

Your Boost for

# Regeneration

to Optimize

**Green** Muscle Growth



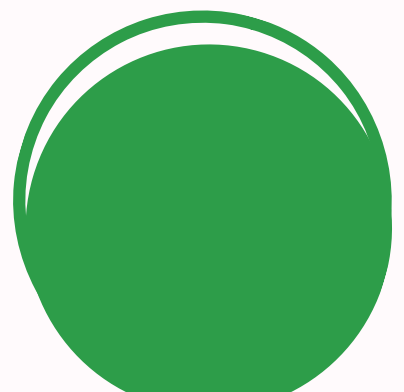
# REGENERATION AND RECOVERY

Do you want to gain green muscle the fastest way possible? Rapid progress is a function of two interrelated variables: training stress and recovery. Hence you can increase your progress either by improving your training or improving your recovery from exercise.

Proper use of helpful regeneration techniques can:

- Enhance the amount of progress you make between training sessions
- Allow you to train more intensely, more often, with more regularity
- Reduce the risk of injuries
- Help to deal with minor aches and pains

Here you find three very effective ways to get the most out of regeneration.



# 1 - PROLONGED FASTING OR FASTING MIMICKING DIET

Prolonged fasting between 2 and 4 days is a fountain of youth without alternatives. Fasting is one of the most powerful tools we have to keep our bodies young, healthy and efficient.

Fasting is the only post-natal event that massively activates stem cells that rejuvenate the body on many levels and destroys cells we don't need. Fasting tells the body: "You need to kill all these cells", and refeeding sends the message: "You need to rebuild all the cells in the system".

*Our goal is the improved and efficient rebuilding of all cells, especially muscle tissue cells.*

## **Confirmed benefits of fasting are:**

- Fat loss despite muscle maintenance
- Targeted loss of abdominal fat
- Life-extending; f.ex. mice can extend their lifespan by 11 % through some 4-day fasts
- Reduced risk of major diseases such as CVD, cancer, diabetes or obesity; f.ex. in mice, some 4-day fasts reduced the occurrence of tumours by 45 %

The most astonishing thing about fasting is probably the **regeneration effect after fasting**, which is responsible for many benefits. Only through the reintroduction of nutrients after the fasting period, the body activates *regeneration programmes* **via stem cells**. The result is unprecedented.

As an example of the effect on biological age and the immune system, here are excerpts from research with mice:

During a four-day fast, mice break down about 40 % of their white blood cells -useless junk cells. But the body rebuilds this 40 % within a few days after eating again. During regeneration, the body thus regenerates large parts of the immune system with new, fresh and functional cells within a few days. That renewal had dramatic effects on the biological age of the mice: before fasting, they had an immune system profile of 20-month-old mice. After fasting, the immune system profile was more similar to 4-month-old mice.

Fasting had the same rejuvenating effect on organs such as the liver and other tissues such as the muscles:

- Autophagy and cell death of defective cells mean that old or faulty cells are discovered and degraded. This cell-cleansing also applies to muscle cells. The breakdown of old and no longer needed structures and waste is vital to form new cells, i.e. grow, and remain healthy.
- In mice, fasting was able to eliminate disrupted autophagy in muscle tissue. The regeneration process after fasting, therefore, led to an increase in growth factors in the muscle.

Prolonged fasting initiates an enormous regeneration programme by activating the body's stem cells, differentiating the prolonged from intermittent fasting or caloric restriction regimes. Therefore, this type of fasting is probably the most powerful and, at the same time, the most accessible tool we humans have so far for regeneration, rejuvenation and disease prevention.

*Therefore, fasting regimes of a few days length could help on every level. However, precisely because fasting can be very strenuous, I recommend the supervision of a professional or implementing the Fasting Mimicking Diet or FMD, which Dr Valter Longo designed to make fasting more convenient and safe.*

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## 2 - HYDRATION

A sufficient supply of fluid is vital for all bodily functions. For example, dehydration in older people is common and linked to increased mortality and poorer health. It could also impair cognitive performance.

*But can optimal fluid intake perhaps even improve performance and regeneration?* That seems to be precisely the case.

Great potential arises from the fact that many people are not optimally hydrated. For example, one study found that almost half of all footballers are in a state of water deprivation (hypohydration) before a match, which reduces performance.

That's a shame, because:

**Poor hydration reduces performance at every level: less endurance and strength and faster fatigue.**

Hypohydration reduces aerobic endurance. For example, drinking enough water on the bike while riding for several hours increases the performance of cyclists. However, not drinking enough water before a workout, in turn, reduces aerobic power output during training.

Even mild dehydration can increase perceived exertion and fatigue and reduce performance, as found in an ice hockey goalies study. Additionally, hypohydration leads to poorer thermoregulation and increases body and muscle temperature during exercise.

Hypohydration is also terrible for anaerobic energy supply, which is needed predominantly during resistance training. One reason for that seems to be the water content of cells, including muscle cells.

Dehydration of a muscle cell has severe consequences for intracellular protein structure and function, leading to cell damage. In addition, water determines the volume of the cell and how much it swells. We know that cell swelling acts as an anabolic signal, while cell shrinkage acts as a catabolic signal. In older people, the water content in the muscle cell can therefore be directly related to muscle strength and functional capacity. Even mild hypohydration can lead to a reduction in cell volume.

The direct test with people who had upper and lower body strength measured turned out accordingly. Fatigue in the anaerobic test was increased by 70 % with hypohydration. Also, power decreased in the dehydrated state: by 7 % for the upper body and 19 % for the lower body.

Interestingly, many don't drink enough, but enough water can significantly affect performance and recovery. So how do you manage to drink more water?

Here are a few tips:

- When do you need more water? The colour of urine in adults and athletes is indicative of the state of hydration. If you are healthy and well-hydrated, your urine should be between colourless and light honey. The less water you drink, the darker your urine will be. Yellow and rather cloudy colour means your body needs water. Urine should rarely be dark yellow to amber, like, for example, in the morning after a long night without fluids.
- If you find it difficult, you could try different water temperatures. For example, one study found that most athletes better like water during exercise below 22 C°— of course, drinking before the workout is also essential.

- You could get a water bottle or container that you can keep with you at all times. That way, you always have your water handy and don't have to go out again.
- If buying water is inconvenient and expensive, maybe it's worth getting your filter system for your home? There are now filter systems ranging from small and inexpensive to professional and more costly. The result is excellent: no more carrying water or spending money on water, and everything is always at hand.
- Try to keep your water balance optimal outside of training. Training is not the time to replenish your water supply. However, you should still drink water regularly in small sips during training.

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### 3 - CONTRAST SHOWERS

This method is not about Wim Hof ice baths, which have to be arranged elaborately and are too cold for some people. It is about alternating showers, which everyone with a shower at home can do. Alternating showers are a practical way to improve circulation and regeneration quickly and incidentally.

When you expose tissues of the body to cold water, small blood vessels constrict in response. However, if you immerse tissue in warm water, the opposite happens; the blood vessels dilate. Rapid changes in temperatures thus lead to a kind of pumping motion.

This method is very effective in increasing peripheral circulation and thus promoting recovery from micro-injuries. Studies have shown that alternating baths can help rugby players recover more quickly or speed up the breakdown of lactates after resistance training. In addition, alternating baths have been effective in reducing muscle soreness.

A proven cycle looks like this:

After training, alternate these 2 phases in the shower:

- 1 minute of water as cold as you can stand (8 to 15 °C)
- 2 minutes of hot water (38 to 42 °C)

*Often, 3 to 6 cycles worked for participants of studies. The effort equals a total time of 9 to 18 minutes, which is, of course, not a small amount of time, but in many studies, a single session already brought the benefits mentioned.*

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