# Beta interferons

## (Avonex, Plegridy, Rebif)

**This factsheet is about beta interferons, disease modifying therapies (DMT) for relapsing multiple sclerosis (MS). At the end of this factsheet you'll find out where you can get more information on these drugs, other drugs for MS and the benefits of early treatment.**

This factsheet doesn't cover everything about this drug and shouldn't be used in place of advice from your MS specialist team. For more information speak to them and read the online information from the drug's makers (see the section **More information and support**).

## What are beta interferons?

There are three beta interferons (or interferon betas) now available in the UK. They're the oldest DMTs for relapsing MS. They were officially recommended for use on the NHS in 2018, but had been used since the late Nineties under a special agreement.

In 1998 beta interferon was also shown to help people with secondary progressive MS if they still had relapses. But the beta interferon prescribed for this, Extavia, is no longer made. Doctors now prescribe the DMT siponimod (Mayzent) instead.

Beta interferon can also slow down how quickly someone with clinically isolated syndrome or CIS (see box on the next page) goes on to get MS.

Beta interferon is pronounced: BEE-ter inter-FEER-on.

The interferon drugs available in the UK have these brand names: **Avonex**, **Plegridy** and **Rebif**. Two others, **Extavia** and **Betaferon**, are no longer available. This isn't because of any safety problems, but because their makers stopped making them.

## Can I have these drugs?

Beta interferons are licenced to treat 'active' relapsing MS, defined in guidelines as two or more relapses in the last two years. But more and more MS specialists define 'active' MS as one recent relapse and/or signs on MRI scans that MS is active. These signs include new 'lesions' (areas of damage) in your brain.

Beta interferons don't usually have serious side effects, so they're often the first DMT you might be given. A beta interferon might only be replaced by another DMT if it fails to control your MS.

## So you can take beta interferons if you have:

- relapsing MS and you've had a recent relapse and/or MRI scans show new signs that your MS is active (you have new 'lesions')
- clinically isolated syndrome or CIS (a first attack of MS-like symptoms) and a brain scan shows you're likely to go on to get MS

Beta interferons can also be given to children with relapsing MS.

Whether you'll be offered a beta interferon depends on whether you qualify for it based on guidelines used by your neurologist. These come from the Association of British Neurologists (ABN) and the National Institute for Health and Care Excellence (NICE). In England there are rules from NHS England about who can have the different DMTs and when. Scotland, Wales and Northern Ireland also have their own guidelines for many DMTs.

If you can have a drug also depends on whether the NHS where you live will pay for it. NHS guidelines on this tend to follow what NICE says.

## You won’t get these drugs if:

- you’re already on another DMT that’s controlling your MS well. You can’t take more than one DMT at a time
- you have progressive MS

You might not be able to take this drug if you have some health conditions. So tell your MS specialist your full medical history, including any other health problems and medications you’re taking.

### CIS

Clinically isolated syndrome (CIS) is a first attack of MS-like symptoms. If it happens again you’ll be diagnosed with MS. CIS is caused, like MS, by damage to the coating of myelin that covers nerves in your brain and spinal cord. MRI scans show if you’re likely to go on to get MS (most people do if scans show lesions on their brain).

If you’re a woman trying to have a baby, or not using contraception, you should discuss with your neurologist the possible risk these drugs might pose to your baby if you become pregnant (see the section **What side effects might I get?**).

## How do I take them?

Beta interferons are all injected. You can learn how to inject yourself, or a friend or relative can give you injections. Many people afraid of needles find they get used to their injections.

You don’t need to see the needle going in as injecting often means clicking on a kind of ‘pen’ that holds the syringe against your skin. You’ll get instructions, and a doctor or nurse stays with you for half an hour after you inject for the first time.

Your MS nurse or someone in your health care team can teach you the best way to inject. This should cut down the chance of side effects (for example, infections) on the skin where you inject.

The leaflet these drugs come with has more information about how to inject, travelling with the drugs and injecting equipment and so on.

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| Avonex | Injected into the muscle | Comes as a pre-filled syringe, automatic injecting pen | Once a week | Keep theinjecting pen in the fridge (2–8°C). If no fridge is available, it can be kept at room temperature for up to a week before use |
| Plegridy | Injected under the skin | Comes as a pre-filled syringe or automatic injecting pen | Every two weeks | Keep out of sunlight until needed. Store in a fridge between 2°C to 8°C. Don’t freeze. Warm up to room temperature before injecting<br>If you have no fridge keep it out of sunlight and under 25°C for no more than a month |
| Rebif | Injected under the skin | Comes as a pre-filled syringe, automatic injecting pen or the RebiSmart electronic injection device | Three times a week | Keep in the fridge (2–8°C), but if not possible keep at room temperature for two weeks |

## How do they work?

Your immune system fights off infections. But with MS it attacks the nerves in your brain and spinal cord by mistake. This leads to inflammation and damage, especially to the coating that covers your nerves (myelin). This damage interferes with how signals travel along these nerves. Over time this affects your control over many parts of your body and causes the symptoms of MS.

Your body makes its own interferons (a protein). They dampen down the inflammation caused when your immune system has reacted to an infection. It’s thought that man-made beta interferons also reduce (and might prevent) inflammation.

## How well do they work?

When DMTs, including beta interferons, are working well you have:

- fewer and less serious relapses
- fewer new or bigger 'lesions' (or 'plaques') in your brain and spinal cord (lesions can be seen on MRI scans)
- a slowdown in your disability getting worse

Like other DMTs, beta interferons work best the sooner you start them after you're diagnosed with MS. Taking them later can also have benefits, but it can't undo any permanent disability you may already have.

**DMTs can be split into three groups, according to how big their effect can be.**

**High (they can work very well):**

- alemtuzumab (Lemtrada)
- natalizumab (Tysabri)
- haematopoietic stem cell transplantation
- ofatumumab (Kesimpta)
- ocrelizumab (Ocrevus) when used for relapsing MS
- fingolimod (Gilenya)
- ponesimod (Ponvory)
- siponimod (Mayzent)

**Good (they can work well):**

- cladribine (Mavenclad)
- ozanimod (Zeposia)
- dimethyl fumarate (Tecfidera)
- diroximel fumarate (Vumerity)

**Moderate (they can work fairly well)**

- glatiramer acetate (Copaxone and Brabio)
- **three beta interferons (Avonex, Rebif and Plegridy)**
- teriflunomide (Aubagio)
- ocrelizumab (Ocrevus) when used for early primary progressive MS

### The effectiveness of beta interferons is classed as 'moderate'

### Relapses dropped by: 33%

This means that in trials, on average, people saw a 33% drop in the number of relapses they had. This was compared to people who took a placebo, a dummy treatment with no drug in it.

### Disability getting worse was slowed down by: a modest amount

This means that in trials, on average, people saw only a modest drop in the risk of their disability getting worse. This was compared to people who took a placebo.

The figures here on relapses and disability come from a 1999 trial involving 533 people over two years, and a 2014 study of 1,512 people over two years.

Beta interferons might work much better for you than these average results – or they might not work as well.

**Long-term benefits:** studies lasting only two years didn't show much impact on how fast people's disability got worse. But a study over six years showed that beta interferons (or glatiramer acetate) do slow this down and that this effect is much bigger than 'modest'.

Check out our factsheets on two other MS drugs, alemtuzumab and fingolimod. They have details of three trials where beta interferons are compared with these drugs. In all of them beta interferons weren't as good at cutting relapses. In two trials beta interferons were as good as the two other drugs at stopping people's disability getting worse but not as good in the third trial.

**Impact on CIS:** Beta interferons can slow down how quickly you go from a CIS to more attacks and then a diagnosis of MS. A 2013 study of nearly 2,000 people who had a CIS showed that the risk of their disability getting worse over a year fell by around a half at least if they took beta interferon. This fell even more the longer they took these drugs.

## What side effects might I get?

Like all drugs, beta interferons can have side effects, but not everyone gets them. Not many people stop taking these drugs because of side effects.

The more effective a DMT is, the more risk of serious side effects. Beta interferons (along with glatiramer acetate) are the DMTs that are the least effective at controlling MS but have the lowest risk of serious side effects. They've been used for nearly 30 years so we know they're safer with fewer serious side effects than DMTs in general.

There's no evidence that beta interferons harm unborn babies. But they're not licensed to be used during pregnancy. You can take Copaxone, (a brand of glatiramer acetate) while you're pregnant if your neurologist thinks you need to.

To be extra careful, if you're a woman who wants to try for a baby, one option is to stop your beta interferon up to a month before you try to get pregnant. Always talk to your neurologist first before deciding to stop taking your beta interferon. For more information on getting pregnant see **'I want a child. Can I take beta interferons?'**

Side effects are common when you start treatment but tend to ease off over time.

Your neurologist, GP or MS nurse can give you advice about ways of dealing with side effects.

### The most common side effects

**flu-like symptoms** (very common, at least one in ten people get one or more of these)

- headache, muscle aches, chills, fever, sweating, pain in your joints arms or legs and feeling tired
- these symptoms usually last for no more than 48 hours (two days) after you inject and often get better over time
- injecting immediately before going to bed and taking ibuprofen or paracetamol can help – you may sleep through the worst of them
- drinking more fluids the day you inject might help with the headache

**reactions where you inject yourself**

- reddening, hardening, bruising, swelling or itching of the skin, fluid draining from where you inject, breaks in your skin, pain and your skin becoming very sensitive or changing colour
- your MS nurse can teach you good injection technique to help lessen these side effects
- you're usually less likely to get injection reactions as time goes on
- less common is something called 'lipoatrophy'
  - this means you lose fat in small areas under the skin where you inject
  - this leaves dents which usually don't go away
  - the problem can be kept to a minimum by looking out for early signs of dents and changing where in your body you inject each time

Other common side effects (less than one in ten get these) include muscle stiffness, rash, pain, problems sleeping, stomach pain and weakness. Side effects seen in blood tests include increases in liver enzymes or a drop in how many red or white blood cells or platelets you have.

## More serious side effects

**allergic reactions**

- stop using your beta interferon and get medical help straight away if you notice any signs of an allergic reaction:
    - swelling of the face, lips and tongue
    - itching all over your body
    - difficulty breathing
    - a rash

**mood and depression**

- some people may get depressed so your doctor might not give you a beta interferon if you've had depression in the past
- call your MS specialist or GP straight away if you have changes in your mood

**liver problems**

- changes in how your liver works are quite common but usually mild and they settle down

Some possible but very rare serious side effects include kidney problems, blood clots in small blood vessels that could affect your kidneys, heart or thyroid problems, seizures and autoimmune diseases.

In **More information and support** you'll find where you can get a full list of all possible side effects and other information about this drug.

### Side effects:
### weighing up the risks of DMTs

Only you can decide what level of risk you're happy to take. You'll need to weigh up:

- possible risks against the benefits you could enjoy
- taking a DMT with fewer side effects but less impact, against a DMT with better results but maybe more serious side effects
- the risk of not being treated

This last point has recently become clearer. We now know that damage could be taking place in your brain between relapses, when it might seem nothing is happening with your MS. Before deciding, talk to others and get the information you need. Some ideas are in **More information and support.**

## What tests will I need?

Regular blood tests will check that your blood and liver are OK, maybe your kidneys, thyroid and blood pressure too. If you have a heart condition, this will be monitored. Blood tests will check if you've developed 'neutralising antibodies' which might stop your beta interferon working (see the box below).

ABN guidelines say that it's a good idea to have MRI scans to see how much difference the drug is making to your MS.

### Neutralising antibodies

Your immune system makes antibodies to kill viruses and bacteria. Some people find their body makes 'neutralising antibodies' against some MS drugs. Over time these antibodies can stop the drug working. Regular blood tests will pick this up. You'll then switch to a new DMT.

The chance of developing these antibodies depends on the drug. It happens to 2-5% of people on Avonex and 12-25% on Rebif. It happens to less than 1% on Plegridy.

## When should I stop taking this drug?

Beta interferons are meant to be taken long term. If a beta interferon is controlling your MS well and side effects aren't a problem, you should be able to take it for years.

Your neurologist might recommend you stop taking your beta interferon and switch to another DMT. This can happen if you have bad side effects or the drug isn't controlling your MS. Switching drugs only usually happens after you've taken a drug for six months.

You'll need to stop taking your beta interferon if your MS changes to secondary progressive MS. But if you have that type of MS and still get relapses or your MRI scans show inflammation, you can take siponimod (Mayzent) instead.

You'll need to stop taking your beta interferon if you develop 'neutralising antibodies' to it (see box on the previous page).

You'll also need to discuss with your neurologist whether to stop taking beta interferon if you're a woman thinking about getting pregnant.

# I want a child. Can I take a beta interferon?

There's no evidence that beta interferons harm unborn babies. But to be extra careful, and after speaking to their neurologist, some women stop taking the drug up to a month before trying to get pregnant.

If you decide to do this, you need to wait until the amount of the drug in your body drops to a safe level before getting pregnant. The time this takes is called the 'washout period'. Doctors might recommend one month or less for beta interferons. Blood tests will check that the level of drug in your blood has dropped low enough.

Official guidelines say that breastfeeding should be encouraged because the benefits of breastfeeding while on beta interferons are bigger than any risk.

Men and women with MS who would like to have a child should discuss this with their neurologist. Talk to your neurologist if you're a woman and you think you may be pregnant.

## More information and support

**mssociety.org.uk/earlytreatment**

On the web page above you'll find more about treatment, a report on the evidence for early treatment and links to our a basic guide to DMTs and factsheets on other DMTs.

Guidelines say everyone should have a review of their MS and treatment with a specialist at least once a year. But if you're not happy with the treatment you're offered, find tips about what to do here: **mssociety.org.uk/about-ms/treatments-and-therapies/getting-treatment-for-ms**

Elsewhere on the MS Society site you'll find the latest updates on research into drugs for the different types of MS.

### Patient information leaflets

Every DMT comes with detailed information about doses, how to store and take it, side effects and results from trials. Find the one for this drug at **medicines.org.uk** and search for 'beta interferons' or the brand name.

The circle with 'PIL' on it has information written for patients. The circle with 'SPC' on it has information for doctors.

### Your MS specialist team

Your neurologist, MS nurse and other members of your specialist team can give you information and support, as can your GP often.

MS nurses, if you have one where you are, can be especially helpful if you need support taking a DMT.

**mssociety.org.uk/forum**

On this and other online forums you can talk to others thinking about treatment or already taking it.

## About this resource

With thanks to Louise Coghlin and all the neurologists and people with MS who contributed to this factsheet.

**Disclaimer**: We have made every effort to ensure that the information in this publication is correct. We do not accept liability for any errors or omissions. Availability and prescribing criteria for drugs in various parts of the UK may change. Be sure to seek local advice from the sources listed.

## Let us know what you think

If you have any comments on this information or on the work of the MS Society, please send them to **resources@mssociety.org.uk**

## References

A list of references is available on request. Call **0300 500 8084.**

## Further information from the MS Society

### Resources

Our award winning information resources cover every aspect of living with MS.

0300 500 8084

shop@mssociety.org.uk

www.mssociety.org.uk/publications

### Helpline

The Freephone MS Helpline offers confidential emotional support and information for anyone affected by MS, including family, friends and carers.

Information is available in over 150 languages through an interpreter service.

0808 800 8000 (closed weekends and bank holidays)

helpline@mssociety.org.uk

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## Contact us

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