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Know the Facts About Cognitive Enhancers

By Vaughan Bell

Smart drugs are supposed to make you smart, but it's not always smart to take them. Until smart drugs are safer and more effective, there are some alternative mental performance enhancers to try that are both interesting and legal.

Mind altering substances have been used for millennia to alter how we perceive and understand the world. Some of these substances have been taken because they are thought to enhance specific aspects of our thought and behaviour to enable us to become more productive — caffeine [Hack #Use Caffeine Intelligently] is a popular example.

More recently, advances in drug testing and development – and a better understanding of how the brain works – have resulted in drugs that are intended to boost intelligence or cognition in specific ways. Often, these drugs have been developed to help with specific illnesses or conditions, but are now gaining notoriety, as they are often being used illegally by people hoping to improve performance during intense work or study periods. Others are still in development and are currently only in the experimental stages of development.

1. Pharmaceutical amphetamines (such as *Adderall*, or *Ritalin*) have been used without a prescription, for their tiredness-reducing and concentration-enhancing effects, by about 5% of students in US colleges according to a recent study, with some colleges reporting rates as high as 25%[1].
2. *Modafinil* is a non-amphetamine stimulant, marketed to help people with narcolepsy stay awake. In some places it has been reported as popular with otherwise healthy individuals who are using it maintain concentration levels and alertness during several days of wakefulness[2].
3. *Ampakines* are a class of drugs known to affect the sensitivity of the brain to a neurotransmitter called glutamate, a chemical known to be important in fast information transfer and memory formation. These drugs are still in development, but one, known as *CX516*, and currently targeted at treating schizophrenia, has been shown to improve cognitive performance in the elderly[3], and other ampakines, such as *CX717*, are being touted as future cognition enhancing drugs.
4. *MEM 1003* is a substance being developed by a company advised by the Nobel Prize winning neuroscientist Eric Kandel. Although few details are available, it is to be marketed, not just for clinically diagnosable conditions, but also for "age associated cognitive decline" in healthy individuals. In other words, it's a chemical pick-me-up for those experiencing the normal decline in memory that typically occurs past middle age. The fact that this drug is being openly promoted for use in people without serious illness, suggests that cognitive enhancers are going to become increasingly mainstream.

Most of these drugs are still in the pipeline, however, and for the time being, most "cognitive enhancers" are officially classed as medicines. Non-medical uses of these substances are officially frowned upon and possession could lead to jail time in some countries, although for some people, a greater risk may be unwanted short- or long-term effects of such drugs. It is well known that amphetamines can trigger psychosis in some users, particularly with heavy use, and the fact that most people will use them without proper medical advice and assessment makes it unlikely that any

negative effects will be detected sufficiently early. Newer drugs are typically marketed as being free of side effects, although history tells us that some side effects do not come to light until later on.

For those wanting to avoid pharmaceuticals, however, the scientific literature has reported some alternative ways of temporarily boosting mental performance—some more unusual than others.

In Action

Glucose is the brain's fuel, and there is plenty of evidence that a well-timed glucose intake increases mental performance. Your glucose blood level will peak about 60 minutes after you consume a sugary drink. If you time a sugary drink about an hour before a mentally demanding task, your brain should have maximum fuel to do its job. Glucose is broken down to become an important element in brain cell function, as well as being important in the creation of a neurotransmitter called acetylcholine. This chemical is particularly linked to memory, and it is no accident that extra glucose is linked to an increase in memory and learning ability[4]. In the long-term, too much sugar can lead to health problems, but in the short-term it can give a brief mental lift.

Ginkgo biloba is an ancient plant that has survived many thousands of years and has no living relatives. It is commonly sold in health food stores as a herbal supplement and there is good evidence that in small doses it can increase mental performance, particularly attention, in healthy young adults[5]. It is thought to work through direct effects on neurotransmitters and by promoting blood flow and circulation to the brain. Although Ginkgo is considered safe enough to be sold in shops, it does not agree with everyone – some people may find it upsets their stomach. More seriously, it is usually advised that people with blood circulation disorders, those taking aspirin, pregnant women and people taking certain forms of anti-depressants (known as monoamine oxidase inhibitors or MAOIs) should avoid it as a precaution. If in doubt, discuss it with your doctor.

Chewing gum—a number of recent studies have found that chewing gum improves mental performance, typically memory[6]. It is still not clear exactly why this happens. Speculations include the fact that chewing causes insulin to be released in the body in anticipation of food digestion, which increases the rate of glucose uptake. This might make more glucose available for the brain, temporarily providing more "fuel" for cognitive functions. Another theory is simply that chewing increases arousal, making us slightly more alert and therefore that little bit sharper.

Tyrosine is an amino acid that is one of the building blocks of a group of neurotransmitters called the catecholamines, which include dopamine, epinephrine and norepinephrine. It is commonly available as a supplement in health food shops and has been shown to significantly increase mental performance, particularly during periods of tiredness[7]. In some people, however, it can trigger migrains and stomach upsets, and people taking antidepressants and stimulants are usually advised to avoid it to prevent potentially harmful interactions.

Ginseng is a plant extract that is taken throughout the world, and a number of claims have been made for its brain-boosting properties. Nevertheless, controlled studies have shown mixed results[8], suggesting that it may increase memory performance, although this can be accompanied by a decrease in attention. Despite its popularity, the scientific jury is still out on this ancient supplement.

In Real Life

Education and information are the key to the safe and smooth running of your brain. Make sure you are fully informed about the things you put into your body and how they affect your thoughts and behaviour, whether they come from multi-million dollar drug companies or the local grocer. Also, don't overlook the everyday maintenance [Hack #Dont Neglect The Obvious] of your body that can keep your mind optimally tuned.

End Notes

1. Mc Cabe, SE, Knight JR, Teter CJ, Wechsler H. (2005) Non-medical use of prescription stimulants among US college students: prevalence and correlates from a national survey. *Addiction*, 100 (1), 96-106.
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