

NUTRITION AND DIET

0.- INTRODUCTORY FACTS.

- Nowadays, DIET is the most important environmental (not genetic) factor influencing our health condition. Overweight or underweight people have greater risks of suffering health disorders such as: hypertension, cholesterol, obesity, etc..
- We must be aware of the alimentation relevance in our health and how important it is to develop good habits.
- Before you move forward try to think about your diet.

CONCEPTS.

1.- *NUTRITION*; we use this word to define all the internal biological processes which take place in our body during digestion. It is involuntary.

Nutrition has three different objectives:

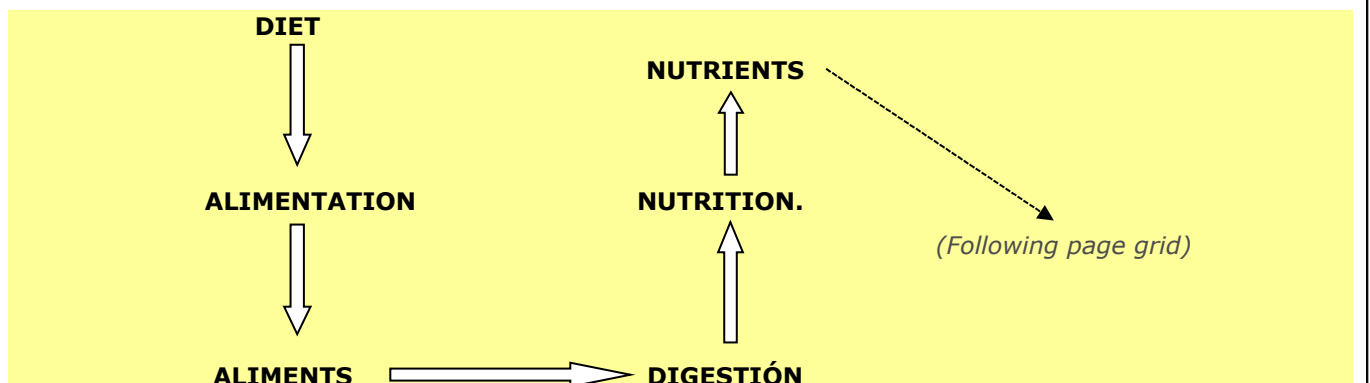
- Supply energy.
- Adjust and balance metabolism.
- Build different tissues: bones, muscles, tendons....

2.- *ALIMENTATION*; it is a voluntary, conscious, variable and educable process of selecting, preparing and taking aliments. We can make personal decisions about our alimentation.

3.- *NUTRIENTS*; components released during digestion and derived from aliments breakdown (carbohydrates, fats, proteins vitamins and minerals salts)

4.- *ALIMENTS* any substance or product that may be included in our diet.

5.- *DIET*: whole group of aliments we consume daily.

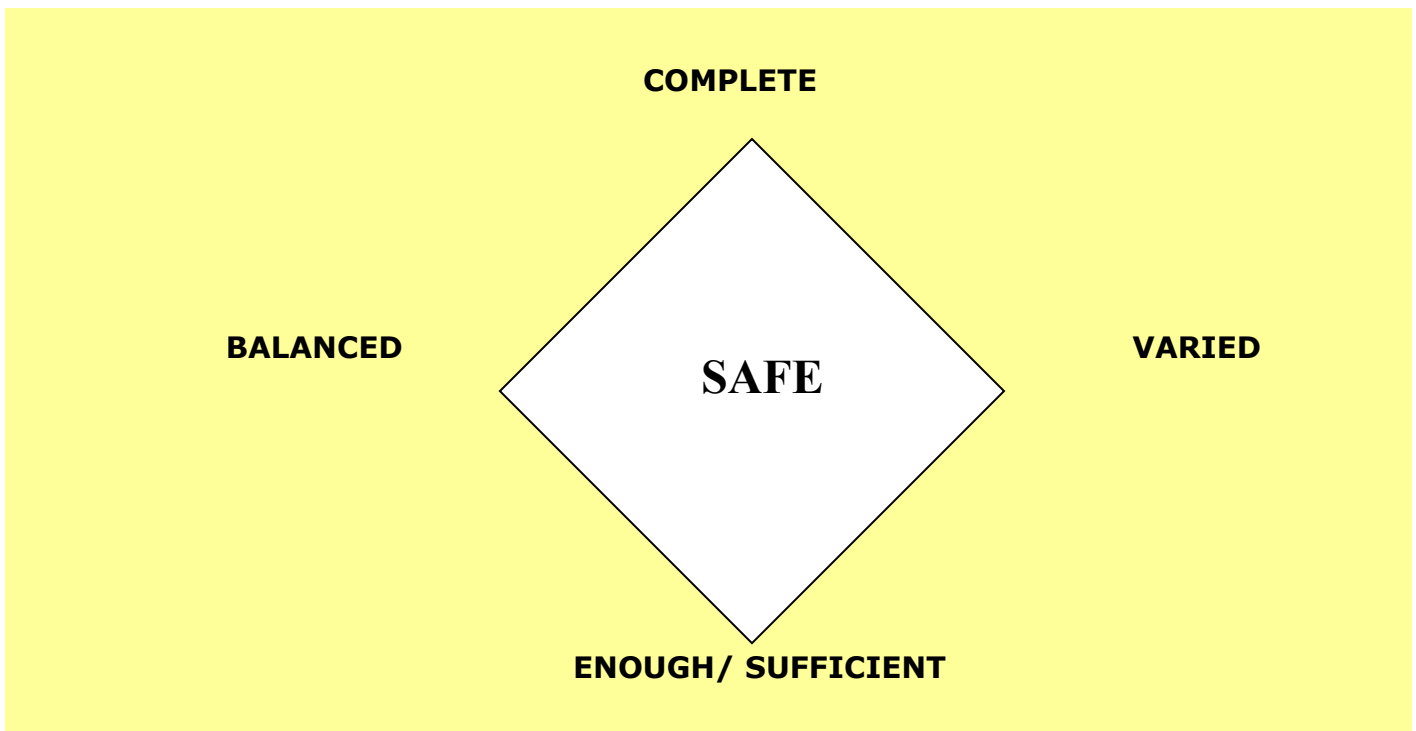


NUTRIENTS

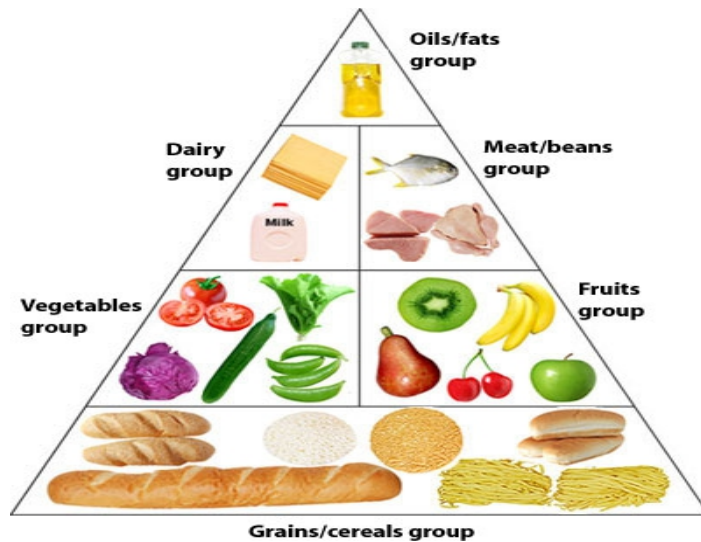
<u>CARBOHYDRATES</u>	<u>FATS.</u>	<u>PROTEINS.</u>
1gr= 4 Kcal. Supply energy in a very quick and effective way. "Fibre" (1gr= 2 Kcal) is included here although doesn't provide calories.	1gr= 9 Kcal Alcohol (1 gr = 7 Kcal) Provide a lot of energy but it is more difficult to process in our organism. That's the reason why we store it in our body, because it is difficult to "use" it. The only good way to remove it is physical activity.	1gr = 4 Kcal They are responsible for building tissues: bones, muscles... They can be animal or vegetable. First ones are essential
<u>VITAMINS AND MINERAL SALTS.</u> <i>(Micronutrients).</i>	Indispensable for keeping our organic functions. They don't provide calories.	

1.- HEALTHY DIET.

*FEATURES.



- COMPLETE; our diet must provide aliments from all the groups.



- BALANCED;
 - ⊖ CARBOHYDRATES: 50- 60% (daily nutrients intake).
 - ⊖ PROTEINS; 10- 15%(daily nutrients intake).
 - ⊖ FATS; 30% (daily nutrients intake).
 - ⊖ WATER; it depends on the amount of calories but generally speaking we should drink 1ml per calorie consumed.
- ENOUGH; must reach our personal energetic needs and keep basic health levels.
- SAFE; we should follow basic hygienic rules and keep a healthy diet compatible with our daily life, providing enough nutrients.

- VARIED;



The eatwell plate

Use the eatwell plate to help you get the balance right. It shows how much of what you eat should come from each food group.



2. -ENERGETIC NEEDS.

Our energetic needs are expressed in Calories and we can estimate them with this formula

<p>ENERGETIC NEEDS (minimum amount of calories we should have every day) = Basal Metabolic Rate+ Daily Activity = "x" Cal./ day.</p>
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Basal Metabolic Rate: refers to the minimum amount of energy -- in the form of [calories](#) -- that your body requires to complete its normal functions, such as breathing, breaking down food, and keeping your heart and brain working. Age, gender, weight, and physical activity directly effect on basal metabolic rate. BMR varies from person to person and increases with your amount of muscle tissue. Exercising increases your BMR, and it can stay raised after 30 minutes of moderate physical activity. Many people's BMR stays increased for approximately 48 hours following exercise. We must estimate this BMR when at rest, while fasting and at comfort temperature (22° C). We use the following formula:

<p>Girls = weight in Kg. x 0´95 x 24.</p>
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<p>Boys = weight in Kg. x 1 x 24.</p>
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Furthermore, if we want to determine our final energy needs we must add the energy consumption for different activities.

DAILY ACTIVITY ENERGY EXPENDITURE

Activity	Energy Expenditure (calories/min/kg)	Activity	Energy Expenditure (calories/min/kg)
Racquetball (recreational)	0.07	Cycling (light, <10 mph)	0.12
Kayaking (leisure)	0.04	Cycling (light-moderate, 10-12 mph)	0.10
Dancing (general)	0.08	Cycling (moderate, 12.1-14 mph)	0.14
Golf (walking + bag)	0.09	Cycling (hard, 14.1-16 mph)	0.18
Running (5 mph, 12 min/mile)	0.12	Cycling (v. hard, 16.1-19 mph)	0.21
Running 5.5 mph (11 min/mile)	0.14	Cycling (stationary, 50W)	0.05
Running (6 mph, 10 min/mile)	0.16	Cycling (stationary, 100W)	0.09
Running (6.6 mph, 9 min/mile)	0.19	Cycling (stationary, 150W)	0.12
Running (7.5 mph 8 min/mile)	0.22	Cycling (stationary, 200W)	0.18
Running (8.6 mph, 7 min/mile)	0.24	Cycling (stationary, 250W)	0.22
Running (10 mph, 6 min/mile)	0.28	Calisthenics (push-ups, etc.)	0.08
Chopping Wood	0.09	Circuit Training	0.14
Mowing Lawn (walking, power)	0.08	Weight Training (light)	0.05
Raking Leaves	0.07	Weight Training (hard)	0.10
Trimming (manual)	0.07	Rowing (50W)	0.06
Weeding/Gardening	0.07	Rowing (100W)	0.12
Sitting Activities (very light)	0.03	Rowing (150W)	0.15
Standing (very light)	0.04	Rowing (200W)	0.21
Walking (3 mph 20 min/mile)	0.06	Stretching/Yoga	0.06
Walking (3.5 mph, 17 min/mile)	0.07	Aerobics (low impact)	0.09
Walking (4 mph 15 min/mile)	0.08	Aerobics (high impact)	0.12
Sweeping	0.05	Volleyball (recreational)	0.05
Washing Car	0.07	Bathing/Dressing	0.04
House Cleaning	0.06		0.02
Washing Dishes/Ironing	0.04		0.03
Cooking Food	0.04	Swimming (light)	0.10
Carrying Groceries (light)	0.07	Swimming (moderate)	0.14
Laundry Folding/Making Bed	0.04	Sleeping	0.02
Playing with Kids (sitting)	0.04	Child Care (sitting)	0.05
Playing with Kids (standing)	0.05	Child Care (standing)	0.06

Adapted from McArdle, W., Katch, F., & Katch, V. (2001). *Exercise Physiology: Energy, Nutrition, and Human Performance* (5th Ed.). Philadelphia: Lippincott Williams & Wilkins.

Age is another significant determinant in order to consider our energy needs. As we get older we need fewer calories, therefore:

- If you are under 25: you must 300 calories to the formula.
- Between 25 and 45: keep the formula as it is.
- Over 45 years old: 100 calories less every ten years.

3.- ENERGY BALANCE.

Energy balance describes the relationship between the calories (energy) consumed in foods and beverages and the calories (energy) burned by the body. For most people, when calories (IN) = calories (OUT), body weight remains stable, which is a desirable condition for adults who are at a healthy weight. When intake consistently exceeds expenditure, body weight increases. When more calories are consistently burned than consumed, weight loss occurs.

$$\text{Calories (Energy) IN} = \text{Calories (Energy) OUT}$$

Our body weight will be then the result of this balance and inherited factors that we can hardly modify. These are the only facts we must consider in order to manage our body weight.

BODY WEIGHT = Calories Balance + Inherited Conditions + What and When we eat.

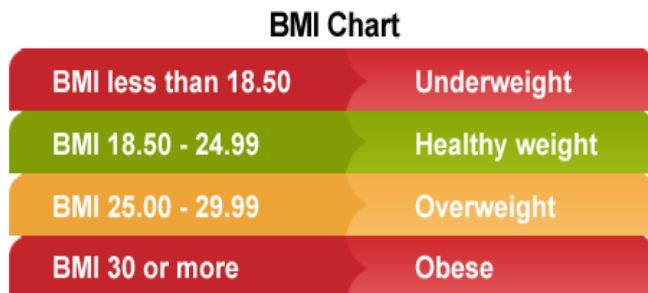
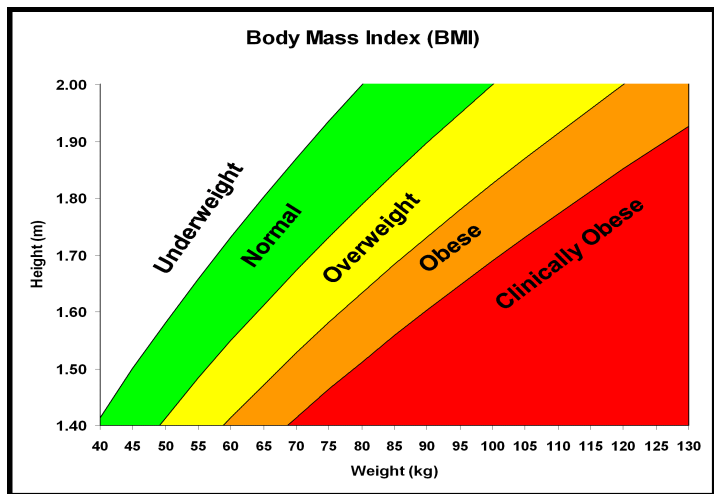
If we want to keep a healthy stable weight we should increase the amount of physical activity and not only reduce the calories we have. Active life enables:

- Keeping our weight stable in the long term.
- Increases Metabolic Rate.
- Reduce appetite.

4.- MY HEALTHY WEIGHT.

We can use the following formula to determine if our body weight is healthy or not. Anyways this is only an approach and we certainly need to confirm with the doctor. For example, a person with great muscle development may be listed as overweight even though he is completely healthy.

$$\text{Body Mass Index} = \frac{\text{Weight (in kg)}}{\text{Height}^2 \text{ (in m)}}$$



In Spain we use [Orbegozo](#) Table to estimate our healthy weight and underweight or obesity ranges. We you are under 18 and therefore not totally developed this document will be the most reliable one if you are using the BMI formula.

PUNTOS DE CORTE DE IMC PARA DELGADEZ GRADO 1 Y 2, SOBREPESO Y OBESIDAD								
m: meses a: años P: percentil								
EDAD	VARONES				MUJERES			
	Delgadez 2	Delgadez 1	Sobrepeso	Obesidad	Delgadez 2	Delgadez 1	Sobrepeso	Obesidad
	P0.4	P4	P79	P97.5	P1.6	P10	P89	P99
m	10,7	11,5	13,7	14,9	10,8	11,5	14,2	15,6
3 m	13,4	14,3	17,6	19,4	13,7	14,6	17,9	19,7
6 m	14,3	15,2	18,7	20,9	14,4	15,4	18,9	20,9
9 m	14,7	15,6	19,1	21,3	14,9	15,8	19,4	21,5
12 m	14,7	15,6	18,9	21,1	14,7	15,7	19,2	21,3
15 m	14,7	15,5	18,8	20,9	14,6	15,5	19,0	21,1
18 m	14,6	15,5	18,7	20,8	14,6	15,5	18,9	21,0
21 m	14,4	15,2	18,4	20,5	14,5	15,4	18,8	20,8
24 m	14,1	14,9	18,0	20,0	14,3	15,2	18,5	20,6
2,5 a	13,6	14,4	17,4	19,6	13,9	14,8	18,1	20,2
3 a	13,3	14,1	17,3	19,7	13,6	14,4	17,9	20,2
3,5 a	13,3	14,0	17,3	19,8	13,3	14,2	17,9	20,4
4 a	13,2	14,0	17,3	19,8	13,2	14,1	17,9	20,6
4,5 a	13,2	14,0	17,3	19,9	13,2	14,1	18,0	20,6
5 a	13,2	14,0	17,3	19,9	13,2	14,1	18,0	20,7
5,5 a	13,2	14,0	17,4	20,0	13,2	14,1	18,0	20,7
6 a	13,2	14,0	17,4	20,1	13,1	14,1	18,1	20,9
6,5 a	13,1	14,0	17,6	20,5	13,1	14,1	18,4	21,5
7 a	13,1	14,0	17,8	21,0	13,2	14,3	18,9	22,4
7,5 a	13,2	14,1	18,1	21,6	13,3	14,4	19,5	23,4
8 a	13,3	14,2	18,6	22,4	13,4	14,6	20,0	24,1
8,5 a	13,4	14,4	19,1	23,5	13,5	14,8	20,5	24,7
9 a	13,5	14,6	19,8	24,6	13,6	14,9	20,9	25,2
9,5 a	13,6	14,8	20,2	25,3	13,7	15,1	21,2	25,6
10 a	13,7	14,9	20,4	25,6	13,8	15,3	21,6	26,1
10,5 a	13,8	14,9	20,7	26,0	14,0	15,5	21,9	26,4
11 a	13,9	15,1	20,9	26,3	14,1	15,6	22,1	26,6
11,5 a	14,0	15,3	21,2	26,7	14,2	15,7	22,3	26,8
12 a	14,2	15,5	21,5	27,0	14,3	15,9	22,5	27,0
12,5 a	14,4	15,7	21,8	27,3	14,6	16,1	22,8	27,4
13 a	14,5	15,9	22,1	27,6	15,0	16,5	23,2	27,9
13,5 a	14,7	16,1	22,4	27,9	15,3	16,9	23,6	28,4
14 a	15,0	16,3	22,7	28,2	15,6	17,2	23,9	28,8
14,5 a	15,2	16,6	23,1	28,5	15,9	17,4	24,2	29,1
15 a	15,5	16,9	23,4	28,9	16,2	17,8	24,4	29,4
15,5 a	15,8	17,3	23,8	29,2	16,5	18,0	24,7	29,6
16 a	16,1	17,5	24,1	29,5	16,8	18,2	24,8	29,8
16,5 a	16,3	17,8	24,3	29,6	16,9	18,4	24,9	29,9
17 a	16,6	18,0	24,5	29,7	16,9	18,4	25,0	29,9
17,5 a	16,8	18,2	24,7	29,8	17,0	18,4	25,0	29,9
18 a	17,0	18,5	25,0	30,0	17,0	18,5	25,0	30,0

5 .- GLYCEMIX INDEX.

Describes the rate of carbohydrate digestion and its effect on the rise of blood glucose. Foods that are digested rapidly and cause a pronounced rise in blood sugar have a high GLYCEMIX INDEX. Those digested slowly have low index. Low index foods supply energy for a longer time and therefore reduce appetite.

Low Glycemic Foods List 0 - 55	Medium Glycemic Foods List 56 - 70	High Glycemic Foods List 70+
Most non starchy vegetable <15 Peanuts <15 Low-fat yogurt, no sugar<15 Tomatoes 15 Cherries 22 Peas 22 Plum 24 Grapefruit 25 Pearled barley 25 Peach 28 Can peaches, natural juice 30 Soy milk 30 Baby lima beans 32 Fat-free milk 32 Low-fat yogurt, with sugar 33 Apple 36 Pear 36 Whole wheat spaghetti 37 Tomato soup 38 Carrots, cooked 39 Apple juice 41 All-Bran 42 Canned chickpeas 42 Custard 43 Grapes 43 Orange 43 Canned lentil soup 44 Macaroni 45 Pineapple juice 46 Banana bread 47 Long-grain rice 47 Bulgur 48 Canned baked beans 48 Grapefruit juice 48 Green peas 48 Oat bran bread 48 Old-fashioned porridge 49	Canned kidney beans 52 Kiwifruit 52 Orange juice 52 Banana 53 Potato chips 54 Special K 54 Sweet potato 54 Brown Rice 54 Linguine 55 Oatmeal cookies 55 Popcorn 55 Sweet corn 55 Muesli 5 White rice 56 Pita bread 57 Blueberry muffin 59 Bran muffin 60 Hamburger bun 61 Ice cream 61 Canned apricots, light syrup 64 Macaroni and cheese 64 Raisins 64 Couscous 65 Quick-cooking porridge 65 Rye crisp-bread 65 Table sugar (sucrose) 65 Instant porridge 66 Pineapple 66 Taco shells 68 Whole wheat bread 68	Bagel 72 Corn chips 72 Watermelon 72 Honey 73 Mashed potatoes 73 Cheerios 74 Puffed wheat 74 Doughnuts 75 French fries 76 Vanilla wafers 77 White bread 79 Jelly beans 80 Pretzels 81 Rice cakes 82 Mashed potatoes, instant 83 Cornflakes 84 Baked potato 85 Rice, instant 91 French bread 95 Parsnips 97 Dates 100 Compiled by: www.LowGIHealth.com.au from various sources

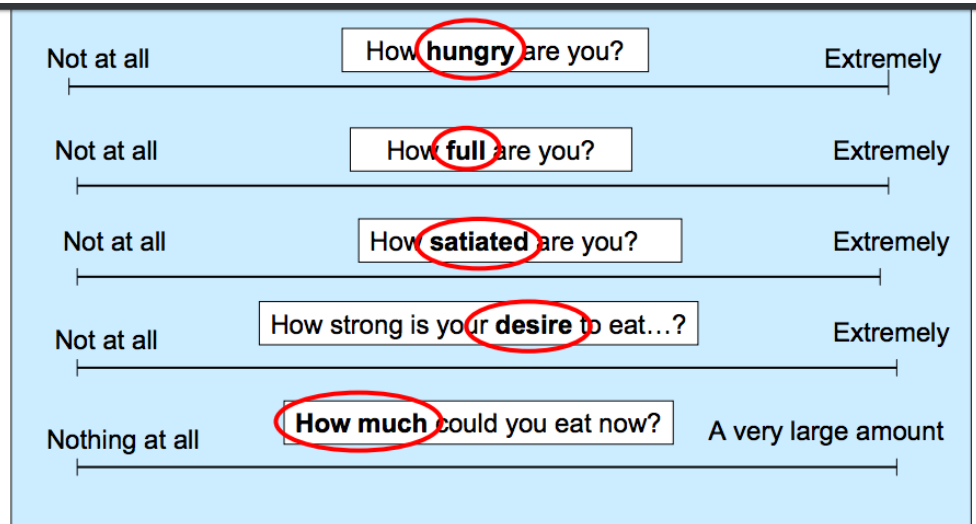
6 .- HUNGER, SATIETY & SATIATION.

GLYCEMIX INDEX is directly linked to SATIETY. Low Glycemic Index will cause High Satiety levels and therefore we can control our energy intake. The type of food we eat may lead the amount of it we have.

- Hunger:
 - [a compelling need or desire for food
 - [the painful sensation or state of weakness caused by the need of food
 - [• □ Satiety • □ Hunger • □ energy intake?
- Satiation – prompts the termination of eating
- Satiety – fullness that persists after eating

- Both are important in controlling energy intake – Satiation – amount consumed at one sitting – Satiety – length of time until next eating occasion

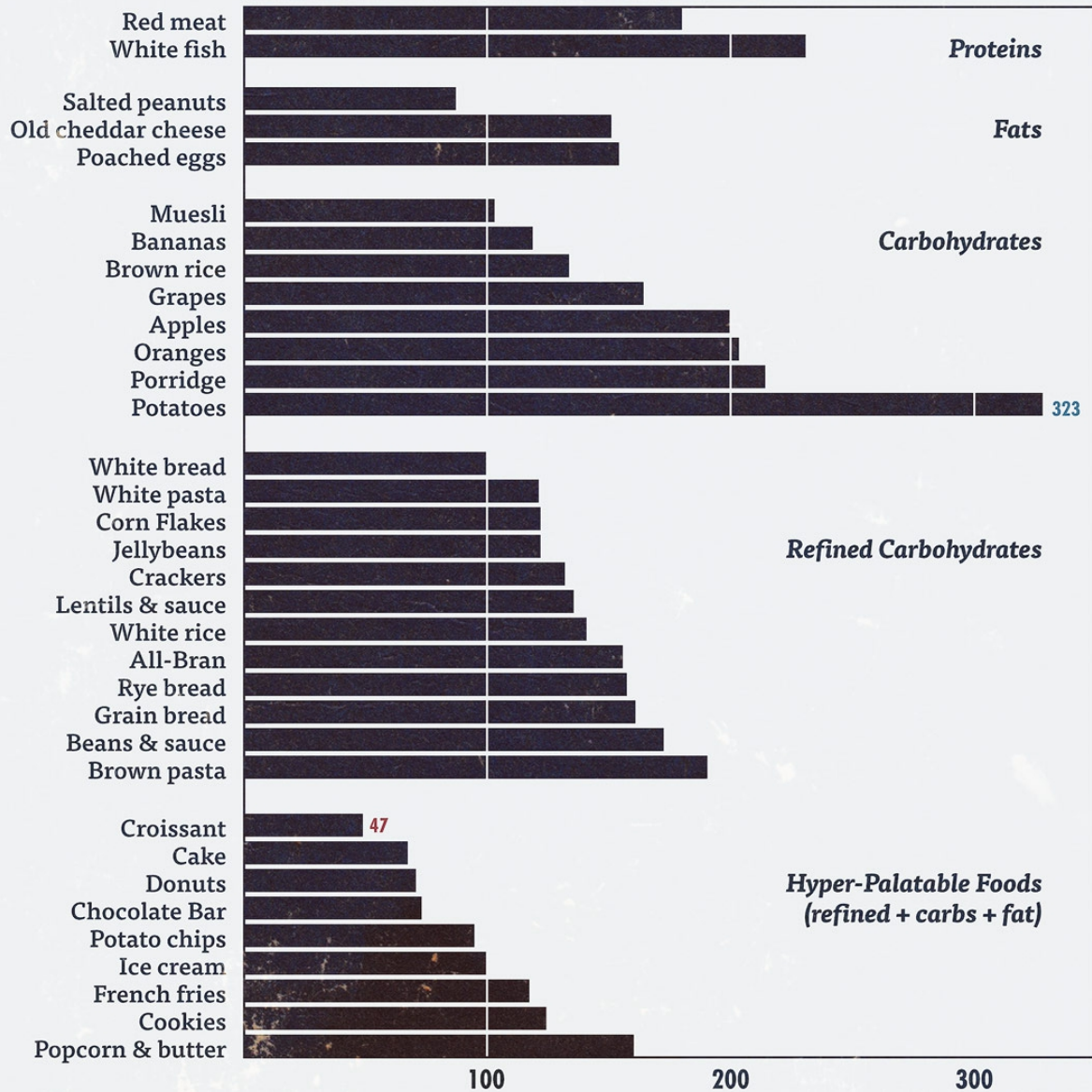
Measuring satiation & satiety



by the British Nutrition Foundation.

THE SATIETY INDEX

(The Bony to Beastly Version)



Holt, S.H., Miller, J.C., Petocz, P., Farmakalidis, E. (Department of Biochemistry, University of Sydney, Australia.)
 "A satiety index of common foods." European Journal of Clinical Nutrition, Volume 49, September 1995, pages 675-690.

6.-WAYS THAT PROCESSED FOODS ARE HARMING PEOPLE. By Kris Gunnars.

Foods that have been *chemically* processed and made solely from refined ingredients and artificial substances, are what is generally known as “processed food.”

1. *Processed Foods Are Usually High in Sugar and High Fructose Corn Syrup:*

Many studies show that sugar can have **devastating** effects on metabolism that go way beyond its calorie content.

It can lead to insulin resistance, high triglycerides, increased levels of the harmful cholesterol and increased fat accumulation in the liver and abdominal cavity.

2. *Processed Foods Are “Hyper Rewarding” and Lead to Overconsumption:*

Food manufacturers spend massive amounts of resources on making their foods as “rewarding” as possible to the brain, which leads to overconsumption. For many people, junk foods can hijack the biochemistry of the brain, leading to downright addiction and cause them to lose control over their consumption.

3. *Processed Foods Contain All Sorts of Artificial Ingredients:*

Preservatives: Chemicals that prevent the food from rotting.

[**Colorants:** Chemicals that are used to give the food a specific color.

[**Flavor:** Chemicals that give the food a particular flavor.

[**Texturants:** Chemicals that give a particular texture.

4. *Processed Foods Are Often High in Refined Carbohydrates:*

The carbohydrates you find in processed foods are usually refined, “simple” carbohydrates. These lead to rapid spikes in blood sugar and insulin levels and cause negative health effects.

5.- *Most Processed Foods Are Low in Nutrients:*

In some cases, synthetic vitamins and minerals are added to the foods to compensate for what was lost during processing.

However, synthetic nutrients are NOT a good replacement for the nutrients found in whole foods.

6.- *Processed Foods Tend to be Low in Fiber:*

Fiber, especially soluble, fermentable fiber, has various benefits.

One of the main ones is that it functions as a prebiotic, feeding the friendly bacteria in the intestine.

There is also evidence that fiber can slow down the absorption of carbohydrates and help us feel more satisfied with fewer calories

7.- *It Requires Less Energy and Time to Digest Processed Foods:*

The Thermic Effect of Food (TEF) is a measure of how much different foods stimulate energy expenditure after eating. It totals about 10% of total energy expenditure (metabolic rate) in the average person.

According to this study, people who eat processed food will cut their TEF in half, effectively reducing the amount of calories they burn throughout the day.

8.- *Processed Foods Are Often High in Trans Fats or Processed Vegetable Oils:*

Several studies show that when people eat more of these oils, they have a significantly increased risk of heart disease, which is the most common cause of death in Western countries today.

If the fats are hydrogenated, that makes them even worse. Hydrogenated (trans) fats are among the nastiest, unhealthiest substances you can put into your body.

7.- HOW TO ORGANIZE FOOD AND NUTRIENTS DURING THE DAY.

This is another very important feature if we want to keep a healthy and balanced diet. Since different nutrients have different purposes and we have different needs during the day we must think on how to organize the food intake. Here you have some suggestions.

1.- **In the morning**, after fasting for seven hours, we need ENERGY to start our day. As you know, the main energy source is found in CARBOHYDRATES AND FATS. Therefore as breakfast those would be the favorite nutrients together with vitamins, mineral salts and water/ liquids (juice or similar)

2.- **In between meals** ("meriendas") must provide easy digestion aliments to keep sugar level balanced (we can perform efficiently in physical and mental activities) and prevent starving before main lunches. PROTEINS or non-processed CARBOHYDRATES are the best choice. For example: fruits, yoghurts, etc...

3.- **Main lunch**, after school, must provide a little bit of everything. If we are going to be active physically or mentally you should pay special attention to carbohydrates (they are the only valid source of energy for our brain).

4.- **Before we go to bed** we need nutrients less energetic efficient. Carbohydrates are not as important but we will add more low fat PROTEINS which will help our rest and boost the tissues reconstruction while we are asleep. Try to have dinner at least 90 minutes before you go to bed.

8.- SUGGESTIONS FOR A HEALTHY DIET.

- ✓ Have **BREAKFAST** as soon as you wake up. It is the most important part of our diet and it is essential to keep rest of our meals healthy. Breakfast means 20 to 25 % of our final calorie intake.
- ✓ **Distribute** your food intake in 5 different meals. It is healthier and much more efficient to have 5 five small meals than two big ones. That way we keep our sugar level balanced and stable.
- ✓ “ Desayuna como un rey, come como un príncipe y cena como un mendigo”.
- ✓ **Never skip meals.** That leads to weight gain and breaks organism and metabolism balance.
- ✓ In order to help our metabolism and endocrine system you must add **fiber** to our diet. They don't supply much energy but even tough, are necessary for keeping basic functions active.
Fruit and vegetables are the main source of fiber and vitamins.
- ✓ A healthy **eating pattern** limits intake of sodium, solid fats, added sugar, and refined grains. Forget Hydrogenated fats (Trans- fatty acids).
- ✓ Besides energy and nutrients, the body needs an ample supply of water. **Water** serves to transport energy, gases, waste products, hormones and heat. It is also involved in the regulation of acid- base balance (cause of muscles injures; cramps, soreness, pulls). The inactive person needs 2.5 liters daily to replace water lost (food and water are the main sources). If you practice physical activities it's sure you must add more than that. You can assess your level of hydratation by observing the color of your urine. The darker the more dehydrated. Loosing weight through sweat loss is not a good idea. It is dangerous for your health so you should replace it as soon as possible.
- ✓ **Soda and energetic drinks** are damaging for our health. They are addictive and have high chemical composition which is difficult to digest and process for our organism.
- ✓ In a healthy diet, **dietary supplements** are not necessary as far as you don't want to achieve specific objectives which should be verified by a professional on health and nutrition.
- ✓ Don't forget to **stick to a diet** that you can maintain for a long period.
- ✓ Not everybody needs to eat less...: - Eating disorders,- Illness, Elderly adults, Teen agers, Athletes, Growing up people, Intense physical or intellectual activity.