

## Debunking the brain chemical imbalance myth

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### What is the 'brain chemical imbalance' myth?

This myth suggests that some people have imbalances in neurotransmitters in the brain, such as serotonin, dopamine, and norepinephrine which cause mental disorders such as depression and anxiety. Most people have heard this myth, or have been directly told that low levels of 'brain chemicals' are the cause of their mental health conditions.

The most common brain chemical imbalance myth is that depression and anxiety is caused by 'low serotonin levels' that can be corrected by taking SSRIs (selective serotonin reuptake inhibitors, commonly known as 'antidepressants', which is a marketing term).

### Where does the myth come from?

In the early 1950s, there were several studies in animals which explored what happened when animals were exposed to chemicals that were thought to lower serotonin in the brain. There was no way to test this, so it was assumed that this was the case. Animals (rodents) were given a chemical called reserpine (usually and still used in the treatment of hypotension). When the rodents were given reserpine, they became excited and energetic, before becoming lethargic, calm, quiet and still. At the time, this was known as 'catatonia' which eventually became known as 'depression'.

As the rodents became 'catatonic' after a medication was used which was thought to lower serotonin, the scientists concluded that low serotonin must cause depressive symptoms in rodents. Between the 1950s and the late 1970s, scientists tried to prove that low serotonin also caused depressive symptoms in humans but were unsuccessful. This did not stop pharmaceutical companies using this claim to market medication, however, and so, the term 'antidepressant' was born – and so was the brain chemical imbalance myth.

### How was the 'brain chemical imbalance' myth communicated?

Primarily, this myth was communicated and encouraged by companies who were producing and selling medications around the world. Whilst they did market 'antidepressants' to health services and practitioners, they also engaged in DTCA (direct to consumer advertisement). This meant adverts, social media, posters, and press articles which described feelings of depression and anxiety as being caused by a brain chemical imbalance that could be solved by taking medication.

In the last 70 years, millions of people have been exposed to direct marketing of antidepressant medication, and myths about serotonin causing 'depression' and 'anxiety'.

Today, 1 in 6 British adults and 1 in 5 American adults are taking an antidepressant, with women significantly more likely to be taking antidepressants than men in both countries (NHS, 2021; CDC, 2020).

## Can we prove brain chemical imbalances cause mental health conditions?

Simply put, we can't. There are no current tests for 'brain chemical imbalances'. There are no blood tests, urine tests, brain scans, or cerebrospinal fluid tests that can measure neurotransmitters in the brain.

Some studies have attempted to estimate serotonin in the body, by instead measuring the biogenic amine breakdown products (metabolites) in the urine and cerebrospinal fluid. The assumption underlying this measurement is that the level of biogenic amine metabolites in the urine and cerebrospinal fluid reflects the amount of neurotransmitters in the brain. However, less than 50% of the serotonin and norepinephrine metabolites in the urine or cerebrospinal fluid come from the brain. The other half come from various organs in the body.

This is important to understand, as many people believe that there are scientific tests and scans to prove that mental health conditions are caused by low levels of neurotransmitters.

Therefore, no one with a mental health condition has ever been formally diagnosed using a physical test of any kind. The tests do not exist.

## Do leading scientists and psychiatrists believe in the 'brain chemical imbalance' myth?

No. Most leading medical journals, academics, institutions, and regulatory bodies reject the 'brain chemical imbalance' myth. In fact, many now claim that it was never said at all. The DSM-V (Diagnostic & Statistical Manual for Mental Disorders) does not list serotonin as the cause of any theorised mental disorder.

In an article for the Psychiatric Times, the Chief Editor of the Psychiatric Times, Professor Ronald Pies wrote that he had spent many years trying to 'drive a stake through the heart of this myth' with little success. Interestingly, he argued that the 'brain chemical imbalance' myth never really existed in the way people believe. He instead suggests that psychiatry as a profession never endorsed the 'bogus theory' of mental health.

*'Scientifically speaking, there never was a network of validated hypotheses capable of sustaining a full-blown, global chemical imbalance theory of mental illness. Moreover, psychiatry as a profession and medical specialty never endorsed such a bogus "theory,"*

*To be sure: what many psychiatrists in the 1980s and 1990s did promote was some version of the biogenic amine (or catecholamine) hypothesis of mood disorders, focusing mainly on the neurotransmitters norepinephrine and serotonin. Schizophrenia was conventionally explained by the now outdated "dopamine hypothesis." And, in truth, the significance of serotonin was considerably over-emphasized.*

*Furthermore, the SSRIs were accorded a rock-star status as effective antidepressants that they did not deserve. Most troubling from the standpoint of misleading the general public, pharmaceutical companies heavily promoted the "chemical imbalance" trope in their direct-to-consumer advertising.'*

Professor Ronald Pies, 2019, The Psychiatric Times

Professor Pies goes on to quote the American Psychiatric Association as stating that ‘Psychiatric disorders result from the complex interaction of physical, psychological, and social factors and treatment may be directed toward any or all three of these areas.’

There are certainly many thousands of professionals, academics, and members of the public who believe that mental health issues are caused by low levels of neurotransmitters. There are still doctors and nurses explaining mental health issues to their patients by invoking this debunked theory, too.

## Has anyone influential spoken out about the ‘brain chemical imbalance’ myth?

Yes, it is spoken about widely and openly by influential psychiatrists, academics, and professionals. Within the field, this is not controversial, and so it is discussed frequently. Many psychiatrists have criticised and rejected the myth since the early 2000s.

‘Many neuroscientists no longer consider a chemical imbalance theory of depression and anxiety to be valid.’ (Dr David D. Burns, Professor of Psychiatry, Stanford University)

‘Chemical imbalance is sort of last-century thinking. It’s much more complicated than that.’ (Dr. Joseph Coyle, Professor of Neuroscience at Harvard Medical School)

‘After decades of trying to prove [the chemical-imbalance theory], researchers have still come up empty-handed.’ (Marcia Angell, former editor of The New England Journal of Medicine).

‘Despite pseudoscientific terms like “chemical imbalance” nobody really knows what causes mental illness. There’s no blood test or brain scan for major depression.’ (Dr Darshak Sanghavi, clinical fellow at Harvard Medical School)

‘We do not know the aetiology of really any of the mental disorders at the present time.’ (Previous Director of Research at the American Psychiatric Association)

‘Research has yet to identify specific biological causes of any of these [mental] disorders.’ (U.S. Congressional Report, entitled: The Biology of Mental Disorders; New Developments in Neuroscience)

‘The results of decades of neurotransmitter-depletion studies point to one inescapable conclusion, low levels of serotonin, norepinephrine or dopamine do not cause depression.’ (Professor Irving Kirsch, Harvard Medical School)

‘We still don’t know the relationship between biology and the mental disorders.’ (Carol Bernstein previous president of the American Psychiatric Association)

‘Patients have been diagnosed with chemical imbalances, despite that no test exists to support such a claim, and that there is no real conception of what a correct chemical balance would look like.’ (Dr David Kaiser, Psychiatric Times)

‘A simplistic biological reductionism has increasingly ruled the psychiatric roost... [we have] learned to attribute mental illness to faulty brain biochemistry, defects of dopamine, or a shortage of serotonin. It is biobabble as deeply misleading and unscientific as the psychobabble it replaced.’ (Andrew Skull, Professor of History of Psychiatry, Princeton University, Lancet)

## Why did my doctor tell me that I have a brain chemical imbalance?

Many medical practitioners are influenced by myths, marketing, and poor training. General Practitioners (GPs) receive very little training in mental health, trauma, abuse or emotional wellbeing, and so they tend to believe the same misinformation and myths as everyone else. This is similar for other professions, such as therapists, police officers and social workers.

Furthermore, GPs are seriously under-resourced and overwhelmed, with a lack of alternatives to give to their patients. GPs often prefer to refer people for therapy or support, but waiting lists mean that their patients can be waiting months or years for support. In the absence of anything else, many doctors feel under pressure to prescribe a medication to their patient to validate and support them.

However, there is no evidence of mental health issues being caused by a brain chemical imbalance, so doctors should not tell patients that their depression or anxiety is caused by brain chemicals, low levels of neurotransmitters, lack of serotonin, or anything else that cannot be proven or tested.

It is much vaguer (but more honest) to explain to patients that we don't know much about the link between biology and mental health at all, and instead, we should be looking at our environments, lifestyles, experiences, trauma, distress, and health.

## But if I don't have a brain chemical imbalance, why do I feel this way?

There are many reasons why you may feel low, irritable, scared, tired, angry, sad, demotivated, hopeless, and isolated. It could be that something in your life is harming or scaring you, or something happened in your past that still upsets you. You could be being bullied, exploited, oppressed, discriminated against, exhausted, abused, intimidated, or traumatised by something or someone. It might be that you are living in a situation that is harmful to you, such as poverty, homelessness, relocation, chronic illness, an unhealthy or abusive relationship, unemployment, stressful job, toxic relationships with family members or friends. It might be that something happened to you that still upsets you such as loss or grief. Even if none of this applies to you, it is common and normal to become anxious, scared, sad and angry as we move through our lives. Human life is complex and often difficult. Whilst you may not have a brain chemical imbalance, **the way you are feeling is still real, and valid.**

## I was told I need medication for a brain chemical imbalance, so should I stop taking the medication?

If you choose to stop taking your medication, you should do so with supervision and advice of a supportive doctor. **Do not suddenly stop taking your medication, as this may cause adverse effects and withdrawal symptoms.** When you have been taking a medication such as an antidepressant or antipsychotic for a long time, you will need to taper off the drug slowly and carefully, with your doctor. If you wanted to discuss any of this with your doctor, they should support your decision and arrange to help you to reduce your medication safely. Conversely, if you don't want to stop taking your medication, you can continue to take it as normal. The most important thing to do, is to ask your doctor if you have any questions about your own medication.

## What is the trauma-informed approach to mental health?

At VictimFocus, we work within a trauma-informed approach to understanding human distress, trauma, and day-to-day emotional wellbeing. Instead of working from an assumption or theory that people have 'mental disorders' and 'mental illnesses' that arise from physical disorders of the brain, we prefer to work from the position that human experience, emotion, thought, and behaviour (no matter how different or extreme it may seem) is natural, normal, valid, and rational. Therefore, when we meet someone who is anxious, scared, low, and struggling to cope, we do not conclude that they must have a brain chemical imbalance, a mental disorder or illness which is causing them to feel that way, we ask what might be happening for that person, and how their feelings might be a response to an event, environment, problem, or to something else which is causing them distress.

Where the medical model of mental health theorises that mental health conditions come from the brain or the mind, the trauma informed model of mental health theorises that so-called 'symptoms' and 'illnesses' are likely to be completely normal responses to human experience and human suffering.

## Sources of support

**Samaritans** provides confidential, non-judgemental emotional support for people experiencing feelings of distress or despair, including those that could lead to suicide. You can phone, email, write a letter or in most cases talk to someone face to face.

**Telephone:** 116 123 (24 hours a day, free to call) **Email:** [jo@samaritans.org](mailto:jo@samaritans.org) **Website:** <https://www.samaritans.org>

**Shout** is the UK's first 24/7 text service, free on all major mobile networks, for anyone in crisis anytime, anywhere. It's a place to go if you're struggling to cope and you need immediate help.

**Text:** 85258 **Website:** <https://www.giveusashout.org/>