

Ageing and the
immune system

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Supporting families affected
by primary and secondary
immunodeficiency

About this booklet

This booklet explains how ageing affects the working of the immune system for people affected by immunodeficiency. The information has been reviewed by the Immunodeficiency UK Patient Representative Panel and endorsed by the Chair of the Immunodeficiency UK Medical Panel.

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Our immune system

The immune system is a complex organisation of cells and molecules that act together to:

- protect us from harmful, infectious agents
- aid recovery from injury
- eliminate abnormal or cancerous cells.

If our immune system overreacts and is poorly regulated, then inflammatory disease can occur. Conversely, if it does not react enough, and in the right way, then it fails to protect us from a multitude of dangers, including infections.

In young, healthy people there is generally a good balance between overreaction and underreaction. However, this balance can lessen as we age. In older people, the immune system can fail to protect effectively against infection, and the risk of inflammatory disease increases. As with other parts of the body, most aspects of the immune system deteriorate with age; a process known as immune senescence (biological ageing).

What happens to our immune system as we age?

As we age, our immune system becomes less effective in the following ways.

- The immune system becomes less able to distinguish between body tissues and foreign substances. As a result, a person can develop antibodies that attack body tissues, which means that autoimmune diseases, such as rheumatoid arthritis and systemic lupus erythematosus, become more common in older people.
- Macrophages – specialised cells that help destroy and clear away bacteria and other foreign cells, such as cancer cells – work more slowly. This slowdown may be one reason why cancer is more common among older people.
- T-cells, which are the immune system's memory cells, become less able to recognise, remember and respond to the toxins and other foreign substances they have previously met.
- There are fewer white blood cells capable of responding to new challenges to the immune system, such as the threat posed by new viruses. Thus, when older people encounter a new foreign threat, the body is less able to remember and defend against it.

- Although the number of antibodies produced in response to the immune system encountering a foreign substance remains about the same overall, the antibodies become less able to attach to the foreign agent. This change may partly explain why illnesses like pneumonia, influenza and other infections are more common among older people and result in death more often. These changes may also partly explain why vaccines are less effective in older people and thus why it is important for older people to keep up to date with their immunisations.

Overall, these changes in immune function may contribute to the greater susceptibility of older people to some infections and cancers.

When do the changes occur?

As with many aspects of the human body, there is no single point at which these changes occur but instead it is a gradual process. Indeed, the shrinkage of the thymus, an organ that produces a type of immune cell known as T-cells, begins shortly after birth. Over the age of 55 there is also a rise in chronic background inflammation, called 'inflammaging'. This chronic inflammation also reduces the ability to respond to infections or vaccinations.

The implications of having an ageing immune system and an immunodeficiency

People with a primary immune deficiency (PID) have faulty immune systems. The fault can be in any part of the system. Except for the most severe PIDs, some parts of the immune system will still function but nevertheless deteriorate with advancing age. In general, people with a normal immune system will have more difficulty in fighting off infections when they are older, and people with an untreated PID will become more ill. This is one reason why the diagnosis of a mild PID is often not made until later in life; it is the combination of inborn error and ageing that result in recurrent infection.

Likewise, people with secondary immunodeficiency are likely to have more difficulty in fighting off infections as they become older.

Co-existing illnesses and ageing

Many illnesses become more common with advancing age. These include heart disease, diabetes, cancer, stroke and arthritis. An important factor is obesity, which increases inflammation, adversely affects most other conditions and can affect mobility.

COVID-19 and ageing

It is well established that older people have more difficulty fighting off COVID-19 and that the risk of becoming seriously ill increases with existing co-morbidities (health conditions that are present at the same time).

Official COVID-19 advice changes in line with the prevalence of the infection and other factors, such as the ability of the NHS to cope with demand for its services. Always follow current advice. It is important to maintain good hand hygiene and to shield or self-isolate if advised. Consider wearing a face covering in busy or enclosed public spaces, and try to avoid crowds. Get a test if you develop symptoms. If you receive a positive test result, then inform your GP and medical team and follow their advice. COVID-19 medicines are available to those people with certain types of primary and secondary immunodeficiencies, so keep yourself informed as to how to access these medicines if needed.

Keeping up to date with your COVID-19 vaccinations is important to help prevent severe illness, hospitalisation and death. Your medical team may also recommend you have the annual flu vaccination. If you have had adverse reactions to a vaccine in the past, you can discuss the suitability of a particular COVID-19 vaccine with your GP or medical team. Not responding well to other vaccines in the past is not a reason to rule out receiving the currently available COVID-19 vaccines. If you have an immunodeficiency, the benefits to you may be more limited, but any protection is worthwhile.

Staying well as you get older

Keep a positive outlook

Although many physical attributes deteriorate with advancing age, consider celebrating the wealth of experience behind you and embracing the extra time you may have to enjoy your interests.

Keep active

A daily walk benefits both physical and mental health, and is free. It improves circulation, strengthens muscles, helps to maintain a healthy weight and adds interest to the day. Try to increase the distance you walk each day. You may wish to keep track of your progress by making notes, taking photos or recording your activity on a smartphone app.

Eat well

Try to follow the NHS Eatwell guidance (<https://bit.ly/3P8UYQ7>), which advises at least five portions of fruit or vegetables a day; wholemeal bread, rice and pasta; moderate dairy and protein foods; and a low intake of sugary and salty foods, such as crisps and biscuits.

Tackle obesity

It is important to keep your weight within the recommended range. This simple BMI calculator (<https://bit.ly/2Qu6Try>) will tell you if your weight is in the normal range. If you are overweight, then you can follow the advice given online. If you are obese, then you may need help from your GP, practice nurse or a dietitian to achieve a healthy weight.

Limit your alcohol intake

For advice about making better choices concerning alcohol consumption, see www.drinkaware.co.uk

Don't smoke

Smoking makes it harder for your lungs to keep pathogens (microorganisms that cause disease) out and is harmful in other ways too. Contact your GP practice if you need help to stop smoking.

Try to avoid injuries

A weakened immune system can affect healing, so do what you can to reduce the risk of injuries and falls. Look at ways to stay safe in the home and garden, consider using a walking pole or stick to stabilise your balance, and stay home in icy conditions.

Vaccinations

As well as the COVID-19 vaccine, make sure you have flu and pneumonia vaccinations, and any other vaccinations that your doctor advises.

More advice is available in our leaflet *'Keeping well and healthy when you have an immunodeficiency'*.

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About Immunodeficiency UK

Immunodeficiency UK is a national organisation supporting individuals and families affected by primary and secondary immunodeficiency.

We are the UK national member of IPOPI, an association of national patient organisations dedicated to improving awareness, access to early diagnosis and optimal treatments for PID patients worldwide.

Our website has useful information on a range of conditions and topics, and explains the work we do to ensure the voice of patients with primary and secondary immunodeficiency is heard. If we can be of any help, please email us or call on the number above, where you can leave a message.

Support us by becoming a member of Immunodeficiency UK. It's free and easy to do via our website. Members get monthly bulletins.

Immunodeficiency UK is reliant on voluntary donations. To make a donation, please go to www.immunodeficiencyuk.org/donate



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