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Introduction

Dear Readers,

Carmelo Chines

Our decision to launch the "Scientific papers" project arises from our desire to expand our range of publications for the world of Eyecare. For the first time we are talking to the general public, to those in search of authoritative and credible sources which will increase their knowledge and awareness of prevention and healthcare-related topics.

This first paper is issued for the inauguration of the ***Radicepura Garden Festival****, an international event dedicated to the Mediterranean landscape. The 2019 Festival focus is on the theme of "Productive Gardens" and the Garden of the Mediterranean Diet was made available for SIFI. to illustrate, through a highly creative layout, the importance of the raw materials we consume daily and their significance for our well-being.*

We therefore conceived this publication as a means of enhancing awareness among the wider public, visitors and non-visitors, of plant life, of the way in which fruit and vegetables are transformed into food and other substances useful to our health. In particular, we focused on their metabolism, their evolving influence on our lives and the impact they have on our eyes.

For our first issue, the editorial staff drew upon the experience of two high-ranking scientists: ***Lucio Buratto MD*** *(ophthalmologist) and* ***Prof. Marcella Renis*** *(university professor).*

Lucio Buratto is universally known as a fine cataract surgeon and a true pioneer of refractive surgery. During the last years he has been dedicating his skills also to an in-depth investigation into the relationship between eye health and nutrition, resulting in several authoritative scientific papers. It is his 2013 publication, in fact, that provided the main inspiration for this paper.

For the updates in this issue, the editors benefited from the collaboration of one of the most respected personalities in the field of nutrition and health, Prof. Marcella Renis from the University of Catania. Prof. Renis is not only the professor who guided many of us during our university studies in chemistry, pharmacy and biology. Her specialization in clinical molecular biology has been our "daily bread" for everything related to the most recent insights offered by scientific literature, as well as to the challenging aspects arising from the plethora of widely found health recommendations.

Thus was born this first multi-disciplinary publication. It offers a concise and up-to-date guide for readers wishing to make, through small daily activities, decisions that will enable them to enjoy a healthy lifestyle, improve their diet and so enhance their psycho-physical wellbeing. In order to achieve this latter, the visual system must have the nutrients it needs, thereby forestalling and significantly reducing the risk of eye disease and/or its progression (including degenerative retinal diseases, such as Age-related Macular Degeneration).

At every stage of our lives, it is necessary to ensure that the eye, no less than our other systems in the body, receives suitable amounts and proportions of the right nutrients, vitamins and minerals in particular.

A correct diet, tailor-made as far as is possible, is also essential for maintenance of proper metabolic control in diabetic individuals and for prevention of severe diabetes-related complications affecting the visual system, such as diabetic retinopathy and diabetic macular edema.

Improved lifestyle and a healthy, balanced and tailored diet are necessary conditions, therefore, if we are to enjoy good psychophysical well-being in our later years. By these means we will forestall metabolic disorders, keep our eyes healthy and improve our vision.

I wish, lastly, to thank personally the Radice Pura Foundation, in the persons of its Chairman, Cav. del Lav. Venerando Faro, and its Vice-Chairman Dr. Mario Faro, whose foresight and love for their territory have enabled us to launch this new editorial project.

Nutrition and eye health

Food is of fundamental importance for the visual system, not least because men and women in modern times demand a very great deal from their eyes.

Today, from school age onwards, interactive learning systems and games, lighting devices of all kinds, IT systems, television sets, mobile phones and so on, impose an enormous workload upon our most important sensory organ.

If we stop to consider all the work our eyes do from the moment we wake up to the last blink that preludes our hard-won sleep, we can only conclude that it is a terrible lot, and it is likely to increase, unfortunately, with the evolution of mankind.

Correct nutrition helps us to make the best use of our sight and influences other important factors. It reduces, for example, the onset of degenerative and non-degenerative eye disorders.

Lucio Buratto, MD

Lucio Buratto MD is the ophthalmologist who supervised all updates in this booklet on topics concerning nutrition and ocular health.

Lucio Buratto is an ophthalmologist whose main field of expertise is eye surgery and in particular cataract surgery in all its multiple aspects. He is also particularly skilled in refractive surgery, the technique that aims to correct myopia, hyperopia, astigmatism and presbyopia. In both areas, Dr. Buratto has received numerous international awards including, in 2000 at the Congress of the American Academy of Ophthalmology (AAO), the highest international award for a refractive surgeon.


Lucio Buratto MD

For appointments

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Our diet can and must be adjusted, therefore, to take into account emerging or existing eye diseases and as a complement to their treatment.

So let us help our eyes to work well and let us support them to prevent ocular diseases.

Lucio Buratto

Mediterranean diet and health

In 2010, UNESCO inscribed the **Mediterranean diet** (from the Greek word "δίαιτα" = way of life) on the **Representative List of the Intangible Cultural Heritage of Humanity**[1], stating that it "*constitutes a set of skills, knowledge, practices and traditions ranging from the landscape to the table*". The Mediterranean diet is a nutritional model inspired by the traditional nutritional styles of the countries bordering the Mediterranean Sea and is at the center of an ideal triangle embracing social customs, man and nature. It promotes social interaction, since sharing meals is the

Prof. Marcella Renis

Prof. Marcella Renis is the biologist who edited the chapters describing the relationship between nutrition and health and commented on the 13 nutritional guidelines.

Prof. Marcella Renis

*A Professor of Clinical Biochemistry and Clinical Molecular Biology at the Department of Pharmaceutical Sciences of Catania University, Prof. Renis is the regional contact person for the International Observatory on Oxidative Stress and Vice Chair of **BiONuMeRi**, the "Biological Observatory for Nutrition and Research on Heavy Metals".*

She has held various institutional roles, including Chair of the Center for Disabilities of the University, CInAP, and Director of the Department of Biochemistry.

She has carried out research on the roles of environment and nutrition, as well as on genes and epigenetics in the development of autistic spectrum syndromes. She has studied extensively the effects of extracts from natural substances on different tumor and non-tumor cell lines. She has developed an interest in the effects of methylmercury on cell cultures of human astrocytoma and also in monitoring the environmental health of the Sicilian coasts via investigation of the DNA status of fish (Blenniiformes) living along the coasts.

She is currently studying the pleiotropic role of vitamin D and its metabolome, and the interactions between correct diet, microbiota/microbiome and exome in cancer and neurodegenerative diseases. She analyzes the exome using a software specifically created by the group with which she collaborates (Pennisi et al. 2018).

She coordinates a multidisciplinary team (doctors from different specialties, IT scientists, nutritionists, psychologists) that studies and provides holistic treatment for patients with autoimmune-inflammatory diseases, autism spectrum disorders and gastrointestinal diseases.

cornerstone of social customs, storytelling and festive events. It respects biodiversity, and ensures the conservation and development of traditional activities and crafts linked to it.

Its typical nutritional style was studied and validated in the 1950s by Ancel Keys, an American biologist and physiologist, on a large population sample from the Mediterranean Coast, including Southern Italy.

On the basis of this study, in 1999 the Greek Ministry of Health illustrated the typical pattern of the Mediterranean diet, developing a food pyramid with daily consumption of unrefined cereals (bread, pasta, rice), fruit, vegetables, olive oil, milk and dairy products, wine (in moderation) and weekly consumption of fish, poultry, pulses, potatoes, eggs and sweets. This dietary pattern and the pyramid itself were developed further in the following years.

In 2009, INRAN (National Institute for Food and Nutrition Research) proposed a new pyramid which, as well as distinguishing between vegetable and animal fats, highlighted the importance of a correct lifestyle, combining social gathering around the table, a proper time to devote to meals, starting with mastication (which should be slow and complete), moderate daily exercise and daily consumption of seasonal foods, with attention to biodiversity and the use of typical local products.

Guidelines for a Healthy Diet were published in 2003 and are currently being updated by CREA, since scientifically validated knowledge requires continuous updating.

A diet that is qualitatively and quantitatively inappropriate in relation to its nutrients has been identified as a primary cause of chronic disease and mortality, particularly in the United States where some three quarters of the population follow an unhealthy dietary model (excessive added sugar, saturated fat, sodium, calories and low micronutrient content, particularly potassium, calcium, vitamin D and fiber).

Eating is not the same as ***nourishment*** and "eating with your eyes" certainly does not help the well-being of the individual or even that of their eyes!

Fortunately, there is a growing awareness of the importance of food within scientific societies, schools and health institutions, communities, associations and families.

The MedDiet (Mediterranean Diet) is currently considered the best for our health on the basis of countless experimental evidence.

This diet is characterized by relatively high consumption of total fats, in particular

extra-virgin olive oil (EVO), moderate consumption of wine during meals (binge drinking and preference for beer over wine are certainly not part of the traditional MedDiet), low amounts of saturated fats, while envisaging lots of vegetables, fruits, nuts, pulses and, in particular, unprocessed cereals, fermented dairy products, nutrients and dietary fibers, antioxidant compounds and bioactive elements with anti-inflammatory effects, thus ensuring a series of beneficial results. For example, it helps to maintain overall a low glycemic index and all those healthy properties that assist achievement of a healthy body weight, increased longevity, reduced risk of chronic diseases, including cardiovascular disease (CVD) and metabolic syndrome, and hence type 2 diabetes, obesity, certain tumors and, last but not least, cognitive impairment.[9]

Knowing the glycemic index of foods is an important step towards the maintenance of good physical form and the prevention of a wide range of diseases, by avoiding combinations of foods with a high glycemic index during meals.

Regarding fats, EVO oil, obtained from the first cold pressing of the ripe fruit, is the only one included in the MedDiet. It contains hydroxytyrosol and tyrosol, oleocanthal, resveratrol and many other bioactive phenolic dietary compounds with anti-atherogenic and phytochemical properties, tocopherols, polyphenols and phytosterols with antioxidant and anti-inflammatory action.[7] These properties represent an ideal nutritional approach by which to prevent various inflammatory diseases, including eye diseases, not least because recently validated scientific data show the ability of specific nutrients to cross the retinal barrier.

Turning to proteins, it is advisable to privilege white meat and fish, eggs and only a few cheeses. Fish, fresh or frozen, may be eaten 2/3 times a week, checking its origin to rule out the possibility that it contains pollutants and harmful metals, such as mercury. If frozen fish is used, it is important to purchase it from stores complying with cold chain requirements.

When choosing meat, white meat should be preferred, such as chicken, turkey (preferably free-range) and rabbit, reducing the consumption of red meat, such as beef and veal, to a minimum and eliminating almost always any visible fat.

Moreover, we have known for some years now that consumption of too much red meat (more than three or four times a month) as well as the use of carnitine in gyms produces intestinal TMA (trimethylamine), a molecule that ends up in the liver where it is metabolized into TMAO (Trimethylamine N-oxide), a very harmful substance for the cardiovascular system, kidneys and brain. A high level of TMAO is considered as a predictive biomarker for cardiometabolic diseases, cancer and even myocardial infarction.[6]

We may, though, have 2-3 eggs (except under specific individual pathological conditions), spread out through the week. These should ideally be from free-range hens in order to have more vitamin D in the yolk. We should not worry too much about a possible increase in cholesterol which, in any case, should not fall below 190 mg/ml in the plasma, since it is necessary for the double lipid layer of cell membranes, as a precursor of steroid hormones, to have vitamin D produced in the skin by solar UV rays, etc.

If we drink milk, it is advisable to choose skimmed or partially skimmed, preferably goats' milk, as it contains casein A2, unlike that of cows which contains inflammation-promoting casein A1. Eat cheese in small quantities, due to its high fat content, and give priority to low-fat cheeses, such as skimmed ricotta, and/or mature cheeses.

Ultra-processed, processed, packaged and long shelf-life foods should be avoided primarily because they contain a lot of additives, preservatives (often harmful synthetic products) and process contaminants. Conversely, they are poor in vitamins and other essential micronutrients, fiber and phytoestrogens, which have various protective functions, while at the same time containing large quantities of sugars, salts and fats. These foods are harmful for our health, yet they remain popular, not least because they are more practical and less expensive. Frequent consumption of this food, moreover, is associated with higher salt excretion and has been shown to disrupt, by increasing it, the Na/K ratio.[2] Additives and preservatives, while admitted in the doses used in single food products, become harmful due to the cumula-

tive effect of consuming numerous foods containing them. Ultra-processed foods, when constituting even a mere 18% of our daily intake, induce obesity, inflammatory diseases and cancer, particularly breast cancer.[15]

Seasonality, biodiversity, nutrient density and the use of a variety of traditional and local food products, as well as culinary traditions, are important elements of the MedDiet which, being mainly vegetable-based, is sustainable not only at an individual level, but also for the planet. It also ensures well-being for future generations, since it involves a smaller impact on water and energy resources, lesser soil use and lower greenhouse gas emissions than other dietary models.

Proper cooking practices and processes (soaking, cooking at 100°C, sprouting, etc.) should be used to help eliminate antinutrients present in several foods.

Readers should remember that diet influences epigenetics, i.e. the modifications of DNA and chromatin which can be inherited and are closely related to our well-being.

Rather than focusing on this or that diet, it is more advantageous to aim for a correct lifestyle, choosing the right dietary practice, refraining from smoking and alcohol consumption and allowing the nutrients to adjust optimally the metabolic processes of our body. In this scenario, a key role is increasingly played by calorie capping, i.e. the reduction by about 40% of normal calorie intake. This favors controlled weight loss, control of cholesterol and triglycerol values, and a reduction

in age-related diseases. Indeed, the MedDiet seems to be the only one capable of mimicking the effects of calorie capping.

There are also myths and erroneous models to be dismissed, such as the "*Japo-Mediterranean diet*" (olive oil, wine, fish, beans, nuts and seeds, soya, vegetables, fruit, bread, rice, seaweed, dairy products and mushrooms), the "*Indo-Mediterranean diet*" (rich in whole-grain cereals, fruit, vegetables, nuts, mustard, oil and almonds), an exclusively vegetarian diet, which in any case requires vitamin supplements, in particular vit. B12, or, even worse, the vegan diet. These are dietary choices that, if made, require periodic medical checks and tests to ensure there are no deprivations of nutrients and the like, with negative effects on the various metabolic processes.

Even the Italian pizza should now be reconsidered and re-examined. In fact, the pizza dough ball with 250 g of carbohydrates might not be very healthy, as it is not often leavened with sourdough and is prepared from grain of unclear origin, plain flour ("00" Italian flour), possibly rich in glyphosate (for example, due to mixing with flours from Canada) and maybe even containing mycotoxins developed during shipment in unsuitable conditions and/or in wet environments. As a consequence, one may eat pizza, even once a week, but paying attention to the flour with which it is produced and to the yeast used. We should prefer a pizza produced from a mixture of several grains, or with local soft grains, with a mixture of grains that will help reduce the overall gluten content. Above all, it should be prepared with sourdough. This will increase digestibility and nutrient intake.

And what should we do if diagnosed with celiac disease or if hypersensitivity to gluten is detected? Firstly, we should remember that gluten is present in many grains, especially in wheat, both durum wheat and soft wheat, both in modern and ancient grains, though in different quantities.[14] The only gluten-free wheat is buckwheat, or "black wheat", which was extensively cultivated in the past. This is a cereal with significant biological value. It is rich in protein, it contains the **eight essential amino acids in optimal proportions** and it has slow-digestion starch that makes it valuable in diets for diabetics. It is also a **good source of fiber and minerals**, rich in phosphorus, calcium, iron, copper, magnesium, manganese, potassium and important vitamins (B1, B2, PP, B5).

The term gluten, from Latin "glue", refers to a mixture of proteins that acts as a binder, holding together other molecules and forming a highly elastic dough that enables the creation of bread, biscuits, pizza, etc.. It has for many years been a widely used additive in the food, cosmetics and pharmaceutical sectors. There are two proteins in gluten that trigger an allergic response – glutenins and gliadins. These reach the intestine as poorly digested toxic peptides, reaching the receptors of the immune system on the internal intestinal walls, where they are perceived as foreign and determine an immediate reaction of the immune system. The alterations in the intestine migrate, through the blood, to different and distant areas of our body, causing stomach pain, tiredness and chronic fatigue, pain in the bones and joints and skin rash. Daily consumption, even several times a day, of these toxic substances (to which we could also add pesticides, badly cooked foods, etc.) generates a sort of "overdose" that creates an inflammatory state that is responsible for the development of various diseases, such as obesity, metabolic syndrome, cardiovascular diseases and colorectal cancer.[10]

If we wish to take care of our well-being, we should pay particular attention to the relationship with our **microbiota**, especially in the intestines.

The microbiota is the plethora of microorganisms, billions of them (archaea, bacteria, yeasts, viruses, fungi) present throughout out body, on the dermis and in all our cavities, which we carry, as if we were a ship, day and night, and which, if in the right balance between eubionts and pathobionts, are necessary for our well-being.

In particular, the microorganisms of the intestinal microbiota help us to assimilate food, protect us from many diseases and produce substances/molecules that are very useful to our metabolism, such as vitamins, including vit. D, short-chain fatty acids (SCFA), hormones and neurotransmitters. Today, the intestinal microbiota is an essential therapeutic target for many inflammatory, autoimmune, neurodegen-

erative and similar diseases. Not only is the diet essential for maintaining human growth, reproduction and health, but it also modulates and supports the various microbial communities and in particular the intestinal microbiota. The type, quality and origin of our food shape our intestinal microbes, influencing their composition and function, with repercussions on the host-microbe interactions. Hippocrates' statement, "*Let food be your medicine and medicine be your food*", still remains very valid, yet it requires us to consider how diet can promote health through modulation of the intestinal microbial ecology. The composition of the individual microbiome, and of the intestinal microbiome in particular, is influenced by pregnancy, then by natural delivery or caesarean section, breastfeeding or artificial breastfeeding, weaning, excessive hygiene, stress, exercise, drugs (especially antibiotics) and our way of thinking. However, it is food – the diet – that has one of the major influences[11]. This is especially true of the MedDiet, the specific food components of which are considered the main "drivers" for the composition of the intestinal microbiota, since they are able to influence its composition, diversity and activity, with immediate effects on the metabolism of the host.[3]

The MedDiet has a high prebiotic potential. Its high consumption of pulses, vegetables, whole grains and fruits, as well as so-called "healthy" carbohydrates, in particular non-digestible carbohydrates such as fiber and resistant starch, influences microbial composition and diversity, and can stimulate the growth of beneficial bacterial species. These latter are involved in the production of butyrate and methane, which scientific data have associated with a better cardiometabolic profile.[13]

Changes in the composition of the intestinal microbiota contribute to the pathogenesis of inflammatory bowel diseases or the irritable bowel syndrome, which is now very widespread as well as leading, if not well diagnosed and treated, to the development of more serious and even autoimmune bowel diseases, especially in the presence of particular viruses that we host.

Recently the term "Immunonutrition" has emerged as a new concept that recognizes the importance of vitamins, such as A, C, E and D, folic acid, beta-carotene and trace elements, such as zinc, selenium, manganese and iron, in assisting metabolic benefit.

We are therefore talking about anti-inflammatory dietary approaches, nutritional interventions or specific and individualized diets, which also include the use of food supplements with prebiotics and probiotics to manipulate selectively the intestinal microbiota with few or no side effects. These include diets that favor specific carbohydrates (SCD), oligosaccharides, disaccharides, monosaccharides and low-fermenting polyol (FODMAP), together with the MedDiet, which has anti-

inflammatory properties and the ability to improve symptoms, while increasingly treating the cause.[5]

We can say, therefore, that a targeted diet taking into account the individual's genetic composition, epigenetics and the composition of the microbiota, adherence to the MedDiet, together with no smoking, moderate alcohol consumption and moderate daily exercise, may represent a successful new therapeutic platform for the prevention and control of various diseases.

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Guidelines for a healthy diet

The Guidelines for a Healthy Diet is "*a document drawn up by distinguished nutritionists to provide consumers with simple information on how to eat better and protect their health*", reduce cardiovascular risk factors and ensure that the various systems in their bodies are healthy, including the eyes. This document needs to be continuously updated on the basis of evolving scientific knowledge and changing consumer behavior, which tend to fall in line with publicly available scientific findings. Following its previous substantial version of 2003, therefore, the National Research Institute for Food and Nutrition has recently prepared an updated version, which will be published shortly. In this new edition, among the main changes, the recommendations have been increased from 10 to 13. The new guidelines also include remarks about *'do-it-yourself'* diets and the use of supplements, as well as considerations on food sustainability and fake news.

Let us examine in detail the rules for eating correctly with a special attention to prevention and well-being.

The 10 recommendations confirmed are:

1. Check your weight regularly and stay active
2. Adapt the diet to the different ages or any particular conditions, such as pregnancy
3. Eat more fruit and vegetables
4. Eat more whole grains and pulses
5. Drink plenty of water every day
6. Limit the fat consumption and choose the most healthy fats
7. Limit the consumption of sugar and drinks containing sugar
8. Limit salt consumption
9. Limit consumption of alcoholic beverages
10. Eat a variety of different foods.

The 3 new recommendations are:

11. Be careful with diets and supplements
12. Food safety (which also depends on us)
13. Choose sustainable foods.

The CREA (Council for Agricultural Research and Analysis of Agricultural Economics), together with the Research Center for Food and Nutrition, is now preparing a slimmer and easier-to-use version, aimed at the wider public, of the comprehensive report, which is mainly addressed to nutrition professionals and those wishing to deepen their knowledge of this field. The Council is currently preparing a sort of leaflet for the general public, since information for a healthy diet needs to be shared globally in the common interest, despite certain economic issues arising from the fact that healthier and safer foods remain more expensive.

Let us examine in detail the 13 recommendation one by one.

1) Check your weight regularly and stay active

It is advisable to weigh yourself at least once a month, also checking your BMI (Body Mass Index), which takes into account your height and weight (ratio between weight in kg and squared height in meters). The BMI depends on numerous factors, but a value around 21 is generally associated with a normal weight.

Weight	Min	Max
Class III Obesity (very severe)	>40.00	
Class II Obesity (severe)	35.01	40.00
Class I Obesity (moderate)	30.01	35.00
Overweight	25.01	30.00
Normal weight	18.51	25.00
Slightly underweight	17.51	18.50
Underweight	16.01	17.50
Severe underweight (starvation)		<16.01

If you realize that you are overweight, or even worse you are "obese", you need to reduce your calorie intake (but always eating all types of foods in a balanced way) and to increase your energy consumption by taking exercise. Your first priority, therefore, should be to perform moderate exercise, ideally aerobic, at least for just 30 minutes a day. Get used to leaving the car at home whenever you can, going up and down the stairs on foot, moving around during the day, maybe doing a little housework or, if possible, gardening.

2) Adapt the diet to the different ages or any particular conditions, such as pregnancy

The nutritional status of the individual is the response of their body to their lifestyle. It is first and foremost an expression of their way of eating, but also of their emotional condition and the time they devote to daily exercise. The nutritional status, in physiological and/or pathological conditions, reflects the diet that the individual has chosen to follow or can follow (according to medical advice) in the short, medium and long term. Let us start from the concept that there is no ideal diet; the diet must be adequate, in terms of quantity and quality of food, to the individual's needs (taking into account age, health conditions, type of job, as well as their working and living environment), but without penalizing their tastes.

In addition, we must also consider very carefully that:

a) the diet influences individual epigenetics and this modifies gene expression, which can activate or deactivate protein synthesis. Hence, exposure to particular nutrients and/or availability of food, during pregnancy, infancy, childhood, developing years and old age, can interfere with the well-being of the individual and contribute in the short or long term to the development of various diseases (cardiovascular diseases, neurodegenerative diseases, obesity);

b) what we eat, depending on how it is digested, feeds our intestinal microorganisms (microbiota), regulating the balance between good and bad microorganisms.

In general, however, at any age and in any condition, we must avoid at all costs unbalanced, drastic or high-protein diets or those that do not include all foods. It is necessary to follow a diet with multiple foods that is as balanced as possible and to avoid eating uninterruptedly. We should always eat at regular times, in proper quantities and respecting the seasonal nature of the food.

Diets for children or young people cannot and must not be like those for elderly people, since they have very different energy and nutritional needs. The same is true for the various supplements, which must be chosen according to individual needs and also age. After the age of 50, for example, we need to consider supplementing what we start to produce less and less, such as CoQ10, Alpha Lipoic Acid, Glucosamine, Collagen, Hyaluronic Acid.

We should eat a suitable quantity of proteins. This quantity is higher for young people than for adults and must always be proportionate, according to medical advice, to the individual's health status and professional activity (studying included).

During pregnancy, a controlled diet must be followed, not least because of the close correlation between the metabolism of the mother and that of the child. Therefore, the mother cannot and must not be overnourished or undernourished, otherwise she risks exposing her child to diseases that may develop later, during their teens or adulthood, such as diabetes or obesity.

Pregnant women should eat fruit and vegetables daily, but also carbohydrates and proteins, ideally at every meal, from breakfast onwards. Milk, if any, should preferably be goat's milk and should often be drunk with small protein addition, due to a higher protein requirement during pregnancy, which can sometimes be met with six or seven almonds.

Combine pulses with whole grains and remember that these also include spelt, rice, oats, rye, buckwheat and millet. The consumption of whole grains, rich in fiber, increases intestinal motility and the elimination of waste and also prevents glycemic peaks, all of which are important benefits during pregnancy. If possible, make home-made cakes and sweets using local flours and ancient grains mixed with modern ones, but always prefer local and with the addition of some buckwheat flour.

Food intolerances can be addressed or reduced by observing a short fast for 24 hours, once or twice a month.

Give preference to colored fruits and vegetables, which are rich in vitamins and antioxidants. Eat some types of vegetables raw, such as spinach and some types of broccoli, without too many seasonings, except for Extra Virgin Olive Oil and lemon.

Extra Virgin Olive Oil and calcium requirements increase in pregnancy due to the high demand by the fetus. Therefore eggs, rich in calcium and vitamin D, should be eaten with milk and dairy products, always in suitable quantities.

Vitamin D, which has endless positive effects and also helps to maintain calcium in the bones, must be dosed and, if it is deficient, must be supplemented daily and should not be missing during pregnancy. Iron, on the other hand, is mainly present in pulses (white beans, in particular) and in meat; in salads and vegetables it becomes more bioavailable through the use of lemon.

Fats to be eaten during pregnancy must provide an adequate balance between the different polyunsaturated fatty acids. Omega 3 are present in oily fish (cod, salmon, but avoid swordfish or tuna because of their mercury content), in almonds, pistachios, hazelnuts, flaxseed, walnuts, etc. These fatty acids are useful for the development of the cerebral brain system of children, while monounsaturated acids, of which the Extra Virgin Olive Oil is in the forefront, are key components for proper development of cell membranes and the growth of the fetus. Obviously moderate exercise, always under medical supervision, is a must.

3) Eat more fruit and vegetables

Low fruit and vegetable consumption is widespread in many countries. This has led the World Health Organization (WHO) to issue strong statements on diet, nutrition and the prevention of chronic diseases. As a minimum, the recommended consumption is ***4/5 portions*** of fresh fruit and vegetables per day, for a total of at least ***400 grams***.

Low consumption of fruit and vegetables is linked to increased risk of non-

transmissible chronic disorders, including hypertension, cardiovascular diseases, stroke, obesity, diabetes, osteoporosis and certain tumors, as well as increased mortality. It has been estimated that, in 2009, two million deaths and 26 million disability-adjusted life years (DALY, 1.8%) could be attributed to sub-optimal consumption of fruit and vegetables worldwide.[15]

Fruit and vegetables are endowed with a wide range of beneficial nutrients and non-nutrients, including fibers, vitamins (especially A, B and C), minerals (selenium and potassium), antioxidants (carotenoids and tocopherols) and phytochemical substances such as flavonoids, glucosinolates and isothiocyanates.

Antioxidants and vitamins may reduce the risk of cancer and vascular diseases by eliminating reactive oxygen species (ROS) and other free radicals and by preventing oxidation of the DNA and of lipids in the tissues. Other potential mechanisms attributed to the antioxidants and vitamins B present in fruit and vegetables include maintenance of DNA endogenous stability, reduction of total plasma homocysteine and maintenance of blood pressure and the functionality and health of the endothelial cells.[16]

4) Eat more whole grains and pulses

Increase consumption of pulses, both fresh and dried, but take care to limit added oils and fats, which may be replaced with aromas and spices. Remember that pulses need to soak for 12 hours in cold water, which must never be reused for cooking. They should then be cooked over low heat without fats. Uncooked EVO can be added at the moment of consumption.

Eat bread, pasta, rice and grains regularly (if possible, whole and unrefined, Ital-

ian class 1 or 2 flour or durum wheat flour), quinoa and amaranth. Avoid adding too many fatty condiments (see paragraph 2).

Give preference to wheat and grain products, i.e. bread and derivatives, prepared with ***sour dough***, which ensures slower baking, with products that are more digestible and richer in calcium.

Choose wheat carefully! In wheat that comes from a long distance we may find, as well as glyphosate (which is cancerogenic and is used as a desiccant to accelerate ripening of the ears), other "guests" generated by non-optimal conservation during transportation and elsewhere. These are fungal toxins, mycotoxins. They cannot be eliminated and are extremely harmful, encouraging oxidative stress and/or cancer. Fortunately in Sicily, and in many other parts of Italy, we have the sun to desiccate the ears and do not need glyphosate, but we risk having mycotoxins if the products are not optimally stored. We recommend, therefore, choosing wheat with awareness of the origin and, if possible, the producers and their ethics. Different varieties of wheat, moreover, have different gluten indexes. The ideal is to make bread by mixing local wheats, both ancient and modern, with different gluten indexes so as to reduce gluten content overall, adding buckwheat flour which does not contain gluten. Give preference to Italian class 1 or 2 flours, never class 00, using durum wheat flour if possible. This is an Italian flour and has a different type of starch, which is beneficial to our intestinal microbiota, reducing the risk of inflammatory diseases and other pathologies.

5) Drink plenty of water every day

Drink water as soon you feel thirsty. Better still, try to precede the feeling of thirst, drinking often and sufficiently – an average of 1.5 to 2 liters of water per day (including tea and herbal teas).

Drink frequently, in small quantities and slowly, especially if the water is cold. A suddenly lowering of the stomach temperature can cause dangerous congestions.

Drink water without fear of excessive sweating or becoming fat. Sweating is an indispensable body temperature regulator and water does not contain calories.

Remember that beverages such as orange squash, Chinotto, Coca-Cola and fruit juices, as well as providing water, also supply calories and sugars or may contain pharmacologically active substances, such as caffeine and theine. Drink these beverages rarely.

During and after physical activity, drink (prevalently water) to replace immediately the losses due to sweating.

Under certain pathological conditions that provoke greater loss of water (such as fevers or repeated episodes of diarrhea), the water loss must be compensate sufficiently and swiftly. Consider taking added electrolytes (sodium potassium, chlorine).

6) Limit fat consumption and choose the healthiest fats

It is advisable to limit the quantity of fats used for condiments and cooking. Above all, cut down on animal fats such as butter, lard and pork fat. Give preference to vegetable fats, especially EVO (extra virgin olive oil), which has certain healthy properties due to its content of monounsaturated fatty acids and antioxidant substances.

When using fats for condiment, use them uncooked and avoid using fats and oils that have been previously cooked.

Reduce fried food consumption to a minimum. Use EVO oil for frying. Change it for each fry-up and never reuse it. In addition, even when using EVO, when it reduces, do not add more but change it entirely.

As far as possible, use well-made, high quality non-stick frying-pans (throwing them away as soon as any scratch appears on the coating), steam cookers, microwave ovens and cooking foil (never silver paper!).

7) Limit consumption of sugar and drinks containing sugar

Limit use of sugar as a sweetener and all sweetened drinks. Avoid refined sugar completely and give preference to cane sugar, but natural. Similarly, reduce to a minimum all desserts produced with refined sugar.

Give preference to traditional Italian baked desserts, which contain fewer fats and sugar and more starch, such as biscuits, unfilled cakes and so on.

Make careful use of sweet products to spread on bread or rusks (such as jams, preserves, honey and creams).

Limit consumption of products containing a lot of sucrose, and especially those that stick to the teeth, such as soft toffees, nougat and so on. In any case, wash your teeth after consuming them. Avoid saccharine and other sweeteners containing aspartame. If you consume hypocaloric sweet foods and drinks, or those with substitute sweeteners, read carefully the label describing their characteristics and the precautions to be followed.

Do not substitute sugar with fructose thinking if it were not sugar.

Remember that sugar favors diabetes as well as cardiovascular and inflammatory diseases. We should not exceed 20-25 grams per day (c. 5 lumps), including sugars contained in foods. For example, an apple or an orange contains 10 grams of sugar, while a soft drink has from 35 to 40 grams of sugar.

Beware of squashes or juices which, if produced with a lot of fruit, increase the amount of sugar in the blood.

The sugar with the least sucrose is whole black cane sugar, which is also rich in mineral salts.

8) Limit consumption of salt

Gradually reduce use of salt, both at the table and in cooking. In preference to common salt, use iodized salt or Himalayan salt, a special type of halite (that is to say rock salt), of high quality and pure, not subjected to any kind of refining and especially rich in iron and copper.

Get used, in any case, to flavoring food, rather than with salt, with aromatic herbs (such as garlic, onion, basil, parsley, rosemary, sage, mint, oregano, marjoram, celery, leek, thyme and fennel seeds) and spices (such as pepper, chili pepper, nutmeg, saffron or curry).

Limit use of alternative condiments (bouillon cubes, ketchup, soy sauce, mustard and so on).

Choose, whenever available, product lines with low salt content (unsalted bread, tinned tuna with low salt content and so on).

Avoid as far as possible consumption of processed foods rich in salt (snacks, potato crisps, table olives, certain cured meats and cheeses). Above all, avoid giving these to infants and children.

9) Limit consumption of alcoholic beverages

Make moderate use of alcoholic beverages, preferably drinking them during meals, according to Italian tradition, or in any case immediately before or after eating.

Give preference to alcoholic beverages with low alcohol content (wine, beer) and avoid drinks with high alcoholic content, especially after other alcoholic drinks.

Do not consume alcoholic beverages if you have to drive or use devices that are fragile or which may be dangerous for yourself and others, as stated in new laws on the matter.

10) Vary your diet and the food served at the table

Vary your diet often, alternating sufficient quantities of foods belonging to different groups (cereals, meat, fish, eggs, fruit and vegetables, milk and dairy, etc.). Introduce foods with low gluten content and low glycemic index into your diet.

Try to avoid unbalanced and monotonous dietetic patterns. Females, especially, should ensure adequate intake of iron and calcium.

NEW RECOMMENDATIONS

11. Be careful with diets and supplements

Your diet must always be well diversified to ensure intake of different nutrients: macronutrients (carbohydrates, proteins and fats), micronutrients (vitamins, minerals) and other substances (such as fibers and antioxidants). Many widely publicized and disseminated diets are anything but healthy.

Excessive consumption of one foodstuff or limited use of others is always harmful. Omnivorous diets should always be studied for the uses we explained above. But diets that involve reduction or exclusion of certain types of food may risk to generate metabolic imbalances with negative effects, including long-term ones, on the health. This is especially so if the person following them does not undergo regular medical checks and tests. Even vegetarian and vegan diets should be used very carefully, since they require, at the least, vitamin B12 supplementation. It has been shown, moreover, that vegetarians and vegans have more pesticides in their blood than those using other diets.

Diets are not always about restricting calories and reducing weight. Various metabolic, physiopathological conditions call for the use of suitable – and certainly not "do-it-yourself" – diets.

Recent data published in literature tell us that, in reality, there do not exist diets better than others. Indeed, their effectiveness seems to be about the same. The aim should be:

- to achieve a correct lifestyle (diet, physical activity, relaxation methods, conviviality, etc.)
- to choose healthy "zero-mileage" foods, as far as possible locally produced and less contaminated
- to adopt best practices for preparing foods
- to understand the role of antinutrients and how to eliminate them.

Regarding supplements, it should be said that the population of the industrialized world makes improper use of them today and often takes them without suitable medical control, perceiving as optimal what is described, often with little understanding of the term, as a "holistic" form of self-care. The number of food supplements on the market as of now, including those based on herbs, has seen an unprecedented increase. Nevertheless, unlike vegetable-based products, or *nutraceuticals*, intended for treatment or prevention of certain diseases, whose therapeutic effect is (and must be) scientifically proven, current legislation classi-

fies the food supplements as products intended to achieve nutritional or physiological effects and to complement a normal diet. They should not be associated, therefore, with specific health indications, but only as nutrients integrating particular deficiencies, preferably clinically tested. The medicinal plants included in food supplements do not usually produce immediate and dramatic pharmacological effects. Some producers, therefore, in order to satisfy their customers' expectations, have had recourse to the illicit and dangerous practice of adulterating their products with synthetic additives, including molecules present in nature, to obtain the desired effect. This practice is prevalent in, though not limited to, food supplements intended to help weight loss, as well as for improved sports performance and sex drive. See, for example, the phenylethanolamines and their semi-synthetic derivatives present in food supplements in the European Union, as reported by the Rapid Alert System for Food and Feed.[10]

Also molecules such as quercetin, catechin and proanthocyanidins, which are flavonoids present mainly in foods and food supplements and which are noted as having an anti-cancerogenic activity and for acting in particular on the glioblastoma, may not be wholly efficacious. Their doses should therefore be decided extremely carefully. Their bioavailability and their capacity to cross the blood-brain barrier, as well as their health benefits, need further studies. But, on account of the limited capacity of these flavonoids to reach the brain, their normal dietary intake is probably insufficient to produce significant antitumoral effects on this organ. As a result, there have been many recommendations for a necessary integration.

Flavonoids are known to protect the glial cells through the reduction of oxidative stress, while some others also attenuate the excitotoxicity induced by glutamate and reduce neuroinflammation. Others inhibit proliferation of glioblastoma cells and induce their death, thereby intensifying the effect of conventional cancer treatment. However, most of these effects, especially the anti-glioblastoma ones, have been observed only in vitro or in animal models.[11]

12. Food safety (which also depends on us)

Private and public institutions make proper controls, but the risk of toxic substances in foods is hardly ever equal to zero. What counts is the "cumulative" effect when we introduce several doses of foods that contain a small – even very small – amount of toxins/contaminants.

We come into play ourselves, therefore. Our sense of responsibility and our care to avoid even minimal risk become important.

This means:

- Learning to know what to buy and what to consume.
- Storing foods correctly at all times, considering that a significant risk derives from microbial contaminations, as well as from additives and pesticides.
- Always reading carefully the labels and expiry dates of the products.
- Reading the list of ingredients, especially if you suffer from allergies.

- Taking care over the cold chain. If you buy frozen foods, for example, use suitable bags to carry them and do not delay before putting them in the freezer.
- Never freeze again food that has been unfrozen.
- Make sure your hands are clean when touching fresh food or when washing vegetables and similar items.
- Avoid contact between cooked and uncooked foods.
- Put cooked foods in the refrigerator within two or at most three hours.
- Avoid consuming raw or very slightly cooked fish, meat and eggs, especially in the case of children or pregnant women.
- Protect cooked foods cooling at room temperature from microbes. For subsequent reuse, heat only the portions to be served, bringing them to a high temperature internally as well as externally.
- Always keep the refrigerator clean and respect the proper temperature for each food.
- Pasta, rice, flour and dried pulses, etc., may be conserved in containers at room temperatures in cupboards or closed shelves in the kitchen.
- Store cooked foods only in glass containers.
- Avoid cooking vegetables at high temperatures and in abundant water because this eliminates vitamins and nutrients. Give preference to longer cooking times at lower temperatures, especially for meat and eggs, but also for some fish.
- Cooking vegetables in only a little water hinders the production of bacteria and preserves the nutrients.
- Ideally vegetables, if not eaten raw, should be steam cooked.

13. Choose sustainable foods

Significant estimates forecast that, by 2050, the world population will grow to reach nine billion. The demand for food will increase notably as a consequence. The more developed regions of the planet consume more food today than necessary and for the most part use products of animal origin, with high environmental impact. In order to enable future generations to feed themselves, it is necessary to move towards more sustainable food production, and also more sustainable consumption. This means changing our dietary habits decisively.

If we are to go in this direction, the achievement of a sustainable food production system and a reduction in food waste are major global challenges. The FAO, the United Nations Food and Agriculture organization, has stated, in fact, that a sus-

tainable diet is one that causes a reduced environmental impact while at the same time meets nutritional guidelines. It must therefore be: 1 Cost-effective; 2. Accessible; 3. Culturally acceptable.

Upon what tenets should we build a new framework to achieve this goal?

What can we do?

a) Eat less food, waste less and reduce consumption of animal-derived food products, choosing more sustainable animal-derived products such as poultry and fish caught with sustainable methods. Reduce consumption of dairy products and eggs, giving preference to vegetable-derived alternatives, which are associated, furthermore, with lesser risk of hypertension, strokes, type 2 diabetes and certain forms of cancer. The Protein2Food project financed by the EU aims to create and promote innovative, high quality food products of vegetable origin, enriched with protein.

b) Reduce food waste throughout the chain, from production to processing, distribution and catering.

c) Opting for locally produced foods may seem a sustainable choice, but it is so above all if they are seasonal.[12,13,14]

Key nutrients for our eyes

Scientific research has identified a series of nutrients because of the evidences of their benefits for the visual system.

1. Concentrated in the human macula are three interesting carotenoids which have a strong antioxidant activity against ageing: **lutein**, **zeaxanthin** and **meso-zeaxanthin**. The first two are found in green-leaved vegetables such as spinach, cabbages, chard and broccoli, but also in maize, basil, tomatoes, in yellow vegetables such as pumpkins, in green tea and in many other vegetables. The third seems to be produced in the macula from metabolic transformations of ingested carotenoids. The intake of these substances are therefore among the nutritional actions that may/must be set in motion to counter ageing, macular degeneration and other eye disorders.[1]
2. **Lycopene** is a carotenoid that the human organism cannot synthesize. It must therefore be taken in through the diet. The main source of lycopene is the tomato, from which we extract the maximum amount of bioavailable lycopene in the presence of healthy olive oil. Fresh tomato, if sliced, should therefore be left in contact, at least, with olive oil, as should tomato juice, if we wish to exploit, among the nutrients, the lycopene contained therein. Obviously, the lycopene bioavailability increases to some extent when the tomato is transformed into purée, but it does so especially when it is cooked (as it is or as purée) in the presence of oil and at low heat. A very recent study has significantly demonstrated, for the first time, the efficacy of lycopene on the ocular tissue, both in the prevention of inflammation and oxidative stress associated with diabetes, and on tissue damage affecting the optical nerve.[3]
3. **Astaxanthin** is a carotenoid belonging to the xanthophyll class. It is abundantly present in the macula of the eye together with the previously mentioned lutein and zeaxanthin. Animal studies have shown that astaxanthin is able to cross the blood-brain barrier and, like lutein, deposits itself on mammal retina. It is contained in certain foods, such as shellfish, trout, shrimps, lobster and salmon (the color of which is actually the result of the accumulated astaxanthin), as well as in *Haematococcus pluvialis* seaweed, which is the largest natural source of astaxanthin and is today cultivated on an industrial scale also in Italy. Astaxanthin is a coloring and a powerful antioxidant for several tissues/organs. It exercises an important role, especially, in protecting the eyes from ultraviolet rays, in preventing oxidation of essential polyunsaturated fatty acids, and performs an important anti-inflammatory action. A diet rich

in carotenoids is therefore strongly advisable, complemented, if necessary, by suitable supplements that are decidedly useful for general wellbeing and for the health of the eye in particular.[2]

Sources of carotenoids	
Lutein and Zeaxanthin	Egg yolk, pumpkin, zucchini, spinach, broccoli, Brussels sprouts, peppers, saffron, kiwis, oranges, red apples, mangoes, peaches
Lycopene	Tomato, saffron, red apples, oranges, water melons, apricots, pink grapefruit, grapes, papayas
Astaxanthin	Shellfish, salmon
β-carotene	Carrots, broccoli, peppers, spinach, pumpkins, zucchini, mangoes, peaches, apricots, oranges

4. **Omega-3** and **omega-6** are essential **polyunsaturated fatty acids** for a balanced diet. Omega-3 are mainly contained in fish, while omega-6 (which are only of vegetable origin) are also present in dried fruit, such as walnuts and hazelnuts, but above all in certain oils (omega-3 mainly in linseed oil and linseeds; omega-6 in corn seed and sunflower seed oils, but also olive oil, which is particularly rich in monounsaturated oleic acid).
5. **Vitamin A** is present above all in liver, eggs and milk, and in vegetables such as pumpkins, zucchini and carrots. Correct intake of vitamin A helps reduce the risk of developing degenerative pathologies of the retina.
6. **Vitamin D** 25-hydroxy-vitamin D [25 (OH) D] is a pleiotropic hormone that controls the expression of around 3,500 genes. It is one of the vitamins frequently lacking in our organism and for this reason daily supplementation

has become necessary. There are two principal forms: ergocalciferol (vitamin D2) and cholecalciferol (vitamin D3). The former can be acquired through food (salmon, oily fish, tuna, eggs), but provides only 20% of the requirements. The latter, cholecalciferol, is mainly synthesized in the skin after exposure to ultraviolet light at a very precise time of day (half an hour daily between 11.00 and 15.00). Vitamin D has beneficial effects on inflammation, on autoimmune diseases and on dry eye syndrome, a common, chronic and serious ocular pathology affecting around 30% of the adult Caucasian population and around 60% of the adult Asiatic population, producing ocular and visual disorders, with inflammation and corneal and conjunctival anomalies. This disorder can appear at any age, but is most frequently found in elderly people who often have very low levels of vitamin D in the blood. It is therefore strongly advisable to monitor serum levels of vitamin D when treating dry eye syndrome in order to understand how to intervene with a correctly dosed supplement. Some data, not yet scientifically confirmed, support the idea that age-related macular degeneration (AMD) and neovascular AMD may be associated with low vitamin D levels and some variants in protein genes belonging to the vitamin metabolome, such as its receptors (VDR) and the cytochromes that participate in its activation (CYP 450).

7. **Vitamin C**, or ascorbic acid, is found mainly in fruit (citrus fruit, kiwis, strawberries and blackcurrants) or vegetables (cabbages, spinach, tomatoes and potatoes). Vitamin C has a high antioxidant power which combats free radicals, protecting the eyes from degenerative retinal disorders and glaucoma, as well as providing prevention against corneal ulcers.

8. **Vitamin E** is a powerful antioxidant, very much present in dry fruit (almonds, peanuts and pine-nuts), as well as in dried apricots, sunflower seeds, pulses and green-leaved vegetables.
9. **Vitamins of B complex**, especially vitamins B1 (Thiamine), B2 (Riboflavin), B6, B12 and folic acid are very important for the prevention of degenerative eye disorders and to ensure good functioning of the eye muscles. They are present in cereals, milk, eggs, rice cuticle, brewer's yeast, walnuts and peanuts.
10. **Bioflavonoids** are compounds that act on the small vessels, increasing the resistance of the vessel walls. They are therefore used in vascular retinopathies, such as diabetic and hypertensive retinopathies. Among bioflavonoids, we mention anthocyanosides, contained in a large number of citrus fruit and berries, especially strawberries and bilberries (which also contain a lot of vitamin C).

Sources of bioflavonoids

	Green tea	Dark Chocolate	Red wine	Berries	Citrus fruit	Red grapes	Soya	Honey	Onions
Rutin			■		■	■			
Hesperidin					■				
Quercetin			■		■	■		■	■
Catechin	■	■	■						
Polyphenols			■						
Anthocyanosides				■					
Isoflavones							■		

11. **Phosphatidylcholine** or **lecithin** is a substance abundantly present in soya. It may be considered for lipid-based therapies (liposomal sprays and emulsion drops) as an interesting alternative to artificial water-based tears, since it is closer to the composition of the tear film. This kind of treatments, moreover, improve the signs and symptoms of the dry eye syndrome. They alleviate patients' symptoms immediately after topical use and directly improve the structure of the lipid tear film, giving it greater stability. Lipid-based treatments can also be potentially combined with conventional treatments for eye surface

diseases, such as wipes, omeg-3 supplementation, cyclosporin or diquafosol for management of the disease and its symptoms. Additionally, since cationic lipids possess anti-inflammatory properties, they may be considered for inflammatory states of the eye surface.[7]

12. **Zinc** is a powerful antioxidant that helps the body absorption of vitamin A. It is an important nutrient, involved in various physiological metabolisms. Zn is present in the eye tissue in high concentrations, especially in the retina and the choroid. It has been shown that Zn shortages affect eye development, cataract, senile macular degeneration and even diabetic retinopathy. It is contained above all in animal-derived foods and can also be found in seafood, especially oysters, eggs, liver, beef and lamb. Individual dose calculation is advisable to assess that any supplementation, even as prevention, is necessary.[8]
13. **Selenium** performs an antioxidant action and protects the cells. It also helps absorption of vitamin E and is the iodine bond for the thyroid hormones. Individual dose calculation is recommended to avoid the need for supplementation. Selenium is contained in sunflower seeds, seafood, fresh tuna, sardines, cod and walnuts.
14. **Copper** and **manganese** are minerals with antioxidant properties, useful for eye health. Copper is found in seafood, shellfish, pulses, hazelnuts, chocolate, meat and whole grain. Manganese is present in green-leaved vegetables, pulses, fruit, beetroot and whole grain cereals.

An ideal test to inform us on the state of our minerals and metals, including any contaminations from heavy metals, is the hair mineral analysis, which should be performed at least once every two years.

Tips for a healthy diet

- International recommendations have always advised consuming 5 daily portions of fruit and vegetables, amounting to 5,000 ORAC (Oxygen Radical Absorbance Capacity) per day, necessary to maintain adequate (prebiotic) oxidant capacity.
- If possible, begin lunch and dinner with a healthy mixed salad dressed with EVO (extra virgin olive oil) and lemon juice. Alternatively, always eat fennel, carrots and celery (prebiotics).
- Eat a dish of vegetables every day, preferably lightly steam-cooked (prebiotics).
- Use lemon juice to dress salad and vegetables to ensure better iron absorption.
- Breakfast should be rich in carbohydrates, especially complex and whole grain ones, and ensure at least 40% of daily food requirements. It may also include a modest amount of proteins.
- Preferably eat fruit at breakfast and at intervals between the two principal meals (and not at the end of a main meal).
- Vary the menu between lunch and dinner and also during the week.
- Use seasonal food as far as possible.
- If you eat fish at a meal, you should avoid eating meat too.
- If you drink red wine, avoid drinking other alcoholic beverages.
- If you eat cheese, avoid drinking milk (cappuccino, etc.) or other dairy products. Give preference to cheese made from goats', cheese rather than cows', milk, and seasoned cheeses rather than fresh ones.
- Drink at least two liters of water a day, natural or only slightly sparkling.
- Reduce consumption of coffee, and of sparkling and sweet drinks.
- Always consider the glycemic index of the foods when preparing a meal. Avoid combining foods with a high glycemic index. For example, if you eat pasta, do not introduce other sugars into the same meal, such as bread, polenta or potatoes. When it is possible, do not take a dessert.
- Finish dinner by h. 20.00 if possible and avoid carbohydrates after h. 18.00.
- Increase consumption of herbal teas, ginger and turmeric.
- Make use, daily if possible, of fermented foods: kefir, miso, nattō or krauts (probiotics). Learn how to produce fermented foods at home.

- Avoid refined sugar and flour (including derivatives). Use, if at all, natural cane sugar and local, preferably ancient grain, flours. Use buckwheat from time to time, also for bread.
- Check that foods are as free as possible from pesticides, pollutants, endocrine disrupters and the like. Use zero km foods if possible.
- Always eat in the calmest, most relaxed atmosphere possible, preferring conviviality if you can.
- Chew for a long time. The digestive phase in the mouth is really important. Remember that man, more than what he eats, is what he digests. Our intestinal microbiota feeds on what we digest and makes us the "gift" of many very useful molecules: vitamins, including vitamin D, hormones and anti-inflammatory molecules.

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Eye disorders and nutrition

Dry eye

Dry eye syndrome is a disorder affecting the tear film and the ocular surface. The causes are multiple and may arise from two main potential causes:

1) inadequate tear secretion
2) deficit in tear composition.

The principal symptoms are:

- ***eye discomfort***, characterized by burning, sensations of extraneous body, difficulty in opening eyelids, especially on awakening.
- ***visual dysfunction***, such as cloudy vision, photophobia (intolerance to light), instability of the tear film with potential damage to the eye surface.

Among the **risk factors** we mention here:

1. Ageing, which may cause gradual atrophy of the tear glands.
2. Sex: women between 40 and 60 are more affected, probably because of the new hormone balance following menopause.
3. Pharmaceutical agents: hormones, immunosuppressors, anti-hypertensives, anti-histamines, anti-depressants and others.
4. Climate-environmental factors: air conditioning, dry climate, cigarette smoke, wind, smog.
5. Prolonged use of computer and television.
6. Nutritional deficit: insufficient intake of vitamin A.
7. Use of contact lenses.

Dry eye is a widespread condition. In its severest forms it may impact strongly on affected persons' quality of life.

When dry eye is not a secondary manifestation of more severe systemic disorders (such as multiple sclerosis or Sjögren syndrome), a symptomatic therapy is usually applied, with administration of eye drops or gels based on substances substituting tears, that is to say "artificial tears", which help alleviate symptoms of eye discomfort.

Recent studies have shown that a suitable **nutritional therapy** may also help to alleviate dry eye-related disorders. Regarding this, it has been shown that suitable intake of proteins, vitamins A, B6 and C, potassium and zinc are necessary

for normal tear functioning and improved stability of the tear film. Excessive excessive fat in the diet, incorrect salt intake, hypercholesterolemia and alcohol abuse are linked to greater frequency of tear dysfunction.

In the populations of the developed countries, where there are no particular problems of underfeeding, checks are nevertheless recommended on the correct proportion of macronutrient intake (proteins, fats and sugars). Individuals should consider increasing intakes of vitamin A (vegetables), zinc and folate (whole grain foods and pulses), vitamin B6 (walnuts, bananas, beans) and vitamin C (citrus fruits). At the same time, alcohol and caffeine consumption should be reduced and only moderate use should be made of salt as a food seasoning. It should not be forgotten that tears consist largely of water, so adequate hydration of the organism is essential. It is advisable, therefore, to drink at least two liters of water per day.

Separate treatment should be reserved for omega-3, mainly contained in fish and which has been shown by recent studies to be useful in prevention of eye surface diseases. The mechanism has not been completely explained, but the data obtained seem to show that omega-3 can help to improve the flow of secretion of the Meibomian glands, one of the components of the tear film, by diminishing its viscosity and at the same time reducing obstruction of the ducts, a condition that influences the onset of the dry eye syndrome.

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Vitreous body floaters or flying flies

Vitreous body floaters or "*flying flies*" (their scientific name is *myodesopsia*) are little dots, filaments, cobwebs or other moving bodies that float within the visual field. They are due to fibrils or accumulations of collagen that develop inside the vitreous body, caused by ageing, severe myopia or eye traumas.

The main symptoms are visual perception altered by spots of various shapes and sizes floating within the visual field, difficulty in reading and flashes of light.

The first therapeutic measure is to increase hydration: drinking abundantly favors re-expansion of the vitreous mass and reduces the movement of the fibrils,

allowing a significant reduction in the perception of floating bodies, with consistent improvement of the subjective visual perception.

The consumption of foods containing amino acids, collage precursors (glycine, proline and lysine) and hyaluronic acid (glucuronic acid, acetyl glucosamine), as well as vitamin C in the diet helps to provide substances useful for an adequate turnover of the natural constituents of the vitreous humor.

Foods that, for their antioxidant properties, are useful for relieving dysfunction due to fluidization of the vitreous humor are:

- Fruit (citrus fruits, kiwis, strawberries, blackcurrants) and vegetables (cabbages, spinach, tomatoes and potatoes) with high vitamin C content.
- Pulses, pasta and cereals, which are sources of essential amino acids.

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Age-related Macular Degeneration (AMD)

AMD is the main cause, in developed countries, of blindness in the over-60s. It is a chronic degenerative disease, with a gradual onset tending to become bilateral. It affects the ***macula***, the central region of the retina responsible for clear vision. There are two forms: ***dry*** (non-vascular) and ***wet*** (neovascular).

In its initial phase, the main symptom of AMD is an altered and distorted perception of images (lines becoming wavy). At times, opaque spots are present at the center of the visual field. In advanced stages, there is a gradual loss of vision, especially of central vision.

This disease has multiple causes. Nevertheless, the presence of predisposing retinal lesions increases with age. It seems, therefore, that it is in fact the ***ageing*** of the body that predisposes the onset of this disease. Other risk factors are family history, cigarette smoke, excessive alcohol consumption, diets rich in saturated fats and poor in fish, fruit and vegetables, as well as obesity; insufficient exercise and prolonged exposure to sunlight.

Among the processes at the origin of this disease, ***oxidative damage*** takes first place, while many epidemiological studies, based on questionnaires and clini-

cal observation, have shown the protective role of vitamins, trace metals (zinc, selenium, copper, magnesium, iodine, iron, manganese) and macular pigments (lutein and zeaxanthin).

In particular, in 2001 AREDS (Age Related Eye Disease Study) had the merit of showing with scientific data the importance of diet supplementation in AMD prevention.

It has also been shown that people with high antioxidant levels in the blood, especially carotenoids, have a lesser risk of developing AMD. Both prevention and therapy for AMD, therefore, require intervention on "modifiable" risk factors: life style and diet.

Regarding life-style, experts recommend:

1. quitting cigarette smoking
2. practicing a physical activity, moderate or intense according to the overall health condition
3. limiting exposure to ultraviolet rays, especially in the peak hours of solar radiation. UV rays should, in any case, always be screened with the use of protective sunglasses.

On a nutritional level, significant scientific evidence show that anthocyanins, contained in high concentration in bilberries, contribute to the health of the retina, inhibiting the production of free radicals.

Positive effects have also been demonstrated for lutein and zeaxanthin, which are found in spinach, cabbage, red chicory, lettuce and beets. Furthermore, vitamins A and C, carotenoids and selenium protect the macular zone, as does moderate consumption of red wine (with high phenol content).

List of main antioxidant substances	
Vitamin C	fruit and vegetables
Vitamin A	vegetable oils
Flavonoids	tea, coffee, soya, fruit, oregano, olive oil, chocolate, red wine
Carotenoids	fruit and vegetables (lutein, zeaxanthin, lycopene, astaxanthin)
Vitamin E	broccoli, green-leaved vegetables
Trace elements	zinc, copper and selenium (fish, shellfish, eggs, pulses, etc.)

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Diabetic retinopathy

Diabetic retinopathy is the most significant and most frequent ocular complication resulting from diabetes, both type 1 and type 2. In the industrialized nations, it accounts for the main cause of legal blindness among working age subjects. It is a pathological condition characterized by lesions affecting the retinal capillaries and which, according to the type and degree of the lesions, is classified as ***non-proliferative diabetic retinopathy*** and ***proliferative diabetic retinopathy***.

Proliferative diabetic retinopathy is characterized by the development of newly formed capillaries (neovascularization), which are extremely fragile and can exude liquid or burst, creating micro-bleedings.

A very serious complication of diabetic retinopathy is ***macular diabetic edema*** (***MDE***), which can severely impair central vision.

In its early stages, retinopathy is generally asymptomatic, since visual symptoms often appear only when the lesions are already advanced. This can limit the efficacy of any treatment. In general, diabetic retinopathy affects first the peripheral areas of the retina, but when the macula is involved there may appear, even in early stages, clouded vision and a marked visual impairment. Sudden visual loss may be due to an intraocular hemorrhage (hemovitreous) or occlusion of a large vessel (thrombosis).

The main risk factors associated with early onset and rapid progression of retinopathy are the duration of the diabetes, blood sugar imbalances and and high blood pressure.

In order to prevent and delay the appearance of retinopathy and macular edema, the diabetic patient should, first of all, make regular checks with a diabetologist, the family doctor and an ophthalmologist.

It is fundamental, moreover, that these patients check rigorously their blood sugar levels and blood pressure, as well as other metabolic parameters such as hypercholesterolemia.

Essential for this purpose are suitable ***physical activity***, ***compliance***, i.e. the patient's adherence to the prescribed medical treatment (oral hypoglycemic agents or insulin), and a ***suitable diet***.

Overeating leads, in fact, to an increase in the ***insulin requirements***, thus stimulating the pancreas to produce more.

A diabetic patient's ideal diet should be characterized by a controlled calorie intake and a balanced and complete range of foods, taking into consideration their calorie content:

- intake of rapidly absorbed ***simple sugars*** (glucose and saccharine) should be reduced, giving preference to slowly absorbed complex sugars (starch).
- daily ***carbohydrate*** intake should not exceed 50-55% of total calories.
- ***fibers*** should be consumed in high quantities, especially water soluble fibers, that are able to slow intestinal absorption of carbohydrates and cholesterol.
- ***proteins*** should constitute around 15%-20% of total calories and at least a third should be from animal origin, which are rich in essential amino acids.
- the remaining calories (25%-30%) should be provided by ***fats***, if possible of ***vegetable origin***.
- there should be suitable intake of ***vitamins*** and ***mineral salts***.

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RED TUNA IN ONION STEW

Ingredients for 4 persons

- 600 g fresh red tuna
- ½ kg onions
- Oil
- Salt
- Pepper
- Vinegar
- Sugar

Procedure

1. clean the onion and cut it into julienne strips
2. stew with oil and cook, adding salt, sugar and vinegar to taste
3. cut the tuna in slices of 150 g each
4. lightly cook (ideally rare) in frying pan with a sliver of oil
5. serve by laying the onion stew base with the tuna slices on top

- **Fresh red tuna** contains many proteins and essential omega-3 fats, especially types EPA and DHA, which are very important against hypercholesterolemia. It is also rich in iron, thiamin, riboflavin, niacin and retinol, all hydrosoluble and liposoluble vitamins. Its omega-3 content makes it useful for prevention of tumors, especially breast cancer, and for combatting cognitive decay in the elderly.
- **Onion** is a vegetable rich in trace elements (sulphur, iron, potassium, magnesium, fluorine, calcium, manganese and phosphorus), vitamins (A, complex B, C, E), flavonoids with diuretic action and glucokinin, a vegetable hormone with an antidiabetic action. It can boast antioxidant and anti-inflammatory properties and its consumption produces diuretic and detox effects, lower sugar levels and a tonifying action on the digestive tract.

MUSSEL AND PECORINO CHEESE RISOTTO

Ingredients for 4 persons

- 240 g Carnaroli rice
- 1.5 Kg cleaned raw mussels
- 100 g seasoned pecorino cheese
- Pepper
- Butter
- Vegetable broth
- Lemon zest

Procedure:

1. open mussels and remove from shells
2. toast rice with butter, salt and begin to soak with vegetable broth
3. cook the rice, soaking it in vegetable broth
4. as soon as the rice is cooked, stir in butter, pecorino cheese and lemon zest till creamy
5. serve the rice with mussels on top

- **Rice** is a grain characterized by high digestibility and a capacity to regulate the intestinal microbiota. It possesses an essential amino acid, lysine, and good quality proteins. Regarding its lipid content, it contains above all essential fatty acids. It has a lot of potassium and little sodium and is, therefore, a food suitable for those suffering from hypertension.
- **Mussels** are bivalve mollusks, rich in useful substances, such as selenium, which can favor good functioning of the immune system and acts as an antioxidant. It also contains riboflavin, which has a role in regulating the humor, participates in communication between nerve cells and favors good use of iron. Mussels contain, moreover, omega-3 fatty acids, which are important allies of our health and, in particular, the heart and arteries. Mussels are, however, also rich in sodium and cholesterol, which are both enemies of our cardiovascular system. They should therefore be eaten in moderation. It is essential, furthermore, to ensure they come from a reliable source, since they can be contaminated by polluting agents.

PUMPKIN FLOWER TEMPURA

Ingredients for 4 persons

- 8 pumpkin flowers
- 500 g finely ground wheat flour
- 0.75 ml sparkling water
- 100 g fresh ricotta cheese
- Salt
- Pepper

Procedure:

1. clean the flowers, removing the inner and outer stalks
2. stir the water and flour in a bowl vigorously with a whip then let them stand for 10 minutes to make the batter crisp when fried
3. prepare filling with ricotta, salt and pepper
4. insert the filling in the flowers with a pastry bag
5. batter the flowers and fry for 3 minutes

- **Frying:** frying does no harm once in a while, the important thing is not to exaggerate and to take care not to use again the fat (oil if possible) used for frying.
- **Fresh ricotta cheese** is a dairy product, classed among low-fat cheeses. Its nutritional features make it a complete and digestible food. It can be recommended for hypocaloric or cholesterol lowering diets.
- **Pumpkin flowers** are a delicate, but tasty, vegetable, rich in vitamins A, B1, B2, B3, B9 and C and in minerals such as iron, calcium, magnesium and potassium. Their calcium content makes them useful against osteoporosis.

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