
Dark chocolate improves snails' memory

Even the smallest and most insignificant animal needs to have the ability to remember. This includes the seemingly ignorant snail which has to recall which foods are safe for consumption, and the sound their predator makes, among other important information. After all, this would ultimately affect their survival.

With the human brain being so much more complex than that of a snail, one may wonder why researchers so often use snails as test subjects when trying to study how the brain works. Just by looking at their physical appearance, one would never have guessed that a snail's thought process and memory could

However, when one takes a closer look, a snail's thought process and memory is more similar to that of a human than one would have previously imagined from looking at their outer appearance. Snails react to environmental stimuli in a similar manner that humans would. As such, these are commonly used in studies to find out more about how our memories work. Unsurprisingly, snails were also used to prove that dark chocolate can enhance memory formation. In a study published in July 2016, researchers from the University of Calgary in Canada found that a component of dark chocolate improves the memory of snails.

This component mentioned is a compound called epicatechin (Epi), and it is famously found in dark chocolate, among other foods. Epi is a member of a larger group of compounds called flavanols, a group of components made by plants. Studies looking at trends in the population as well as in human volunteers have shown that consuming flavanols leads to a lower incidence of cognitive impairment and causes significantly better cognitive performance in older people.

To test if Epi affects the memory of snails, the snails have to be given an experience to learn from, and then be tested for their ability to recall this change in their behaviour. Snails have a special ability to absorb oxygen through their skin, however when oxygen is scarce in the water, they are able to take in more oxygen by breathing through a pore called the pneumostome.

à snails not hurt during this process

Researchers make use of a method of learning called operant conditioning to teach snails to reduce such aerial respiratory behaviour. In this type of learning, behaviour is controlled by consequences. Behaviours that are reinforced tend to continue while behaviours that are punished eventually end. In such studies involving snails, snails are punished with a gentle poke to the pneumostome every time they open it. In this particular study, snails were subject to a 30-minute training session followed by a memory test of the same duration 24 hours later. If they have learned from the experience and formed a memory after the training session, they would have a reduced number of attempts to open their pneumostome during the memory test. As the snails are able to remember what they have learnt 24 hours prior, long-term memory is said to be present.

Another point to note is that there is a consolidation period after learning takes place. It is during this period that learning is encoded into memory. In snails, this period persists for about an

hour, and it is possible to alter memory formation during this period either by enhancing or suppressing it using different stressors. It was previously proven that encountering a predator during this period would result in an improved memory.

It was found that only when snails are trained in Epi or exposed to Epi-containing pond water immediately after training for there to be an Epi-induced enhancement of memory formation. However, Epi exposure an hour before or after training was not sufficient to cause memory enhancement.

It is still unclear to scientists how exactly memory can be improved in snails, as it involves many mechanisms consisting of elaborate biological processes. As such, it is still a mystery how Epi is able to bring about memory enhancement. However, current experiments are showing a relationship between Epi and the activity of a neuron that is known to be necessary to form, reconsolidate and forget memories. It is also possible that Epi also alters the activity of other neurons that control a snail's respiration through its breathing pores.

In due time, there should be conclusive studies to prove or disprove the hypothesis that humans would be able to improve their memory too if they eat dark chocolate. In the meantime, why not just eat dark chocolate, if not for its possible memory enhancing effects, then for its great taste!

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