PATIENT INFORMATION

Depression and the brain

What is happening inside, and how treatment helps

Depression is a real illness of the brain and body. It is not weakness, laziness or a lack of willpower — and it can be treated.

What can lead to depression?

Usually several things together — never one person's fault.

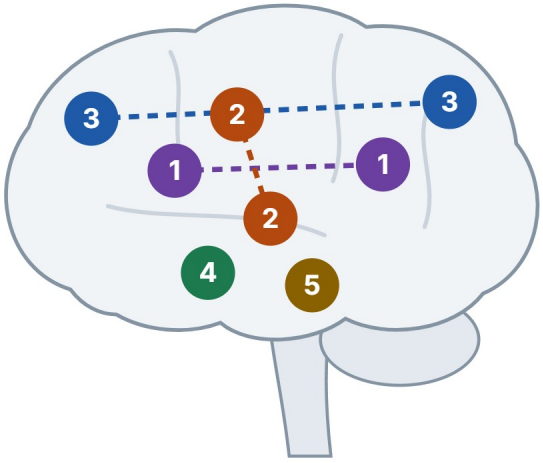
- Family genes
- Long-term stress
- Difficult childhood
- Loss, trauma, loneliness
- Poor sleep
- Illness, inflammation, alcohol

Your brain works in teams called networks

Brain areas are linked like towns joined by roads. They work as teams — for inner thoughts, for alarm, for planning, for joy, and for sleep and appetite.

In depression, some teams become too loud and others too quiet. That imbalance is what you feel as symptoms.

See which symptom comes from which team → page 5



1 Inner talk · 2 Alarm · 3 Manager · 4 Joy · 5 Body clock

Simplified picture — real networks spread across the brain

EVERYDAY STEPS

When low mood stays — first steps

Is it more than a bad week?

Low or empty mood	No joy or interest	Sleep changes
Appetite or weight change	Tired all the time	Can't concentrate
Guilt, feeling worthless	Slowed down or restless	Thoughts of death

Several of these, most days, for two weeks or more? Talk to a doctor.

Do first — the mood follows

Don't wait to feel like it. Small actions come first; better mood often follows.

The low loop

Do less → Feel worse → Do even less ↻

The lift loop

One small step → A small lift → A little more energy ↻

Small first steps

- Wake up at the same time every day
- 10 minutes of morning sunlight
- A short walk, even around the house
- Eat at regular times
- Do one small task and tick it off
- Talk to one person you trust

Makes it worse: alcohol and cannabis · staying in bed all day · cutting off from people

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Get help today if you have thoughts of ending your life, or cannot eat, drink or look after yourself. In an emergency, go to the nearest hospital.

KNOW YOUR DEPRESSION

How severe is it, and will it come back?

Severity

Mild PHQ-9 5–9	Some symptoms; daily life is harder but manageable. → **Self-help, activity plan, CBT, exercise**
Moderate PHQ-9 10–14	Many symptoms; work, study or home life clearly affected. → **CBT and/or medicine**
Severe PHQ-9 15+	Most symptoms, strongly; hard to get through the day. → **Medicine plus therapy; closer follow-up**
Severe with psychosis or high risk	Hearing voices, fixed false beliefs, not eating, or suicidal plans. → **Urgent specialist care; sometimes hospital or ECT**

Your doctor may use a short questionnaire such as the PHQ-9 to measure severity and track progress.

Recurrent depressive disorder (RDD)

When depression returns as two or more separate episodes, with months of feeling well in between.

Chance of another episode



What lowers the risk

- Continue medicine at least 6 months after feeling well — often 2 years or more if depression has come back before
- Relapse-prevention therapy (CBT, mindfulness-based CBT)
- Know your early warning signs and act early
- Steady sleep and activity; no alcohol or cannabis

Early warning signs — see your doctor early

Sleeping badly · Losing interest · Pulling away from people · More irritable · Negative thoughts returning

THE BIGGER PICTURE

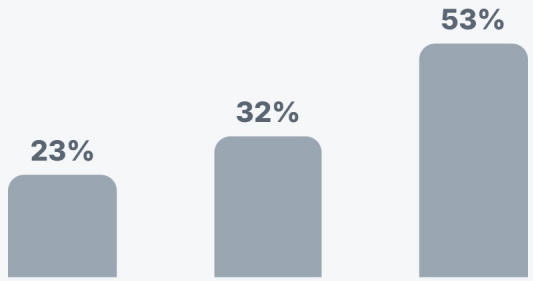
Why treatment matters: risks and quality of life

If depression is not treated

- Suicide risk rises
- Heart disease and diabetes
- Alcohol and drug misuse
- Work, studies and income suffer
- Strain on family and relationships
- Longer episodes that return more often

Waiting it out vs getting treatment

Without treatment — recovered by:



With treatment, many people start to feel better within 2–6 weeks.

About 1 in 3 recover fully with the first medicine — and more do when treatment is adjusted step by step.

The longer depression goes untreated, the harder it is to treat. Early help gives the best chance.

What recovery gives back

- Better sleep and energy
- Focus at work and study
- Enjoying people and hobbies again
- A healthier body
- Hope for the future
- Back to work and responsibilities

The goal is not just fewer symptoms but getting your life back. Full recovery also lowers the chance of depression returning.

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If you have thoughts of ending your life, tell someone today, contact your doctor, or go to the nearest hospital.

Each symptom comes from a network out of balance

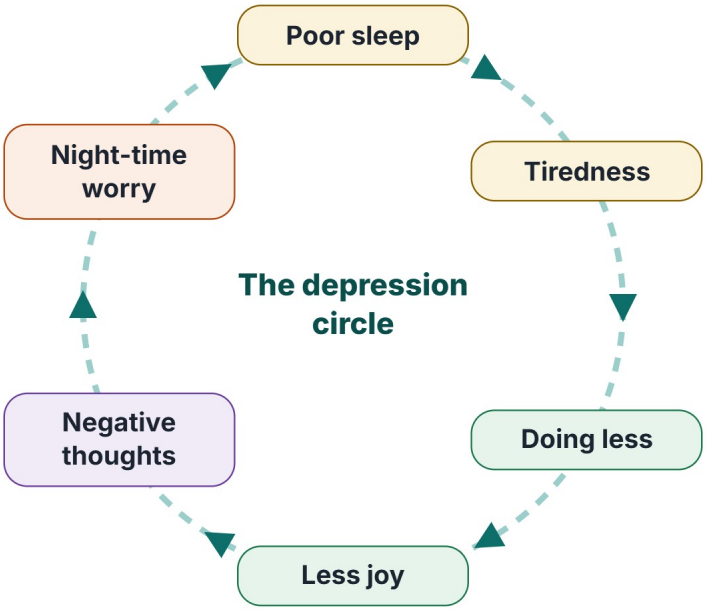
1 Inner-talk network
Default mode network
Too loud ↑
Overthinking, replaying the past, guilt, thoughts like ‘I am useless’.

2 Alarm network
Salience network · amygdala, insula
Stuck on threat
Noticing mostly the bad, worry, tension, feeling heavy or irritable.

3 Manager network
Executive network · prefrontal cortex
Too quiet ↓
Poor concentration, forgetfulness, slow thinking, difficulty making decisions.

4 Joy & reward network
Reward circuit · striatum, dopamine
Too quiet ↓
Nothing feels enjoyable, loss of interest, no drive to start things.

5 Body clock & stress system
Hypothalamus · stress hormones
Off rhythm
Sleep and appetite changes, tiredness, low energy, aches and pains.



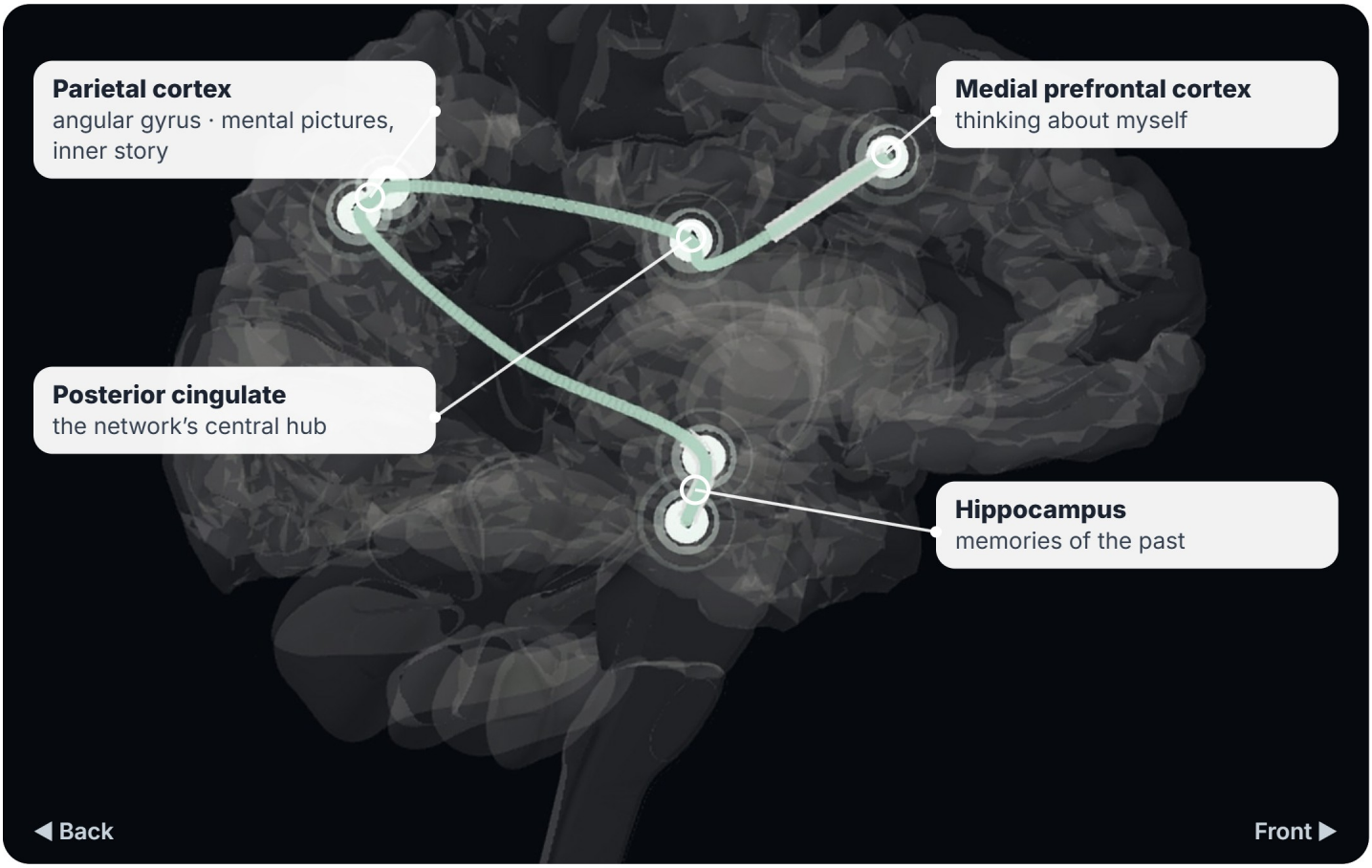
Symptoms also feed each other

Each symptom pushes the next one. This circle keeps depression going.

Good news: breaking the circle at any point helps — medicine, therapy, a fixed sleep time, or one small enjoyable activity a day.

BRAIN CLOSE-UP

The default mode network — the ‘inner talk’ network



What it does: switches on when the mind wanders — daydreaming, remembering, imagining the future, thinking about ourselves. It should switch off when we focus on a task.

In depression

- It becomes overactive and over-linked with emotion areas, so thoughts keep circling back to the self.
- It doesn’t switch off easily, so the manager network struggles to take over.

What you may feel

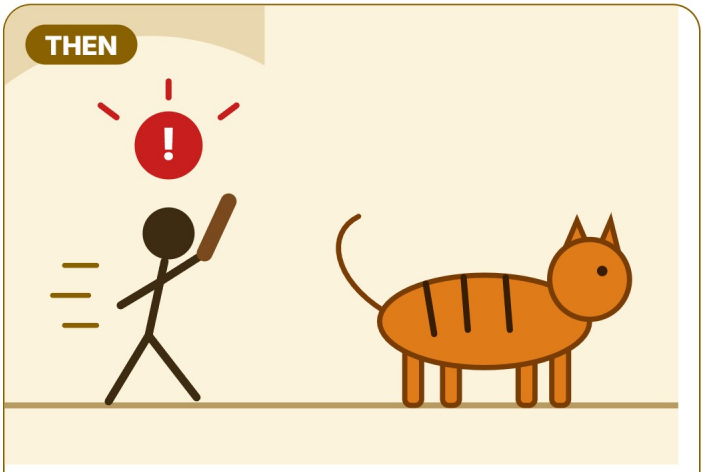
- Rumination — going over the same worries and regrets again and again.
- Poor focus, self-blame, ‘I am a failure’ thoughts.

How treatment helps: antidepressants and therapy reduce this over-linking. Activity, mindfulness and CBT help the brain switch to ‘task mode’. rTMS stimulates the prefrontal cortex to rebalance these networks.

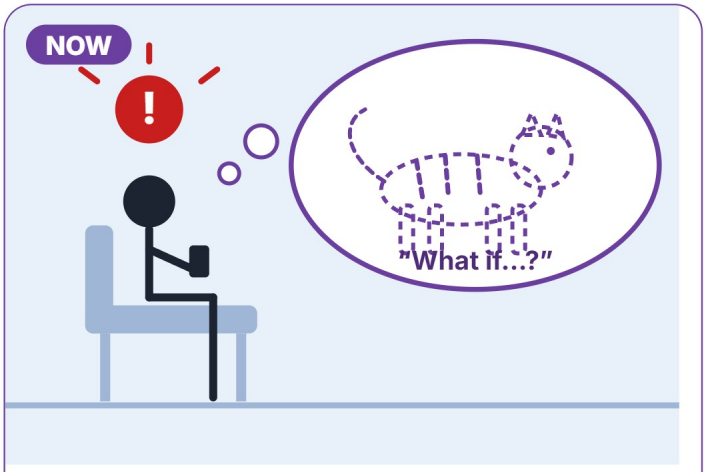
BRAIN CLOSE-UP

The over-active alarm — a cave-age brain in a modern world

The amygdala is the brain's smoke alarm. It was built thousands of years ago, when a wild animal could attack at any moment.



Real tiger → alarm → run. The alarm saves your life.



No tiger — just a thought: "What if something bad happens?" The same alarm rings.

A false alarm feels real

- Racing heart
- Fast breathing
- Sweating, shaking
- Tense muscles
- Imagining the worst

In depression and anxiety the alarm becomes too sensitive. It rings at memories, worries and imagined scenes — the brain makes up dangers that are not there.

Turning the alarm down

1. Breathe out slowly — it tells the body you are safe.
2. Name it: "This is a false alarm."
3. Check the facts: is there a real tiger?
4. Treatment helps: medicines calm the amygdala; therapy trains the thinking brain.

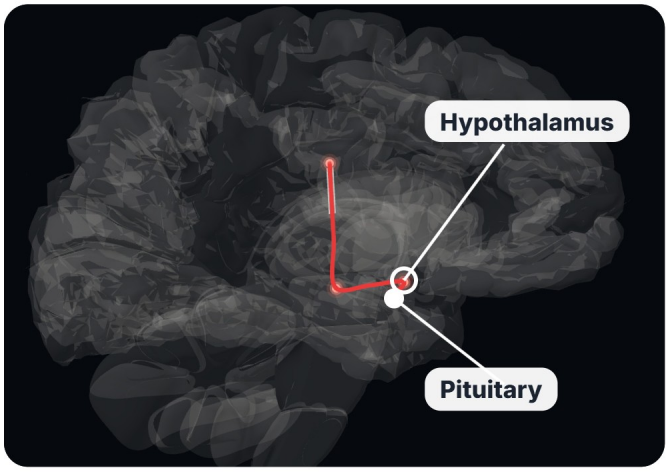
BRAIN CLOSE-UP

The stress hormone system (HPA axis)

1. Long-lasting stress or depression
2. Hypothalamus (brain) sends a signal — CRH
3. Pituitary gland sends ACTH into the blood
4. Adrenal glands make cortisol — the body's own steroid hormone

Healthy: cortisol tells the brain 'enough' — the system switches off.

In depression: the off-switch fails — cortisol stays high for months.



Adrenal glands (yellow) sit on top of the kidneys and make cortisol.

Short bursts of cortisol are useful — energy and alertness in an emergency.

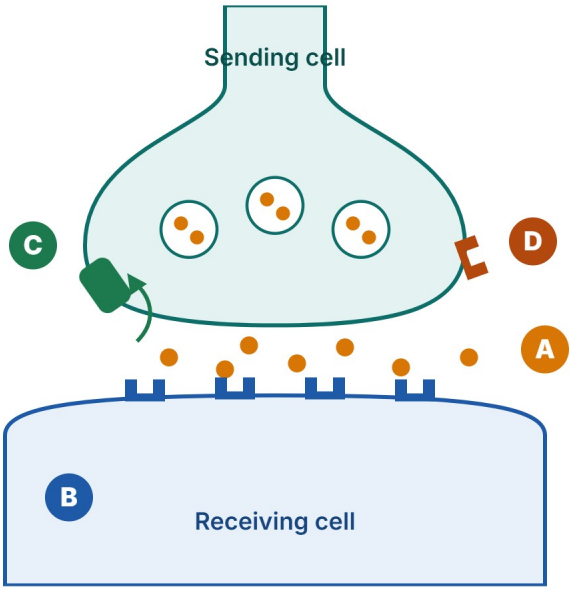
When cortisol stays high for a long time

- **Weight gain, especially belly fat**
- **Higher blood sugar — risk of diabetes**
- **Higher blood pressure — heart risk**
- **Poor sleep, memory and immunity**

Treating depression protects your body too. Medicines, therapy, regular sleep, exercise and healthy meals help bring cortisol back to normal. Tell your doctor about any change in weight or blood sugar.

How brain cells talk: messengers and receptors

Nerve cells pass messages across a tiny gap using chemical messengers.



- **A** **Messengers** — serotonin, noradrenaline, dopamine, glutamate
- **B** **Receptors** — ‘locks’ on the receiving cell that catch the message
- **C** **Recycling pump** — pulls the messenger back into the sending cell
- **D** **Brake receptor** — tells the sending cell ‘that’s enough, slow down’

More than a ‘chemical imbalance’

With long stress the brain adapts: receptors change in number and sensitivity, and BDNF — a natural ‘brain fertiliser’ — falls. Connections in the memory and planning areas thin out, so networks talk less well. **These changes can recover with treatment.**

Medicines, therapy and daily life work together

Medicines

Restore messenger signalling and help brain cells grow new connections.

Talking therapy

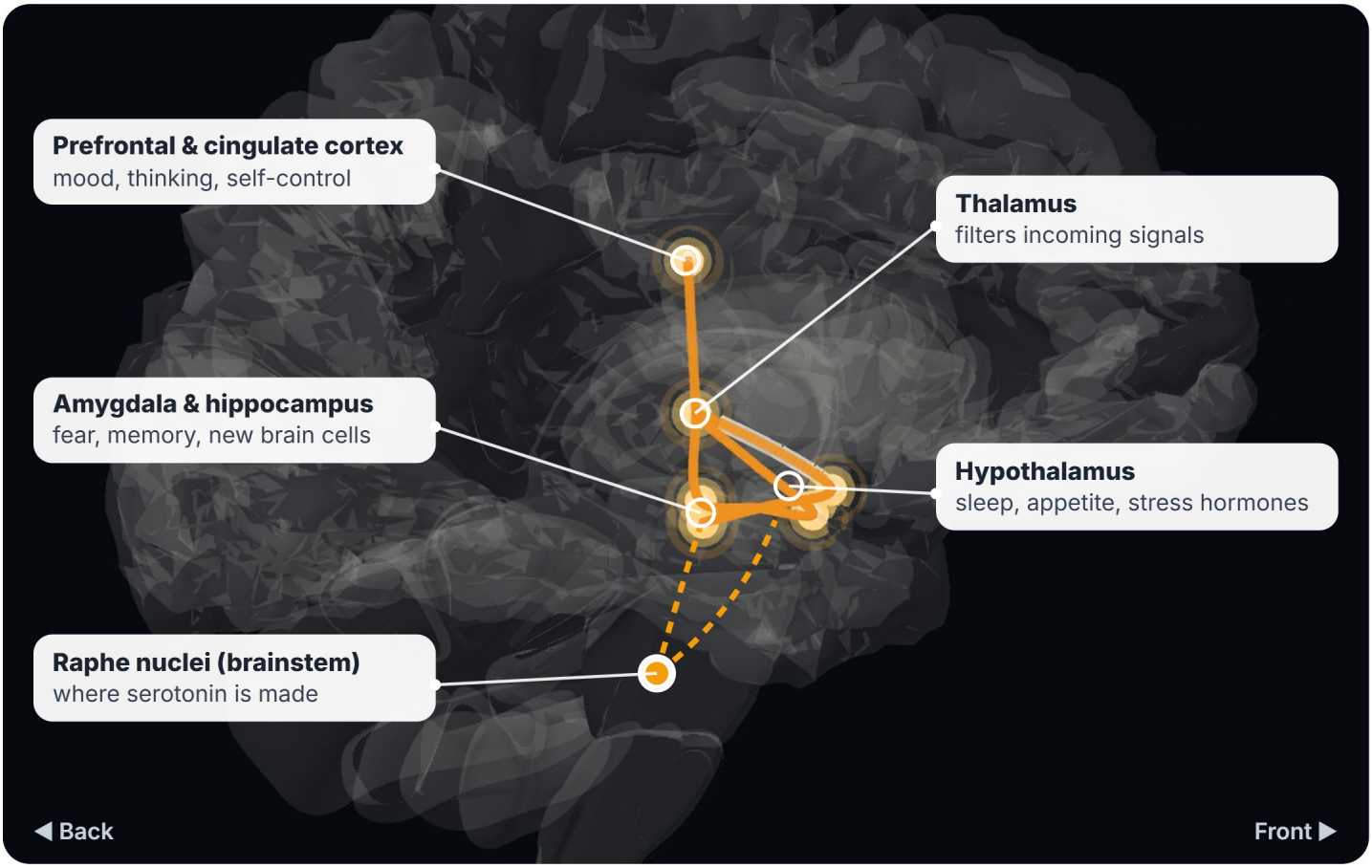
Calms the inner-talk and alarm networks; strengthens the manager network.

Daily routine

Small activities wake up the joy network; regular sleep, sunlight and movement reset the body clock.

BRAIN CLOSE-UP

The serotonin pathway — why the medicines work



Serotonin is made by a small cluster of cells in the brainstem (the orange dot, added for clarity). Their fibres branch out like a tree to almost every network in this handout.

Why the medicine works — step by step

1. The SSRI blocks the recycling pump (SERT), so more serotonin stays around.
2. Over 2–4 weeks the raphe's brake receptors (5-HT1A) relax.
3. The raphe now fires more, sending serotonin all along the pathway.
4. Targets settle: calmer amygdala, better control, steadier sleep and appetite, more BDNF.

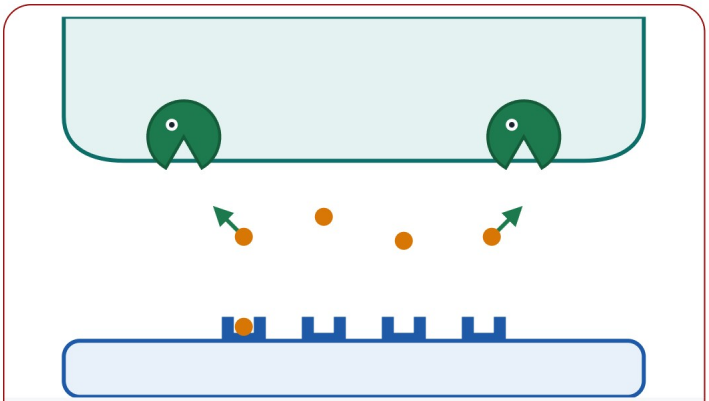
Why nausea at the start? Most of the body's serotonin is in the gut, so the stomach feels the medicine first. This usually settles in 1–2 weeks.

HOW MEDICINES WORK

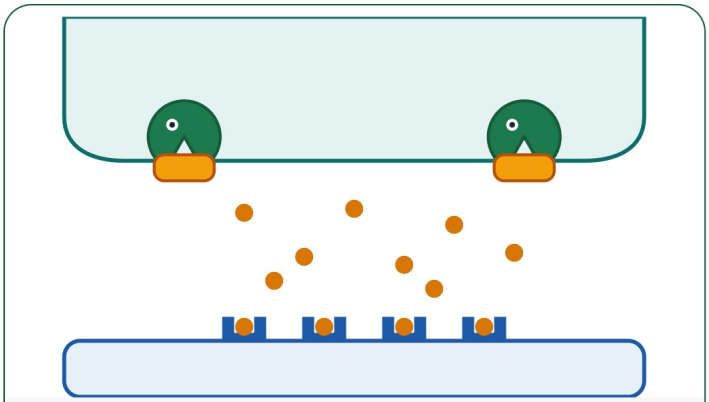
Message scavengers, and a brain that can rewire

The serotonin scavengers (SERT)

After a message is sent, little pumps called SERT sweep the serotonin back into the sending cell — like scavengers clearing the road.



Without medicine: scavengers clear messages quickly — few reach the receiving cell.



With an SSRI: scavengers are slowed — messages stay longer and reach more receptors.

serotonin message · SERT scavenger pump · receptor · SSRI medicine

This is only the first step. The real benefit comes over weeks, as the brain adjusts and grows.

Neuroplasticity: the brain can grow new connections



During depression: fewer branches

With recovery: more branches

Long stress lowers BDNF, the brain's natural fertiliser, so nerve branches shrink — especially in memory and mood areas. Treatment raises BDNF, and the branches grow back over weeks to months.

What helps the brain rewire

- Medicines
- Exercise
- Therapy & learning
- Good sleep
- People & connection
- rTMS

Like a path through tall grass: the more you walk a new way of thinking or acting, the clearer that path becomes.

Why antidepressants take a few weeks

The brain needs time to adjust its receptors and rebuild connections.

1 Days 1–7

IN THE BRAIN

The medicine blocks the recycling pump; messenger levels rise.

YOU MAY NOTICE

Mild nausea, headache or restlessness — these usually settle.

2 Weeks 1–3

IN THE BRAIN

Brake receptors slowly turn down, so cells send stronger signals. Receiving receptors adjust.

YOU MAY NOTICE

Side effects fade. Sleep, appetite and energy often improve first.

3 Weeks 2–6

IN THE BRAIN

The alarm and inner-talk networks quieten; the joy network wakes up.

YOU MAY NOTICE

Mood, interest and focus begin to lift. Family may notice before you do.

4 Months 2–12

IN THE BRAIN

BDNF rises and new connections grow; networks rebalance.

YOU MAY NOTICE

You feel more like yourself. Keep going so the change lasts.

Good to know

Not habit-forming, but don't stop suddenly — your doctor will reduce it slowly.

Early side effects usually settle in 1–2 weeks. Tell your doctor if they bother you.

Continue 6–12 months after you feel well — this protects against relapse.

Avoid alcohol and cannabis — they worsen depression and interfere with treatment.

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TALKING THERAPY

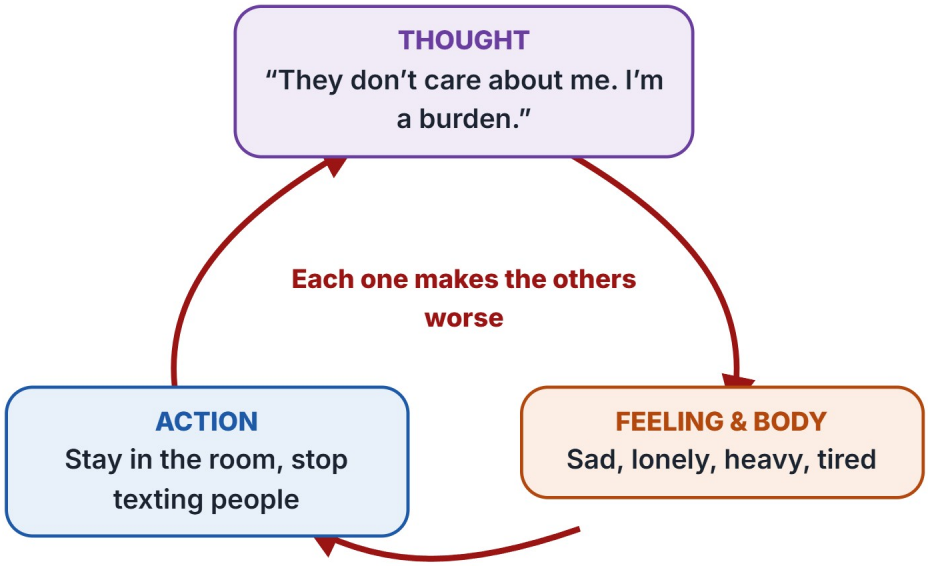
Thoughts, feelings and actions: the CBT view of depression

In depression the mind looks at life through a negative filter. Thoughts, feelings and actions then feed each other in a loop.

SITUATION

A friend doesn't reply to your message.

→



The three dark lenses (Beck's cognitive triad)

About me	About others	About the future
"I'm useless."	"Nobody cares."	"It will never get better."

Common thinking traps

All-or-nothing "One mistake — I'm a total failure."	**Mind reading** "They think I'm boring."	**Fortune telling** "It will go badly."
Always / never "I always mess things up."	**Ignoring the good** "It went well, but it doesn't count."	**Self-blame** "It's all my fault."

How CBT helps

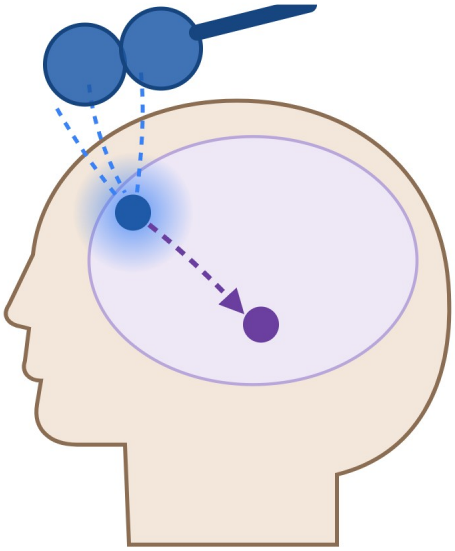
1. Notice the thought
2. Check the evidence
3. Find a balanced thought
4. Test it with a small action

Balanced thought: "Maybe they're busy. I'll message again tomorrow."

CBT usually takes about 12–20 weekly sessions. It works well for mild to moderate depression, adds to medicines in severe depression, and lowers the chance of depression coming back.

BRAIN STIMULATION

rTMS: gentle magnetic pulses for depression



- **Magnetic coil** over the left prefrontal cortex — the ‘manager’ area, too quiet in depression
- **Deep mood centre** — calmed through its connection to the manager area

rTMS = repetitive transcranial magnetic stimulation

How it helps

1. A magnetic coil rests on the scalp over the left front of the brain.
2. Its pulses create tiny electrical currents that wake up the under-active ‘manager’ area.
3. The signal spreads to deep mood areas and helps quieten the inner-talk network.
4. Repeated sessions strengthen these connections — neuroplasticity.

What it is like

Awake, sitting in a chair — no anaesthesia	**Tapping on the scalp and a clicking sound**	**About 3–40 minutes a session, 5 days a week, for 4–6 weeks**	**Back to work or driving straight after**

Who it is for: when one or two medicines have not helped enough, or side effects were a problem. It can be combined with medicines and therapy.

Results in difficult-to-treat depression



About 4–5 in 10 people improve a lot; 2–3 in 10 recover fully.

Side effects: mild headache or scalp discomfort, usually easing after the first week. Seizures are very rare. Not suitable with metal in the head or some implants — your doctor will check.

FOR FAMILY

For family and partners: standing beside someone with depression

Depression changes how a person feels, thinks and behaves. It is an illness — not something they are choosing, or doing to you.

Less helpful

- ✕ "Just cheer up" or "think positive"
- ✕ "Others have it worse"
- ✕ Pulling away, or getting angry
- ✕ Doing everything for them

Helpful

- ✓ Listen without rushing to fix
- ✓ Do small things together — a walk, a meal
- ✓ Encourage treatment, and offer to go along
- ✓ Notice and praise small steps

Words that help

"I'm here with you."

"You don't have to explain."

"Shall we go for a short walk?"

"Let's see the doctor together."

Look after yourself too. Sleep and eat well, keep your own friends, take breaks, and talk to someone you trust. Caring is easier when you are not running on empty.

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Act the same day if they talk about death or being a burden, give things away, say goodbyes, or seem suddenly calm after a long low. Stay with them, keep medicines and sharp objects away, and call Tele-MANAS or go to the nearest hospital.