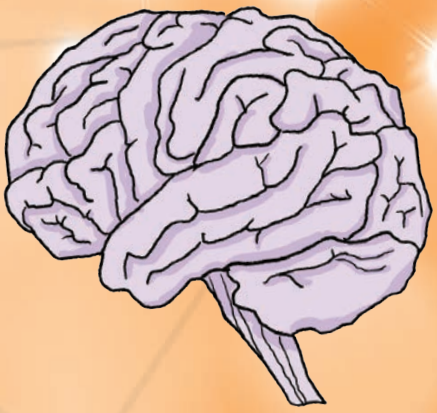
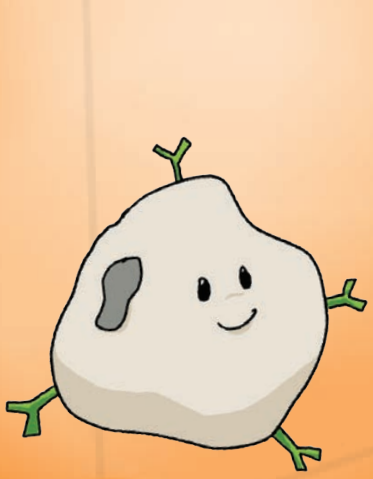
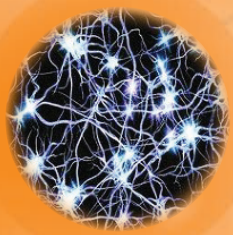
Inflammation and Mental Health



An introduction to how inflammation can affect our mental health

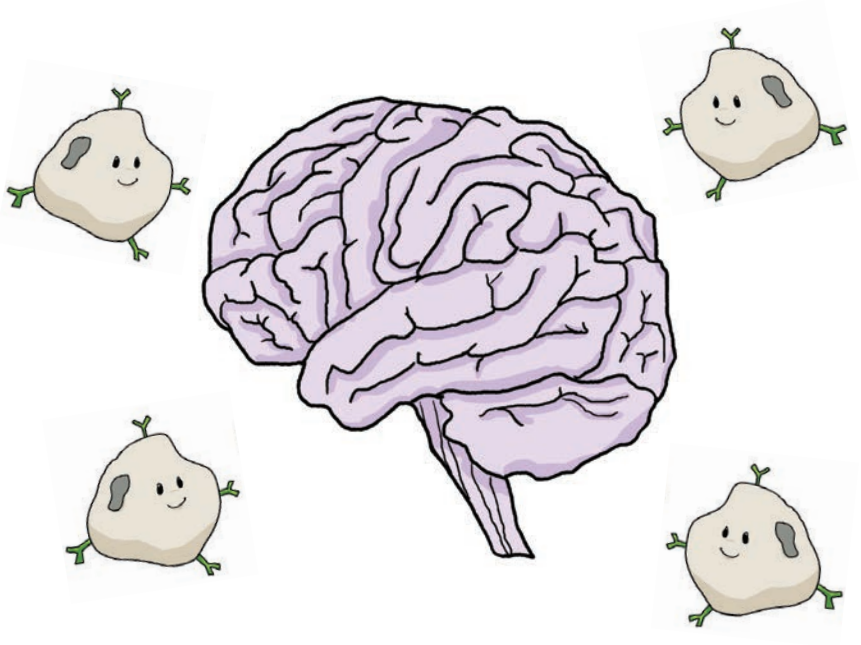




Study of ImmuNotherapy in Autoantibody Positive PsychosiS

Booklet Guide

Introduction to Inflammation and Mental Health



What is inflammation?

Inflammation is the body's response to injury or infection. Its aim is to protect the body from harm. For example, if you fall over and hurt your knee it will probably become red, sore, hot and swollen. This is because of inflammation. This does not only happen when you are injured, but also if you get an **infection**, develop a **disease** or have an **allergy**. You can read more about how inflammation happens on the next page.

Sometimes the part of the body that controls inflammation, called the **immune system**, can go wrong. When this happens, inflammation can be triggered when no protection is actually needed. So instead of protecting our body, inflammation can cause damage to parts of our body.

There is even some evidence that inflammation could affect our **mental health**. Inflammation has been associated with a range of mental health difficulties, such as:

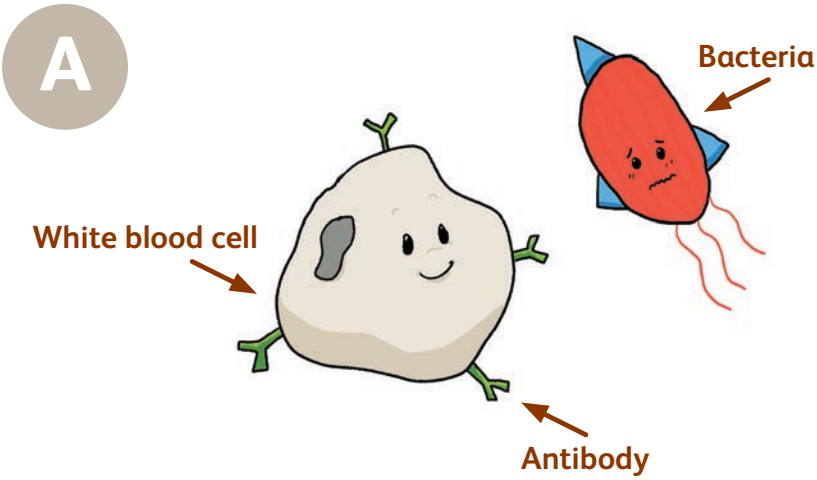
- **Depression**
- **Psychosis**
- **Bipolar**
- **Schizophrenia**
- **Schizoaffective disorder**

So how can inflammation become involved in some people's mental health? In this booklet, we will run through some of the evidence, tests and treatment options available to people. We will also answer some of the questions that people often ask doctors and other healthcare professionals.

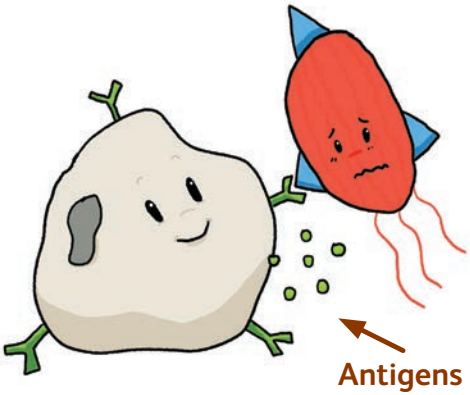
How is inflammation triggered inside my body?

Inflammation happens because there is a system inside our bodies called the immune system that works to protect the body from infections and disease. It is programmed to react to "invaders", or something that the immune system does not recognise, including bugs such as bacteria and viruses. Special patrollers called **white blood cells** move through our blood, looking out for these invaders.

The patrolling white blood cells have Y-shaped structures on their surfaces, called **antibodies** (A). These antibodies grab on to "sticky points" on the surfaces of invaders, so the invaders cannot get away (B). The invaders' sticky points are called antigens. After this happens, the patrolling white blood cells release chemicals that activate and communicate with other parts of the immune system.

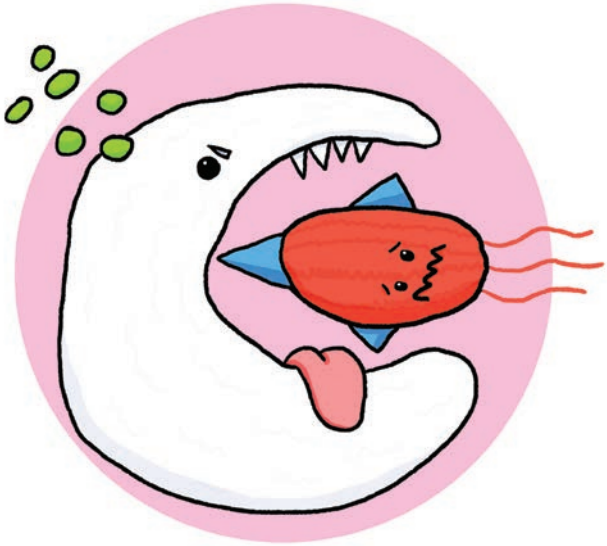


B



Because of this communication, more white blood cells will arrive to help out. Together they will destroy the invader, either by breaking it down or "eating" it (C). This is the process behind inflammation.

C



Depression and Inflammation

What is depression?

Depression is a mental health difficulty which negatively affects how you feel, think and behave. Some of the main symptoms of depression include feelings of sadness, a loss of interest in things you used to enjoy, low self-esteem, disturbed sleep and poor concentration. Over time, these symptoms can increasingly affect your daily life.

Medications called **antidepressants** are sometimes prescribed by doctors to help relieve this low mood. It's not known exactly how antidepressants work. It is thought that they work by changing

the levels of certain chemicals in our brains that are linked to mood and emotion.

While antidepressants can relieve the low mood, they don't always address why a person may be feeling this way, or any other mental health difficulties they may be experiencing. This is why other forms of treatment, such as **talking therapies**, are also offered to people experiencing depression. A common type of talking therapy offered is **cognitive behavioural therapy (CBT)**.

How can inflammation be involved in depression?

Many people experiencing depression begin to feel better after taking antidepressants. However, some people do not feel better after taking antidepressants. A reason for this could be that these people have inflammation in their body which is triggering their symptoms of depression.

The antidepressants prescribed to people with depression are not known to reduce inflammation. Some evidence suggests that this may be a reason why some people do not feel better after taking antidepressants, because the possible cause of their symptoms are not being treated. More research into this is needed, so that doctors can better help those people who do not begin to feel better after taking antidepressants.

For more information about depression, please visit this website: www.nhs.uk/conditions/clinical-depression

Experimental therapies for inflammation-related depression

Currently, antidepressants and talking therapies are offered to people experiencing depression. For people who also have inflammation that may be linked to their depression, there is no recommended treatment. Research into this is currently happening.

Some research is looking into the use of **anti-inflammatory medications** for people experiencing depression who also have inflammation. If you think that inflammation is involved in your symptoms of depression, you may want to consider taking part in the **Insight Study**. The Insight Study will test whether taking a type of anti-inflammatory medication improves people's symptoms of depression.

The type of anti-inflammatory medication used in the Insight Study is called **tocilizumab**, which is also a treatment for **rheumatoid arthritis**. At the time of writing (January 2019), researchers are looking for people who:

- are aged between 20 and 65
- have been diagnosed with depression by their GP or psychiatrist
- have been taking an antidepressant for at least four weeks

The researchers will take a sample of your blood and test it to measure the level of inflammation in your body. If you have high inflammation and you meet the criteria, you may be invited to take part in the trial. The trial will involve you being randomly placed into one of two groups. The people in one group will receive the anti-inflammatory medication.

The people in the other group will receive a "dummy medication" (an inactive substance known as a **placebo**). This is a method commonly used to test whether a new treatment has any effect. People taking part in the trial will not know which group they are in.

To find out more about the Insight Study, please visit this website: www.immunopsychiatry.com/the-insight-study

Stress, trauma and inflammation

When we experience something emotionally challenging or upsetting, our bodies will release chemicals that make us feel stressed.

This stress response can be helpful in certain situations, such as for preparing your body to protect itself against danger. However, if you are stressed for a long time, this can impact on your mental and physical health. It is known as **chronic stress**.

There is some evidence that having high levels of stress chemicals in your blood can be harmful to the body. It can trigger inflammation in the brain. High stress can also impact on how the different parts of your immune system work, so it becomes more difficult for your body to fight infections. This may give you the feeling of being run down.

Psychosis and Inflammation

What is psychosis?

People experiencing psychosis can view or interpret things in a different way to the people around them. Some of the most common symptoms of psychosis are **hallucinations** and **delusions**.

Hallucinations are when someone sees, hears, smells, tastes or feels things that don't exist outside their mind. For example, hearing voices. Delusions are incorrect beliefs that no one else shares, even if it can be shown to not be true. For example, believing that someone is following you. Hallucinations and delusions can make people feel confused. This can change how they usually think and behave and sometimes lead to them becoming distressed.

How can inflammation be involved in psychosis?

There is some evidence that inflammation may be involved in causing some people's symptoms of psychosis. Sometimes, certain types of antibodies that usually help to protect us from harm can begin to mistakenly attack healthy parts of our body, including in the brain. The brain is the computer of the body. It sends messages to control the body through our **nerves**. Nerves are connected together by junctions to form a network inside the body called the **nervous system**. If antibodies mistakenly attack the junctions in the network, it can disrupt the messages going to and from the brain and cause the brain to become swollen or inflamed. It is thought that this is the cause of a

form of **psychosis**, called **antibody-associated psychosis**. Different terms are used to describe this condition, including: **"autoimmune psychosis"**, **"autoimmune encephalitis"** and **"antibody-mediated psychosis"**. The name of this condition varies because we are not certain of the exact role antibodies play in psychosis.

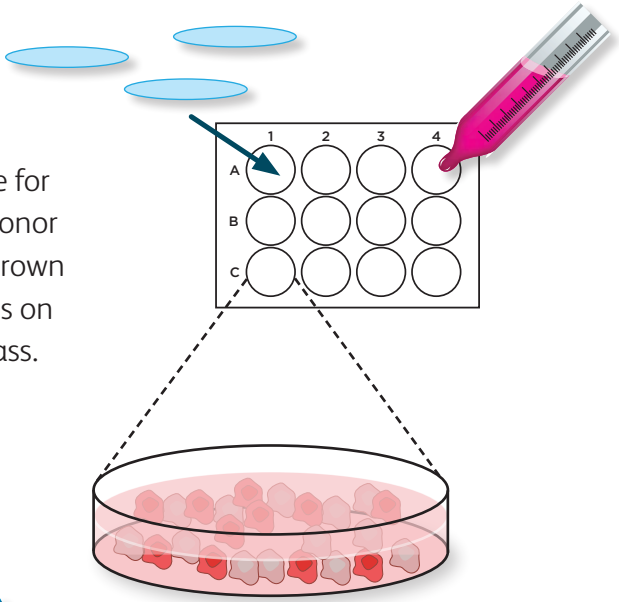
How do we know if the type of psychosis a person experiences is related to antibodies?

There is a test available to see if a person has the antibodies linked to antibody-associated psychosis. To perform the test, a sample of blood is taken, usually from the person's arm, by a doctor or nurse. Sometimes, to make the test more thorough, a doctor may also request a sample of fluid from a person's spine. This is done through a common procedure called a **lumbar puncture**. A doctor will then complete a form and the samples will be taken to the laboratory where the tests are performed.

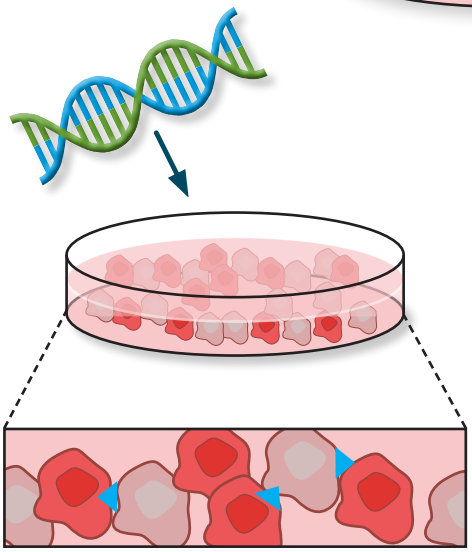
Two different types of tests are available, a fixed-cell test and a live-cell test. The fixed-cell test uses dead cells and the live-cell test uses live cells. The testing process is similar for both tests. The live-cell test is the significantly more sensitive test and is currently only available from one UK laboratory, based in Oxford. If you are being tested, you may not know whether your test is the live-cell or fixed-cell version, but you can ask the doctor requesting the test. Doctors can select which type of test is made when they complete the testing-request form. You can read more about how the live-cell test works on the next page.

Please note that it is not advised to test for antibodies in people who are not at the time experiencing any symptoms of psychosis.

Testing for the antibodies involved in antibody-associated psychosis

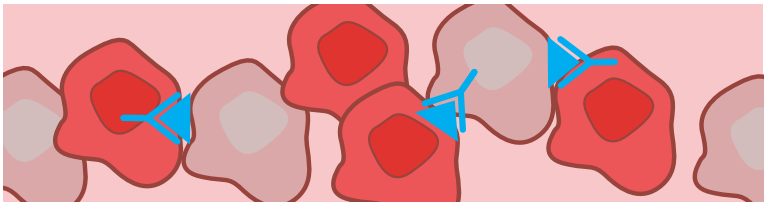


1 To prepare for the test, donor human cells are grown overnight in plates on small circles of glass.

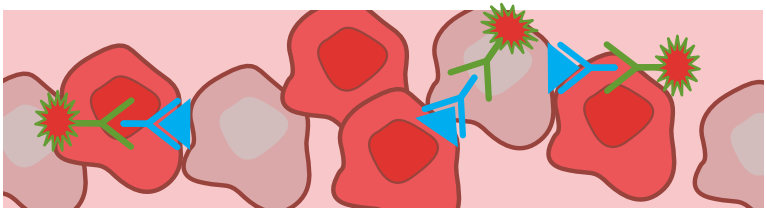


2 For the test to work properly, the cells need certain "sticky points", or antigens, on their surface. A genetic code for these antigens is added to the plate containing the cells. The cells will then form antigens on their surfaces (shown as blue triangles).

3 The patient's blood or spinal fluid samples are added to the plates containing the donor cells. If there are "bad" antibodies in the patient's sample (shown as blue Y-shapes), they will attach themselves to the antigens (shown as blue triangles) on the donor cells.



4 Special fluorescent antibodies (shown as the green Y-shapes with red attachments) is then added to the plates. These fluorescent antibodies will stick to any "bad" antibodies stuck to the cells (blue Y shapes).

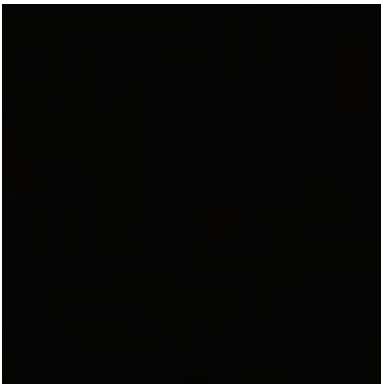


5 The cells are removed from the plate and viewed under a microscope.

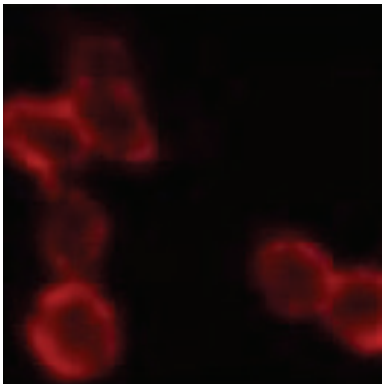
6 If, under the microscope, the cells glow red, this counts as a positive test. A positive test means that a person has the "bad" antibodies linked to antibody-associated psychosis.

If the cells do not glow red, this is a negative result. This may mean that the person does not have the antibodies associated with psychosis.

The tests are always repeated, just in case. If all of the repeated tests are negative, then this is counted as a negative test.



Negative Result



Positive Result

Experimental therapies for antibody-associated psychosis

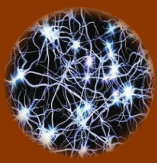
If you think your symptoms of psychosis may be related to inflammation, you may (at the time of writing, January 2019) be able to take part in the **PPiP2 study**. The test described on pages 11-13 is used in this study.

If you choose to take part, your test results will be used, along with other people's results, to estimate the number of people in the UK who have the antibodies linked to antibody-associated psychosis.

To find out more about the PPiP2 study, and how to be tested, please visit this website: www.sinapps.org.uk/ppip2/4593809824

There is some evidence that destroying these antibodies may help to improve the symptoms of people with psychosis. If you test positive for the antibodies linked to antibody-associated psychosis, you may be invited to take part in a clinical trial called the **SINAPPS2 study**, which, at the time of writing (January 2019), is recruiting people to test a new treatment for antibody-associated psychosis.

To find out more about the SINAPPS2 study, and how to take part, please visit this website: www.sinapps.org.uk/sinapps2-details/4593878902



Study of ImmuNotherapy in Autoantibody Positive PsychosiS

If you are not able to take part in this clinical trial, but have tested positive for the antibodies linked to antibody-associated psychosis, you may be offered one of the therapies described on below.

Immunosuppressant Therapy

This therapy involves taking a type of medication called an **immunosuppressant**, which targets a specific part of the immune system to prevent it from doing certain things. The immunosuppressant used in this therapy is called **rituximab**.

It works by killing the cells which produce the "bad" antibodies linked to antibody-associated psychosis. It is thought that by killing these cells, the "bad" antibodies won't be produced by the body, which should help to reduce the symptoms of psychosis.

Intravenous Immunoglobulin (IVIg) Therapy

This treatment involves being given "good" antibodies collected from people's donated blood. The "good" antibodies go into your blood through a drip.

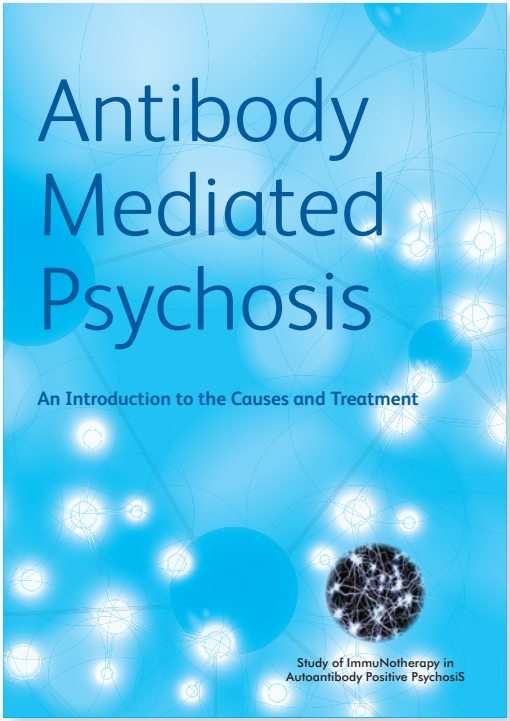
The good antibodies will stick to the antibody-producing cells to try to stop them from producing more of the "bad" antibodies linked to antibody-associated psychosis.

Plasma Exchange Therapy

Your blood is made up of a mixture of **red and white blood cells** and sticky parts called **platelets**. Platelets help your blood to clot together to help stop you from bleeding after an injury. Cells and platelets are all carried around the body by a watery liquid called **plasma**.

Plasma also carries around the antibodies associated with antibody-associated psychosis. In plasma exchange therapy, your blood is taken through a plastic tube from a vein in your arm. Your plasma is separated out by a special machine and replaced with a plasma substitute, to remove the harmful antibodies. Your blood and the substitute plasma is then returned into your other arm.

For more information about these therapies, and the benefits and risks involved, please download the Antibody-Mediated Psychosis information booklet from this website: www.antibodymediatedpsychosis.org/about-2/



Other Mental Health Difficulties and Inflammation

Bipolar

People with bipolar can experience times of feeling depressed and/or low mood, as well as times of feeling high and being overactive. These highs and lows that people with bipolar experience can sometimes be extreme, affecting their everyday life.

During these times, some people with bipolar may also experience psychosis. Some evidence suggests that inflammation may be involved in the symptoms experienced by some people with bipolar.

Some evidence has shown that chemicals involved in triggering inflammation in the body have been found to be higher in people with bipolar, compared with those without bipolar. It may be that changes in these chemical levels may have some role in the development of the high and low moods experienced by people with bipolar.

Schizophrenia and schizoaffective disorder

Schizophrenia is sometimes described as a type of psychosis. This is because people with schizophrenia often experience similar symptoms to psychosis. There is some evidence that the development of schizophrenia is similar to how antibody-associated psychosis develops. You can read more about this on page 9.

People with **schizoaffective disorder** can experience psychosis, similar to schizophrenia, and the mood symptoms of **bipolar**. These symptoms can be experienced at the same time or at similar times. It is possible that inflammation plays a role in the development of schizoaffective disorder symptoms, similar to how inflammation could be involved in psychosis. You can read more about this on page 9.

Frequently Asked Questions (FAQs)

General FAQs

Where can I get more information about antibody-associated psychosis?

For more advice, please discuss any questions or concerns you may have with your GP or psychiatrist.

Research study websites

You can also visit the following research trial websites to read more about the trials and research discussed in this booklet. On the following websites you will also find contact details for researchers who may be able to answer some of your questions.

- **Insight study website**
  www.immunopsychiatry.com/the-insight-study
- **PPiP2 and SINAPPS2 study website**
  www.sinapps.org.uk/home/4593757155

The Encephalitis Society

The Encephalitis Society's website also has lots of useful information: (www.encephalitis.info/Default.aspx). They also have a support line you can call (Tel: 01653 699 599).

You can also refer to the **Useful Resources for Patients, Families and Carers** section of this booklet (page 28).

What kind of doctor should I see?

If your doctor thinks **inflammation** may be affecting your mental health, you may need to be seen in a specialist clinic within a hospital. However, it is likely you will still need to be seen and treated by a psychiatrist.

Depending on any further physical health problems you may also have, additional doctors may also be involved in your care. For example, if you also have rheumatoid arthritis, you may need to see a **rheumatologist**.

Where can I find examples of people going through this process?

There are many written, video and audio stories available online. Some stories are available on the Encephalitis Society's website:
www.encephalitis.info/Pages/Category/your-stories

Other patient stories are also available on YouTube. For example, you can watch Sarah's story here:
www.youtube.com/watch?v=nWgO4tI39nQ

Depression and Inflammation FAQs

Can I ask my doctor to prescribe me anti-inflammatories for my depression?

No. While there is some evidence that anti-inflammatories may improve people's symptoms of depression, this has not yet been proven. More evidence needs to be gathered by research before prescribing anti-inflammatories for depression is recommended.

If you are interested in trying to take anti-inflammatories to help with your symptoms of depression, you might like to find out if you can take part in a clinical trial, like the Insight Study, described on page 7.

Anti-inflammatories are by no means a "magic cure", and might only be helpful for a small number of people. Continuing with the therapies you may have already been offered is still recommended by the UK's medical guidelines.

Will taking anti-inflammatories cure me of my mental health difficulties?

We don't know the answer to this. We are at the very beginning of research into the possible link between inflammation and mental health difficulties. Lots of work still needs to be done. This work will add to what we already know, and may help us find better therapies to help people.

However, everyone's mental health is different and there are a variety of reasons why people might be feeling a certain way.

Researchers are trying out different medications, such as anti-inflammatories to try to reduce the inflammation people may have, rather than cure it completely. At the moment, we just don't know enough about the possible link between inflammation and mental health. This is why gathering evidence through research and **clinical trials** is so important.

Psychosis and Inflammation FAQs

Are the research studies for antibody-associated psychosis approved?

Yes, it is the law that the majority of research studies have to be looked at carefully and approved by an independent panel of people called an ethics committee, before the research is carried out.

What are the side effects and risks of the experimental therapies for antibody-associated psychosis?

Few medications or treatments are without side effects. All medications and treatments are different. Doctors have to work with their patients to carefully weigh up the benefits versus the drawbacks on an individual basis. Some of the side effects of the therapies described on page 14 are discussed below.

Rituximab is an immunosuppressant medication given by a drip. Rituximab does have some **side effects**. Some people may feel sick or have a fever, rash, or wheezy feeling in the chest. If these reactions happen while you are having the therapy, the nurse will slow down the drip. As rituximab prevents parts of the immune system from working properly, you may be more vulnerable to infections after treatment, such as the flu.

IVIg therapy involves being given "good" antibodies collected from people's donated blood. The good antibodies go into your blood through a drip. Some people may have an **allergic reaction** during treatment. Symptoms may include mild symptoms similar to the flu, such as a headache, rash, nausea and vomiting, chest, back or muscle pain and a change in blood pressure.

Plasma exchange therapy is a way of cleaning out the "bad" antibodies from your blood. The side effects can be similar to IVIg therapy as well as feeling faint and bruising or bleeding around the sites where the intravenous lines are connected. After several treatments you may find your blood doesn't clot together as easily. If this happens, you may require an additional infusion of something called a clotting factor to return this to normal.

Are the antibody-associated psychosis therapies 'experimental'?

The above treatments have been used and approved for other health conditions. The way they have been given to people has been well-practised and their side effects are well understood. However, at the time of writing (January 2019), they are not currently licensed to treat antibody-associated psychosis. To be licensed, more evidence needs to be gathered through research, to support that they are effective treatments.

However, doctors are allowed to prescribe these therapies under what is known as "off-label prescribing". This means that the doctor takes responsibility for prescribing the medication or treatment.

Should I stop taking my other medications and treatments if inflammation is linked to my mental health difficulties?

No. There is not enough evidence to support the sole use of anti-inflammatories or immunosuppressant medications to treat inflammation and mental health difficulties. You may need to continue to take other medications to help relieve some of the symptoms you are experiencing before you can try other treatments.

You **must not** stop any current medications or treatments without first speaking to your doctor or psychiatrist. Talking therapies and other forms of therapy can still have benefits for dealing with distress that mental health difficulties may bring and any other factors in your life which could be affecting your mental health.

What other mental health difficulties are linked to inflammation?

As well as depression, bipolar, psychosis and schizophrenia, it may be possible that inflammation is involved in a number of other conditions. **These include: autism spectrum disorder, attention deficit hyperactivity disorder (ADHD), mild cognitive decline, obsessive compulsive disorder (OCD) and Tourette's.** Further research is needed to see if this is the case.

Antibody Test FAQs

How can I be tested?

If your doctor or psychiatrist thinks that inflammation might be associated with your symptoms of **psychosis**, they can request a test which is available on the NHS.

Is the test available for people living overseas?

Yes. The laboratory which does the test often provides the service to people living overseas. Overseas doctors can contact the laboratory directly to request the test for their patients. Please follow this link to find the laboratory contact details:
www.ouh.nhs.uk/immunology/neuroimmunology/default.aspx

Will I need to go to the hospital to get a lumbar puncture?

Yes. Usually, you will go to the hospital, have the lumbar puncture and go home in one day. To read more about lumbar punctures and their side effects, please visit this website: **www.nhs.uk/conditions/lumbar-puncture**

Where do the cells come from which are used in the test?

The cells used in the test come from a human donor. The donor's cells were collected and stored to be used for research later on. The cells are continually grown and used for different medical tests because they are easy to use.

How long does it take to receive my test results?

After the laboratory has received your samples, it will normally take two weeks for your doctor to receive your results.

Is it possible to be re-tested?

Yes. Your doctor can request for the test to be repeated on your behalf.

Does everyone who experiences psychosis have these "bad" antibodies?

Evidence suggests that 9 % of people experiencing psychosis for the first time, have the "bad" antibodies in their blood or in the fluid surrounding their spine (see References, page 30).

A smaller group within this 9 % of people are likely to have the antibodies linked to why they are experiencing psychosis.

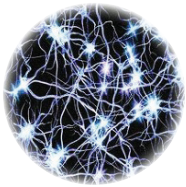
Are there any trials I can take part in for antibody-associated psychosis?

If you think your symptoms of psychosis may be related to your immune system, you may want to consider taking part in the PPiP2 study or another called the SINAPPS2 study. Please see page 14 of this booklet for more information on these.

Do I have to be enrolled in the PPiP2 Study to get the antibody test?

No, if you are not taking part in the study, or there are reasons why you are unable to take part, you can still be tested. Please speak to your doctor, who will be able to request a test for you by arranging for your samples to be taken and completing a test-request form. For more details about how the test works, please see pages 11-13 of this booklet.

If you can't find the answers you are looking for in this booklet, we encourage you to speak with your GP, doctor or psychiatrist.



Study of ImmuNotherapy in Autoantibody Positive PsychosiS

Other Ongoing Research

Research into how inflammation may affect mental health is ongoing, as there are lots of things that we just don't know yet. Researchers across the UK are working on a number of exciting projects. Some of the projects are looking for people to take part in research. If you are interested in taking part in research, visit the UK Clinical Trials Gateway website: **www.ukctg.nihr.ac.uk**.

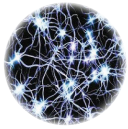
Currently, there is one dedicated clinic in the UK that specialises in inflammation and mental health. The clinic mainly works on using different treatments to help people with depression and bipolar who also have (or are believed to have) raised inflammation. The clinic is only for patients of Sussex Partnership NHS Foundation Trust. For more information, visit this website: **www.sussexpartnership.nhs.uk/immunopsychiatry-clinic**

Useful Resources for Patients, Families and Carers

The National Health Service (NHS)

www.nhs.uk/conditions

The NHS health A-Z is a useful and up-to-date resource for all information relating to our health, including mental health.



Study of ImmuNotherapy in Autoantibody Positive PsychosiS

The SINAPPS research group

www.sinapps.org.uk

The SINAPPS group is a research team that studies the role of antibodies in psychosis. The group is carrying out a study testing different therapies for the treatment of antibody-associated psychosis.

This study is funded by the Medical Research Council (**www.mrc.ukri.org**).

The Immunopsychiatry Clinic (for patients of Sussex Partnership NHS Foundation Trust)

www.sussexpartnership.nhs.uk/immunopsychiatry-clinic

The Immunopsychiatry Clinic is using new approaches to treat depression and bipolar for people who have (or are believed to have) raised inflammation.

Mind

www.mind.org.uk

Mind is the UK's largest mental health charity with a network of local Mind associations across the UK. Mind operates a national information helpline called Mind Infoline (Tel: 0300 123 3393).

Headway

www.headway.org.uk

Headway is a national charity with local branches that support people, families and carers who have been affected by encephalitis, through to recovery.

Rethink Mental Illness

www.rethink.org

Rethink Mental Illness is a major mental health charity in the UK. The charity runs numerous mental health services. The charity operates a helpline called Rethink Advice and Information Service (Tel: 0300 5000 927).

The Encephalitis Society

www.encephalitis.info

The Encephalitis Society is a charity that produces many useful resources for people with encephalitis-related medical conditions and their loved ones and carers. They operate a helpline for people affected by encephalitis (Tel: 01653 699 599).

Samaritans

www.samaritans.org

The Samaritans provide a free and confidential listening service which operates 24 hours a day, 365 days a year (Tel: 116 113 or email: jo@samaritans.org).

Autoimmune Encephalitis Alliance

www.aealliance.org

The Autoimmune Encephalitis Alliance was founded by families and patients affected by autoimmune encephalitis (AE) in the United States. Much of their work is to educate clinicians about early diagnosis and treatment of AE and to establish a community of patients, families and carers.

Reference

Lennox, B. R. et al. (2017). Prevalence and clinical characteristics of serum neuronal cell surface antibodies in first-episode psychosis: a case control study. *The Lancet Psychiatry*, 4(1), 42–48. **www.doi.org/10.1016/S2215-0366(16)30375-3**

Glossary

Antibodies: (also called immunoglobulins) are protective, Y-shaped proteins produced by your immune system to protect against "invaders", such as bacteria and viruses.

Antibody-associated psychosis: is a type of psychosis in which it is thought that antibodies attack the junctions of our nerves in the brain. This can disturb the messages our brains send and also cause the brain to swell. It is thought that this can trigger some of the symptoms of psychosis, such as delusions or hallucinations. Different terms are used to describe this condition, including: "autoimmune psychosis", "autoimmune encephalitis" and "antibody-mediated psychosis". The name of this condition varies because we are not certain of the exact role antibodies play in psychosis.

Antibody-mediated psychosis: (see definition for antibody-associated psychosis).

Antidepressants: are medications prescribed by doctors to help relieve the low mood people with depression experience. It's not known exactly how antidepressants work. It is thought that they change the levels of chemicals in our brains that are linked to mood and emotion.

Antigens: are "sticky points" which are found on the surfaces of "invaders", such as bacteria and viruses, and on the surfaces of our own cells. Antigens also work like labels, as they are unique to each person or invader. This helps our immune system to identify what is good and what is a bad, possibly dangerous, invader.

Anti-inflammatories: are medications which work to reduce inflammation in the body. An example of a common anti-inflammatory medication which you may have heard of or taken before for an injury is ibuprofen. There are many other types of anti-inflammatories, some of which are specifically used for certain health problems.

Anxiety: is a feeling of worry, nervousness, or unease about something. Some people can find it difficult to manage these feelings. If it begins to affect their daily life, it could be a sign of an anxiety disorder.

Attention-Deficit Hyperactivity Disorder (ADHD): can affect people's behaviour. It can make a person over-active and restless and they might find it difficult to concentrate. Often, ADHD is diagnosed in childhood.

Autism spectrum disorder: is a lifelong condition which affects how people view the world and how they interact with others. There are different types of autism which exist along a spectrum.

Autoimmune encephalitis: (please also see definition for "antibody-associated psychosis") is a term used to describe a broad range of conditions that can arise when the immune system mistakenly attack parts of the brain, causing swelling or inflammation. People can experience different types of autoimmune encephalitis and each type can have different symptoms, depending on the part of the brain affected. Some symptoms can be related to the brain and nerves and some can be related to mental health.

Autoimmune psychosis: (see definition for antibody-associated psychosis).

Bipolar: is a long-term mental health difficulty which can cause people to experience times of feeling depressed, or low mood, and times of feeling "high" and being overactive. The highs and lows that people experience can sometimes be extreme and affect their everyday life. People with bipolar may also experience some symptoms of psychosis.

Blood tests: are where a sample of blood is taken from your vein and collected in a tube. We can find out lots of information about our health from what is in our blood. Sometimes we can use blood tests to help find out why we feel unwell and to help diagnose health conditions.

Chronic stress: is a response to the pressures and stress a person may experience over a long period of time. It can make a person feel that they have little or no control over how stressed and pressured they feel.

Clinical trials: are research studies that test out whether a medical treatment, strategy or device is safe and effective.

Cognitive behavioural therapy (CBT): is a type of talking therapy that can help people to manage the difficulties they experience by changing the way they think and behave. It is often used to treat anxiety and depression, but it can also be useful for other mental and physical health difficulties.

Delusions: are incorrect beliefs that no one else shares, even if it can be shown to not be true. For example, believing that someone is following you.

Dementia: a term used to describe a group of symptoms linked to a decline in your memory or other thinking skills.

These symptoms may affect your ability to perform everyday activities, such as making a cup of tea. The most common type of dementia is Alzheimer's disease.

Depression: is a mental health difficulty which can negatively affect how you feel, think and behave. There are many different symptoms of depression, some include feelings of sadness, a loss of interest in things you used to enjoy, low self-esteem, disturbed sleep and poor concentration. Over time, these symptoms can increasingly affect your daily life.

Diseases: can cause harm to your body and can cause specific symptoms in specific areas of the body, which isn't directly related to an injury. Often diseases are caused by infections, but sometimes they are caused by parts of your body not working properly.

Encephalitis: is the medical term for when the brain becomes swollen or inflamed. This can happen in antibody-associated psychosis.

Ethics committees: are panels of people, separate from research teams. An ethics committee will look at research plans and make sure that new therapies or research are carried out in an ethical way.

Hallucinations: are where someone sees, hears, smells, tastes or feels things that don't exist outside their mind. For example, hearing voices.

The immune system: works to protect the body from harm and is made up of lots of different parts of the body. It is programmed to react to "invaders" such as bacteria and viruses, or something that the immune system does not recognise

Immunoglobulin: is the technical term for an antibody.

Immunosuppressants: are a type of medication which stop parts of the immune system from working properly. Different immunosuppressants work in different ways.

Infections: are an invasion of bugs such as bacteria and viruses in the body. Infections may or may not cause symptoms. They can affect a small area of the body or the whole body.

Inflammation: is the body's response to injury or infection, triggered by the immune system. For example, if you fall over and hurt your knee, it will probably become red, sore, hot and swollen, this is because of inflammation. This does not only happen when you are injured, but also if you get an infection, develop a disease or have an allergy.

Lumbar puncture: is a procedure by which a thin needle is inserted between the bones in the bottom part of your spine, to take a sample of the fluid that surrounds your spine.

Mental health: concerns how you feel, the way you think and how you behave.

Mild cognitive decline: is a condition by which a person may find it difficult to remember or think about certain things. However, it is not enough to interfere with their daily life, so is not classed as a form of dementia. People who experience mild cognitive decline do have an increased risk of developing dementia.

Nervous system: is the network inside the body which carries messages to and from the brain and spinal cord to different parts of the body.

Nerves: are the "wires" inside our bodies and brains that carry messages from our brains to tell the other parts of our body what to do.

Nerve junctions: are the connections between our nerves which help turn on and off the messages sent from our brains.

Neurologists: are medical doctors who are experts in treating disorders of the brain and nervous systems.

Obsessive-compulsive disorder (OCD): is a mental health difficulty whereby people experience obsessive thoughts that can be unwanted or unpleasant and repeatedly enter their mind. They may also repeat certain behaviours that they feel they have to do to try to relieve their unpleasant feelings and thoughts.

Panic attacks: are sudden intense feelings of fear or discomfort. People experiencing panic attacks may feel their heart is pounding, racing or not beating regularly, or feel that they are finding it difficult to breathe. They may also be shaky and begin sweating.

Placebo: is an inactive substance or "dummy drug" which has no effect on someone's health.

Plasma: is the liquid that carries blood cells and platelets around the body.

Platelets: are sticky parts in your blood which helps blood clot together, to stop you bleeding after an injury.

Proteins: are chains of small units called "amino acids". They make up most of the dry mass or non-water parts of the body.

Psychiatrists: are medical doctors who are experts in mental health. They specialise in diagnosing and treating people with mental health difficulties.

Psychologists: are professionally trained people and researchers who study our mental health.

Psychosis: is a mental health difficulty where people view or interpret things in a different way to the people around them. Some of the most common symptoms of psychosis are hallucinations and delusions.

Red blood cells: are the cells that carry oxygen around our body.

Rheumatoid arthritis: is a disease caused by your own immune system launching an attack on your joints. This can lead to your joints becoming inflamed, sore and stiff. Usually, it is the joints in your hands, feet and wrists that are the worst affected.

Rheumatologists: are medical doctors who specialise in the diagnosis and treatment of arthritis and other joint-related conditions.

Rituximab: is a type of medication called an immunosuppressant. It works by stopping the immune system from doing certain things by killing the cells that produce the "bad" antibodies linked to antibody-associated psychosis. It is thought that by killing these cells, the "bad" antibodies cannot be produced.

Side effects: are unwanted symptoms that can be caused by medications and treatments. For example, you may be taking an antidepressant to help with your symptoms of depression, but taking this medication may also make you feel sick.

Schizoaffective disorder: is a mental health difficulty in which someone experiences some of the symptoms of psychosis and depression, such as delusions and hallucinations and low mood. "Schizo-" relates to the symptoms of schizophrenia and "-affective" refers to changes in your mood.

Schizophrenia: is a mental health difficulty which can change a person's behaviour and ability to understand what is real and what is not. People with schizophrenia can sometimes experience symptoms of psychosis, such as delusions and hallucinations.

Talking therapies: are a type of treatment that is usually offered to people who are experiencing difficulties relating to their mental health and feelings. The therapy involves talking to a specially trained therapist or counsellor. One of the most common talking therapies offered is cognitive behavioural therapy (CBT), which is available on the NHS.

Tocilizumab: is a type of medication called an immunosuppressant. It works by stopping the immune system from doing certain things. It does this by stopping some of the chemicals used by the immune system from working. It is usually used to treat rheumatoid arthritis.

Tourette's: is a condition that causes a person to make sudden, repeated sounds and movements, known as tics.

White blood cells: are the cells of the immune system which act as patrollers and work to find and destroy invaders.

Endnotes

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MRC Medical Research Council

Disclaimer

1. We encourage readers to seek professional medical advice if they have any questions, and not to rely solely on the contents of this booklet.
2. While we have made every effort to ensure that the information in this booklet is correct at the time of writing (January 2019), we cannot be held responsible for any errors that it may ultimately contain. A lot is currently unknown about how inflammation may be associated with mental health and more research is needed. Our understanding will evolve as the research builds up. With that in mind, we aim to review this booklet annually.
3. A wide variety of terms are used in mental health. For example, "service-user", "patient", "client" etc. Other terms and 'diagnoses' are often debated. Please note that the terms used in this booklet are not necessarily those used by the McPin Foundation. These terms have been included in this booklet as they are widely used in the NHS.
4. The Insight, SINAPPS 2 and PPiP2 research studies have all received ethical approval from a HRA Research Ethics Committee (REC refs: 18/SC/0118, 16/SC/0584, and 12/EE/0307, respectively).

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About the McPin Foundation

The McPin Foundation is a mental health research charity which exists to transform mental health research by putting the lived experience of people affected by mental health problems at the heart of research methods and the research agenda.

We work in three main ways:

- We conduct user-focused mental health research
- We build the capacity of others to conduct user-focused mental health research
- We seek to influence methods, practice, and decision-making in mental health research

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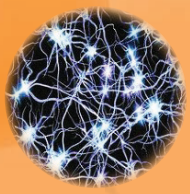

Study of ImmuNotherapy in
Autoantibody Positive PsychosiS

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