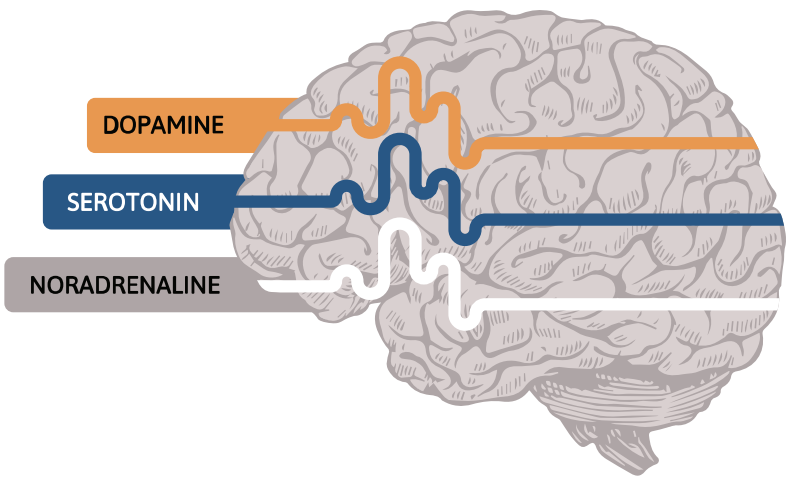
## THE EFFECTS OF CRYSTAL METHAMPHETAMINE ON THE BRAIN

Ice (crystal methamphetamine) triggers the release of chemicals in the brain. These chemicals are also released during pleasant activities - like eating and sex – and they are responsible for making us feel alert and excited. But flooding the brain with these chemicals can cause on 'overload' in the system, which is why some people can't sleep for days or may experience symptoms of psychosis after taking ice.

Ice also stops the brain from reabsorbing these chemicals which lowers their supply in the brain. This is why people often feel low or irritable for 2-3 days after taking ice.

Over the long term, regular use of ice can damage or destroy certain receptors in the brain — sometimes to a point where users no longer feel normal without having ice in their system. Even after people have stopped using ice it can take a long time before these brain changes return to normal.




LOW MOOD AND OTHER MENTAL HEALTH ISSUES

COGNITIVE IMPAIRMENT

TOLERANCE WITHDRAWAL DEPENDENCE

## THE EFFECTS OF METHAMPHETAMINE (INCLUDING ICE) ON THE BRAIN

Methamphetamine has been shown to affect three different chemical messenger (neurotransmitter) systems in the brain:

1. **Dopamine** is associated with reward seeking behaviour. The use of methamphetamine causes an initial increase in dopamine in the brain, associated with a feeling of Euphoria. However, long-term use is associated with declines in dopamine, which can be responsible for feelings of losing control and compulsive drug taking.
2. **Serotonin** is responsible for learning and memory. Use of methamphetamine causes an initial increase in serotonin in the brain, related to an increased feeling of wellbeing. Long-term use causes serotonin levels in the brain to decline, related to changes in behaviour and mood.
3. **Noradrenaline** is a chemical messenger responsible for arousal and motivation. Use of methamphetamine causes an initial increase in noradrenaline, associated with an increased alertness and attention. However, long-term use can deplete noradrenaline, related to decreased alertness and attention.

Long-term heavy use of methamphetamine, including ice, can change the structure and functions of the brain. Changes can result in abnormal brain tissue (grey and white matter), inflammation in the brain, and deficits in chemical messenger systems described above. These abnormalities

have been linked to poor brain functioning particularly in relation to self-control, decision-making and being able to adapt thinking.

Other effects related to brain changes can include:

- impaired motor skills
- cognitive decline
- increases in anxiety
- violent behaviors
- hallucinations
- delusions
- depression

It should be noted that the effects outlined above come from a number of studies examining both human and animal brain changes after methamphetamine use. While these effects have been observed we need more studies to follow humans over a long time to confirm these effects, taking into account the use of other drugs and conditions, such as mental health problems.

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