REGENERATIVE MEDICINE
THE BENEFITS OF NAD

The principal benefits of NAD are found in the following areas:

1. Anti-Aging
2. Neurology
3. Addiction and Recovery
4. Metabolism

1. ANTI-AGING BENEFITS

NAD plays a major role in the aging process, in part by regulating the circadian and metabolic cycles and acting as a regulator for new proteins. NAD plays a role in the regulation of the Sir2p family, which influence lifespan and aging. Changes in metabolism can lead to the development of certain age-related pathologies.

This coenzyme also helps protect the integrity of DNA, which becomes damaged over time from wear and tear, duplication errors, and the damaging effects of free radicals. NAD is especially important in regulating inflammation that damages DNA over time. In addition, NAD can correct existing damage.

NAD is believed to play a role in arresting the shortening of telomere length and possibly contributing towards increasing telomere length. This is very important. Telomeres are protective caps located at the ends of chromosomes that naturally get shorter every time a cell divides. At a certain critical telomere length, the cells die. As they approach that critical length, short telomeres have been associated with virtually all the diseases of aging.

The body naturally produces NAD, but as the body ages, overall levels decrease and leads to the development of age-related conditions. Restoring and supplementing NAD in the body can improve physical appearance, health, and quality of life.

Benefits include:

- Improved prevention and correction of damage to DNA
- Restored muscle function and athletic performance
- Boosted energy levels
- Improved appearance
- Reduced fatigue

2. NEUROLOGICAL BENEFITS

NAD increases your body's levels of serotonin, a neurotransmitter associated with mood regulation, and can improve symptoms of depression and anxiety. A decrease in cognitive ability is a hallmark of aging. There are many age-related neurological conditions including dementia, decreased focus, and memory problems.

NAD rejuvenates and restores brain function *inter alia* by boosting sirtuins – proteins that slow the effects of neurodegenerative diseases and natural cognitive decline. Together, NAD and sirtuins protect against toxicities in the body and improves cells' resistance to stress.

Benefits include:

- Improved brain health and neurological function
- Improved symptoms of depression and anxiety
- Improved mental clarity [clearing "brain fog"]
- Improved focus and concentration
- Improved brain regeneration
- Improved mood stability
- Improved memory

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3. ADDICTION AND RECOVERY BENEFITS

NAD has proved helpful for individuals undergoing therapy for substance abuse and addiction recovery. The treatment reduces cravings and withdrawal symptoms, provides energy to the body, and boosts brain regeneration. It is a holistic alternative to medication-based solutions and is especially useful for patients who want to avoid the side effects of medications.

NAD detoxifies the body, helping the replacement of essential vitamins and nutrients that are typically depleted in individuals who engage in substance abuse. NAD reduces withdrawal symptoms by binding to opiate receptors, which can help individuals overcome cravings and risk of relapse. At the same time, this powerful coenzyme naturally protects the brain which, in turn, accelerates recovery.

Benefits include:
- Reduced cravings associated with withdrawal
- Fewer withdrawal symptoms
- Improved cognitive clarity
- Improved brain function
- Restored energy levels
- Improved mood
- Cell restoration

NAD therapy for addiction and recovery is not a cure in its own right. It should be used in tandem with counselling or therapy.

4. METABOLIC BENEFITS

The term ‘metabolism’ refers to the amount of energy that is expended to maintain the body. The metabolism naturally slows with age and can lead to weight gain and lower energy levels. NAD plays a large role in normalising metabolic function which, in turn, helps to improve weight loss and overall energy level.

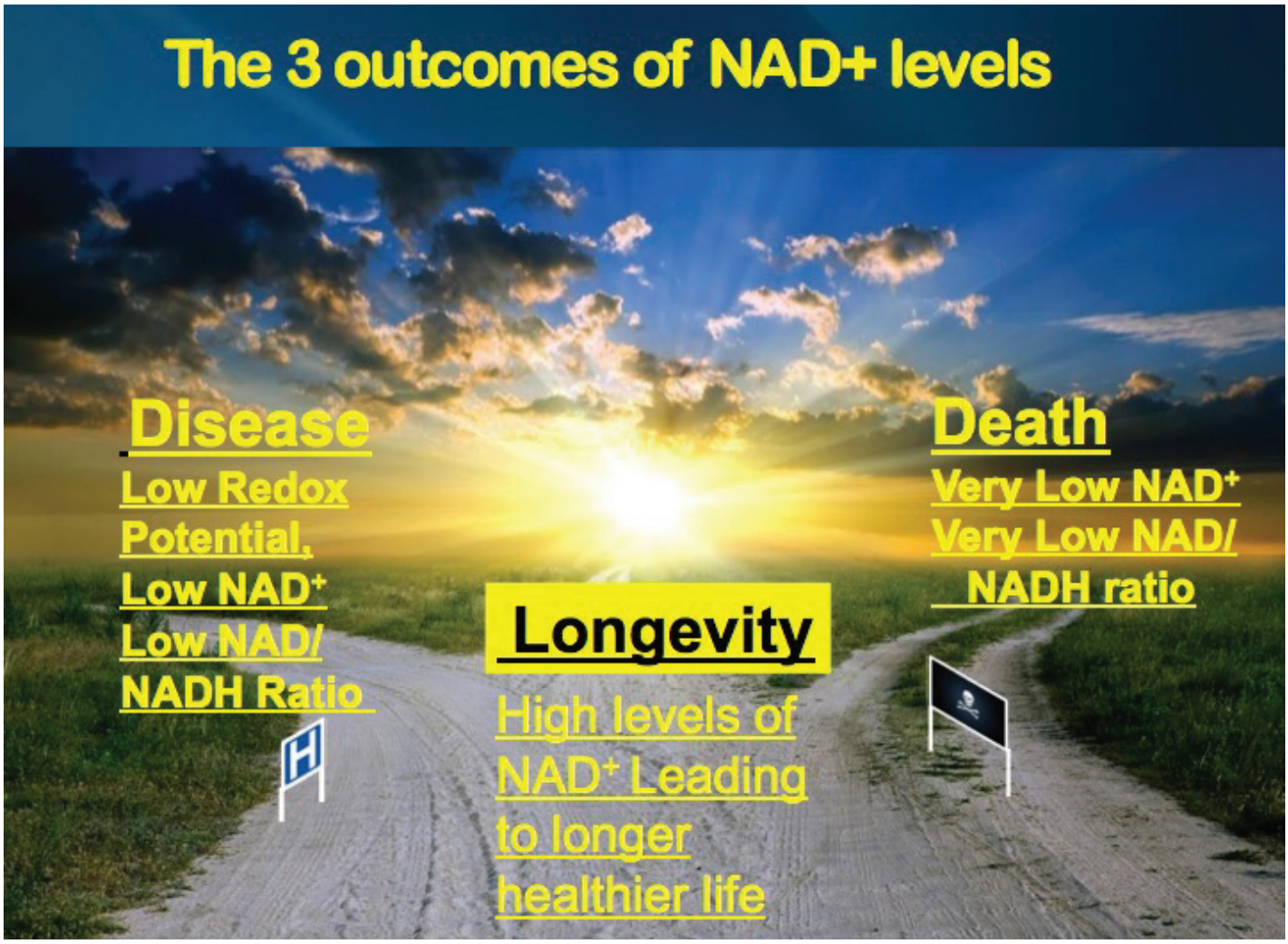
NAD helps promote mitochondrial fitness by maintaining the mitochondrial unfolded protein response, a reaction to cell stress, by ensuring that these cells form into the correct shape for normal function. NAD helps the liver break down fats that are essential to provide energy for the body. It also helps create ATP, which is a major source of energy for cells.

Benefits include:
- Increased energy levels
- Improved metabolism
- Increased weight loss
- Decreased fatigue

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NAD+ SUPPLEMENTATION



WHAT IS YOUR PATH?

The above diagram sums up the choice of paths you can take when it comes to NAD levels. Very low NAD can lead to death. Low NAD can lead to disease and then possibly to death. High NAD helps lead to a longer and healthier life.

WHAT IS NAD?

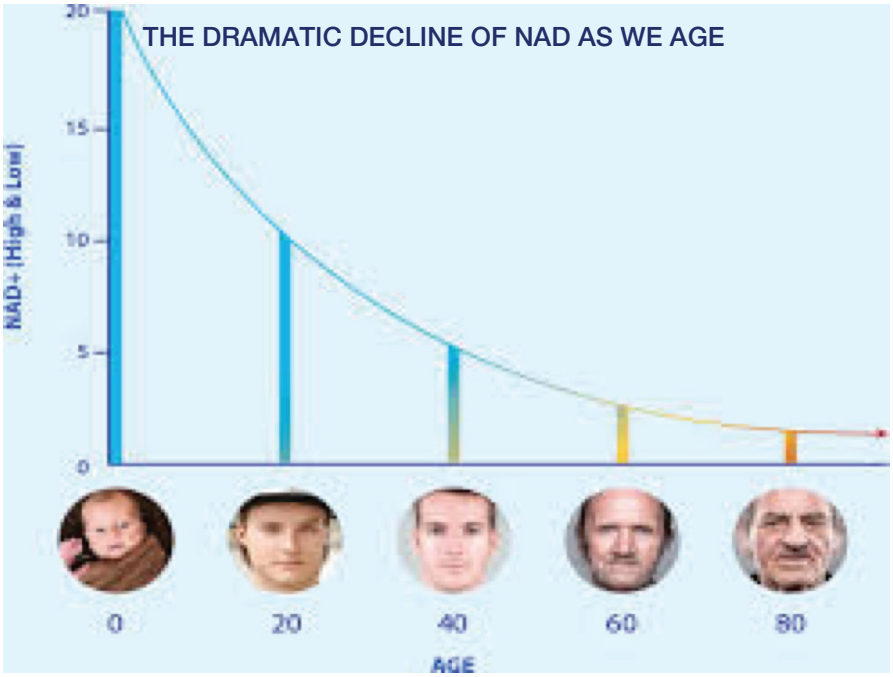
Nicotinamide adenine dinucleotide (NAD) is a coenzyme discovered over 100 years ago by scientists studying fermentation. NAD does two essential things in the cell. First, it aids in the process of turning nutrients into energy - a crucial part of cellular metabolism and the beginning of every energy-driven process in our bodies. Second, NAD is known to boost the activity of sirtuins, an essential protein used by the cell. Sirtuins promote mitochondrial health and support overall cellular health when they are active and working hard.

NAD+ is the oxidized form of NAD and is found in all living cells required for fundamental biological functions at a cellular level. You literally can't live without it. But NAD+ levels decline with age, and low levels of NAD+ are often associated with poor health. The chart below demonstrates this decline.

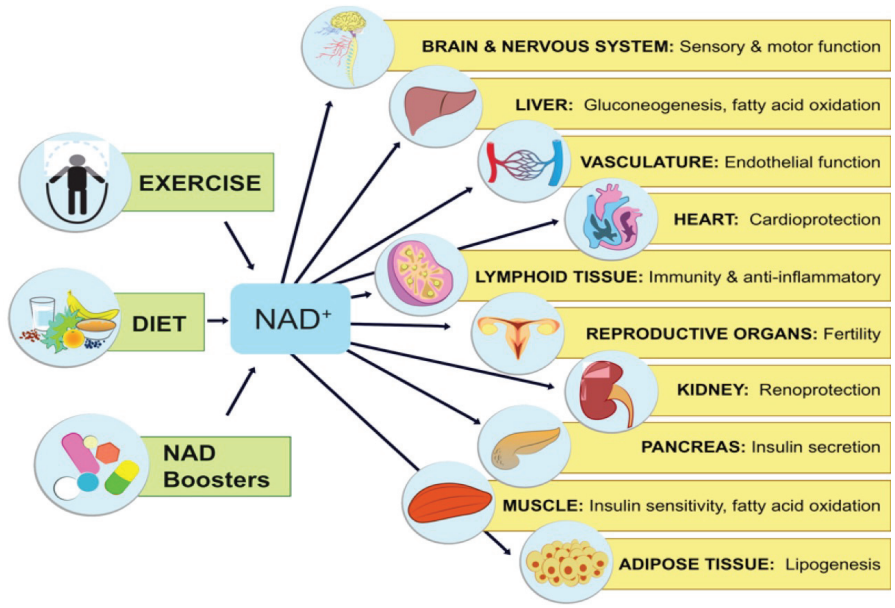
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NAD+ SUPPLEMENTATION



As a result of this decline, the scientific community has been researching how NAD+ relates to overall health and age-related diseases. NAD+ has earned its reputation by playing a role in the body's central biological functions. NAD+ is essential in the production of energy especially the Krebs cycle, which produces energy, namely ATP. NAD+ also works throughout the body to support mitochondrial function, oxidative stress defences, cellular respiration, and DNA repair. We should think of the mitochondria as the body's batteries. The following diagram shows the some of the aspects of health NAD+ touches.



Your body already makes and maintains NAD+ in various ways, specifically by converting food in your diet to NAD+. But since NAD+ levels decline with the aging process, it's important to understand that you must increase your levels in other ways.

It's not entirely known why NAD+ declines with age, but what's suspected is that NAD-consuming enzymes, which provide various benefits to the body's biological function and overall health, essentially "use up" NAD+. Many of these NAD-consuming enzymes are concerned with repairing various types of damage that come from aging. The older we get the more damage that needs to be fixed and thus the more NAD+ we need but the less we have. At the same time, important repairs need to be done.

PARPS

One such repair mechanism involves a group of enzymes called PARPs, or poly (ADP-ribose) polymerases. These enzymes rely on NAD+ to function and regulate DNA repair, among other biological functions. Without PARPs the body would be in BIG TROUBLE since DNA could not be repaired. The problem with the PARPs is that they are tremendous users of NAD. Perhaps a good analogy with the PARP enzymes is to think of them as the Pac Men from the old video game. Think of these Pac Men enzymes as large consumers of the NAD and NAD as the dots that Pac Men consume.

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SIRTUINS

NAD+ is also an essential cofactor of key enzymes responsible for longevity called sirtuins. While resveratrol is well known for sirtuin activation, evidence indicates it does so indirectly, whereas NAD+ directly activates sirtuins to regulate the genes of aging. Sirtuins, specifically Sirt1and Sirt3, are intimately related to longevity through their control of gene expression and require NAD+ for their activity. Research into sirtuins continues to yield substantial information on how to control aging. By activating these sirtuins, we're able to gain control over one of our body's anti-aging "switches."

SIRT enzymes "turn off" certain genes that promote aging, such as those involved in inflammation, in fat synthesis and storage, and in blood sugar management. SIRT enzymes are activated by calorie restriction, the proven means of reliably extending life span in all organisms. The way calorie restriction activates anti-aging sirtuins is by increasing cellular NAD+. Perhaps one of the most important aspects of the Sirtuin genes is that they control mitochondria biogenesis (production) and maintain the health of the existing mitochondria.

DELIVERY

NAD+ can be delivered to the cells by a number of different methods. We must realize that there are a number of NAD+ precursors. There are some oral precursors such as Niacin which is one of the Vitamin B3 class. Niacin is not very efficient in producing NAD+. It can also have some significant side effects such as flushing. A better B3 vitamin choice is nicotinamide riboside (NR). NR boasts the double whammy of not causing flushing and getting along great with sirtuin genes. This gives it an edge over the other vitamin B3s because it increases NAD and can kickstart sirtuins that support overall cellular health. However, the best source of NAD+ precursor is NAD+ via an intravenous route. This is the best method of boosting NAD+ levels in the body.

NAD KINASE

But this is still not the complete story. There is one missing ingredient, an enzyme called NAD Kinase which will dramatically increase the amount of NAD+ that enters the cells. However, as we age, there is a significant drop in the production of NAD Kinase and there is really no effective method of increasing it through supplements.

However, we are able to increase the amount of NAD Kinase via a patch placed over the skin. This is a revolutionary proprietary approach, so the product is simply not available in most other facilities. Between IV treatments of NAD+, we can supply NAD Kinase patches to maintain high levels of NAD+.

We also have treatments that can prolong the life of NAD+ by eliminating the negative effects of certain enzymes.

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