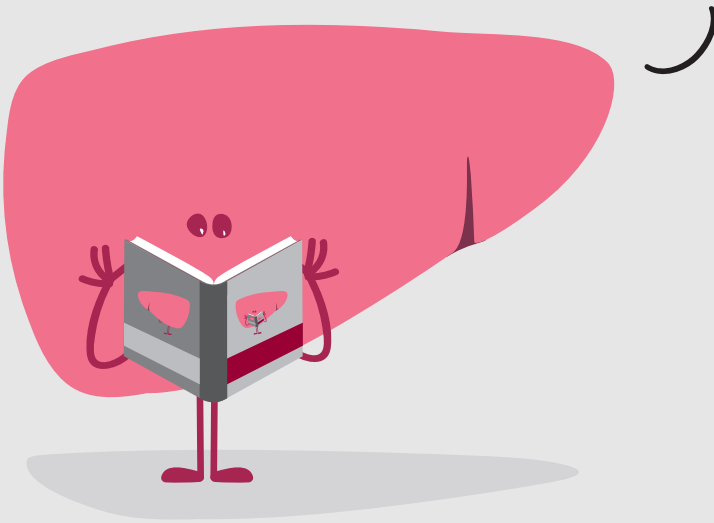


# **NASH:**

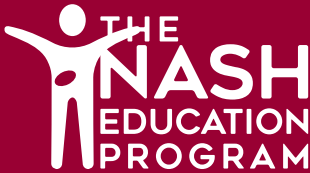
**An Explanatory  
Guide for Patients  
and their Families**



**TO BETTER UNDERSTAND**

**NONALCOHOLIC**

**STEATOHEPATITIS (NASH)**



**The NASH Education Program™** is a major stakeholder in fighting and raising awareness about **NonAlcoholic SteatoHepatitis**.

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Working worldwide since its launch in 2017, The NASH Education Program, a cross disciplinary initiative, aims at bringing together all major NASH stakeholders: physicians from all relevant specialties (hepatologists, diabetologists, cardiologists, general practitioners); patients, populations at risk and their families; health authorities; industry experts; general public and media. The endowment fund's mission is to create and disseminate scientific and medical information about NASH, to improve the clinical management of patients and populations at risk.

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**The Program's awareness initiatives rely on:**

- Evaluating NASH patients' needs to improve the support they receive as part of the patient journey.
- Creating a bridge between physicians from all specialties and patients or individuals at risk, in order to improve and optimize patient clinical management.
- Designing and making scientific and medical educational material available to all.
- Improving the media exposure of this global silent epidemic in order to raise awareness in the general public and reduce high-risk behavior.

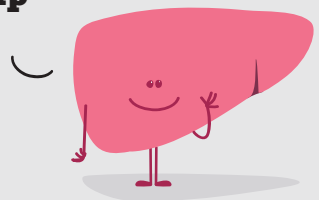
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**Hi I'm Mac'Liver, your liver, and together with my friends, I'll help you to better understand NASH!**

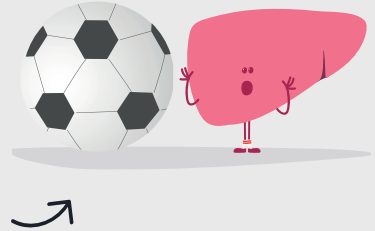


# THE LIVER: A CENTRAL ORGAN

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The liver is an organ that weighs an average of **1.5 kilograms**, and is located at the upper right area of your abdomen, protected by the lowest ribs. A healthy liver cannot be palpated as it is under the ribcage.

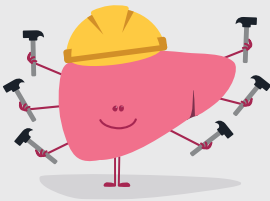
**Did you know?:** Even though it's only **10 cm high**, an average-sized liver has the **same volume as a soccer ball**, making it the 2<sup>nd</sup> biggest organ in the human body after the skin.



The liver has **600+ functions in the body**. Its main functions are:

## #1 : Production

The liver plays a central role in controlling blood sugar levels and is essential in the production of bile, proteins, fats and some hormones.



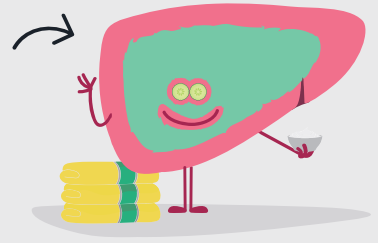
## #2 : Detoxification

The liver filters all molecules in the body (medicines, alcohol, food...)

## #3 : Processing fats

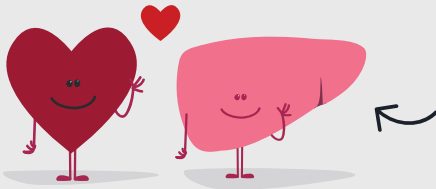
The liver processes fats in the body: production, transformation, transport. The liver is not made to store fat, but in a healthy liver, up to 5% of liver cells may contain fat "droplets".

**Did you know?** The liver is an exceptional organ. It has the remarkable capacity of regenerating when it's damaged!



## The Liver and the Heart: a love story

The liver is an important organ, which lies at the centre of essential metabolic processes. It balances out good cholesterol (HDL) and bad cholesterol (LDL).



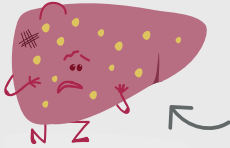
This means the liver is of paramount importance in the proper functioning of the cardiovascular system.

## The origin of the word "melancholy":

During Antiquity, the liver was considered as the centre for our emotions, which is a role typically attributed to the heart today. People thought then that anger and sadness took their origin in the liver. The word "melancholy" comes from the Ancient Greek "melas", black and "chol", bile, meaning "black bile". Melancholy is a state of sadness, pensiveness.

# NASH: WHAT IS IT?

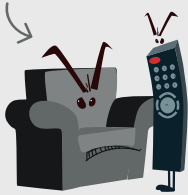
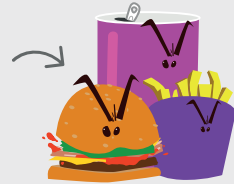
## NASH: a severe form of "NAFLD"



NASH, or NonAlcoholic SteatoHepatitis, is a liver disease from the family of NAFLD, «Non-alcoholic fatty liver diseases».

## Consequence of modern lifestyles

In most cases, NASH is the consequence of **high sugar, high fat diets, and insufficient physical exercise.**



NASH is closely linked to **overweight, obesity and type 2 diabetes.** This is why it is qualified as a "metabolic" disease.

NASH is an **asymptomatic disease**, meaning patients often have no symptoms until advanced stages. This makes NASH a **difficult disease to diagnose.**



## Did you know?

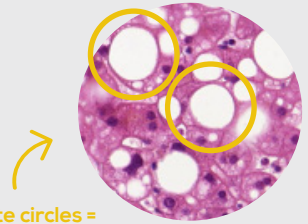
"Hepatitis" does not only refer to viral diseases (such as hepatitis B and C). The word hepatitis derives from the Greek "hepatos" meaning "that comes from the liver". A liver disease is called hepatitis when it provokes the inflammation of the liver. (see opposite)

# FROM STEATOSIS TO NASH

## The accumulation of fat: steatosis

Sugar is transformed into fats by the liver so it can be stored in case of future need. When the sugar and fat intake is **too high**, the liver produces and stores fat in excess.

When the percentage of **fatty liver cells exceeds 5%**, it is said there is **«steatosis»** (literally “fat increase”).



white circles =  
accumulation of fat in the cells

At this stage, the liver is usually bigger than the norm, and appears white on ultrasounds (some say it is “shiny”).

In some patients, the accumulation of fat will remain benign.

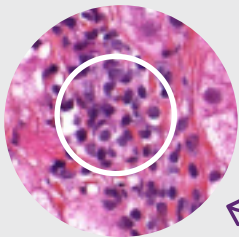
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## 2 characteristic lesions: inflammation and ballooning

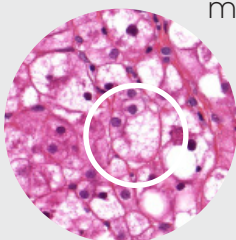
In other patients unfortunately, fat will become toxic and start **damaging the liver**.

The body starts developing a defense mechanism called **«inflammation»**.

At this stage, cells start suffering and swell: this is called **«ballooning»**.



Numerous nuclei:  
inflammation

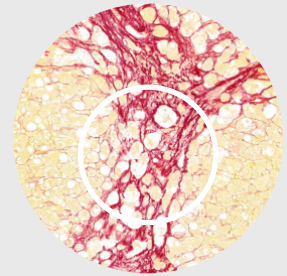


Swollen cell  
= ballooning

# FROM NASH TO CIRRHOSIS

## Scar tissue: fibrosis

If nothing is done to stop the progression of the disease, the liver begins a healing process. **Scar tissue appears on the liver: it is called «fibrosis».** This scar tissue does not function properly and day after day, liver function is impaired. Fibrosis can be classified into four stages: from one to three (mild, moderate, severe), fibrosis evolution can be halted, and even reversed.



collagen fibers  
(red) = fibrosis



But if fibrosis spreads to the majority of the liver, then stage 4 fibrosis, called «cirrhosis», is reached. This stage is irreversible.

## The 3 ultimate stages of NASH in the liver

#1

The liver continues to function:  
**Compensated Cirrhosis**

#2

The liver deteriorates to liver failure:  
**Decompensated Cirrhosis**

#3

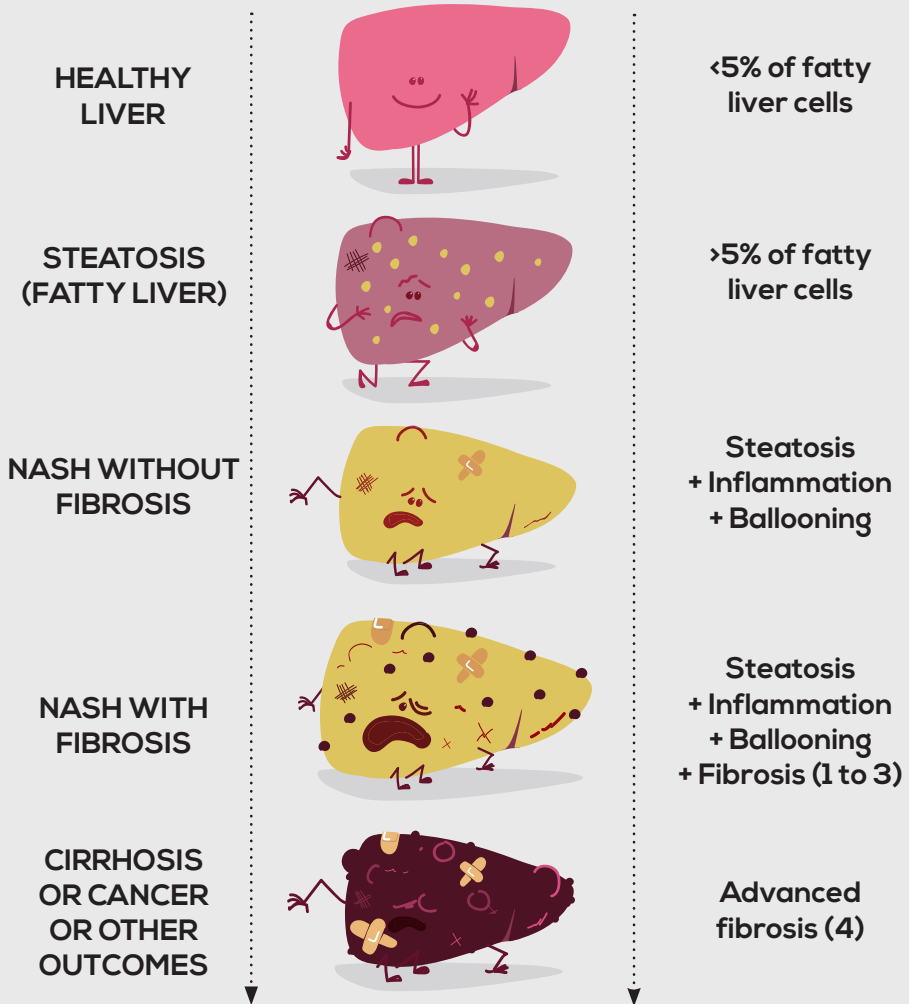
Cirrhosis deteriorates and **develops into Liver Cancer**

In NASH patients, liver cancer can develop without going through the cirrhotic stage.

**Beyond liver damage, the 1st cause of death in NASH patients remains cardiovascular events.** (see page 10)



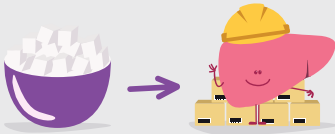
# UNDERSTANDING THE STAGES OF PROGRESSION



When the disease progresses to **cirrhosis** or **liver cancer**, the only option left is a liver transplant. Unfortunately, all patients are not eligible, organ availability is critical, and a transplant remains a risky procedure.

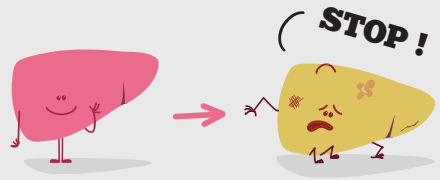
# WHAT ARE THE CAUSES OF NASH?

NASH is the consequence of sedentary lifestyles associated with high sugar and high fat diets.



Sugar is transformed into fat by the liver, to be stored and used when needed.

When the sugar and fat intake is too high, the liver produces and stores fat in excess.



## Risk factors

Some individuals are more at risk for NASH than others. Indeed, some conditions are recognized as risk factors for NASH:

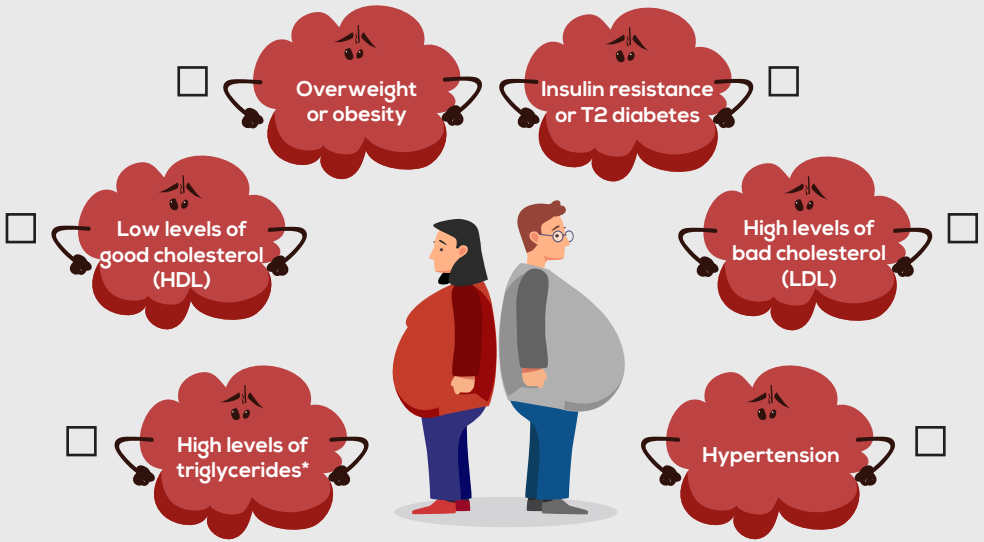
- Overweight (25 < BMI < 30)
- Obesity (BMI > 30)
- Type 2 diabetes
- Insulin resistance
- Metabolic syndrome

## Good to know:

To calculate your BMI, divide your weight in kilograms by your height in meters squared. If you are 1.70 meters tall and weigh 90 kilos :  
 $90 / (1.7 \times 1.7) = 31.15$ . Your BMI is 31.

# What is the metabolic syndrome?

The metabolic syndrome is not a disease *per se*. It is the combination of biochemical and physiological disorders, indicating a dysfunction in metabolism. An individual is diagnosed with a metabolic syndrome when they have two or more of the following conditions:



## NASH diagnosis

Cumulating these risk factors should encourage patients to visit their doctor for a NASH screening. A healthcare professional will refer you to specialists and test for NASH using one of the following methods currently available:

Most reliable method today



Liver biopsy



Abdominal ultrasound



MRI/MRE



Elastography



In the future: bloodtests

see page 11

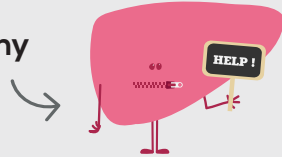
\* lipid

# WHAT ARE THE SYMPTOMS OF NASH?

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## NASH: a silent disease...

The liver is a discrete organ, this is why NASH is “silent” chronic disease.



Most patients feel no particular symptom, and the disease is often discovered fortuitously. It can also be revealed because of complications, meaning the disease has already progressed to advanced stages.

## ...until advanced stages!

Some patients may feel symptoms, such as moderate pain or discomfort in the upper right area of the abdomen and/or fatigue. Other symptoms more commonly associated with advanced liver disease can be observed, but they are not specific to NASH and could be linked to other conditions:

- Loss of appetite
- Swelling in the legs
- Confusion and/or slurring of speech
- Yellow discoloration of the skin and eyes (jaundice)
- Fluid accumulation in the abdomen (ascites)



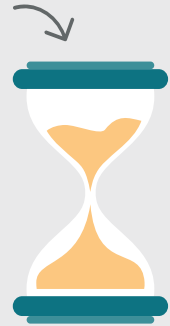
**The right move:** If you have any sudden symptom or discomfort, you should seek medical attention and visit your doctor. You can tick the boxes that apply to your conditions and symptoms and show this leaflet to your doctor.

## WHAT CONSEQUENCES FOR YOUR HEALTH?

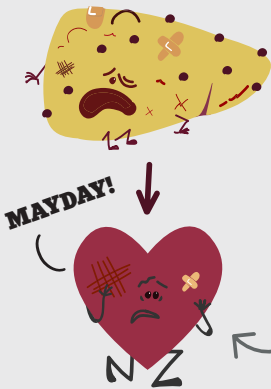
### NASH: a progressive disease

Estimating the disease progression rate is difficult because it varies from one individual to the next.

But gaining weight or the worsening of diabetes are known to accelerate progression to advanced fibrosis, cirrhosis or cancer. Developing NASH also increases the risk of developing diabetes or worsening its control.



### Far more than just a liver disease



The liver is at the center of all metabolic processes. When affected by NASH, the liver is damaged and inflamed and releases molecules into the bloodstream that can be especially harmful for the cardiovascular system.

The major danger for NASH patients is the cardiovascular risk (cardiovascular disease or event).

**Remember:** Contrary to what most could think, the main cause of death in NASH patients is not hepatic complications but cardiovascular diseases<sup>1</sup>.

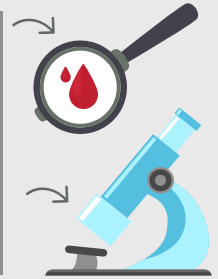
<sup>1</sup> Angulo, Gastroenterology, 2015

# WHAT TREATMENTS FOR NASH?

## Therapeutic progress

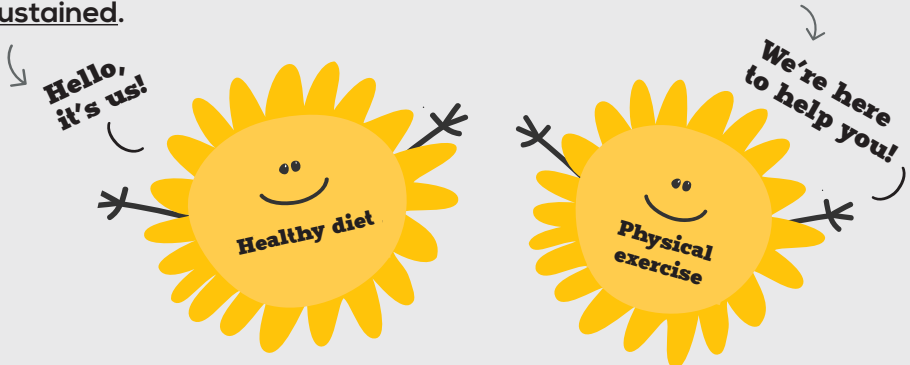
In the last decade, science has made great progress in developing molecules to treat NASH. To this day, there is no treatment yet approved by health authorities, but for NASH patients there is real hope of having treatments in the years to come.

**Did you know?** Beyond ongoing research into therapeutic solutions for NASH, scientific progress is also being made in the field of diagnosis, and we are moving towards the development of diagnostic tests based on blood tests which could facilitate NASH



## Lifestyle change

In conjunction with therapeutic solutions, studies show that **controlling the progression of the conditions associated with NASH can help prevent NASH disease progression.** In the absence of treatment, NASH patients can only avoid or slow down progression by changing their lifestyle. An efficient and sustained lifestyle modification can have an impact on NASH and even on fibrosis, **provided the weight loss is of at least 10% of bodyweight, and is sustained.**



# LIFESTYLE CHANGE: AN ESSENTIAL EFFORT

Losing weight and sustaining the effort in the long run is difficult and demanding, and patients may feel powerless when facing such a great change. If you have difficulties overcoming the challenge, do not feel guilty or discouraged, but seek support.

## Note:



The real challenge is to sustain weight loss in the long run, which only 10% of patients manage to achieve, often because of a lack of time and/or resources.

To help you, good habits can ensure you start this journey on the right foot towards the accomplishment of this daily battle.



## #1: Cook your own meals

It is recommended to cook from scratch as much as you can, to keep an eye on what's in your plate. Processed foods contain high levels of added fats, salt and sugar, even in savory products.

## #2: Reduce your fat intake



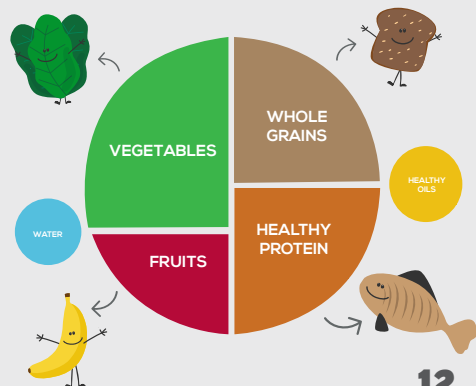
It is advised to grill meats, fish and shellfish, and to preferably use oils that are rich in unsaturated fats (olive, rapeseed, flaxseed).



## #3: Control your portions

A balanced plate should be divided as shown here. You can refer to "The Healthy Eating Plate" created by the Harvard School of Public Health, and available on their website:

[www.hsph.harvard.edu/nutritionsource/healthy-eating-plate](http://www.hsph.harvard.edu/nutritionsource/healthy-eating-plate)



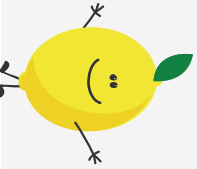
## #4: Drink water!

**Hydration is essential.** Drinking water throughout the day will keep you hydrated. If the taste of plain water does not satisfy you, other ways can ensure your water intake is sufficient:

**Hot unsweetened drinks:** like tea or coffee (sweeteners should be avoided as they get you used to sweet drinks).



**Natural flavoring:** fresh lemon, mint or cucumber will give water a fresh and flavorful taste.

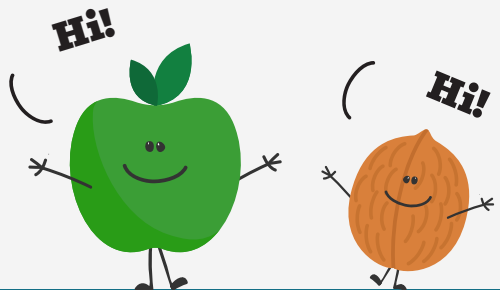


## #5: Snack healthily

**If you can, avoiding snacking is best.** But this is not always achievable so selecting the right snacks is key:

**Almonds, walnuts and nuts:** are a good source of protein and keep you full for longer.

**Fruits:** are good options, but beware of their high sugar content which can quickly lead you to exceed the recommended sugar intake.



**Did you know?** Staying hydrated reduces the feeling of hunger. **Drinking plenty of water throughout the day will help you to avoid snacking.**



## Good to know:

Eat slowly! Your stomach needs at least 20 minutes after the beginning of the meal to send satiety messages to your brain. If you eat too quickly, you may overeat.

### #6: Read food labels!

When you shop for groceries, make sure to carefully read the labels on the foods you buy. They are an essential source of information about the nutritional contents of the products you put in your cart.

#### Tip of the day

Downloadable mobile apps that allow you to scan product labels are now available. They analyze products and indicate their nutritional quality.

The ingredients list describes ingredients in order of weight: the main ingredients in the product always come first. If the first ingredient on the list is butter or oil, the fat content of the product is probably very high.

Moreover, nutritional values displayed on the labels indicate the fat, sugar and salt contents in the product.

**For example:** A product containing >20g of sugar per 100g of product is high in sugar. But, a product containing <3g of fat per 100g of product is low in fat.

**Hi guys, I'm an orange\* !**

\* 100% natural and without added sugars!



## #7 Exercise as much as you can, but keep safe!

Exercise promotes well-being, but also better physical shape: weight, sugar levels control for diabetics, reduction of cardiovascular risk...

Exercise is any movement that leads to energy expense:



**Low-intensity:** walking, gardening...

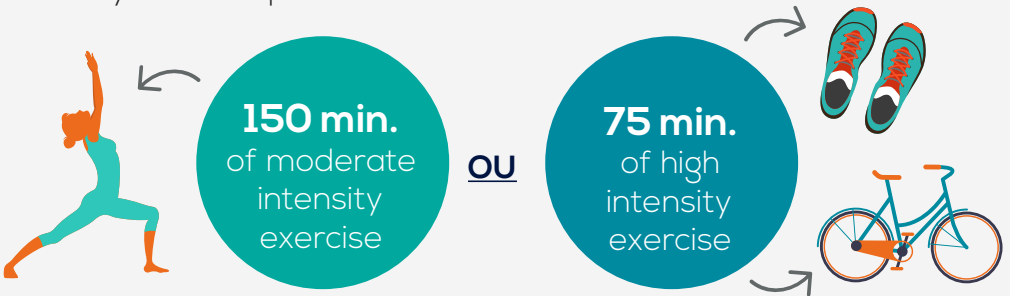
**Moderate intensity:** swimming, slow jogging, yoga...

**High intensity:** tennis, cycling, running...

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### Physical exercise: good practice

To stay fit, the World Health Organization recommends a weekly exercise practice of:



**Enjoy yourself:** Most importantly, find the activity that best suits you, and stay safe: **if you are beginning or starting a physical activity after a long break, seek advice from your doctor, he will assist you in this new step.**

## I THINK I MAY BE AT RISK, WHAT SHOULD I DO?

---

If you have one or more risk factors listed below:



- Prediabetes or type 2 diabetes
- Overweight or obesity  
(especially located around the abdomen)
- Hypertension
- Sleep apnea  
(breathing interruption during sleep)
- High cholesterol (LDL) or triglycerides
- History of cardiovascular event

Or if you have any symptoms such as **pain or discomfort in the upper right area of your abdomen**, seek advice from your primary care physician, diabetologist or cardiologist if you are followed for other conditions: they will examine you and may offer a liver test (blood test) or an abdominal ultrasound.

**If treatment is necessary, your physician will in any case be able to inform and advise you.**

### To help you:

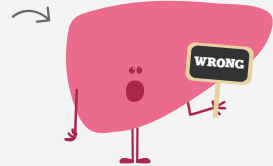
If you have difficulties explaining your symptoms and conditions, you can tick the corresponding boxes and show this brochure to your doctor.

# HOW CAN I TALK ABOUT THE DISEASE WITH MY LOVED ONES?

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## Liver diseases: overcoming prejudices

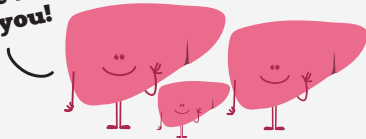
Liver diseases are still subject to prejudice, and are too often associated to alcohol or drug abuse, or sexually transmitted diseases. It is time to change these preconceived opinions!



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## Loved ones: an essential support

We are here for you!



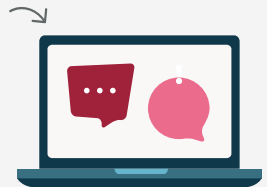
It is important to be able to share with your loved ones as you fight a disease.

It is important they listen to you and understand your disease and its potential consequences on your health, and also that they get involved in following-up your treatment: **lifestyle changes are more likely to be successful if your loved ones get involved in making this challenge a success.**

---

## Patient support groups: a sharing space

If you do not wish to share your experience with your family, there are **online patient support communities** that you can find on dedicated websites or social networks.



**Patient associations** are also a good option for you to share your feelings, your needs, and your experience to find support.

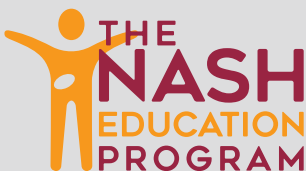
**Disclaimer:** This brochure has been edited and distributed for general information purposes only, and to give you information to better understand and manage your disease. It is not intended or implied to be a substitute for professional medical advice, diagnosis or treatment. Any question regarding your health should be evaluated by a doctor or other healthcare professional, especially regarding any symptom that requires diagnosis, treatment or care.

**We invite you to share this brochure with your family and loved ones, to help them better understand your disease and how they can support you in everyday life.**



**You are looking for more information about NASH or about the actions of The NASH Education Program™?** Visit our website, and click the page “What is NASH?”

**You have an idea, a need or would like to give us your opinion on how to help other patients or spread awareness?** We are listening! You can tell us about it on our website if you click “Express a need”.



- 🔍 [www.the-nash-education-program.com](http://www.the-nash-education-program.com)
- ✉ [contact@nash-education-program.com](mailto:contact@nash-education-program.com)
- 🐦 [NASH\\_Education](#)
- 📺 [The NASH Education Program](#)

# PERSONAL NOTES

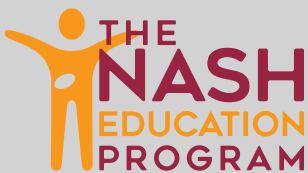
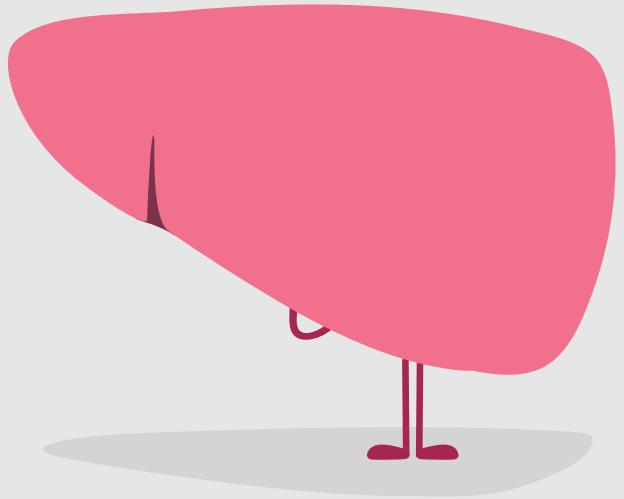
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# TOPICS TO DISCUSS WITH MY DOCTOR

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🔍 [www.the-nash-education-program.com](http://www.the-nash-education-program.com)

✉ [contact@nash-education-program.com](mailto:contact@nash-education-program.com)

🐦 NASH\_Education

📺 The NASH Education Program