
Is Your Brain Constantly Eating Itself?

Believe it or not, it does!

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Image of the brain | Source: Osakawayne Studios, Moment, Getty Images

That sounds weird. Maybe a little clickbait-y too, but standby. It's an interesting thing to look at! I found this piece of (dare I say, concerning) information in an Instagram comment section, and my potentially 'self-eating' brain was inevitably curious. A quick Google search amused me with this:

 BBC Science Focus Magazine
<https://www.sciencefocus.com/the-human-body/does-...>
Yes, your brain is eating itself all the time. Here's why

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The first news article that popped up when I searched Google.

So, why? Is this a disorder? Is it bad?

The Background:

Researchers have found that the average adult human being may contain 30 to 40 trillion cells in their body. These cells have variable lifespans. For example, neutrophil cells may

only last 2 days, while the cells in the middle of your eye lenses may last your entire life. These tiny cells have numerous tasks. They may divide and produce more cells, some fight in our immune system, some transport essential nutrients, and some eventually die.

But the question is, how does this relate to the fact that our brain is eating itself? One word: **phagocytosis**.

What is Phagocytosis?

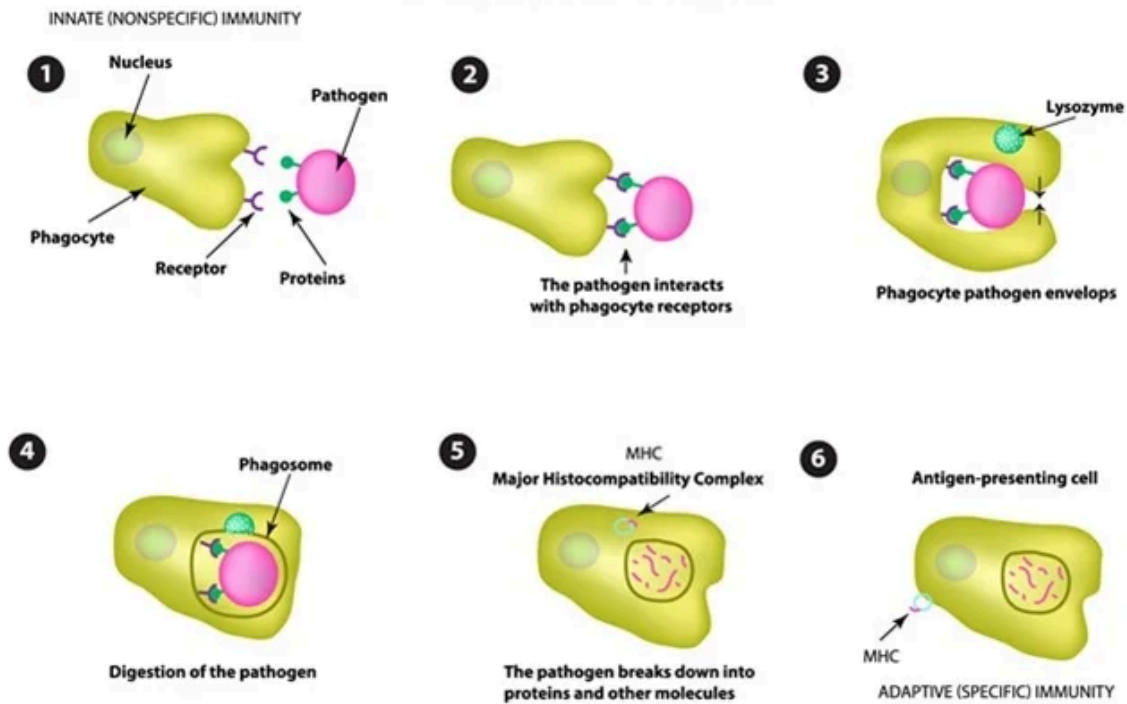
Phagocytosis is the process by which a cell uses its plasma membrane to engulf a particle. A cell that performs this is called a **phagocyte**. Phagocytosis is also utilized as a defence mechanism to protect the body from foreign substances (antigens) that may cause infection.

The Process

The first step is **recognition**, where receptors on the surface of phagocytes identify targets for engulfment. These may include bacteria, dead cells, or even debris marked by antibodies. The phagocyte then wraps its cell membrane around the particle, forming arm-like extensions called '*pseudopods*', which surround the particle, forming a sac-like structure called a **phagosome**.

Once the phagosome is inside the cell, it fuses with the lysosome (containing digestive enzymes) which then breaks down the engulfed particle. Some leftover waste products may be excreted from the cell using exocytosis while others may be reused for bodily processes.

PHAGOCYTOSIS



The process of phagocytosis | Source: Timonina, Shutterstock

Why is Phagocytosis Essential for the Brain?

Our brain is said to consume $\frac{1}{3}$ of our body's energy because of the complex processes that it carries out. All these processes may produce unusable byproducts, and create debris.

Debris needs to be removed for the brain to function consistently and efficiently, which is where phagocytosis steps in to save the day. Breaking down molecules makes it much easier for waste and reusable products to be separated, which eases the 'cleaning up' process.

Does the Brain Ever Over-eat?

As much of an optimistic person I am, I always wonder about the negatives, especially when it comes to intricate processes that take place in our bodies. You know, like our body producing *too much* thyroxine leads to **hyperthyroidism**, and *too little* leads to **hypothyroidism**, what happens if too much of this 'eating' occurs?

Interestingly enough, the brain *does* over-'eat'.

The Relationship of Sleep & The Brain Overeating in Mice:

I will spare you the details of why a good night's sleep is good for you (you should know by now), but I will enlighten you with research done about *not* getting a good's night sleep.

You see, most of this 'cleaning up' of the brain occurs when you are sleeping. **Microglial cells** carry out phagocytosis to clear away the neurological excess byproducts of the brain. Fascinatingly enough, this process also happens when you lack sleep. Except, in excess. The microglial cell activity was relatively higher than the subjects (mice) with deprived sleep. It is especially concerning because excess microglial cells have been linked previously to Alzheimer's and neurodegeneration.

It is important to note that this study was conducted on mice, and is yet to be studied in humans. But regardless, good sleep is important inevitably.

Conclusion

Simply put: Your brain does technically 'eat' itself all the time, but once again, it is to keep you a healthy and happy person.

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