



Anti-Inflammatory Lifestyle Approaches for Mitigating Age-Related Chronic Diseases

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DESCRIPTION

Chronic low-grade inflammation, often termed “inflammaging,” is a central contributor to the physiological decline associated with aging. Unlike acute inflammation, which serves a protective role in response to injury or infection, chronic inflammation persists over time and can disrupt cellular function, impair organ systems, and accelerate the onset of age-related diseases such as cardiovascular disease, type 2 diabetes, osteoporosis, and neurodegenerative disorders. Lifestyle interventions that target inflammation offer a powerful approach to promoting healthy aging and reducing disease risk.

Dietary patterns play a primary role in modulating systemic inflammation. Diets rich in fruits, vegetables, whole grains, legumes, nuts, and fatty fish provide antioxidants, polyphenols, and omega-3 fatty acids, which counteract oxidative stress and suppress pro-inflammatory pathways. Conversely, diets high in refined sugars, processed foods, trans fats, and excessive red or processed meats are associated with elevated markers of inflammation, including C-reactive protein and pro-inflammatory cytokines. Emphasizing anti-inflammatory foods while minimizing pro-inflammatory components creates a nutritional foundation for healthy aging. Physical activity is another critical determinant of inflammation. Regular moderate-intensity exercise enhances circulation, promotes efficient metabolic function, and reduces visceral fat, a key source of inflammatory mediators. Exercise stimulates the release of anti-inflammatory myokines from skeletal muscles, contributing to systemic benefits. Both aerobic activities, such as walking or cycling, and resistance training are effective in reducing chronic inflammation and improving overall functional capacity in older adults.

Sleep quality profoundly influences inflammatory processes. Inadequate or disrupted sleep is associated with elevated levels of pro-inflammatory cytokines and impaired immune regulation. Establishing consistent sleep schedules, optimizing sleep environments, and addressing sleep disorders such as insomnia or sleep apnea can mitigate these inflammatory effects. High-quality restorative sleep supports both metabolic balance and

immune competence, enhancing resilience against age-related chronic conditions. Stress management also contributes to anti-inflammatory strategies. Chronic psychological stress activates the Hypothalamic-Pituitary-Adrenal (HPA) axis, resulting in prolonged cortisol secretion and immune dysregulation. Mindfulness-based practices, meditation, yoga, and deep-breathing exercises reduce stress, modulate HPA activity, and lower inflammatory markers. By integrating psychological well-being into lifestyle interventions, individuals can address both mental and physiological contributors to aging.

Weight management is closely linked to inflammation. Excess adiposity, particularly visceral fat, is a major source of pro-inflammatory cytokines such as interleukin-6 and tumor necrosis factor-alpha. Combining dietary modification with physical activity supports healthy body composition, reducing systemic inflammation and associated risks of metabolic syndrome, cardiovascular disease, and other age-related conditions. Even modest reductions in visceral fat can produce measurable decreases in inflammatory markers.

Gut health influences systemic inflammation and overall aging processes. A diverse, fiber-rich diet promotes a healthy gut microbiome, which produces metabolites like short-chain fatty acids that modulate immune responses and reduce inflammatory signaling. Probiotic and prebiotic supplementation may further support microbial diversity and enhance anti-inflammatory effects, particularly in older adults experiencing age-related shifts in gut microbial populations. Environmental exposures and lifestyle behaviors, including smoking cessation, moderate alcohol consumption, and limiting exposure to pollutants, also contribute to anti-inflammatory strategies. Tobacco smoke, excessive alcohol, and environmental toxins induce oxidative stress and inflammatory pathways, compounding age-related vulnerability. Addressing these factors creates a more favorable internal environment that supports cellular resilience.

Social engagement and purposeful activity have indirect anti-inflammatory effects. Socially connected individuals experience reduced psychological stress, improved mood, and enhanced adherence to healthy behaviors. Engaging in meaningful work,

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volunteering, or hobbies reinforces emotional well-being, which in turn reduces stress-related inflammatory responses. This holistic perspective emphasizes the interplay between psychosocial and physiological factors in managing inflammation. Emerging research also suggests that intermittent fasting or caloric modulation can contribute to anti-inflammatory effects. Controlled periods of reduced caloric intake activate autophagy and metabolic pathways that decrease oxidative stress and inflammatory signaling. While such interventions require individualized planning to ensure nutritional adequacy, they represent promising complementary approaches to traditional lifestyle strategies. Integrating anti-inflammatory approaches requires consistency and personalization. Combining balanced nutrition, regular physical activity, sufficient restorative sleep, stress management, and social engagement creates synergistic benefits that amplify reductions in systemic inflammation. These practices collectively

reduce the risk of chronic diseases, enhance functional capacity, and promote longevity, illustrating the cumulative impact of lifestyle factors on healthy aging.

CONCLUSION

Chronic low-grade inflammation underlies many age-related health challenges, making anti-inflammatory lifestyle strategies essential for preserving physiological function and promoting well-being. By prioritizing nutrient-dense diets, regular movement, restorative sleep, stress reduction, and social connectedness, older adults can mitigate inflammatory processes, maintain resilience, and improve quality of life. Targeted lifestyle interventions offer practical, sustainable, and integrative solutions to support longevity and prevent the progression of age-related diseases.