

- Fasting

AUTOPHAGY: WHEN YOUR BODY EATS ITSELF TO SURVIVE

Here's a breakdown of the cellular process that rejuvenates your system and how intermittent fasting can trigger it

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Your body can eat itself to survive. That sounds ghoulish and like something out of *The Walking Dead*, but really, it is actually quite beneficial.



That is what autophagy is all about. The self-explanatory term originates from Greek, where 'auto' means self and 'phagy' means eating. It is the body's cleaning out process that occurs when the cells in our bodies are bereft of nutrients. The cell eats itself to survive.

"It is a cellular process, when a cell breaks down and eliminates old, damaged proteins and other substances in our body," explains Sarah Lindsay, a fitness trainer and founder of the ROAR Gym, Dubai.

Our bodies use autophagy to recycle, repair and clean out toxic proteins in cells, leading to a healthy regeneration of cells. If these toxic materials are not cleared out, your cells would be unable to divide and function normally, which can lead to damaged cells, or worse, cell death.

HOW AUTOPHAGY WORKS

It takes place within the gelatinous fluid inside of a cell called cytoplasm, as researched by American health expert and nurse Kristin Hayes in her May 2023 article *What is Autophagy*, published by Very Well Health site, an American medical platform. Autophagy occurs when cells are damaged or deprived of essential nutrients. This leads to complex chemical reactions within the cytoplasm, turning the 'junk' into fuel.

There are four steps, as explained by Hayes:

Sequestration: The dysfunctional component of a cell is surrounded by a double-membrane structure called a phagophore. The encased component is called an autophagosome.

Transfer: The autophagosome merges with a specialised structure in the cytoplasm, called a lysosome. Lysosomes contain enzymes that degrade dysfunctional components.

Degradation: The lysosome releases enzymes called hydrolases that break down the dysfunctional component into amino acids, which is the building block of proteins.

Utilisation: The amino acids are repurposed as a fuel for cells, called adenosine triphosphate (ATP), and synthesised into new proteins to maintain cells, rebuild cells, or create new cells. So as you can see, the cell breaks itself down and rebuilds in order to function.

HOW YOU CAN INDUCE IT

Fasting and dietary habits can induce autophagy. However, fasting isn't similar to starvation. Without knowing it, most of us practise intermittent fasting. If you avoid eating between meals, or don't eat after a certain time in the evening, your body is in a fasting state. So, when you fast, you are depriving your body of nutrients. This compels the body to repurpose cell components, in order to keep functioning.

The difference between fasting and starvation is that you are exerting control with the former, explains American author and researcher Thomas Hawthorne in his book, *Autophagy: How to Combine Intermittent Fasting and Nobel Prize Winning Science for Rapid Weight Loss, Reducing Inflammation, and Promoting Long-Term Health*.

When you fast, you are choosing to withhold the food supplied to your body in a controlled manner. The whole point behind the method is to see positive changes in your body with a healthy outlook,

and preferably under guidance and supervision. You aren't depriving your body of food; you are teaching it to rely on meals when you provide it.

"Intermittent fasting or specific fasting periods can stimulate autophagy," explains Lindsay. She also adds that low-carb and high fat diet, commonly referred to as 'Keto' or ketogenic diet, promotes autophagy.

Entering ketosis can trigger the process, as your body now has a new method of burning energy. Instead of carbs and sugar, it burns fat instead.

"Factors such as entering ketosis can promote autophagy, and certain levels of exercise can also contribute to its activation," she adds.

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HOW KETO DIET WORKS

In the Keto diet, the body uses fat instead of the glucose from carbohydrates, and high glucagon levels trigger autophagy. However, the Keto diet may not be advisable for everyone, especially pregnant women or those with health conditions such as diabetes.

Sudden changes to your diet can also have a negative impact on your health, so it's best to consult a doctor before experimenting with your diet.

If you don't wish to attempt the Keto diet, a diet rich with leafy vegetables like broccoli, cabbage, kale and fruits is a good start, advises Lindsay.

Antioxidant rich foods like walnuts, pecans, artichokes, blueberries, pomegranate juice can also stimulate autophagy, explains American health expert Jeffrey Bland as told to the medical research site, Mind Body Green.

Nevertheless, while intermittent fasting can fuel autophagy into action, you need to observe your own lifestyle as well. Watch your sleeping habits, exercise regularly, and overall, your emotional and physical well-being, explains Bland. Regular exercise can stress your skeletal muscles, that can induce autophagy.

FAST WITH CAUTION

There's still research being done on the amount of fasting one needs to do before entering autophagy. "It is important to approach the topic of autophagy with caution, as the optimal duration of fasting to achieve the desired stage of autophagy remains uncertain," explains Lindsay. She adds that prolonged fasting without proper knowledge can damage cells or even

lead to cell death. While there are cases of extreme fasting that last for extended periods, the exact time required to reach the optimal stage of autophagy is still unknown. “Going without any food for several days, especially combined with intense exercise, can have detrimental effects,” she says.

People who have not fasted before, or those who are not under supervision and engage in excessive fasting at random, can face disastrous consequences, she warns.

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Sarah Lindsay | Founder of ROAR Gym

HOW AUTOPHAGY HELPS

Autophagy is not negative, says Lindsay, rather it is the lack of preparation and education on the subject, which leads to more harm than good. Several factors need to be considered before a person attempts fasting, including the body’s internal environment, previous health conditions as well as the well-being of the person. “Specific medical conditions like diabetes, would render fasting inappropriate,” she says.

Autophagy is the body’s way of pressing hard reset and creating younger cells. Apart from recycling residual proteins, encouraging weight loss, and prompting regeneration for healthy cells, there is much study on its other advantages.

HEALTHY AGEING

Aging begins when there is a gradual decrease in cellular repair. This leads to an accumulation of damaged cell components, which results in the deterioration in tissues and organs. So, according to 2012 research review published in Journal of Clinical & Experimental Pathology, regular stimulation of autophagy keeps the cells healthy and can ensure that the body ages in a healthy manner as well.

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BETTER BRAIN HEALTH

There is still much research and study on autophagy benefitting brain health, but research does point to the fact that Alzheimer’s disease and Parkinsons are a result of accumulated toxic proteins.

Autophagy can also provide protection against other neurodegenerative diseases such as Huntington’s disease and amyotrophic lateral sclerosis (ALS), according to research published in the 2014 American journal Neurobiology of Aging. Autophagy cleans out these damaged proteins that can clog the brain, leading to ageing and brain-related illnesses.