact on our weight as we age. Using the GI as a tool, choose foods lower in GI more often than foods higher in GI. The role of sugar in overweight and obesity is complex and we live in a society with a variety of good tasting foods with added sugars that are always within easy reach. Choosing foods that are naturally sweet, like fruit, is a good way to reduce added sugars and boost nutrients, like fibre and vitamins.

Another useful tool could be incorporating foods with isomaltulose that can provide the sweet taste you like (same profile as table sugar but less intensive in sweetness), while providing a low GI alternative to sugar.<sup>41</sup> Consumption of meals with isomaltulose (Palatinose™) in place of high glycaemic sugars was associated with lower blood glucose and insulin levels and an increase in fat oxidation by almost 20%. Increasing fat burning may translate into beneficial changes to body composition by reducing overall body weight and specifically fat stored around the midsection.<sup>42</sup> High blood glucose levels trigger higher insulin release, promoting the use of carbohydrates instead of fat for energy. This metabolic action suppresses fat mobilization and promotes the storage of fat. And fat oxidation may be suppressed in individuals with obesity.<sup>43</sup> While it is not clear yet whether this is causal or a consequence of a higher levels of body fat, it has been shown that individuals with obesity who oxidize fat more slowly tend to continue gradually gaining weight. Therefore, impaired fat oxidation appears to be an important contributor to long-term weight gain, independent of other factors. Increasing fat oxidation could benefit weight management and body composition.<sup>26</sup>



## Slow-release Palatinose™ delivers greater loss in body weight and fat mass.

While weight management is primarily dependent on the balance between caloric intake and caloric expenditure, it is important to recognize additional factors that also have an influence. One significant factor is the potential to steer the metabolism towards the fat-burning process. With its slow release of energy and lower rise in blood glucose and insulin, isomaltulose can help drive the metabolism towards higher fat burning and ultimately support weight management and body composition.

A recently published scientific study showed that the slow release and low glycaemic carbohydrate Palatinose™ supports additional loss of body weight and fat mass in overweight and obese adults, when replacing sucrose in a weight loss diet.<sup>44</sup> These findings are linked to the advantage of Palatinose™ in steering the metabolism towards fat burning and highlight that carbohydrate choice matters in a weight loss diet, beyond calorie counting.

In a recent randomized, double-blind, controlled intervention study, researchers aimed to evaluate the effects of an energy-reduced diet containing Palatinose™ on weight loss, compared to sucrose. Over a 12-week period, 50 healthy adults with overweight or obesity consumed either 40g of Palatinose™ or sucrose over four meals a day, as part of their energy-reduced diet (in total approximately 1700 kcal per day). For the evening meal the participants could choose freely their foods. Changes in body weight, body composition (fat mass, fat free mass) and energy metabolism were assessed at the beginning of the study and every subsequent four weeks.

Both the Palatinose™ and sucrose groups lost weight over the 12-week study period. However, only those participants consuming Palatinose™ achieved significant weight loss; losing an extra 2lbs. in comparison to the sucrose group. In addition, the Palatinose™ group also experienced a reduction in fat mass percentage (approximately 2%) and a significant increase in lean body mass. These observed changes were linked to a greater reduction in energy intake and a higher fat burning rate with Palatinose™ compared to sucrose.<sup>44</sup>

# Digestive health.

The gastrointestinal tract (GI tract), the long tube that stretches from the mouth to the anus, functions well in most older people. Yet, some gastrointestinal problems are more common with ageing, such as constipation. Maintaining a healthy diet with plenty of fibre and drinking sufficient water are important steps to keep the GI tract in good working order, yet most Americans are woefully short on consuming enough fibre. Women and men over the age of 50 average 15.5 and 18.4 grams of fibre per day, respectively. The recommended intake of fibre is 25 grams per day for women and 31 grams for men.<sup>45</sup> Fibre includes non-digestible soluble and insoluble carbohydrates naturally occurring in fruits, vegetables, and whole grains, and isolated (i.e. extracted from plant sources) or synthetic non-digestible carbohydrates (NDCs), each having a physiological health benefit.<sup>46</sup> Fibre can't be broken down in the stomach or intestines, so it passes through the body. Fibre can aid in regular bowel movements, can bind with cholesterol to speed its removal, helps keep blood sugar in check, and provides a source of fuel for the gut microbiome. Fibre comes in many types so eating a variety of foods can help you get all of the types of fibre needed for good health.

## Three smart ways to increase your fibre intake.

Dietary fibre, calcium and vitamin D are considered nutrients of public health concern for Americans.<sup>45</sup>

Most Americans only consume about half of the recommended intake of fibre and this shortage in our diet is called the fibre gap. To reach the suggested fibre intake without fibre-enriched foods, most Americans would need to increase their calorie intake by more than 500 calories per day. Yet meeting fibre requirements doesn't have to mean adding calories. A fibre-rich diet plus fibre-enriched foods can help bridge the fibre gap while delivering excellent taste and additional metabolic benefits. These foods can be part of an overall diet that includes a mix of various fibre types to help individuals reach fibre intake goals.

### Tips for getting more fibre:

1. Include vegetables, fruits, wholegrains and pulses (also called dried beans and peas and lentils) in your diet
2. When on the run or preparing for a busy day, snack on fibre-enriched bars or yogurt with chicory root fibres. Chicory root fibres (inulin, oligofructose) will help reduce the calorie content and sugar content of the food while adding beneficial prebiotic fibre to your diet. Chicory root fibres may be added to a large variety of common food items like yogurts, cereal bars, bakery products, breakfast cereals and grains and other fibre-enriched products. Check the nutritional label of the grocery store products that you purchase for ingredients like chicory root fibre, inulin, oligofructose, oligofructose-enriched inulin.
3. Consider a fibre supplement that includes prebiotic fibres such as inulin and/or oligofructose.





A study published in 2017 showed that prebiotic chicory root fibres induced selective changes in the gut's microbiota composition that can be directly linked to improved digestive wellness. The researchers used new technology called "next generation sequencing" to study the impact of chicory root fibre fermentation. Looking into the whole gut microbe ecosystem, chicory root fibre consumption was able to selectively alter the abundance of three genera - increasing the good bacteria *Bifidobacterium* and *Anaerostipes* and decreasing the potential pathogen *Bilophila*. While the selective increase in *Bifidobacterium* due to inulin and oligofructose has been demonstrated in numerous human intervention studies, selective fermentation is now confirmed using this new technology. The researchers found a direct link between the consumption of chicory root fibres, decrease in *Bilophila*, and improvement in quality of life in the subjects who were mildly constipated. Lower *Bilophila* numbers were associated with softer stools, reduced discomfort and improved quality of life. This study is further proof of the role that our gut microbiota plays in our overall well-being and it opens the field for exciting research in this area.<sup>47</sup>

# Gut microbiota.

The human gastrointestinal tract is host to one of the most complex ecosystems on the planet. So important that the whole nervous system of the gut, is called the “second brain” for its role in influencing your health.<sup>48,49</sup> Fibre-rich foods are good for the gut microbiome, but a specific type of fibre-rich carbohydrate, called prebiotics, can positively influence the microbes in your gut.

Prebiotics are an important fuel or food source for beneficial microbes that already live in your gut. Almost all prebiotics are dietary fibres but not all dietary fibres are prebiotics. Prebiotics target the microorganisms already present in the gut acting as food to nourish them. Bacteria that reside in the gut, specifically Lactobacilli and Bifidobacteria, are the usual targets for prebiotics, helping these good bacteria grow and multiply.<sup>50,51</sup>

Think of prebiotics as helping the good guys, that is helping the good microbes to flourish while keeping the bad or disease-causing microbes in check. The concept of prebiotics is relatively new, but it is well established that they can improve digestive health and research shows that they can positively influence our immune system, improve calcium absorption (which can protect your bones), and keep blood sugar in check.

5 grams of prebiotics eaten each day, from whole foods or as an ingredient in healthful foods is recommended for well-being.<sup>49,51,52</sup> Whole foods like fruits, vegetables, and whole grains contain prebiotics but are present in low levels which is why prebiotics are being added to foods like bars, drinks, yogurts, cereals, and even chocolate. You would have to eat 10 bananas to get 5 grams of the recommended prebiotic fibre.

You are probably more familiar with probiotics than prebiotics. Probiotics, those active, live cultures added in some yogurts, kefir, and some fermented foods are well-studied for their ability to aid digestion, assist the immune system, help absorb some vitamins, and stabilize the gut bacteria when taking an antibiotic. Specific strains of probiotics can also help with specific health problems. For example, some probiotic strains can help manage lactose (milk sugar) intolerance or reduce symptoms of irritable bowel syndrome. For more information on probiotics and fermented foods you can refer to the ISAPP website:

[Infographics - International Scientific Association for Probiotics and Prebiotics \(ISAPP\) \(isappscience.org\)](https://isappscience.org/)

Prebiotics are the energy source for probiotics. Simply put, prebiotics feed probiotics. They work together for good health: probiotics are the live microbes that can be transient residents in the gut and prebiotics feed them. It is important to choose foods with both pro-and prebiotics.





One of the most well studied prebiotics is called inulin. Inulin is found in the root of the chicory plant. Extracting the inulin from chicory root is a natural process and the concentrated inulin can be added to foods to boost prebiotic intake.<sup>53</sup> The ISAPP (International Scientific Association for Probiotics and Prebiotics) published a consensus definition for Prebiotics in 2017. This current consensus definition is: “a substrate that is selectively utilized by host microorganisms conferring a health benefit”. Inulin and FOS are 2 of the 3 recognized proven prebiotics by ISAPP.<sup>54</sup>

The Chinese Nutrition Society (CNS), China’s largest professional nutrition body, has concluded that inulin and oligofructose are among the first accepted prebiotics. The recognition includes BENEÓ’s functional fibres derived from chicory root and is a result of the premier prebiotic scientific consensus statement in China announced in 2021. The statement defines prebiotics and its criteria for ingredient classification.<sup>55</sup>

The whole foods previously mentioned have naturally occurring prebiotics; for foods with added prebiotics, the amount of prebiotic fibre is included on the nutrition facts panel together with dietary fibre, so it is hard to know exactly how much of the total fibre is prebiotic fibre. To know if a food has added prebiotics, check the ingredient list and look for words like:

- inulin
- chicory root extract
- chicory root fibre
- fructo-oligosaccharides (FOS)
- oligofructose
- oligofructose-enriched inulin

Think of prebiotics as plant-food for the good microbes in your gut.



# Bone and joint disorders.

“Osteo” means relating to the bones. Osteoarthritis (affecting the joints) and osteoporosis (affecting bones) are both chronic health conditions of many older adults. There are several types of arthritis, but osteoarthritis is the most common type affecting ageing individuals. It can occur in any joints of the body, but hands, knees, hips, and spine are the common sites.<sup>56</sup>

Osteoporosis or porous bones is estimated to affect 200 million women worldwide and causes more than 8.9 million fractures annually.<sup>57</sup> One in three women and one in five men over the age of 50 will experience osteoporotic fractures.

Osteoarthritis is the most common joint disorder in the United States and a leading cause of disability. 80% of the population over 65 years old has radiographic evidence of osteoarthritis.

In 2011 there were almost 1 million hospitalizations for osteoarthritis with an aggregate cost of nearly \$15 billion making it the second most expensive disease in the United States. 60% of patients suffer from osteoarthritis as consequence of obesity and associated metabolic syndrome.<sup>58-60</sup>

Osteoarthritis is also tied to genetics, increasing age, physical activity, body weight and diet. Maintaining a healthy weight means less strain on joints in the knees and hips. Excess body fat produces inflammatory compounds which can further damage joints so keeping weight in check with ageing helps reduce stress on joints. Since arthritis is a disorder of inflammation (the “itis” in arthritis means inflammation), some foods have anti-inflammatory potential. Foods that may help reduce inflammation include fruits, such as apples, berries, cherries, oranges, and pomegranates, leafy green vegetables, nuts, fatty fish, such as salmon and tuna, and olive oil.<sup>61</sup>

Emerging research suggests that an imbalance of “bad” bacteria in the gut (called dysbiosis) contributes to inflammation, the hallmark of arthritis.<sup>62</sup> Using probiotics has been shown to increase the “good” bacteria thereby decreasing inflammation.<sup>63</sup>

Osteoporosis is a disorder best prevented rather than treated. Once bone is lost, it is not easy to replace it. The best you can do with diet and exercise is to halt the progress. While at least 15 nutrients are needed for strong, healthy bones, two stars in the nutrient universe are calcium and vitamin D. Men and women over the age of 50 should aim for 1200 milligrams (or 1.2 grams) of calcium in their daily diets.<sup>45</sup> Calcium-rich foods include dairy foods, such as milk, cheese, yogurt, and kefir. It is also found in fortified plant-based milk substitutes, canned fish, tofu, dark leafy greens, almonds, and fortified foods, such as breakfast cereals, juices, and energy bars.

Vitamin D plays many roles in health, but for bones, the main role is helping the body absorb dietary calcium. Without sufficient Vitamin D, calcium absorption is decreased, contributing to bone loss.<sup>64</sup> Fatty fish provides some vitamin D in the diet, but fortified foods provide the bulk of vitamin D in your diet. Many foods that are calcium-rich are fortified with vitamin D, such as dairy milk, as are most plant-based milk beverages, but other dairy foods, such as cheese or yogurt, may not contain vitamin D.

Bone building occurs with growth and development and peak bone density (the maximum amount of bone you can make) happens in early adulthood. Therefore, enhancing calcium absorption can have a positive impact on bone health. Prebiotic fibres not only feed the gut microbiome, but also enhance calcium absorption during adolescence (the best time to build bone) and also later in life (e.g. postmenopausal women).<sup>65,66</sup> That is one more good reason to ensure that prebiotic fibres are part of everyone's daily diet.

## Chicory root fibres increase calcium absorption

Calcium is considered a nutrient of public health concern for Americans.<sup>45</sup> With a sufficient calcium intake as well as efficient calcium absorption and retention for increased bone mineral density in early adulthood, the risk for osteoporosis and related fractures can be reduced. Since its bioavailability is very low in humans and calcium absorption is limited, intake recommendations for calcium intake are high. Chicory root fibre helps to increase prebiotic fibre intake and at the same time serves as a dietary approach to increase calcium absorption in the large intestine for maintaining healthy bones.<sup>67</sup>

How does it work? In summary, chicory root fibres have been shown to increase calcium absorption through several mechanisms tracing back to their intestinal fermentation pattern and production of organic acids. The favourable effects of chicory root fibres on calcium absorption are attributed to their fermentation in the colon, which increases production of short-chain fatty acids and subsequently decreases pH. Dietary calcium is mostly present as insoluble complexes making it unavailable for absorption. The reduction of pH in the colon brings some of this calcium into solution and, thus, makes it available for absorption.<sup>68,69</sup>

In addition, several postulated mechanisms may also contribute to the effects of chicory root fibre on intestinal calcium absorption. Fermentation products (short-chain fatty acid butyrate) increase the absorptive area for calcium due to mucosa growth.<sup>69,70</sup> And, more calcium is absorbed with chicory root fibre intake as the permeability of the intestinal wall is enhanced and as more calcium from the colon lumen is exchanged for hydrogen from the cells.<sup>69,71</sup>

A one year intervention study, conducted at the USDA Children's Nutrition Research Center at the Baylor College of Medicine in Houston, TX, supplied 8 g of Orafiti® Synergy1 per day to 100 adolescents to examine long-term effects of chicory root fibre on calcium absorption and bone health. After one year, the Orafiti® Synergy1 group had significantly higher calcium absorption and greater bone mineral density (BMD) compared to the control group, i.e. it was demonstrated that the additional calcium absorbed indeed reached the bones. This study is one of a kind in demonstrating long-term benefits of Orafiti® Synergy1 (oligofructose-enriched inulin) for bone health.<sup>65</sup> The same results were also found with a group of postmenopausal women where 6 weeks of Orafiti® Synergy1 (oligofructose-enriched inulin) supplementation improved mineral absorption and impacted markers of bone turnover.<sup>66</sup>



## Sarcopenia and frailty.

Sarcopenia is age-related loss of muscle mass and muscle strength. Without intervention, sarcopenia can lead to low physical functioning.<sup>72</sup> Muscle mass peaks around the age of 25 but between the ages 40-70, healthy adults lose an average of 24% of muscle, which increases to 15% per decade after age 70.<sup>73</sup> Muscle strength declines even faster than muscle mass. Maintaining muscle mass and strength is important every day for doing normal tasks: turning a doorknob, opening a jar, climbing stairs, getting up from a chair, even walking. Too much sitting, coupled with a bout of illness or an injury can further deteriorate your functional ability. The good news is that with good nutrition and physical activity the decline can be slowed or prevented.

Strength training is the primary strategy and more on this is provided later in this monograph. Nutrition strategies augment strength training and one important nutrient is protein. For most people, foods can supply the needed quality protein, however for those who need a convenient, quick source of protein, protein powders added to smoothies or ready-to-drink beverages are good options. The highest quality sources of protein are those from animal or seafood sources: milk, cheese, yogurt, beef, pork, fish, shellfish, and eggs. Plant-based quality protein sources include soy, nuts, quinoa, and pea protein. With ageing, you need slightly more protein than when you were younger. Muscle responds by increasing in size and strength with a combination of strength training and a bit more protein at each meal.<sup>74</sup> Older adults should increase protein, both quality and quantity at meals. Consuming at least 30 grams of protein per meal can overcome the anabolic resistance of ageing muscle. While not all studies agree on meal timing, the researchers conclude that spreading the protein evenly across meals is better than backloading all the protein at one meal.<sup>74</sup>

Many of you don't think in terms of grams of protein. To make it easier, foods carry nutrition information that tell you 2 important pieces of information: the serving size is of the food and how many grams of protein are in in one serving. That's an important thing to keep in mind because you might be eating more than the stated serving size, meaning you are also getting more protein.

Earlier, the nervous system of the gut was discussed as the "second brain" of the body. It is established that the gut communicates with the brain and the brain also has cross talk with the gut. Emerging research suggests that in addition to the gut-brain axis, there is a gut-muscle axis.<sup>75</sup> The metabolism of nutrients by the gut bacteria has the potential to influence the functioning of skeletal muscle cells. Gut dysbiosis in elderly may contribute to changes in muscle size, composition, and function, contributing to frailty. Prebiotics may play a role in keeping your muscle function well into advanced age.<sup>76</sup>





### The role of prebiotics in frailty

Frailty is a geriatric syndrome describing physical and functional decline that occurs as a consequence of certain diseases (e.g., cancer, chronic infection, etc.) but also with muscle disuse in the absence of disease. This syndrome is characterized by an increased risk for poor outcomes related to accidental falls, fractures, disability, comorbidity, health care expenditure and premature mortality.<sup>77</sup>

Gut dysbiosis in the elderly may contribute to changes in muscle size, composition and function and frailty is associated with an unfavourable shift in gut microbiota (i.e. less gut microbiota diversity, less *Faecalibacterium prausnitzii* and *Lactobacilli* spp., and more *Enterobacteriaceae*).

A secondary analysis of a placebo-controlled, randomized, double-blind design study with 50 older adults living in nursing homes over the age of 65 was published.<sup>76</sup> The participants were randomly assigned to either a group who received a daily combination of inulin and oligofructose for 13 weeks or a placebo group (maltodextrin). The primary outcome in this secondary analysis was a change in level of a 62-item Frailty Index (FI) compared to baseline. The results showed:

- Significantly lower FI levels after prebiotic intervention.
- In contrast, placebo group showed a slight increase of FI.
- Change in FI was significantly higher in the prebiotic group compared to the control.
- Greater reduction of FI in moderately/severely frail subjects.

The potential of the effects of gut microbiome modulation to address frailty is an emerging research topic. The potential of prebiotics to mitigate or prevent frailty in the elderly was shown with this study. The study further supports the hypothesis that prebiotic supplementation might be linked to overall health also at an advanced age. The authors concluded that “*prebiotic intervention can reduce frailty levels in nursing home residents especially in those with higher levels of frailty.*”



# Immunity.

Keeping a healthy immune system is more important than ever with the appearance of coronavirus and COVID-19. The immune system is a finely tuned system where all parts work together to maintain a defence but not be too aggressive. There are many nutrients needed to keep your immune system healthy. However, food or supplements cannot “boost” your immunity, only vaccines can boost immunity. Be wary of claims for special foods or supplements that claim to boost immunity. A dietary pattern that supports a healthy immune system includes carbohydrates, protein, and healthy fats, as well as fibre, vitamins and minerals.<sup>78</sup> Food and nutrition solutions to support the immune system include a diet rich in the nutrients vitamins C, E, and D, minerals zinc and selenium, and omega-3-fatty acids. Meal plans that include seafood and fish, including canned tuna and salmon, are good sources of nutrients known to support immunity.<sup>78</sup>

A balanced and smart choice of nutrients can also support our inner defence system. This is because our gut is the barrier between the inside of our body and the outside world. Most of us may not think of it this way, however the gut comes into contact with food, drinks, and even bacteria and pathogens everyday via our mouth.

Our gut starts from the mouth, to the stomach, small intestine, large intestine, and finally the anus. Not only does our gut serve as a protective barrier, but it is also the place where a major part, around 70%, of our immune system is found. Because pathogens can enter our body from the outside world, both a good functioning intestinal barrier and a strong immune system can help prevent these pathogens from harming us.

Our gut is also where trillions of microbes live, and our gut microbes play an important role in regulating our immune system.<sup>54</sup> Imbalances in gut microbes have been linked to poor immunity and diseases, so good health starts with taking care of our gut microbes, particularly the beneficial microbes.

How do prebiotic oligofructose and inulin help to strengthen immunity? Some of our gut microbes are known to be beneficial for health, e.g. *Bifidobacteria* and *Lactobacillus*. These bacteria can be selectively increased by eating specific nutrients, i.e. the prebiotic fibres inulin and oligofructose from the chicory root. In this way, our immune system can be strengthened.

Prebiotic oligofructose and inulin are not digested in the small intestine. Instead, they reach the large intestine relatively unchanged and are selectively fermented by the beneficial bacteria in the gut. This results in a higher number of good bacteria.

Good bacteria defends the body by killing harmful microbes and preventing them from colonising the gut. These gut microbes also help in developing the immune cells and strengthening the gut barrier, which is where most of the immune cells are located.<sup>79</sup> Good microbes also produce beneficial substances called short-chain fatty acids. Short-chain fatty acids are crucial for gut health and play a role in regulating the immune system.<sup>54</sup>

Just like babies and children, adults also need a strong immune system. The beneficial gut microbes together with the short-chain fatty acids produced play an important role in regulating the immune system and strengthening the gut barrier.<sup>54</sup>



Prebiotic inulin and oligofructose from the chicory root are special nutrients that help our immune system in many ways. These prebiotics not only improve the numbers of beneficial *Bifidobacteria* in adults, they even reduce the potential gut pathogen *Bilophila*.<sup>54,47</sup> They also help strengthen our gut which is the protective barrier to the outside world.<sup>54</sup> Prebiotic chicory root fibres have been found to increase the activity of certain immune cells and help reduce diarrhoea caused by pathogenic bacteria.<sup>80,81</sup> In addition, prebiotic chicory root fibres reduce inflammation.<sup>54</sup>

This makes it all the more important to consume these special prebiotic chicory root fibres for better immune health. We can get this prebiotic chicory root fibre in various products, including dairy, yogurt, baked goods, cereals and snacks.

During the COVID-19 pandemic, the fact that high blood sugar levels impair immune function became obvious once again.<sup>82</sup> Some years ago, Jafar and coworkers reported that an acute rise in blood sugar levels significantly alters the innate immune response to infections.<sup>82</sup> Accordingly, previous viral pandemics showed that diabetes worsened the progress of the viral infection and resulted in a higher mortality rate.<sup>83</sup> For COVID-19, more and more data around the globe became available confirming that the severity of COVID-19 intensifies with elevated blood sugar levels and the death rate seems to be 2-3-fold higher in the case of patients with diabetes. However, the increased risk affects not only patients with diabetes: data from Europe and China confirm that elevated blood sugar levels are a risk factor for severe COVID-19 progress and death, independent of diabetes.<sup>83-91</sup> This brings it back around to the beginning of this monograph when blood sugar management was discussed. The question that arises is, why does a high blood sugar concentration have such a tremendous impact? Several factors contribute to this: a high blood sugar is associated with disorders such as obesity, which is another risk factor for a severe COVID-19 progress. In addition, high blood sugar levels impair the innate immune response and cause a state of chronic inflammation with high levels of the so-called angiotensin-converting-enzyme-2 (ACE-2). The SARS-CoV-2 virus uses ACE-2 in the lung as an entry into the body and causes an additional increase of inflammatory processes that can even result in an overreaction of the immune system, a so-called “cytokine storm”. The reduced immune response allows the virus to replicate and spread without restrictions. Moreover, negative effects of the virus have also been seen on cells in the pancreas, that secrete hormones to regulate blood sugar. ACE-2 is abundant in the pancreas where the SARS-CoV-2 virus again finds entry and can damage those cells. This bring blood sugar even more out-of-control.<sup>92,93</sup>

Therefore, a healthy blood sugar level is not only relevant to reduce the risk for non-communicable diseases such as type 2 diabetes or cardiovascular disease. Keeping the blood sugar in a healthy range plays a crucial role for immune health as the data for COVID-9 drastically shows. Isomaltulose, Isomalt and chicory root fibres can help keep blood sugar levels balanced and stable thereby supporting healthy ageing.

# Dental health.

It is unfortunate that many older adults do not have access to dental care; in the U.S., medical health insurance does not cover dental health, leading many to forego costly dental procedures.<sup>94</sup> What can you do to protect oral health? Your teeth were meant to last a lifetime, so follow these steps to keep them!<sup>94</sup>

- Brush your teeth twice a day, floss daily and brush with fluoride containing toothpaste.
- Visit your dentist at least once a year for dental cleaning; even if you have dentures, a dentist can examine your mouth to look for signs of disease.
- Do not smoke or use other tobacco products, like chewing tobacco.
- If you have diabetes, maintain control of the disease by keeping your blood sugar in check. This will decrease risk of other complications, including gum disease.
- Many medications can cause dry mouth so drink plenty of water and chew sugarless gum or suck on sugar-free candies with isomalt

Sugarless gum is tooth friendly. While sugar can contribute to tooth decay by providing food for oral bacteria, sugar substitutes, such as isomalt, xylitol, sorbitol, and mannitol, promote oral health by increasing the flow of saliva. Consuming sugar-free products with isomalt can stimulate saliva flow rate and change saliva composition to increase the availability of minerals and increase remineralization of teeth.<sup>95</sup>

Isomaltulose (Palatinose™) is the first sugar that is tooth friendly, confirmed by research and supported by the U.S. Food and Drug Administration and the European Food Safety Authority.<sup>19</sup>



# Summary on nutrition and dietary patterns for healthy ageing.

The phrase “you are what you eat,” is derived from a French philosopher who in the 1800s said, “tell me what you eat, and I will tell you what you are.” What we choose to eat depends on many factors, including personal, social, psychological, environmental, cultural, religion, affordability, accessibility, childhood experiences, age, and most importantly taste. Good nutrition is only good if it is eaten, and taste is a big driver of good nutrition.

While there is no one best diet or superfood, the pattern of eating plays a large part in optimal ageing. Whatever dietary pattern you enjoy, be sure to include:

- Foods containing carbohydrate, protein, and fat. Focus on quality nutrients instead of going low-carb, high protein, or keto.
- Focus on nutrient-rich foods. To maintain a healthy body weight, be more aware of foods that provide key nutrients for healthy ageing and less empty calorie foods.
- Foods that support health and help manage chronic disease. Choose foods that reduce inflammation as it is a hallmark of many chronic conditions.
- Include ingredients, like prebiotic fibres and low GI sugars, to support gut health and manage blood sugar.
- Enjoyment of food and mealtime. Eating should be a pleasurable activity, so enjoy!

## Move Well.

To achieve healthy ageing, the WHO cites functional fitness as a key to well-being.<sup>2</sup> Paired with good nutrition, being active allows you to do the things you like to do, including remaining independent. Much of the decline associated with ageing is tied to disuse. You’ve probably heard the expression “use it or lose it” and that is what happens to many of your body’s functions when you are physically inactive. For example, if you don’t use your muscles, you will lose them, leading to sarcopenia, which literally translates to “vanishing flesh.” To be sure, there are real declines in physical abilities with ageing, but you control the rate of the decline. The good news is that it is never too late to build endurance, muscle strength, and balance, the three pillars of physical activity needed for optimal ageing.

All adults should aim for 150 minutes per week of moderate intensity activity. That breaks down to about 30 minutes of activity each day.<sup>96</sup> What is moderate intensity? If you can talk but not sing an entire song during activity, that is moderate intensity. There is no need to train for a marathon, but activities such as running, walking, dancing, swimming, gardening, and cycling strengthen your cardiovascular system. You should also aim to strength train at least 2 times per week. This can be accomplished by using weights, exercise bands, yoga and tai chi. If you are not meeting these recommendations, you are not alone. Only 24% of adults met the current physical activity guidelines.<sup>97</sup> Training not only improves aerobic fitness but also muscle fitness, a perfect combination to keep your body healthier while improving your well-being.

If all of this sounds daunting, remember that any movement is better than sitting. If you are sedentary, start slow, enlist a friend or family member for support, and just move. Take activity snacks throughout your day; get up from the chair or screen and walk the stairs, pull a few weeds, or perform squats or lunges for a few minutes every hour.



## Be Well.

Eating well and moving well promote optimal ageing. But there are other things that you can do to enhance your healthspan as you age. Sleep, social support, and access to healthcare enhance well-being as we age.

- **Sleep** is restorative and ageing brings challenges to restful sleep. Sleep time shortens and sleep patterns become more disturbed resulting in more time spent awake during the night and a harder time falling back to sleep. Reasons for this are not entirely clear, but most likely related to declining hormone levels and changes to our usual 24-hour rhythm.

Remember, that not just waning hormones and night-time light exposure affect our sleep. Medications, whether prescription, over-the-counter drugs, or dietary supplements can all impact sleep. Forty percent of those of adults over 65 take 5 or more medications. Common medications for blood pressure, heart disease, benign prostatic hypertrophy (BPH), allergies, and asthma can affect sleep, as well as corticosteroids and anti-depressants. The over-the-counter allergy and cold medicines that say, “non-drowsy” may be good for daytime alertness but can negatively affect sleep.

Don't forget about caffeine, the most widely consumed drug in the world! Some people notice more caffeine-sensitivity as they age and by now you probably know whether you are one of those people. Check your medications for caffeine (some headache remedies contain the drug) and don't think coffee is the only beverage with caffeine. Tea and cocoa contain caffeine as do some foods. In addition, high glycaemic carbohydrates may impair sleep due to increased levels of circulating glucose and insulin. Carbohydrates with low glycaemic impact and lower insulin release that maintain energy levels balanced through the day, can be part of the daily tools used to manage fatigue and improve sleep.<sup>98,99</sup> For more tips on better sleep refer to the NIH Sleep Guide.<sup>100</sup>

- **Social Support** is a big part of well-being. Research from the Harvard Study of Adult Development found that older adults derived their greatest happiness and joy in life from relationships.<sup>101</sup> Men who were socially connected to family, friends, and community were healthier and happier, and they lived longer, than those who had less social connection.

There are many ways to stay socially connected: family, friends, religious organizations, community volunteering, and special interest clubs (quilting, book clubs, bridge, etc.). For older adults, membership in a fitness community not only increases physical activity but also improves health through a decrease in social isolation and loneliness.<sup>102</sup>

Older adults who live alone or at a distance from family, learning how to stay in touch using video chats, live streaming, or social media can help with social connection. About 75% of older adults in a recent survey said using various technology tools to stay in contact with family members helped bridge the physical distance.<sup>102</sup> And with more use comes more confidence in using technology. Many older adults are embracing video capabilities and becoming more comfortable and proficient. That shows you can learn new skills at any age.





- **Access to preventive healthcare services.** Not all older adults have access to quality healthcare, but many can access preventive services, that can help to keep them well. One thing you can do is stay up to date with vaccinations. Vaccines are one of the primary prevention strategies outlined at the beginning of this paper. To be sure, getting vaccinated doesn't mean you will not get the disease the vaccine is designed to prevent. If you do get the flu, after getting a flu shot, it is highly likely that the symptoms will be mild and not life-threatening. Older adults should talk to their health care provider or local public health department about vaccines for COVID-19, influenza, pneumonia, and shingles.

Screenings for common cancers, like skin, breast, colon, and prostate, are also recommended for older adults. Many of these screenings are available for free or at low cost through community public health centres.

## Summary

Ageing brings many changes, both positive and negative. There is no magic or secret recipe for healthy ageing. But you can improve your food choices by focusing on a healthy diet and also looking for functional ingredients that are science-based that can help complement your daily nutrition on your way to healthy ageing. For example low glycaemic carbohydrates (Palatinose™ and Isomalt) for blood glucose management, energy and immunity and foods enriched with chicory root fibres (inulin and oligofructose) to protect and feed your gut microbiome for digestive health, wellbeing, bone health and overall health. In addition, staying physically active and mentally engaged is important at any age. When people focus only the negative aspects of ageing, remember not everyone gets the privilege to grow old. Enjoy each day on your path to optimal ageing!

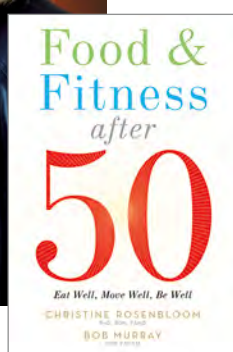
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Denisse has a background in Biological Sciences (Loyola University of New Orleans, 2000). She pursued her Master of Science MSc. in Human Nutrition and Health at the University of Wageningen in the Netherlands (2005-2007). There she discovered an interest in consumer perception of health messages on food packaging and pursued an internship on perception and acceptance of health claims in a functional food product at the Center for Innovative Consumer Studies (CICS, The Netherlands).

In 2014, Denisse received a diploma in Management from the University of Antwerp, Belgium. She has served as Nutrition consultant for EUFIC (European Food Information Council) and joined Puratos Group in Belgium in 2008-2014. In March 2015, Denisse joined BENEÓ as Nutrition Communication Manager for North America and worked between Europe and the US to support BENEÓ'S Nutrition Communication efforts in the United States.

In September 2016, Denisse moved from Belgium to the United States with her family to fully support BENEÓ's Nutrition communication efforts in the North American region, bringing with her over 13 years of experience in food and nutrition and a keen interest in nutrition communication as a way to influence better food choices and also the formulation of healthier food products for all people.

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