Nicoline Sofie Grepperud

Glycoplan for beginners (draft)- Nico freestyle

What is Glycoplan?

Epigenetics, nutrogenomics (how food interacts with genes and increases the risk of diseases) evolutionary biology, modern brain research and nutritional physiology is the foundation of Glycoplan. Glycoplan is about nutrition that is based on the rules of evolution. Varied foods that add useful energy and building blocks to our complex ecosystem. Harmful fatty acids, short chained carbohydrates and ultra-processed food should be avoided to the fullest extent possible**.** Instead, we need healthy fatty acids, long chained carbohydrates, balanced amino acids and the right protein composition. None of the food groups are completely cut out, but one should be aware of the amounts and in what form the food of the various food groups is presented to us as consumers.

Glycoplan is a plan for introducing lasting dietary changes, not intended as a time-limited diet. It's really not that complicated but requires an awareness about what we buy and eat! Something that in itself requires quite a lot of us, since all food products are available in the store all the times. In order to build up the motivation required to change our habits, a little knowledge of *why* can come in handy. Although medications can be absolutely necessary, the focus lies on preventing diseases and improving quality of life by concentrating on the *causes* behind problems and disorders, not only medicate and treat *symptoms*. Last, but not least, it's also about making good food! Fortunately, there is a lot of food that tastes great *and* is beneficial for our health! An increasingly amount of healthy foods are also now available in our normal grocery stores.

Even though our bodies are incredibly intelligent, and good at compensating for deficiencies from the diet we provide it, it does not necessarily mean that it is beneficial for us. Most people living in first world countries today, are going to reach a high life expectancy. At the same time, and increasing amount of people suffer from obesity, autoimmune and chronic diseases. Although nutrition is a particularly challenging field of study, and there still remains a lot of research behind it, there are a few things that already is known to benefit our health. A healthy diet is important for everyone; Professional athletes, moderately active people and people suffering from chronical illness. Everyone has a gut flora that influences the quality of life. Any supplement of vitamins and minerals should be individualized, as we have different prerequisites and challenges.

Diet as medicine

Why is the intestine, and consequently what we put into it, so important?

Intestinal flora

Intestinal flora, also called gut microbiota, in our intestine consists of trillions (= 1000 billion) microorganisms/microbes and bacteria, including at least 1000 different bacterial types with more than 3.3 million genes. It is 150 times our own (human) genetic material! The bacteria

living in the gut, communicates with all the cells in our body and with 130 million brain cells. Approximately 1/3 of the intestinal flora are identical for most people, but roughly 2/3 vary between individuals, a bit like a fingerprint. Nutrition has a strong impact on epigenetic processes in our body, in other words; what you eat helps control how, and if, your genes are expressed or not, e.g. diseases. The more the intestinal flora is studied, the more important it appears to be for our overall state of health. Research indicate that 70-80% of the immune response originates in the intestine. It is indeed harder and harder to escape the fact that we *are* what we eat.

For example, a Team of investigators at Harvard-affiliated Brigham and Women's Hospital (BWH) found evidence suggesting that bacteria living in the intestinal tract, affects the activity of cells in the brain involved in controlling inflammation and neurodegenerative diseases. Neurodegenerative disease describes several conditions that primarily affect the nerve cells of the brain, as SMA (Spinal Muscular Atrophy), Parkinson's and Alzheimer's disease.

Leaky gut

It's our intestinal bacteria's job to maintain our intestinal mucosa. Leaky gut means that the mucous membrane of the intestinal tract is damaged, and abnormal gaps occur between the intestinal cells. It means that large molecules that have entered the intestines via food and drink and which normally cannot pass the intestinal wall, are now free to migrate. Examples of such molecules that can pass through a leaky gut are proteins such as gluten and casein (milk protein), harmful bacteria, viruses and toxins. Especially for people with a genetic predisposition, a leaky gut can cause unwanted molecules to enter the body, through intestine and into the bloodstream, thereby initiating and developing autoimmune diseases. Leaky gut can be linked to arthritis, irritable bowel syndrome, eczema, migraines and muscle pain. It can also weaken the uptake of various vitamins. Studies also now suggest that leaky gut may be linked to type 1 diabetes, Chrons Disease and MS (multiple sclerosis) amongst others.

Gut-Brain axis

Gut-Brain-axis is a term that has gotten more attention over the last years. It describes the biochemical signals that are located between the gastrointestinal (GI) tract (stomach and intestines) and central nervous system (CNS) (brain). How we feel is also linked to the bacterial flora of the intestine. A brain that has problems can send signals to the intestine and the intestine can send signals to the brain. Thus, gastrointestinal complaints may be the cause *or* the effect of anxiety, stress, depression, etc. Therefore, the brain and intestine communicate to a great extent, which means that we cannot ignore that the gut affect our cognitive and emotional reactions.

Circadian Rhythm

Usually we eat sweets in the evening and not in the morning, but according to our inner, biological clock it is preferable to change these habits. How the food is processed in our body is with the circadian rhythm. The Nobel Prize of Medicine 2017 went to three American

scientists, for the discovery of the molecular mechanisms that controls the *Circadian Rhythm*. The circadian rhythm (CR) exists in every cell inside our body. We all have an inner rhythm!

Our inner rhythm affects us more than thought previously, influencing human heart rate, temperature, blood pressure, reaction time, sleep, coordination, metabolism, etc.

So, how is the inner rhythm associated with diet? At night, the body is ready to release energy, not consume it. Studies have shown that blood sugar levels increase more and takes longer to decrease at night, than in the morning. Between 06.00-18.00 we metabolize about 60% carbohydrate and 40% fat burning. Between at 18.00-06.00 we metabolize approximately 80% fat.

Thus, the consumption of carbohydrates, for example, fruits, should take place in the morning, *not* in the evening. Ideally, it's best to eat this food before 2 pm and more importantly, not after 6 pm. Eat food with low or no GI (described later) in the evening. The most important thing is to change our habits when it comes to enjoying carbohydrate from the evening, to the morning.

Metabolism

The problems associated with energy metabolism can lead to a variety of diseases and disorders. Energy metabolism is the process that generates energy (ATP) from the nutrients in the food we eat. It's about how our bodies uses the energy we provide it, and how this affects us. In other words, our bodies and brains are not indifferent to what we eat! Every single tension, contraction and also, *relaxation* of muscles require energy and consumes ATP. Muscle aches, fibromyalgia, muscle impairment, joint problems and osteoporosis are examples of diseases that can be linked to our energy metabolism.

Impairment of energy metabolism can and lead to type two diabetes and overweight. It can trigger heartbeats and strokes. In terms of type three diabetes in the brain it can be developed into Alzheimer´s disease. According to Norwegian Health Informatics, a large number of population studies (prospective cohort studies) found that patients with diabetes have approximately 1.5 to 2 times the increased risk of cognitive impairment and dementia later in life[4]. Also, ALS, Polycystic Ovary Syndrome (PCOS), burnout, autism and Parkinson's disease are disorders/challenges that can be linked to energy metabolism problems.

Every little cell in our body has to self-acquire the energy it needs for cell growth, muscle contractions, transporting signals in the nerve cells, hormone production in hormone cells, etc. There are many tasks! If the cells don´t receive the right energy and building blocks, it can affect the body and brain in many ways.

To increase the probability of avoiding these diseases to the fullest extent possible, we want to give the body the least possible amount of useless energy, and as much useful nutrients as possible. This is not about giving people a bad conscience for their dietary habits, but to provide knowledge that offers *opportunities* to help your body and brain! Vitamins and minerals work closely linked together, and want to be a harmonious orchestra. A deficient/monotonous diet can lead to mineral and vitamin deficiency. For example: Vitamin

C and E (antioxidants) act as a defense for the body. They work together with vitamin B, contributing to a regeneration process (natural renewal of lost or damaged tissues) and other important tasks. Vitamin B and D are also important for bone and muscle formation. In total they provide for cell renewal and regeneration of tissues. For example, without vitamin A one can lose sight, and in recent years there have actually been some cases of scurvy (due to vitamin C deficiency) in the US, because some people have had an extremely unilateral diet without supply of fruits and vegetables.

CARBOHYDRATES

Why avoid empty, short-chained carbohydrates?

Insulin

When we eat carbohydrates, our blood sugar level rises. In order for blood sugar (glucose) to be useful and make its way into the cells, it needs the help of insulin. Insulin is a hormone (protein) produced in the pancreas. Insulin acts as a key that unlocks the cell door and helps the sugar enter the cell.

Hyperinsulinemia and Hyperglycemia

Hyperinsulinemia and hyperglycemia come from so-called insulin resistance. This means that carbohydrates and sugars are not utilized properly because insulin receptors lose their sensitivity. Empty, short-chained carbohydrates can cause insulin receptors to lose their sensitivity.

Hyperinsulinemia is a condition in which there are excessive levels of insulin circulating in the blood, relative to the level of glucose. Hyperglycemia is a condition where blood sugar is too high. These conditions are collectively known as metabolic syndromes and of course has to do with the energy metabolism, as described earlier. Hyperinsulinemia, hyperglycemia and free fatty acids in the body lead to general inflammation. These metabolic disorders can provide energy balance problems and early symptoms, such as muscle pain, fibromyalgia muscle impairment and joint problems can be developed.

Hyperinsulinemia is associated with high blood pressure, obesity, dyslipidemia (dyslipidemia is characterized by abnormal levels of lipids/fats in the blood) and glucose intolerance (the ability to restore normal glucose levels after sugar intake). There is very strong evidence that obesity, hyperinsulinemia and diabetes are related to Alzheimer's disease.

By far the most common cause of insulin resistance is overweight. e.g.: 80% of women with Polycystic ovarian syndrome (PCOS), that also are overweight, will be insulin resistant. (PCOS) is a condition characterized by symptoms such as; Increased levels of male sex hormones, many small bladders (cysts) on the ovaries and rare and/or irregular menstrual periods. Women with PCOS have an increased incidence of Gestational Diabetes according to the Diabetes Association (norwegian).

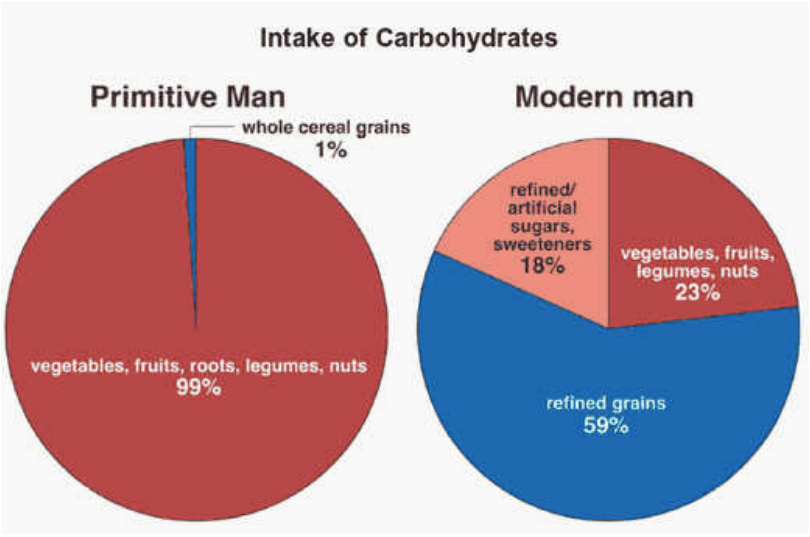

Figure 1: Access to higher amounts of *Insulinotropic* and *IGF-1*-breeding foods (sugar, cereals and dairy products) occurred about 10.000 years ago, and was further reinforced by the industrial revolution. But the human genome has may not been properly adapted to withstand today's western diet. According to mitochondrial DNA data, modern people had almost the same genomic structure about 200.000 years ago and consumed a smaller insulinotropic diet. The food we eat today changed *a lot* in 200 000 years.

Insulinotropic: Stimulates or affects the production, release and/or activity of insulin.

IGF-1: Insulin-like growth factors are small proteins that are formed in the liver under the influence of growth hormone. High concentrations of IGF1 are associated with an increased risk of breast, prostate, colorectal (colon/rectum cancer), lung cancer and inflammation. For example: Cow´s milk and high glycemic foods result in a significant increase of insulin and IGF-1 serum levels.

So, even though insulin itself is not dangerous, we do need it, too much carbohydrates can cause problems for optimal utilization of insulin, and consequently many other diseases. Therefore, it may be wise for many of us, who have a high and unilateral (ex. wheat flour and sugar) intake of carbohydrates, to follow a precautionary principle, since research indicates that we are not made to live a long, healthy life, with so many carbohydrates over many years!

Visceral fat

Carbohydrates can indeed be converted into fats in the body. In fact, researchers in the 1970 figure concluded that the human body could not transform carbohydrates into fats, which may have contributed to the large low-fat, high-sugar-trend, particularly in the United States, where obesity problems have increased over the last few decades. Low-fat products have

tended to contain even more sugar. Later research has shown that the body can certainly transform carbohydrates into fats. An additional problem is that the fat that the body save, are not healthy fats.

Viscerally fat (fat stored within the abdominal cavity, around the internal organs) strongly correlates with insulin resistance and type 2 diabetes. The liver is directly susceptible to increasing amounts of free fatty acids and pro-inflammatory factors that are released from viscerally fat and entering the liver portal vein. The portal vein or the liver portal vein is a blood vessel that carries blood from the gastrointestinal tract and further into the body. Fats that surrounds the internal organs, i.e. belly fat, are more damaging to the health than other fat. To illustrate this, we can think of an exclusive Foie Gras. The production method being used, force feeds the goose with short-chained carbohydrates such as the corn, which causes an excess level of glucose. There is too much glucose for the liver to use as energy right away and the liver packages the sugar into bundles called glycogen, that fill up the liver cells → and we have a fatty liver (NAFLD- None alcoholic fatty liver disease).

We do not want a fatty liver as the Foie Gras. The abdominal fat contributes to a chronic, inflammatory process in the body. The fat cells in the stomach form proteins that trigger inflammation called cytokines. These inflammatory drugs may increase thse risk of both overweight, diabetes, cardiovascular disease, depression, dementia and cancer.

Why change sources of carbohydrates

More than 400 000 studies of the World Cancer Research Found (WCRF) since 2010, countless studies of the Mediterranean diet (good oils, nuts, vegetables, beans, seeds, fish, little red meat, little alcohol), and research about low-carb, show us the advantage of a carbohydrate-reduced diet, the benefits of a lot of healthy fatty acids, and shows the importance of nutrition for our health!

There are many good alternatives to white rice, pasta, potatoes, bread, pastries and white flour. Modern wheat is made in order to get stronger gluten and more starch, so that the dough will be easier to work with in industrial bakeries and leaven (rise) faster. It is not designed to delight our complex, intestinal flora. Now it seems that both gluten and fructans in modern wheat can provide digestive problems. You can react to both gluten, antinutrients and fibers in bread and pastries. If one reacts to bread it is not certain that only gluten is the problem, but the amount of it, interacting with other components. Thus, it may be advisable to cut down/change the carbohydrate sources.

Refined carbohydrates such as white sugar, white rice and pasta interfere with intestinal flora and are also stripped of vitamins, minerals and plant nutrients. Variation is key, as always. A lot of the carbohydrates we consume come from white wheat flour and refined carbohydrates like starch. Pasta made on sifted wheat flour, bread made of wheat flour, pancakes made of wheat flour, pizza with wheat flour bottom, rolls of wheat flour, white rice, baked potatoes,

chips, boiled potatoes, etc. Even if you choose not to cut this out completely, we can get better at varying where we get our carbohydrates from!

What are carbohydrates?

Carbohydrates are a collective term for sugar, starch and fiber. The body extract calories from sugar and starch, but not from fiber which does not have an effect on blood sugar.

Simple carbohydrates lead to a rapid increase in blood sugar and after a short time, decrease at the just as fast. This can lead to increased hunger and a yearning for sweets. The complex carbohydrates are taken up slowly from the intestine and provide a more controlled increase in blood sugar. This is good for the body, because it causes the insulin excretion to be regulated to moderate amounts, which will yield less hunger and sugar yearning.

Sugar: Comes in various forms such as fructose (found in fruit), lactose (found in dairy products), glucose (in grapes among others) and maltose (sugar of malts).

Starch: Is the "sugar" in cereals, flour, bread, pastries, white rice, pasta, potatoes and other root vegetables. Although it doesn't taste so sweet, starch behaves like sugar in the body and gives a similar or greater blood sugar response as sugar. To reduce sugar intake, you have to take starches into account.

Fiber is an indigestible carbohydrate that neither provides energy (calories) nor rising blood sugar. The Fiber (of the soluble type) in a meal can, however, help to reduce the blood sugar response of the meal, promote a good digestion and give satiety. The intestinal bacteria love fiber from vegetables!

Many names of sugar
Always read the ingredient list on food products you purchase. Surprisingly many products contain sugar but can be concealed behind different names. Examples: fructose, fructose syrup, glucose, glucose syrup, maltose, dextrose, maltodextrin, agave-nectar, corn syrup, molasse, cane sugar, caramel, fruit juice concentrate, palm sugar, raw sugar etc.etc!!. A good rule of thumb for all convenience foods you buy is that all the words in the ingredients list should be easy to understand and recognize.

GI (glycemic index) and GB (glycemic load)
Glycemic index (GI) is a way to rank carbohydrate-rich foods by their effect on blood sugar levels. Therefore, foods that do not contain carbohydrates have no GI. GI may be googled for different groceries and can be an indicator of which fast carbohydrates to stay away from, at least in the evenings.

Foods with high GI can in the body cause an excess of glucose (blood sugar) that the cells and liver fail to decompose. The surplus glucose is turned into fat and sent directly to the fat depots and energy reserves.

Example: glucose (e.g. grape sugar) has a GI of 100, food without carbohydrates has a GI equal to 0. Therefore, the interval is 0-100. Food with low GI thus increases blood sugar less than food with high GI. What determines an item's GI is how quickly carbohydrates can be digested and absorbed. The faster it occurs in the small intestine, the faster the blood sugar rises and the higher the GI.

- Processed white sugar has a GI of 68.
- Baked Potato has a GI of 85!
- Even though you have to eat larger amounts of potato than white sugar to get an as great glycemic strain (GB) on blood sugar, this tells us a bit about why for example warm potatoes (fast carbohydrates = starch) should be avoided (ecpecially during the day).

- Glycemic load = amount of carbohydrate in a serving portion x GI of food.

- Keep in mind that the GI doesn´t say anything about the different *nutrients* in the food, but it can be an indicator on what to avoid , ecpecially during the evening,(cf. circadian rhythm).

- When it comes to short- chained carbohydrates, the GI can give an indication of what to avoid. In short: Finished bread and rolls (often industrial flour, added sugar/syrup etc.), pancakes made on wheat flour, frozen pizza, pasta, heated potatoes, fruit with lots of fruit sugar etc.

More information from the Myoreflex website: Bu clicking the hyperlink further down you will access a clever document that ranks foods in different colors: green, yellow and red, as a biological traffic light, based on their importance to our body as a complex ecosystem, developed by Dr. med. Kurt Mosetter. If you have a lot of problems with your health and/ or your gut, it might be advisable to cut out red list-products *completely*, at least for a period of time. Yellow is also advisable to avoid, and can then slowly be reintroduced . The intestinal mucosa will then get time to be repaired and the intestinal flora improve. Either way, a reduction of red and yellow foods is a good idea!

- **Green:** All of these foods are valuable and contain valuable fatty acids, proteins, minerals and secondary nutrients from plants that we need!

- **Yellow:** Can be consumed sometimes, preferably early in the day.

- **Red:** Unnecessary foods that should preferably be avoided all together. For about 3 million years these foods were not available to us as an organism. About 10 000 years ago, some components were introduced, but in a small amount (less than 5%). From 1850-1950, this number rose to about 15% and steadily increased for many years.

- A healthy functioning body is a robust organism and can of course withstand exceptions from red list, but too much, and especially in the evening is not very beneficial for our health and leads to degeneration (opposite of progression) and disease. Here, the degree of ailments/diseases should be emphasized in terms of the level of restrictions.

  HYPERLINK here →

http://www.myoreflex.de/media/downloads/English/Mosetter_Glycoplan_EN_SEP16.pdf

Carbohydrate tips:

- Eat only the fruit, do not drink juice. To make a glass of orange juice, you might use 3-4 oranges, that will contain a lot more fruit sugar than just eating an orange, as well as getting more fiber by eating the whole fruit.

- Eat fruit (and berries) with low fructose content such as: berries, papaya, pineapple, cantaloupe, avocado and lime. TBC

- Think about the total load. If you drink half a glass of juice mixed with still or sparkling water in the morning, do not eat lots of fruit and drink tea with lots of honey as well. A teaspoon of honey in the tea or in the oat porridge may be OK in the morning, but not at night/evening.

- Eat lots of vegetables and legumes (beans, chickpeas and lentils), preferably seasonal and locally produced, and lots of spices and herbs! They are rich in antioxidants, vitamins and minerals.

Antinutrients:

- Lenses, beans and chickpeas are good sources of carbohydrates, but can irritate the intestinal mucosa due to the lectins, also called anti-antinutrients. Lectins are proteins that bind to carbohydrates/sugars. Examples of where lectins can be found are: soybeans, raw tomatoes, lentils and chickpeas. These should be boiled for a long time (preferably 2-3 hours to disarm the lectins).

- Grains, nuts and legumes contain phytic acid. This acid binds minerals and can thus reduce the absorption of calcium, iron and zinc in the body. When soaking and fermenting for a long time (e.g. sourdough bread), the amount of phytic acid decreases so that the nutrients in the food are more easily digestible and mineral absorption increases.

Tips for soaking grain and nuts (they can also start sprouting further on, but this is optional) https://beritnordstrand.no/slik-lager-du-spirer-hjemme/ (English link here)

Good sources of carbohydrates TBC (To be continued/ not written very well)

List of carbohydrates that can replace parts or all of: white rice, pasta and spaghetti, couscous, reffined wheat flour, pizza dough, pie crust, boiled potatoes, baked potatoes, tortillas etc.

Food	Description	Application	Why
Buckwheat	Buckwheat is sold as the whole cereals, grits and flour. Gluten Free Good water absorption and good when baking, but raises poorly. Buckwheat is not a type of grain such as wheat, rye and barley, but is actually a small nut.	As flour in pancakes or tortillas etc. Can replace white rice, pasta and couscous. Whole grains can be used in risotto	A high intake of buckwheat has been associated with a decreased risk of developing cardiovascular disease and treating high cholesterol, high blood pressure and type 2 diabetes. Buckwheat is among other things a very good source of minerals such as calcium, iron, potassium, silicon and fluorine. It especially contains a lot of magnesium which is involved in the body's use of glucose and separation of insulin. Buckwheat contains good

			quality protein, including all the essential amino acids, and especially a lot of the amino acids lysine.
Quinoa	Gluten-Free Seeds, not a type of grain Can be purchased as whole grains or as flour.	Use in the same way as rice, couscous, or as flour (bad lifting properties) to pancakes, pai crusts and tortillas	Full of healthy fats, fibers and antioxidants. High content of the essential amino acids, lysine, methionine and threonine as there is little of in grain and legumes. Contains lysine that can contribute to the release of growth hormones and stimulate muscle growth.
Amaranth	Gluten-Free Can be bought as flour or as whole seeds	The same applications as above	Amarant has an unusually high content of the essential amino acid lysine (Building blocks in protein) that the body does not create itself, but which must be

			supplied through the food. It is important for the metabolism and contributes to long-lasting satiety.
Black Rice/Red rice	Gluten Free TBC	TBC	Most of the rice valuable nutrients, like several types of B-vitamins, are found in the thin, brown seed shell that is removed from the plain white rice.
Millet	Gluten Free Millet is easily digestible and does not cause allergies	Can be used in porridge, as flour or in lettuce instead of pasta/couscous	The proteins of millet is superior to the protein in wheat and rice. Millet is particularly iron-rich and rich in silicon, but also contains a lot of magnesium, phosphorus and potassium.
Lentil pasta	Gluten-Free	Pastas made only on red lentils! Tip: Spagetti can also be made of squash using a cheese razor and a knife or spiral cutter, see link.	Lentils contain a lot of proteins and do not increase

		Https://www.kitchentime.no/no/p/spirelli-spiralkutter	blood sugar levels. Lentils also has a high content of iron, and contains in addition smaller amounts of calcium, folic acid and magnesium.

Baking

If one still tolerates gluten and wants to use flour when making bread, make pancakes, rolls, pies etc. should one use organic products from ancient grains(greater bacterial diversity = happy gut!).

If you have the time and energy, it's even more ideal to create your own *sourdough bread.* The intestinal bacteria prefer sourdough bread as there a fermentation process takes place. That is, a process that breaks down problematic substances in the flour, such as indigestible carbohydrates, phytic acid and some of the gluten. To bake such a bread you need to have a sour dough starter (link attached), or you can get a starter from someone who already has one (e.g. me). Sour dough bread should have a rise time of at least 12 hours, but if you plan it well, the actual baking process does not long!

(Need an english one here) See link to make a sour dough start here→ https://beritnordstrand.no/surdeigsstarter/ or sour dough starts *and* recipe for sour dough bread here: Https://www.norskurkorn.no/surdeigs-grytebrod.htm. Berit Norstrands sour dough starter above with a combination of ecological rye and spelt is a very good option. There are many good sour dough recipes on the internet!

Ancient grains can contribute with more building blocks, more protein, antioxidants, vitamins, minerals and good fatty acids. It contains less/weaker gluten and has a modest content of starch and also dampen inflammatory conditions in the body if you are gluten intolerant.

List of herbal grains: Something can be purchased at the store, on health food stores or the Internet.

Emmer	Emmer is the precursor to the spelt. This grain is rich in fiber and has a weak gluten. It is a hard grain that needs a relatively long rise time and is therefore very well suited to old baking methods such as cold uplift and sour doughs. Emmer has a nutty aroma, providing a relatively dark bread. It is suitable for both coarse bread, tender doughs and baking with yeast.
Einkorn wheat	Is probably the world's oldest grain type, and is the origin of all other well-known varieties of emmer, spelt and wheat. The einkorn wheats nutritional content has been shown to be different from the conventional modern wheat suits in several studies: Protein content is higher than in any other wheat type and has a different composition of protein. Many people who react badly when consuming ordinary wheat, might withstand einkorn wheat. The flavor is nutty and aromatic, while the color is yellowish due to the high carotene content. Cold raising and sour dogh work well with einkorn wheat and it is particularly suitable in combination with other old grains, such as emmer and spelt.

Spelt	Occurred as a natural crossing between the emmer and goat-grass. Spelt is often used by those who tolerate normal wheat poorly, as it has a weaker gluten and a lower content of heavy digestible carbohydrates (fructans). Spelt has good and flexible baking properties and can replace ordinary wheat. Traditional baking methods with cold raise and little yeast work fine with spelt.
Naked barley	It is barley that when harvested, the grains thrash freely from the hole. This cuts down on processing and ensures that all of the bran and germ are retained. Naked barley is rich in antioxidants. It also has a high content of betaglukan. Betag-lucan has been shown to have a beneficial effect on both cholesterol, blood glucose levels and in general in the prevention of cardiovascular disease. Whole grains are well suited both in soups, salads and as substitutes for rice. It can be benefitial to partly include (40-60%) barley flour in the bread dough.
Organic whole grain Rye flour	Rye is suitable for baking bread. You can make a sour dough bread using 100% rye or add a the rye in other flour mixtures. It has a lot of flavor and is very rich in proteins. Ancient types of rye can contain up to twice the protein content of a modern rye.

FAT

Glycoplan focuses on cutting down on the intake of harmful fatty acids (trans fats, hardened fats and long-chain saturated fatty acids). You should also reduce the amount of processed meats, artificial farmed meat and fish, and large amounts of animal protein from cow's milk

products (more on this later). The amount of good fatty acids can be increased and have a good effect on cholesterol, cardiovascular health and more. Fat is essential to many important processes in our body. Types of fat can be identified by their chemical structure.We call them monounsaturated, polyunsaturated, saturated and trans fats.

Trans fats is a type of multi-or monounsaturated fat. Trans fats occurs naturally in small quantities in meat and dairy products from ruminants, but the bulk of trans fat humans get through the diet today is produced industrially as a by-product during the hardening of plant oils. It has somewhat been reduced over the last couple of years, but still exists in a lot of products.

The WHO also recommend that intake of trans fats are reduced *as much as possible.* Frying fat in the fast food industry, the layer of cooking oils around fish sticks etc., in biscuits, cakes should be especially important because they are likely to contain trans fats. Thus, it is of course wiser to cook the food yourself. A type of trans fatty acids called CLA (conjugated linolenic Acid) is widely discussed in recent times. The CLA is found naturally in small quantities in milk and meat and should not be confused with the type of trans fats formed by the processing of plant fats.

Saturated fats: Consists of fatty acids that do not contain any double bonds between the carbon atoms. Saturated fats with 12, 14 and 16 carbons such as laurinic acid, mychloric acid and palmitic acid provide an increase of LDL cholesterol in the blood → Increased risk of cardiovascular disease. Saturated fats should be eaten correctly, i.e. not with high-glycemic carbohydrates.

Unsaturated fats: Consists of unsaturated fatty acids where at least one of the bonds between the carbon atoms is a double bond. Found in fish fats, plants and vegetables, and something in meat. Beneficial for heart health and cholesterol.

- Monounsaturated fatty acid: have a double binding in the carbon chain. Good sources are olive oil, rapeseed/canola oil, olives, almonds and avocados. This can be eaten in large portions.
- Polyunsaturated fatty acid: has *more* double bonds in the carbon chain. Omega-3 and omega-6 fats are polyunsaturated fats. The ratio balance between theses fatty acids is important →

OMEGA-6 AND OMEGA-3 IN OUR DIET

The human body can produce all the fatty acids it needs with the exception of two (essential fatty acids); Linoleic acid (LA), which is the main *Omega-6 fatty acids* and alpha-linolenic acid (ALA), which is an *Omega-3 Fatty acid*.

Omega-6 We get these fatty acids from sunflower oil, corn oil, soybean oil, green vegetables, cereals and cereal products, mayonnaise and margarine.

Omega-3 The fat: The best sources of omega-3 are fish and fish oils, but there is also some omega-3 in linseeds, walnuts, pumpkin seeds, canola /rapeseed oil, linseed oil, walnut oil, and margarine. ALA (Omega 3 fatty acids) is converted to the two essential fatty acids eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). The main sources of these are fatty fish such as mackerel, salmon, trout, herring and halibut.

Omega 6/Omega 3 ratio

Omega 6 fatty acids in the form of corn oil, sunflower oil and soybean oil recovered by heat treatment which entails the formation of a number of hazardous by-products, are cheap to manufacture and are largely used in the food industry today and thus also by us as consumers.

With a western diet one can, as a result, get too much omega-6 fatty acids, and too little omega 3 fatty acids. Exactly what Omega 6-Omega 3 relationship is most ideal is widely discussed among researchers, and it may seem that the optimal ratio may vary between the types of illness.

Most studies point in the same direction: the results of a series of scientific studies suggest that omega-3 acids help to limit inflammatory symptoms, whereas omega-6 acids (and saturated fats) increase inflammatory responses and amplifies allergic reactions.

Excessive amounts of omega-6 polyunsaturated fatty acids (PUFA) and a very high omega-6-omega-3 ratio, as found in today's western diets, seem to promote the start-up and development of many diseases, including cardiovascular disease, cancer, inflammatory and autoimmune diseases, while increased levels of omega-3 PUFA (a low omega-6-omega-3 ratio) have suppressive effects. (Center for Genetics, Nutrition and Health, Washington, D.C.).

Several sources suggest that humans evolved with a diet with a ratio of approximately 1 for Omega-6 to omega-3 essential fatty acids (meaning 1:1), while western diets today have a ratio of 15:1 – 16.7:1. Although previous diet does not necessarily dictate what is perfect for us today, it is still a *substantial* change in the relationship between these fatty acids, which seems to be unfavorable for us.

A lower proportion of omega-6-omega-3 fatty acids is more desirable to reduce the risk of many of the chronic diseases with high prevalence (too many individuals in a particular group who have a given condition/illness) in western societies, as well as developing countries importing food from the rest of the world.

So: We do not want to cut out omega 6 fatty acids completely, but think about at least getting more/enough omega 3 fatty acids!

Tips:

- Use extra virgin olive oil in salads and in dressings. Olive oil also contains a lot of polyphenols (More information further down).

- Also add the olive and rapeseed oil (more neutral taste) to more dishes than you are used to. e.g. To the raw cheese salad, the book wheat or the full grain rice.
- Add seeds to the oat- or millet- porridge and in sauces. Especially linseed and walnuts. A little coconut grease can also be added.
- Eat nuts and avocados in between meals/as snack food.
- Nuts contain most monounsaturated, somewhat polyunsaturated and somewhat saturated fats, various types of nuts (preferably unsalted) and you get healthy fats, vitamins, minerals, fibers and antioxidants. Nuts are also a good addition to sauces. For example, in the tomato sauce for the lentil pasta.
- Fatty fish contain a lot of omega 3 but remember the variation! Many people eat a lot of salmon today compared to other fish. Herring and mackerel are other good sources.
- Take cod liver oil!

PS. White fish- Add white fish to your diet! White fish contain more iodine which is important for regulating our metabolism. In children, iodine is important for normal growth and central nervous system development (especially important for pregnant and lactating). White fish contain oils only in their liver, rather than their gut, and the flesh is more dry and white than oily fish. This can be beneficial to include in the diet (even if we need healthy fatty acids from fatty fish) as lean fish often contain less pollutants (stored in fats) than oily fish. Good iodine sources are: Cod, haddock, saithe, pollock, tusk (brosme), and monkfish.

Dairy products- Variation and replacement

Today's dairy cows are bred to produce large amounts of milk. A cow that had produced enough milk to feed only it´s offspring would produce approx. 4-6 liters a day. An average European dairy cow produces about 20- 60 liters of milk per day! The composition of nutrients in milk is consequently affected. This milk is not so beneficial to our health.

Dairy products, made at large-scale production, contain both more hormones and growth factors that are detrimental to our health (as previously mentioned IGF), as well as sugar (lactose) and casein (milk protein). Casein may, as mentioned earlier, contribute to a problematic leaky gut, and then contributing to autoimmune diseases, hyperactivity and disrupting the inner rhythm.

It has been normal in western and northern countries to associate cow´s milk with good health, but the production method has been altered a lot (both production method, amount and the food that the animals eat) during the last decades. Although there *are* some nutrients in cow´s milk, the benefits of conventional large-scale production milk, are not necessarily good enough today. Many people also suffer of primary or secondary lactose intolerance. If that is the case, you might want to stop the consumption of cow's dairy products all together, for at least four weeks. Then you can try to introduce organic milk again, but then from small-scale productions with animals that eat natural foods as grass and produce around 6 liters of milk. The quality of an animal product is assumed to be proportional to the quality of life and food sources of the animal. That applies to both meat and milk from animals.

Alternatives to/variation in dairy products

Goat's milk and goat cheese

Goat's milk contains nutrients such as zinc and selenium (antioxidant) and is easy to process for the human body. The smaller the animal is (ex. goat and sheep), the more compatible are their dairy products to the human digestion. It also has smaller amounts of IGF-1 and lactose.

Goat's milk contains smaller amounts of casein than cow's milk. This protein can trigger common milk allergies. Goat's milk is more beneficial than cow's milk, when it comes to the metabolism of iron and copper in our body. Experiments show that the digestion/uptake of calcium is greater when the animals use a goat´s milk-based diet, cow's milk, and easier to digest for the human gut.

Goat's milk contains some MCT fats (medium-chain triglycerides, also found and in *coconut milk*) that passes easily through the cell membrane and is not stored as harmful abdominal fat.

Unpasteurized goat cheeses also contain useful healthy bacteria that empowers the intestinal bacteria. In addition, this is food that can replace carbohydrate- snack in the evenings!

Plant-based milk

Regardless of your tolerance form cow´s milk, variation is essential for our health, also when it comes to dairy products. (It is also better for our planet!) Data from various researchers indicates that the presence of steroid hormones in dairy products can be regarded as an important risk factor for various cancers in humans.

Alternatives to animal milk: Can also be used in sauces, porridge, cereal, etc. They're lactose-free and casein free!

PS: Make sure that there is no *added sugar* on the ingredient list, only unsweetened milk.

Almond milk	Does not contain sugar and contains vitamins and calcium
Rice milk	May be consumed in small quantities due to sugar content sometimes. Ok in the morning
Oat milk (There also exists oat cream, oat crème fraiche, oat crème cheese etc.)	Contain oat fibers, a little natural sugar
Coconut milk (not pasteurized, e*xtra virgin)*	Contains healthy MTC fatty acids. MCT fatty acids are unique because it´s easily absorbed and metabolized in the liver, and can be transformed into ketones. Ketone bodies are an important alternative energy source for the brain and can be beneficial for people who develop or have already

	impaired memory, as in Alzheimer's disease (AD). Coconut is rich in dietary fibers, vitamins and minerals. Contains a lot of *Polyphenols* (Acts as antioxidants in the human body).

A little more about polyphenols

Functional effects of natural polyphenols from plants on the human body have been evaluated in a number of scientific research projects. Polyphenols are natural compounds of various chemical structures.

Polyphenols are believed to reduce mortality and/or reduce the development of: cardiovascular diseases, neurodegenerative diseases and cancer. Polyphenols´ biological activity is strongly associated with their antioxidative abilities. They tend to reduce the amount of reactive oxygen compounds (which provide oxidative damage to nucleic acids, proteins and fats), as well as to neutralize potentially carcinogenic metabolites (metabolism products). Nucleic acids are specialized for storage, transfer, and usage of genetic information (DNA and RNA).

A wide range of health enhancing abilities of plant polyphenols include; Antioxidative, anti-inflammatory, anti-allergic, anti-atherogenic (counteracts fatty deposits in arteries), antithrombotic (counteracts blood clots) and anti-mutagenic effects.

Some sources of polyphenols:

- Fruit
- Vegetables
- Nuts and seeds,
- Roots, bark, leaves of different plants and herbs
- Cocoa (dark chocolate)
- Green tea, coffee and red wine.
- NB! Wait 4 minutes to add green tee to the hot water poured in your cup to (to not ruin the good nutrients!)

PROCESSED FOODS

Ultra-Processed food are purely industrial products that are not similar to the pure form they come in. They consist largely of extracts of foods (plant-based oils, sugars and starch), as well as ingredients produced in laboratories (flavors, flavor enhancers, color etc.) This should be avoided as much as possible.

Examples of such products include soft drinks, energy drinks, biscuits, ice creams, cakes and cake mixes, bowls, powder soups, noodles, potato chips, fries, energy bars, sweetened cereals, frozen pizzas, sausages, "nuggets", hamburger and candy.

The ultra-processed food has an unbalanced composition and is a typical example of "empty calories". The natural food product is replaced with energy-rich ingredients, and the nutritional value is correspondingly reduced. Here it is also largely used *Flavor Enhancers* which in large quantities are no good.

Flavor Enhancers

Glutamate is being used to a large extent as a flavor enhancer in processed food. It hides behind different names such as glutamate, glutamic acid, sodium glutamate, MSG and E-620-625. Sources of glutamate include: broth, processed meat, barbeque seasoning, spice mixtures, soups, sauces and mayonnaise. Naturally, it occurs in bone broth (??) from animals, but then it´s more in balance with the other amino acid. s

The brain relies on a balanced relationship between glutamate and GABA/glutamine. Too much glutamate compared to glutamine is harmful to the brain.

Glutamine is the amino acid we find most of in the blood and in the cerebral fluid. Glutamine is required when brain cells tries to calm down uneasiness with the signal element GABA.

GABA (gamma- aminobutyric acid) can be produced by our intestinal bacteria and is essential for concentration and calmness in the way that it dampens specific nerve transmissions, also involved in the regulation of blood pressure and affects our perception of pain.

Homemade Broth

Making soups etc. Is the best therefore to boil the broth oneself! TBC

LINK Boiling broth for soups and sauces→ https://beritnordstrand.no/hjemmelaget-beinkraft/ (needs an English website.)

Ecological/environmental pollutants/glyphosate/pesticides/ The Cocktail effect...

Histamines TBC

Everyday tips and recipes

- Always bring some snack foods with you a when traveling, there is not always a healthy option at airports etc. and it is easy to forget! For example some walnuts, a little 90%-cocoa chocolate, a chia pudding, or salad can come in handy.
- If you are going to make food from scratch (quinoa salad for dinner for example), make large portions so that you have lunch the day afterwards. In total, you won´t use that much time on food preparation.

- Do not go grocery shopping every day, and not when you are the most hungry! Plan your meals for a whole week at a time, google recipes, and let the basis of your groceries be healthy and thought through. Then it´s easier not to be tempted by sweets when being in the store, and if you don´t have access to unhealthy food at home, it is of course easier to avoid!
- If you get a sugar craving you can have some 86 or 90 % cocoa containing chocolate at home, it can help a lot, and it´s not very tempting to eat so much of it! Also tea or other hot beverages such as coffee can help if you crave something.
- **TBC**

Cocoa as evening snuggle

- Mix and warm up 2 parts almond milk (most of this one) and part oat milk (possibly a little sweeter rice milk) during the day) in a kettle
- Add a few tablespoons of raw cocoa
- 1/2 teaspoon cardamom
- 1/2 teaspoon cinnamon (type Ceylon-cinnamon, containing less coumarin (unfavorable for the liver), than the usual Cassia-cinnamon).
- Add a teaspoon of extra virgin coconut fat to the cup after the cocoa has been poured into the cup for 4 minutes (do not boil the oil)
- If you want, add some vanilla from vanilla bean, or pure vanilla powder
- Add some chili powder if you like!
- Chia seeds can be added if you want the beverage to be fuller

Raw food salad for lunch

- Rasp 1 whole beetroot and 2 carrots
- Add the 2-3 tablespoons cold-pressed rapeseed oil
- Add the 1-2 tablespoons of organic apple cider vinegar (without added sugar)
- Season with a little salt and pepper
- Add the a little rustled lemon peel from an organic lemon if you want to
- Mix it all together and enjoy!

Lentils Pasta with cream sauce

- Boil desired amount of lentil pasta (made only on red lentils of green pees)

Creamy mushroom sauce

- Brown mushrooms (e.g. 4 pieces) in a little butter or canola oil, with 1-2 garlic cloves
- Add the oat cream/milk, or organic whipped cream
- Add a teaspoon of Dijon mustard (without sugar)
- Add 2 teaspoons apple cider vinegar
- Add the Other spices/herbs such as parsley/basil, etc., salt and pepper
- Add some spinach of green kale to the sauce, and mix it all together with the pasta

Green kale chips as a snack

Nicoline Sofie Grepperud

TBC