



Scientific explanation about NAD's function and the metabolic pathways of how *Wonderfeel Youngr NMN* formula and its ingredients are effectively working in the cell

Nicotinamide adenine dinucleotide (NAD⁺) is a critical coenzyme in cellular metabolism, essential for life and the production of energy in the form of ATP through oxidative phosphorylation [1]. NAD⁺ also plays a pivotal role in various enzymatic reactions, including those essential for DNA repair, cell signaling, and cellular senescence regulation [2]. A significant decline in NAD⁺ levels has been observed with age, which is attributed to increased enzymatic consumption and insufficient NAD⁺ synthesis in aging cells [3]. The elevated activity of NAD-consuming enzymes such as CD38, poly (ADP-ribose) polymerase (PARP), and sirtuins contributes to this age-related depletion [4,5]. CD38, in particular, a NAD⁺ glycohydrolase, escalates its activity with age and is strongly implicated in the systemic reduction of NAD⁺, as is PARP, which is constantly activated in response to accumulating DNA damage over time [6]. Other mediators, such as mitochondrial dysfunction and oxidative stress, exacerbate the decline in NAD⁺, disrupting cellular homeostasis and accelerating aging processes [7].

To restore and maintain NAD⁺ levels, two primary strategies have been explored extensively: reducing NAD⁺ degradation and enhancing NAD⁺ biosynthesis. Research has shown that inhibiting CD38 or PARP activity can mitigate NAD⁺ loss, while supplementation with NAD⁺ precursors like nicotinamide mononucleotide (NMN) or nicotinamide riboside (NR) has been effective in boosting NAD⁺ availability [8,9]. Although these approaches have demonstrated promising results, they are not sustainable as standalone solutions due to the progressive and often irreversible increase in CD38 and PARP activity associated with aging [10]. Continuous degradation of NAD⁺ caused by age-related factors necessitates a complementary approach that can synergistically reduce oxidative stress and limit DNA damage, thereby reducing the activation of NAD-consuming enzymes.

Our research team at Wonderfeel Biosciences applies a novel approach to NAD⁺ preservation, recommending a dose of two capsules daily of the Wonderfeel Youngr supplement, which NMN with potent antioxidants, including hydroxytyrosol, ergothioneine, and resveratrol, which have been shown to counteract hydroxyl radicals generated by oxidative agents such as hydrogen peroxide, superoxide anions, peroxynitrites, and lipid peroxides [11,12]. Hydroxyl radicals are highly reactive and cause substantial cellular damage, including single-strand DNA breaks, with estimates suggesting up to 50,000 breaks per cell daily due to oxidative stress [13]. The combination of NMN (450 mg), resveratrol (50 mg), hydroxytyrosol (10 mg), ergothioneine (2 mg), and vitamin D₃ (10 mcg) in a single capsule provides a comprehensive strategy to mitigate oxidative damage while supporting NAD⁺ levels. This multi-ingredient

approach is designed not only to alleviate oxidative stress through antioxidant mechanisms but also to partially inhibit the excessive activation of PARP and CD38, thereby stabilizing NAD⁺ levels that otherwise decline with age.

Antioxidants hydroxytyrosol and ergothioneine are known to provide robust protection against oxidative stress and inflammation, potentially mitigating cellular damage and supporting overall health [16]. Furthermore, vitamin D₃ plays a crucial role in calcium homeostasis and immune function; combined with antioxidants such as hydroxytyrosol and ergothioneine, vitamin D₃ may strengthen immune responses and support musculoskeletal health, thereby contributing to overall wellness [17]. These complementary mechanisms may explain the range of benefits reported by users.

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