Benefits of Autophagy, Plus How to Induce It

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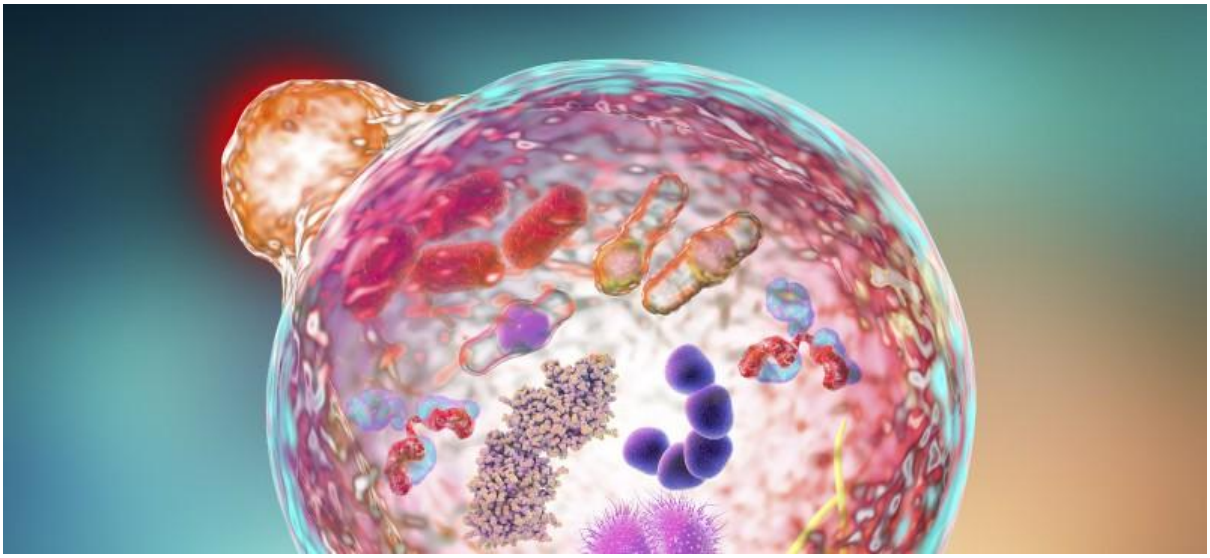
Reference:
https://draxe.com/health/benefits-of-autophagy/



Even in a healthy human body, cells are constantly becoming damaged as a normal part of metabolic processes. However, as we age, experience stress, and deal with more and more free radical damage, our cells become damaged at an increased rate.

This is where autophagy comes in: It helps to clear damaged cells from the body, including senescent cells that serve no functional purpose but still linger inside tissues and organs. The reason it's so important to remove senescent and damaged cells is because they can trigger inflammatory pathways and contribute to various diseases.

The word 'autophagy' was coined more than four decades ago and is derived from the Greek words "auto" (meaning self) and "phagy" (meaning eating). Only very recently in animal studies have researchers have been able to observe how autophagy can promote longevity and benefit the nervous system, immune system, heart and metabolism. (1)

As you'll learn more about below, the best way to induce autophagy is through practicing fasting.

What Is Autophagy?

The definition of autophagy is "consumption of the body's own tissue as a metabolic process occurring in starvation and certain diseases." Researchers believe that autophagy is a survival mechanism, or a way that the body cleverly responds to stress in order to protect itself.

Is autophagy good or bad for your health? It's definitely good! As mentioned above, you can think of autophagy as a form of "self-eating," which might sound pretty scary but is actually your body's normal way of carrying out cellular renewal processes. In fact, autophagy is so beneficial that it's now being called a "key in preventing diseases such as cancer, neurodegeneration, cardiomyopathy, diabetes, liver disease, autoimmune diseases and infections." (2)

Autophagy has many anti-aging benefits because it helps destroy and reuse damaged components occurring in vacuoles (spaces) within cells. In other words, the autophagy process basically works by using waste produced inside cells to create new "building materials" that aid in repair and regeneration.

Thanks to recent studies, we now know that autophagy is important for "cleaning up" the body and defending against the negative effects of stress. However, scientists still emphasize that the exact way that autophagy processes work are just beginning to be understood.

There are several steps involved in autophagic processes. Lysosomes are a part or cells that can destroy large damaged structures, like mitochondria, and then help to transport these damaged parts so they are used to generate fuel. To sum up a complex process: damaged material must first be transported to a lysosome, then deconstructed, then spit back out to be repurposed.

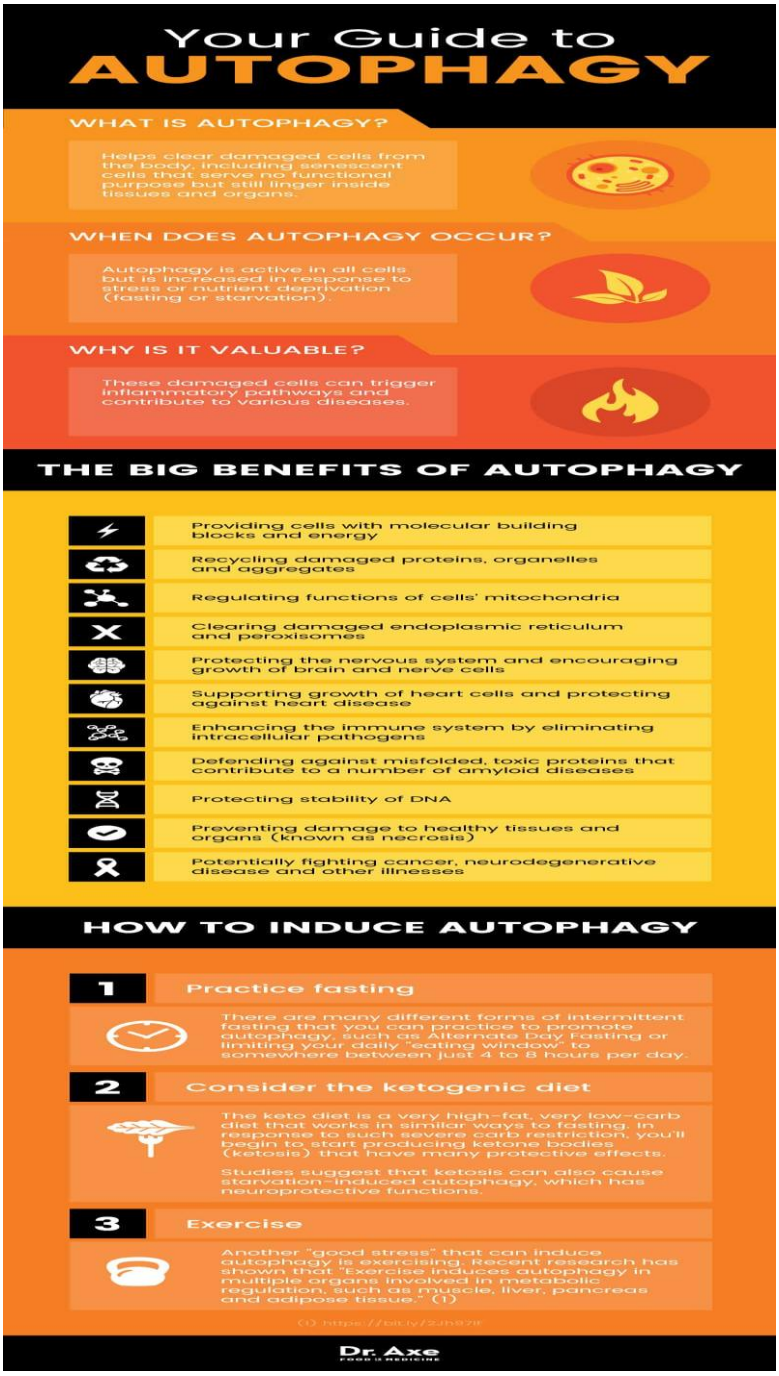
Benefits

Research suggests that some of the most important autophagy benefits include:

- Providing cells with molecular building blocks and energy
- Recycling damaged proteins, organelles and aggregates
- Regulating functions of cells' mitochondria, which help produce energy but can be damaged by oxidative stress
- Clearing damaged endoplasmic reticulum and peroxisomes
- Protecting the nervous system and encouraging growth of brain and nerve cells. Autophagy seems to improve cognitive function, brain structure and neuroplasticity.
- Supporting growth of heart cells and protecting against heart disease
- Enhancing the immune system by eliminating intracellular pathogens
- Defending against misfolded, toxic proteins that contribute to a number of amyloid diseases
- Protecting stability of DNA
- Preventing damage to healthy tissues and organs (known as necrosis)
- Potentially fighting cancer, neurodegenerative disease and other illnesses

There are several different types of autophagy, including macroautophagy, microautophagy and chaperone-mediated autophagy. Macroautophagy is "an evolutionarily conserved catabolic process involving the formation of vesicles (autophagosomes) that engulf cellular macromolecules and organelles." This is usually the type we hear the most about.

Humans are not the only species to benefit from autophagy. In fact, autophagy has been observed in yeast, mold, plants, worms, flies and mammals. Much of the research to date on autophagy has involved rats and yeast. At least 32 different autophagy-related genes (Atg) have been identified by genetic screening studies. Research continues to show that autophagic process are very important responses to starvation and stress across many species.



The Relationship Between Autophagy and Apoptosis

How is autophagy related to apoptosis (or the death of cells that occurs as a normal and controlled part of an organism's growth or development)?

Researchers believe that autophagy is "selective" about removing specific organelles, ribosomes and protein aggregates from the body. As of now, there is not clear evidence that autophagy or apoptosis controls the other process. But some studies have indicated that autophagy is a mechanism of apoptosis-independent cell death.

One of the reasons that the relationship between apoptosis and autophagy is of such interest to researchers is because they believe autophagy may help treat cancer and neurodegenerative diseases like Alzheimer's disease due to its ability to modulate cell death. Autophagy may act as a therapeutic target, protecting healthy cells and removing harmful ones. (3)

In the future, we may be able to use autophagy processes to both protect cells we don't want to die and to cause diseased cells to be destroyed and removed.

How to Induce Autophagy

When does autophagy occur? Autophagy is active in all cells but is increased in response to stress or nutrient deprivation (fasting or starvation). This means you can utilize "good stressors" like exercise and temporary calorie-restriction (fasting) to boost autophagic processes. Both of these strategies have been linked with benefits like weight control, longevity and inhibition of many age-associated diseases.

1. Practice Fasting

When it comes to diet and lifestyle habits that are in your control, the thing that triggers autophagy most is fasting, including the dietary strategy known as intermittent fasting (or IMF). Fasting is a pretty simple concept: You abstain from eating for a certain period of time (you can still drink water and liquids like coffee or tea).

If you're not yet familiar with intermittent fasting, this is a type of cyclic fasting that involves time-restricted eating. There are many different forms of IMF that you can practice to promote autophagy, such as Alternate Day Fasting or limiting your daily "eating window" to somewhere between just 4 to 8 days per day.

How long do you have to fast for autophagy? Studies suggest that fasts between 24–48 hours probably have the strongest effects, but this isn't always doable for many people. (4) Try to at least fast for 12 to 36 hours at a time.

An easy way to accomplish this is to eat just 1 or 2 meals per day, rather than grazing on many small meals and snacks. If you usually finish dinner at 6 or 7 p.m, then try to fast until at least 7 a.m the next morning— or even better, don't eat until 11 a.m. or 12 p.m.

You might choose to occasionally do a 2–3 day fast, or even longer once you're more experienced with fasting. If you prefer alternate day fasting, then you will severely restrict the amount of calories you eat during fasting days (eating only 1 or 2 meals of about 500 calories), then eating to your stomach's content on non-fasting days.

2. Consider the Ketogenic Diet

The ketogenic ("keto") diet is a very high-fat, very low-carb diet that works in similar ways to fasting. The keto diet (KD) involves getting about 75 percent or more of your daily calories from fat, and no more than 5–10 percent of calories from carbs. This forces your body to go through some major changes, as metabolic pathways are shifted so that you start using fat for fuel instead of glucose from carbs.

What types of foods are most beneficial if you plan to follow the KD? High-fat, whole foods like coconut oil, olive oil, eggs, grass-fed butter, ghee, grass-fed meat, fermented cheeses, avocado, seeds and nuts. Vegetables are also included for fiber, vitamins and antioxidants.

In response to such severe carb restriction, you'll begin to start producing ketone bodies that have many protective effects. Studies suggest that ketosis can also cause starvation-induced autophagy, which has neuroprotective functions. For example, in animal studies when rats are put on the ketogenic diet, the keto diet has been shown to start autophagic pathways that reduces brain injury during and after seizures. (5)

3. Exercise

Another "good stress" that can induce autophagy is exercising. Recent research has shown that "Exercise induces autophagy in multiple organs involved in metabolic regulation, such as muscle, liver, pancreas and adipose tissue." (6)

While exercise has many benefits, it's actually a form of stress because it breaks down tissues, causing them to be repaired and grow back stronger. It's not exactly clear yet how much exercise is needed to boost autophagy, but research does suggest that intense exercise is probably most beneficial.

In skeletal and cardiac muscle tissue, as little as 30 minutes of exercise can be sufficient to induce autophagy. Can you exercise while fasting? Most people can. You might even find that you feel energetic once you get the hang of fasting, giving you more motivation for exercise.

Precautions

There's still a lot we have to learn about autophagy and how to best induce it. Beginning to induce autophagy by incorporating fasting and regular exercise into your routine is a great place to start.

However, if you are taking certain medications to control any health conditions, it's best to consult your doctor about introducing fasting. People who suffer from hypoglycemia or diabetes, and women who are pregnant or breastfeeding, should not fast. Anyone being treated for a disease like cancer should always discuss treatment options wand interventions with their doctor.

Final Thoughts

- Autophagy translates to "self-eating." It's a beneficial process that describes consumption and recycling of the body's own tissue as a metabolic process.

- Researchers believe that autophagy is a survival mechanism that has anti-aging benefits. It helps cleanse waste from the body, provides energy and potentially fights cancer, neurodegenerative disease and other chronic illnesses.
- Autophagy is induced through starvation, fasting and other "stressors." You can increase autophagic processes by doing some type intermittent or alternate day fasting, exercising and/or following the ketogenic diet.

Reference :

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