

Natalizumab (Tysabri)

This factsheet is about natalizumab, a disease modifying therapy (DMT) for relapsing multiple sclerosis (MS). At the end of this factsheet you'll find out where you can get more information on this drug, 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 is natalizumab?

Natalizumab is a drug that was given a licence in the UK to be used against 'highly active' relapsing MS in 2006.

In 2007 it was given the go ahead for use on the NHS by the National Institute for Health and Care Excellence (NICE).

It was the first monoclonal antibody approved to treat MS (the reason its name ends with 'mab').

Natalizumab is pronounced: nata-LEE-zoo-mab.

Its brand name is **Tysabri** (ty-SAB-ree).

Can I have this drug?

Natalizumab is recommended for the treatment of relapsing MS that is 'highly active' or severe and getting worse fast.

This means - whether you're on a DMT already or not - you're getting frequent relapses and there are signs on MRI scans that your MS is active. These signs include new 'lesions' (areas of damage) in your brain.

In some circumstances natalizumab might be the first DMT someone is given. But because it can have serious side effects, it's usually given after another DMT hasn't worked well enough.

So you can take natalizumab if you have:

In Scotland, Wales and Northern Ireland

- relapsing MS and you've had a relapse in the last year and MRI scans show new signs that your MS is active (you have new 'lesions'). This is despite taking another DMT
- relapsing MS and you've had at least two relapses in the last year and MRI scans show new signs that your MS is active. This is happening whether or not you've been taking another DMT

In England you can have this drug if:

- you have relapsing MS and you've had at least two relapses in the last year and MRI scans show new signs that your MS is active. This is happening whether or not you've been taking another DMT

Whether you'll be offered this drug depends on if you qualify for it based on guidelines used by your neurologist.

These guidelines come from the Association of British Neurologists (ABN) and 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 this drug if:

- you're already on another DMT that's controlling your MS well. You can't take more than one DMT at a time
- your MS isn't 'highly active' or severe and getting worse fast
- you have progressive MS

Natalizumab won't work if your MS doesn't have relapses, so you won't be offered it if you have primary progressive MS.

A trial in 2015 showed it doesn't work if you have secondary progressive MS either. But several other drugs are now being tested to see if they work for people with these non-relapsing, progressive types of MS.

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

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

How do I take it?

Natalizumab is given through a drip (an 'infusion') in hospital. This takes about an hour, with another hour for you to be monitored.

You need to go to hospital once every four weeks for your infusion, but you don't need to stay overnight.

During each infusion, natalizumab is slowly pumped into your bloodstream through a needle that goes into a vein, usually in your arm. You normally sit in a chair or lie on a bed during an infusion.

How does it 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 symptoms of MS.

Natalizumab reduces this damage by targeting special types of immune cells known as white blood cells or 'lymphocytes', especially ones called T cells. These are thought to be responsible for much of the damage caused in relapsing MS.

Your immune system protects you from disease by making antibodies that attach themselves to viruses and bacteria and destroy them.

Natalizumab is a man-made ('monoclonal') antibody that's been designed to stick to your T cells. This stops them before they enter your brain and spinal cord where they would attack the protective myelin coating around your nerves.

How well does it work?

When DMTs, including natalizumab, 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, natalizumab works best the sooner you start it after you're diagnosed with MS. Taking it 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)**
- ocrelizumab (Ocrevus) when used for relapsing MS*
- haematopoietic stem cell transplantation (HSCT)

Good (they can work well):

- cladribine (Mavenclad)
- dimethyl fumarate (Tecfidera)
- fingolimod (Gilenya)

- ocrelizumab (Ocrevus) when used for relapsing MS*

Moderate (they can work fairly well):

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

*ocrelizumab is new, so it's too soon to be sure how to rank it when it's used for relapsing MS. It'll either be 'high' or 'good', so we've put it under both.

The effectiveness of natalizumab is classed as 'high'



Relapses dropped by: 68% compared to a placebo

This means that in a trial, on average, people saw a 68% 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.

How many people stayed free of relapses when they took this drug?

67% of people who took natalizumab stayed free of relapses over two years.



41% of people who took the placebo stayed free of relapses.



 = no relapses

Disability getting worse was slowed down by: 42% compared to placebo

This means that in a trial, on average, people saw a 42% drop in the risk of their disability getting worse. This was compared to people who took a placebo.

How many people's disability didn't get worse when they took this drug?

Disability didn't get worse over two years for 83% of people who took natalizumab.



Disability didn't get worse for 71% of people on the placebo.



 = disability didn't get worse

The evidence about the benefits of natalizumab here comes from a trial called AFFIRM. A total of 942 people took part over two years.

Natalizumab might work much better for you than these average results - or it might not work as well.

Long-term benefits: studies are underway looking at this drug's longer term benefits. Evidence shows that it's still working after five years with no new risks that we didn't already know about.

What side effects might I get?

Like all drugs, natalizumab can have side effects, but not everyone gets them. Not many people stop taking this drug because of side effects.

The more effective a DMT is, the more risk of serious side effects. Natalizumab is, along with alemtuzumab, the DMT drug that controls MS best but with the biggest risk of serious side effects.

The risk of serious side effects with natalizumab is classed as 'high' if you have the JC virus (see box on PML for more on what this is). If you don't have this virus, then this drops to a 'medium risk'.

Natalizumab affects the cells in your immune system. This leaves you more likely to get infections. The drug doesn't target all types of your immune cells, so it still leaves you with enough protection against infections.

It's not yet known for certain if natalizumab can harm unborn babies. So far studies of pregnant women suggest it doesn't.

If you're a woman who might get pregnant, discuss with your neurologist the pros and cons of stopping this drug.

For more information on getting pregnant see the section **I want a child. Can I take natalizumab?**

The most common side effects (up to one in ten people get them)

Infusion reactions – these last an hour or so and can include:

- hives (an itchy skin rash)
- shivering
- feeling sick or dizzy
- headache
- pain in your joints
- tiredness

Other common side effects, which may affect up to one in ten people, include infections of your urinary tract, lungs, nose and throat. You might also get pain in your arms, legs and stomach, diarrhoea or depression.

More serious side effects

A small minority of people have a more serious allergic reaction with:

- hives (an itchy skin rash)
- swelling of your face, lips or tongue
- difficulty breathing
- chest pain
- fever
- feeling flushed (your face and chest go red)

This happens to about one in 25 people. One in a hundred get an even more severe allergic reaction.

Serious infections

Natalizumab leaves you more open to infections, some of which might be serious such as meningitis (inflammation of the brain). Get medical help straight away if you notice any of the following:

- fever
- stiff neck
- headache
- severe diarrhoea
- shortness of breath
- dizziness that lasts a long time
- weight loss
- lack of energy or enthusiasm

Liver problems

- symptoms include your skin or the whites of your eyes going yellow and your urine going dark

Natalizumab has only been used for a few years. We'll get a better understanding of possible long-term side effects by monitoring people with MS on this drug as time goes by.

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 the section **More information and support**.

What tests will I need?

Before you start this drug you'll have an MRI scan of your brain. You'll have more scans early on in your treatment, then one at least once a year to see how the drug is controlling your MS.

Before you take natalizumab you should have a blood test for the JC virus.

If you have this virus, your neurologist will talk to you about the risk this puts you at of the brain infection PML if you take this drug (see next page).

If you decide to take it, you'll be monitored for signs of PML. This includes MRI scans every three to six months if you're at high risk for PML.

If you don't have the JC virus, you'll be tested every six months to see if you've picked it up since starting natalizumab.

You'll also have blood tests that check your liver and see if you've developed neutralising antibodies that can stop natalizumab working (see the box on the next page about neutralising antibodies).

PML: a serious side effect

Natalizumab can increase your chances of getting a brain infection called PML (progressive multifocal leukoencephalopathy). PML often leaves people seriously disabled or kills them. Up to one in four people with PML die from it.

PML is caused by the JC virus. Over half of people with MS have this virus. Our immune system normally stops it causing us problems, but natalizumab changes the immune system, allowing this virus to become active.

You're at even higher risk of PML if you've ever used a drug that suppresses your immune system like mitoxantrone (but if you've used DMTs like beta interferon or glatiramer acetate that doesn't increase your risk).

You're at the highest risk of PML if these three things are all true for you:

1. you have the JC virus
2. you take natalizumab for longer than two years
3. you previously used a drug that suppressed your immune system

Around four in every thousand people who take this drug get PML. If you don't have the JC virus, the risk of you getting PML is extremely low, at only one in over 10,000 people.

But in people who do have the virus around

one in 500 of those at the highest risk get PML in the first two years of taking natalizumab.

After two years the risk in people with JC virus goes up a lot. An estimate in 2016 put the risk of PML much higher in people with JC virus. People with all three risk factors mentioned earlier could have a one in 44 chance of getting PML.

By the end of 2017 around 756 people taking natalizumab had developed PML (out of over 180,000 people across the world taking this drug).

A blood test will show if you have the JC virus. If you do have it, your health care team will talk to you about changing your treatment. This could mean leaving a longer time between doses or switching to a different drug.

You might have a test that shows you don't have this virus, then a later tests finds it. That's because you've become infected since the earlier test.

For this reason everyone taking natalizumab is tested regularly and checked for early signs of PML. Even if you stop taking the drug, you should look out for possible PML symptoms for the next six months.

Signs of PML are similar to an MS relapse: clumsiness, weakness on one side and changes in your speech, vision or memory and thinking.

When should I stop taking this drug?

Natalizumab is meant to be taken long term. Some people have been taking natalizumab for almost a decade. Two trials are following people on this drug for over ten years. If natalizumab 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 natalizumab and switch to another DMT.

This can happen if you have bad side effects, or the drug isn't controlling your MS. Switching drugs usually only happens after you've taken a drug for six months.

But if you have the JC virus you may be taken off the drug after two years and put on another DMT (usually fingolimod). This is because after two years your risk of getting the brain infection PML goes up a lot.

You'll need to stop taking natalizumab if:

- there are signs that you have developed PML or your neurologist feels the chances of this are too high
- you develop a serious infection. Your neurologist might decide that it's best to stop taking natalizumab for a while
- you develop neutralising antibodies (see box opposite)
- your MS changes to secondary progressive MS. DMTs available now can't help people with progressive MS if they don't have relapses. But clinical trials are underway testing drugs for people with progressive, non-relapsing types of MS.

You'll also need to discuss with your neurologist whether to stop taking natalizumab if you're a woman thinking about getting pregnant (see next section for more details).

I want a child. Can I take natalizumab?

Talk to your neurologist if:

- you're a woman trying to get pregnant
- you're already pregnant (or think you might be)
- you want to breastfeed

We don't know yet for sure if natalizumab is totally safe to take when pregnant. It's a fairly new drug, so there aren't a lot of studies about it. So far it seems not to cause serious harm to unborn babies in women who took natalizumab when pregnant.

You and your neurologist will weigh up the potential risk to the baby against the risk of stopping the drug (and your MS getting worse). Women on this drug who get pregnant sometimes carry on taking it if their MS has been very active.

If you're a woman trying for a baby and you decide to stop taking this drug, you need to wait until the amount of it in your body drops to a safe level. The time this takes is called the

'washout period'. For natalizumab it's up to three months. Blood tests will check that the level of drug in your blood has dropped low enough.

Women who've just had a baby are more likely to have a relapse. So it's recommended they restart their DMT soon after giving birth.

Experts say that this drug is unlikely to be taken in by the baby, and so is safe to take when breastfeeding.

Men and women with MS who would like to have a child should discuss this with their neurologist. Women who think they may be pregnant should also talk to their neurologist.

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 mean the drug doesn't work as well. Regular blood tests will pick this up. You can then switch to a new DMT.

The chances of developing these antibodies to natalizumab are different depending on how long you take the drug. In one study tests showed this was a problem for around 6% of people taking natalizumab. Smokers on natalizumab were more likely to develop neutralising antibodies in one study.

More information and support

[mssociety.org.uk/earlytreatment](https://www.mssociety.org.uk/earlytreatment)

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

New 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](https://www.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](https://www.medicines.org.uk) and search for 'natalizumab' or 'Tysabri'. 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](https://www.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 (weekdays 9am–9pm)

✉ helpline@mssociety.org.uk

We're the MS Society. Our community is here for you through the highs, lows and everything in between. We understand what life's like with MS.

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Contact us

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MS Helpline

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- Posting your donation to: MS Society, National Centre, 372 Edgware Road, London NW2 6ND.
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This factsheet will be reviewed within three years of publication.

