



## IMMUNE SYSTEM

3 DISEASES

Our immune system works hard day after day to protect us from a host of harmful substances, such as viruses and bacteria. Because it's constantly exposed to intruders, the immune system develops antibodies that act like tiny soldiers to help fight invaders.

But sometimes the immune system is defective. What happens when it malfunctions? Antibodies mistake parts of the body for the enemy, and they start to attack. This type of malfunction leads to what are called auto-immune diseases.

There are 50 known auto-immune diseases. In this guide, we'll talk about three of them: Crohn's disease, multiple sclerosis, and rheumatoid arthritis. They're more common than you think, and you'll learn more about each one.

## DID YOU KNOW?

Auto-immune diseases are more common among women than men.

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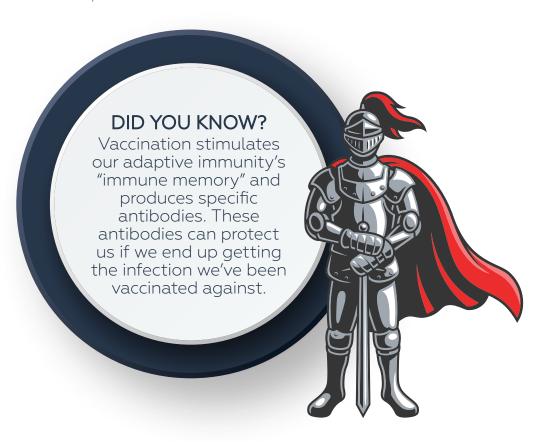
## How does our immune system work?

Our immune system has two types of defence mechanisms to protect us—**innate immunity** and **adaptive immunity**. To carry out its mission, it manufactures tiny soldiers to attack invaders. These soldiers are called antibodies.

**Innate immunity** is our **first line of defence** against invaders. It acts quickly, preventing harmful substances from entering our body or multiplying once inside. Our skin, tears, respiratory system mucous membranes, digestive secretions, and intestinal and vaginal flora ("good bacteria") are all part of our innate immune system, acting as a barrier against invasion.

If attackers manage to get in, we have an internal defence system that will try to fight them off. Innate immunity **has no memory**. In other words, it doesn't produce soldiers that are specially "trained" to protect against a repeat attack by a specific invader.

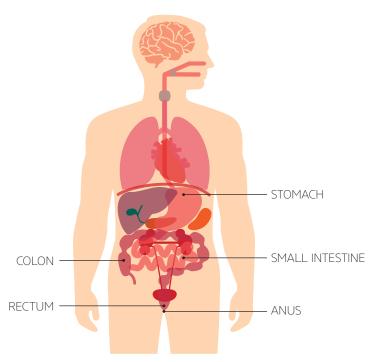
When an invader breaks through the body's first lines of defence, **adaptive immunity** comes into play. This second shield is a complex mechanism that triggers a **stronger immune response**. In this case, our immune system produces specialized soldiers to defend the body more effectively and **memorizes** the immune response in case the invader comes back.



## CROHN'S DISEASE

#### What is Crohn's disease?

As already mentioned, auto-immune diseases occur when our immune system malfunctions. The immune system produces antibodies that mistake parts of the body for the enemy and start to attack. The resulting disease differs depending on the organ or tissue under attack.



Crohn's disease occurs when antibodies attack the digestive system and cause inflammation. This results in a variety of symptoms and potential complications. The entire digestive system can be affected, from the mouth to the anus. The disease most often affects the last part of the small intestine and the upper part of the colon.

## DID YOU KNOW?

This disease is named after Burrill Bernard Crohn, the gastroenterologist who first wrote about it in 1932.

Crohn's disease is an inflammatory bowel disease (IBD). It is considered to be chronic, which means patients will have it their entire life. Most often, Crohn's disease occurs in flare-ups, followed by periods of remission that may last several months. These outbreaks are "attacks" accompanied by symptoms. The remission period is when symptoms are milder or disappear completely.



## CROHN'S DISEASE OR ULCERATIVE COLITIS?

These two inflammatory bowel diseases share similar symptoms, but there are differences between them. Inflammation caused by colitis is generally limited to the colon and rectum and does not penetrate the intestinal mucous membrane as deeply. In addition, colitis can be corrected with surgery, which is not possible with Crohn's disease.

#### What are the symptoms?

The most common initial symptoms are abdominal pain or diarrhea, usually after meals. Other symptoms may include:

- Abdominal cramps
- Chronic diarrhea (lasting more than two weeks)
- Severe fatigue
- Low appetite and weight loss, even when following a balanced diet

There may also be blood or thick mucous in the stools, nausea or vomiting, and a low fever (38°C to 40°C).

Some people will also have anemia, which can be caused by a reduced ability to absorb nutrients or a poor diet due to loss of appetite.

Sometimes symptoms unrelated to the digestive system can occur, such as joint pain.

## Who is at risk of developing Crohn's disease?

The exact causes of Crohn's disease are unknown, but a combination of several different factors is thought to be responsible, including **genetic and environmental factors**.

#### **GENETIC FACTOR**

Genetic information, like hair and eye colour, is passed down through the generations. People with a family history of inflammatory bowel disease (Crohn's disease or ulcerative colitis) are believed to have a higher risk of developing the disease.

#### **ENVIRONMENTAL FACTORS**

Smokers reportedly have a higher risk of developing Crohn's disease. Researchers have also found that Crohn's disease is more common in industrialized countries. Although no single cause has been proven, the western way of life (lower-quality diet, sedentary lifestyle, and so on) could be a risk factor.

#### How is it diagnosed?

**Colonoscopies** are commonly used to diagnose Crohn's disease. The doctor inserts a flexible tube with a camera inside the anus to examine the walls of the intestine.

In addition to a colonoscopy, **blood and stool samples** are used for diagnosis.



#### DID YOU KNOW?

Before a colonoscopy, you have to follow a liquid diet and drink a special solution at home to empty your intestine. If you need a colonoscopy, talk to your healthcare professional to get answers to your questions and find out how to prepare.

## What are the potential complications and consequences?

Crohn's disease can lead to a range of health problems. The severity of these issues varies from person to person. Most complications can be avoided if the disease is properly controlled with treatment. So it's very important to stick to your treatment and follow your healthcare professional's instructions.

Here are some of the potential complications and consequences:

#### **COMPLICATIONS**

- Full or partial blockage of the digestive tract:
  Inflammation can cause lesions resulting in the formation of scar tissue. This scarring process causes the intestinal walls to thicken, which can result in a blockage. Surgery and emergency hospitalization are sometimes necessary to avoid perforation of the intestine.
- Wounds around the anus, fistulas, abscesses: Fistulas are the most common complication. Inflammation causes lesions that sometimes become very deep.
- **Digestive tract hemorrhage:** Intestinal lesions may bleed occasionally.
- **Slightly higher risk of colon cancer:** It's very important to have regular screenings.

#### **CONSEQUENCES**

- Delayed growth in children and late puberty in adolescents.
- Anemia triggered by low iron.
- Nutritional deficiencies caused by reduced appetite during flare-ups and reduced ability to absorb nutrients.
- Higher risk of miscarriage for pregnant women during flareups. Also, fetal growth may be slower. It's very important for women planning on becoming pregnant to keep the disease under control and talk to their doctor.

#### Can Crohn's disease be cured?

Crohn's disease cannot be cured, but **inflammation is controlled** with treatment. Treatment reduces the symptoms and affects how the disease progresses.

In general, treatment options include medication, surgery, dietary supplements, or a combination of all three.

Drug class	Mechanism of action
Digestive tract anti-inflammatories	These drugs are taken orally or rectally as a suppository or enema. They reduce inflammation to relieve symptoms during flare-ups or help prolong the remission period.
Corticosteroids	Corticosteroids have a powerful anti-inflammatory action and are taken orally, rectally, or by injection. They are generally used when anti-inflammatories are not enough. Usually they're prescribed for a short period to bring the disease into remission, then stopped.
Immunosuppressants	Immunosuppressants reduce the immune system's action, reducing inflammatory responses.
Immunomodulators	These are newer medications that target the tumor necrosis factor (TNF), a substance that contributes to the development of inflammation. They are generally only taken by patients with moderate to severe symptoms when other treatments haven't worked or cause too many side effects.

**Antibiotics and medications to control diarrhea and pain** are also used occasionally, as needed.

Sometimes **surgery** is needed, particularly when there are complications (fistulas, complete obstruction of the digestive tract, or a perforated ulcer). Surgery can treat certain complications but the disease is still present.

Given the unpredictable nature of the disease, both in terms of flare-ups and remission periods, the effectiveness of complementary approaches such as natural health supplements, is difficult to assess. It's best to talk to your doctor before using these approaches.

#### Keeping a log book

As Crohn's disease is characterized by flare-ups and periods of remission, it can be helpful to keep a log book. Each day you can record important information, such as the frequency and consistency (solid or liquid) of your bowel movements, frequency, duration, and intensity of stomach cramps, your weight, times of day when you experience symptoms, and your appetite. This will make it easier for your doctor to assess the effectiveness of your treatment.



#### **IMPORTANT!**

It's important to talk to your healthcare professional before taking over-the-counter medications or natural health products. Some anti-inflammatories are not recommended for people with Crohn's disease. They can aggravate symptoms or trigger a flare-up.

#### Let's talk nutrition

There is no specific diet for inflammatory bowel disease. As each person is different (tolerance, tastes, part of the digestive tract affected by the disease), the general recommendation is for each patient to adapt their diet to their own situation.

Here are some useful tips:

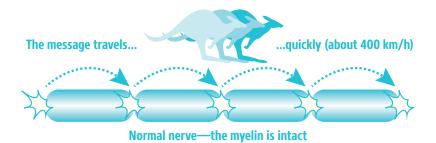
- When you're in remission, follow a balanced diet. Canada's Food Guide can help you make the right choices for balanced nutrition.
- Some foods are more difficult to digest. These include foods with insoluble fibre, grains, nuts, fruits, and raw vegetables.
- Try to identify and avoid foods that trigger your symptoms.
- Eat smaller portions more frequently.
- Reduce your intake of sugar and artificial additives because they irritate the digestive tract.
- Avoid drinking large quantities of liquid when you eat. It's best to wait until after a meal.
- Reduce your fat intake because fat is more difficult to digest.
- Drink less alcohol and eat fewer spicy foods. Both of these can sometimes trigger symptoms.

## MULTIPLE SCLEROSIS

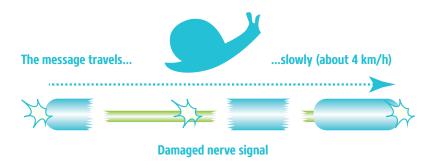
#### What is multiple sclerosis?

Multiple sclerosis is a **chronic disease** that can reduce the quality of life of those affected. **It attacks the central nervous system**, which includes the brain, spinal cord, and nerves that control all the activities of the body, including sensations, sight, smell, taste, and movement.

Nerves are like cables. They transport nerve impulses throughout the body, allowing the body to move, communicate, and so on. Nerves are made up of a central component—a projection called the axon—and myelin, the protective sheath surrounding the axon. Nerves cannot work properly without myelin, which is also essential for speeding up the flow of nerve impulses.



In people with multiple sclerosis, antibodies attack the myelin, causing damage and inflammation. This makes it difficult for the nerve cells to communicate with each other. As a result, the body no longer receives the right instructions to carry out certain functions, such as movement, speech, sight, etc.



Without protective myelin, nerves are exposed. Sometimes they become damaged and irreversible lesions can occur.

Each patient experiences multiple sclerosis differently. The disease has different forms, depending on how it progresses.

Form of multiple sclerosis (MS)	Description
Relapsing- remitting MS	About 85% of patients are diagnosed with relapsing-remitting MS. This form is characterized by <b>unpredictable but well-defined attacks</b> known as "exacerbations," which vary in length. This is when symptoms appear. Attacks are followed by a <b>period of remission</b> when symptoms are milder or disappear completely.
Primary progressive	With this form there are no well-defined attacks. The <b>level of incapacity increases</b> slowly and steadily. In general, there are <b>no periods of remission</b> .
Secondary progressive	This form occurs when relapsing-remitting MS gets worse. Over the years, some patients with the relapsing-remitting form of the disease will see their level of incapacity steadily increase. These people have secondary-progressive MS.
Progressive relapsing	With this form, the disease gets progressively worse from the start. It is also characterized by well-defined attacks that may or may not be followed by periods of remission. It's the rarest form of MS.

## What are the symptoms?

As myelin damage can occur at different places in the central nervous system, symptoms are both highly **unpredictable** and highly **variable**. Not only do they vary greatly from one person to the next, but sometimes within the same person from one day or week to the next.

Possible symptoms include:

- Balance problems and dizziness
- Extreme fatigue
- Vision problems
- Numbness in the limbs
- Memory problems
- Difficulty walking
- Difficulty speaking and swallowing
- Urinary incontinence
- Tremors

#### **DID YOU KNOW?**

In Canada there are more than 100,000 people with MS, making Canada the country with the highest rate of the disease in the world

## Who is at risk of developing multiple sclerosis?

Scientists have still not identified the exact cause of the disease. However, it seems that a combination of factors plays a role in multiple sclerosis. The most significant factors are **environmental**, **genetic**, and related to **being female**.

#### **ENVIRONMENTAL FACTORS**

Multiple sclerosis is **more common in northern regions** than in the tropics or southern regions. Researchers think that a lack of vitamin D could be a risk factor for the disease. When our skin is exposed less frequently to the sun, it produces less vitamin D. However, more research is needed before recommending the use of vitamin D supplements.

Smokers also have a higher risk of developing multiple sclerosis.

#### **GENETIC FACTOR**

If a member of your family has multiple sclerosis, you are more likely to develop the disease.

#### **BEING FEMALE**

Multiple sclerosis is about **twice as common in women than men**.

#### How is it diagnosed?

Multiple sclerosis can appear at any age but is most often diagnosed in young adults between the ages of 15 and 40. If your doctor thinks you might have MS, you'll be referred to a neurologist.

The neurologist may review your **medical history** and conduct a number of tests, such as a **neurological exam** to check your reflexes, eye movement, limb strength, sensation, and coordination.

He or she may also order a **magnetic resonance imaging** to see MS-related lesions.

Another exam, the **evoked potential test**, measures the speed of nerve impulse propagation. This test can detect decreases in nerve impulse transmission speeds that can be caused by the damaged myelin.

You may also need a **blood test** to rule out other diseases with similar symptoms.

## DID YOU KNOW?

MS cannot be diagnosed using just one test. Doctors need to carry out a number of tests before confirming a multiple sclerosis diagnosis.

#### Can multiple sclerosis be cured?

It's possible to slow the progression of the disease and reduce the intensity of the symptoms, but there is currently no cure.

When **flare-ups** are accompanied by severe symptoms, high doses of corticosteroids can be given, usually by injection. These drugs reduce inflammation and may diminish the duration of flare-ups. Because of the potential long-term side effects such as weak bones and higher blood sugar levels, they should only be used for **short periods**.

**Long-term treatment** for MS consists of medications that reduce the number of flare-ups and slow the progression of the disease. These medications are usually started as soon as multiple sclerosis is diagnosed. It's important to **take them regularly** even when you have no symptoms. There are a number of different classes of drugs that are used. The choice of medication will depend on factors such as the form of the disease, response to treatment, side effects, and so on.

There are also medications to help control pain, spasms, urinary problems, and other symptoms.

Consult your healthcare professional for more information or if you have guestions.

Healthcare professionals from various fields can help make daily life easier for people with MS. For example, an **occupational therapist** can help you relearn certain tasks that are more difficult after a flare-up, like getting dressed and taking a shower. They can also suggest ways you can adapt your home to make daily life easier and preserve your energy.

A **physical therapist** can recommend exercises to help you improve flexibility, increase your range of movement, and stretch tight muscles. You may be given exercises to do on your own, as well as others requiring assistance.

Special accessories are available to make daily life easier for people with reduced mobility or who find it more difficult to carry out certain tasks. Remember that accessories must be properly adapted and used correctly to help you remain active without causing further injuries.

See the "Living with the disease" section at the end of this guide for more information.

#### **CAUTION!**

Be sure to consult your healthcare professional before taking any medications other than those prescribed for your situation. Some natural health products, such as echinacea and cat's claw, are not recommended for multiple sclerosis patients.



#### Let's talk lifestyle

There are certain habits you can adopt to help reduce fatigue and improve your quality of life. Here are some suggestions:

**Rest:** It's important to set aside time to rest or relax so you can preserve your energy level. It's particularly important to rest before an activity.

**Exercise regularly:** The right type of physical activity can reduce the intensity of your symptoms and boost your moral.

**Manage stress:** Stress can be hard to control. Taking steps to simplify your life, reducing sources of stress, seeking help, and using relaxation techniques are some of the ways you can help keep stress at bay.

**Join a support group:** It can be comforting to share tips and advice and talk with others in the same situation who know what you're going through. Talks on multiple sclerosis can also help you better understand the disease. Check the **Multiple Sclerosis Society of Canada**'s website to see what's available near you.

**Avoid coffee, alcohol, energy drinks, and tobacco:** These stimulate the nervous system and can aggravate symptoms.

**Prevent infection:** Some relapses may be caused by mild respiratory infections or sinus infections. The best way to prevent infection is to wash your hands often.

**Avoid sudden changes in temperature:** Some people react strongly to these temperature changes, which can trigger or aggravate symptoms.

**Keep a to-do list:** If you suffer from memory loss, write down your daily tasks on a calendar. Save more demanding tasks for times when your energy level is highest. And be sure to set time aside for activities you enjoy!

## RHEUMATOID ARTHRITIS

#### What is rheumatoid arthritis?

Our joints work nonstop every day to keep us moving. Joints are made up of various parts, each with a well-defined role to play. Cartilage helps bones move smoothly against each other. Ligaments restrict motion to a specific range, and the synovial membrane secretes synovial fluid to lubricate cartilage.

In some rheumatoid arthritis cases, **antibodies attack the synovial membrane in the joints**, making it thicker and triggering inflammation. When this happens the membrane can no longer fulfil its role and produces inflammatory substances that can attack our joints, tendons, and bones.

Think of this inflammation as a fire in your joints. If not put out, it can cause permanent damage. Just as firefighters try to put out a fire quickly before it spreads, you need to reduce the inflammation as soon as possible to reduce the risk of complications.

Inflammation causes **pain** and **swelling**, **restricts motion**, and sometimes even leads to **deformed joints**.

#### **Normal** Joint with joint rheumatoid arthritis Inflamed Synovial synovial membrane membrane **Synovial** fluid Loss of Cartilage interstitial space **Eroded**

Rheumatoid arthritis occurs in flare-ups accompanied by symptoms and followed by periods of remissions. During remission, symptoms diminish in intensity and may even disappear temporarily.

#### Arthritis or osteoarthritis?

These two diseases are difficult to tell apart and are often confused.

**Arthritis:** Characterized by joint

inflammation

**Osteoarthritis:** Characterized by wear and tear on the cartilage covering the bones

### DID YOU KNOW? One in 100 Canadian adults has rheumatoid arthritis.

cartilage

## Which joints are affected?

The disease can affect all joints, but in the early stages it most commonly attacks the following:

## DID YOU KNOW?

Rheumatoid arthritis is often symmetrical, attacking the same joints on each side of the body.



## What are the symptoms and potential complications?

Symptoms vary greatly from one person to the next. The initial symptoms are not necessarily typical of the disease. People with the disease may first experience overall fatigue, joint pain, mild fever, reduced appetite, and weight loss. In general, joint pain and stiffness are more pronounced first thing in the morning.

People with rheumatoid arthritis may also have the following symptoms:

- Swollen joints
- Redness and warmth around the joint
- Bumps under the skin

Inflammation that it is not properly controlled could lead to joint deformation and reduced mobility.

Sometimes other organs such as the heart, blood vessels, and eyes can be affected, leading to complications.

Fortunately, appropriate treatment started at the first signs of the disease can limit these complications.

#### **TRUE OR FALSE?**

Rheumatoid arthritis is associated with a higher risk of cardiovascular disease.

**TRUE.** Inflammation due to rheumatoid arthritis often causes or aggravates hardening of the arteries, a major risk factor for cardiovascular events such as a heart attack. Patients should be closely monitored by their family doctor to check their cholesterol, blood pressure, and blood sugar, which are all risk factors for cardiovascular disease.



#### A FEW TIPS

If you have rheumatoid arthritis, here are some tips to help keep your heart healthy:

- If you're a smoker, quitting can drastically improve your health. Talk to your healthcare professional for advice and support in giving up smoking.
- Exercise regularly.
- Maintain a healthy weight.
- Eat a healthy, varied diet.
- Reduce your salt, sugar, saturated fat, and trans fat intake.
- Include fish regularly in your diet and choose olive oil instead of other fats.

## Who is at risk of developing rheumatoid arthritis?

The exact cause is still unknown, but a combination of factors may contribute to the disease. The main factors are **genetic**, **environmental**, **hormonal**, and related to **being female**.

#### **GENETIC FACTOR**

People with a family member who has rheumatoid arthritis are thought to have a higher risk of developing the disease.

#### **ENVIRONMENTAL FACTOR**

Smokers reportedly have a higher risk of developing the disease, and their symptoms are likely to be more severe.

#### **HORMONAL FACTOR**

Hormonal changes are thought to result in a higher risk of developing rheumatoid arthritis. Flare-ups of the disease have been observed in women after childbirth. Breastfeeding may reduce the number of flare-ups. More research is needed, but it would appear that women who take oral contraceptives have a slightly lower risk of developing the disease.

#### **BEING FEMALE**

Women have a higher risk of getting rheumatoid arthritis.

#### How is it diagnosed?

Although rheumatoid arthritis can occur at any age, symptoms are most common in patients age 40 to 60. The earlier the diagnosis the more quickly treatment can be started to help protect the joints.

There is no standard test for diagnosing rheumatoid arthritis. Doctors usually **examine the symptoms** and **the joints** and review the **patient's medical history**. They may also take a **blood sample** or order an **X-ray** to check for lesions in the joints.

#### Is rheumatoid arthritis curable?

Unfortunately rheumatoid arthritis is not curable. However, the symptoms can be treated and progression can be slowed to minimize the risk of complications.

**Anti-inflammatories** and **corticosteroids** are prescribed to reduce inflammation and decrease pain and stiffness in the joints. These medications are generally taken when symptoms are present. Corticosteroids can reduce the progression of the disease but should not be used for extended periods.

**Long-term treatment** involves remission agents that slow the disease's progression, prevent joint damage, and help control pain. Some of these medications are taken orally while others are given by injection.

Sometimes surgery is required to help restore joint function.

For temporary pain relief, creams, gels, anti-inflammatory ointments, and analgesics can be purchased over the counter. Certain anti-inflammatories are also available without a prescription and can help relieve pain. It's very important to talk to your healthcare professional before purchasing any of these products to make sure they are appropriate for you and won't interact with your other medications.



#### DID YOU KNOW?

It's essential to follow the right dose of remission agents and take them regularly, even if you don't see the benefits right away. Some medications can take several months before they become effective. You'll need to be patient!

**Regular exercise** is very important for rheumatoid arthritis patients. It is very helpful for relieving and preventing pain. Exercise also strengthens the muscles around the joints so that they provide better support. The best activities are those that have a lower impact on the joints, like **walking**, **swimming**, and **cycling**. During flare-ups, patients should rest and only do exercises that require limited range of motion.

## DID YOU KNOW?

Maintaining a healthy weight is important for people with rheumatoid arthritis. Excess weight puts additional strain on the joints, particularly the knees and hips.

#### **ICE OR HEAT?**

**Heat:** Relieves pain, spasms, and stiffness. Taking a hot bath or shower or applying a hot pad, hot water bottle, or heated bean bag for 15 to 20 minutes can help relieve pain. To prevent a burning sensation, make sure to set the temperature of the hot pad at the appropriate level.

**ICE:** Helps reduce swelling, pain, and inflammation. When joints are swollen, it's best to use something cold. Apply an ice pack for 10 to 15 minutes and wait at least two hours between applications. Avoid cold if you have blood circulation problems.

If there is no inflammation, you can apply heat or cold depending on your preference. For heat (hot pads) or ice, it's best to put a damp towel over the area to improve conductivity and protect the skin.

As the disease progresses, it may become more difficult to carry out daily tasks. See the "**Living with the disease**" section at the end of this guide for tips to help improve your quality of life.

## Living with the disease

If your disease makes daily life more difficult because of pain or other disabilities, the following tips may help:

- Install sliding shelves in your closets at a height that saves you from having to bend or stretch.
- Use lightweight dishes and pans.
- Use a cart to move heavy objects.
- Install bigger handles on your drawers and closets.
- Put a rubber mat in the bath to prevent slips.

Take advantage of special accessories that will help you remain independent. Remember that they must be properly adapted and used correctly to prevent further injuries. You can also ask a specialist for advice.

Here are some examples:

- **Walking sticks and walkers:** To help you keep your balance and stability while providing extra support.
- Wheelchair: For longer distances.

- **Grab bars:** Often installed in the bath to help you get up and prevent falls.
- Raised seat: Placed over the toilet for improved comfort.
- Long-handled shoe horn: To help you put your shoes on without bending over.
- Jar opener: To safely and easily open jars.



Don't hesitate to ask your healthcare professional to put your medications in a container with an easy-open lid. But remember to keep them out of reach of children.



### Conclusion

Immune system diseases are very complex, and much more research needs to be done to understand them better. Certain factors cannot be controlled, but it has been shown that healthy lifestyle habits are always beneficial. Following a healthy diet, exercising regularly, quitting smoking, and setting aside time to relax are just a few examples. Whether you're in perfect health or living with one or several diseases, it's never too late to take care of yourself. As the saying goes, better late than never!

#### Sources and useful links:

**Canadian Association of Occupational Therapists** 

http://www.caot.ca/

Club de réflexion des cabinets et groupes d'hépato-gastroentérologie (in French only)

http://www.cregg.org/\_MICI/4.html

Crohn's and Colitis Canada

http://crohnsandcolitis.ca/

Multiple Sclerosis Society of Canada

https://mssociety.ca/

Quebec government

http://publications.msss.gouv.qc.ca/msss/fichiers/piq/html/web/Fonctionnement\_systeme\_immu.htm

**The Arthritis Society** 

http://arthritis.ca/



# GUIDE

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