




—  — Integrative
—  — Dermatology
—  — Symposium

Science of Aging Primer



Index

| | |
|--|----|
| Metaflammation and Inflammaging | 3 |
| The Gut-Immune Connection | 4 |
| Aging Clock Assessments and Clinical Practice | 5 |
| The Link Between Mental Well-Being and Skin Health and Aging | 7 |
| The Impact of Skin Diseases on Mental Health | 8 |
| Exosomes in Cosmetics/Skincare and Anti-Aging | 9 |
| Complementary Modalities | 10 |



Welcome to the Integrative Dermatology Symposium!

This guide serves as an introduction to key terms that will be presented during the conference. Please feel free to reference this resource throughout the event for additional background information related to the science of aging.

Together we can integrate, innovate, and inspire!

Metaflammation and Inflammaging

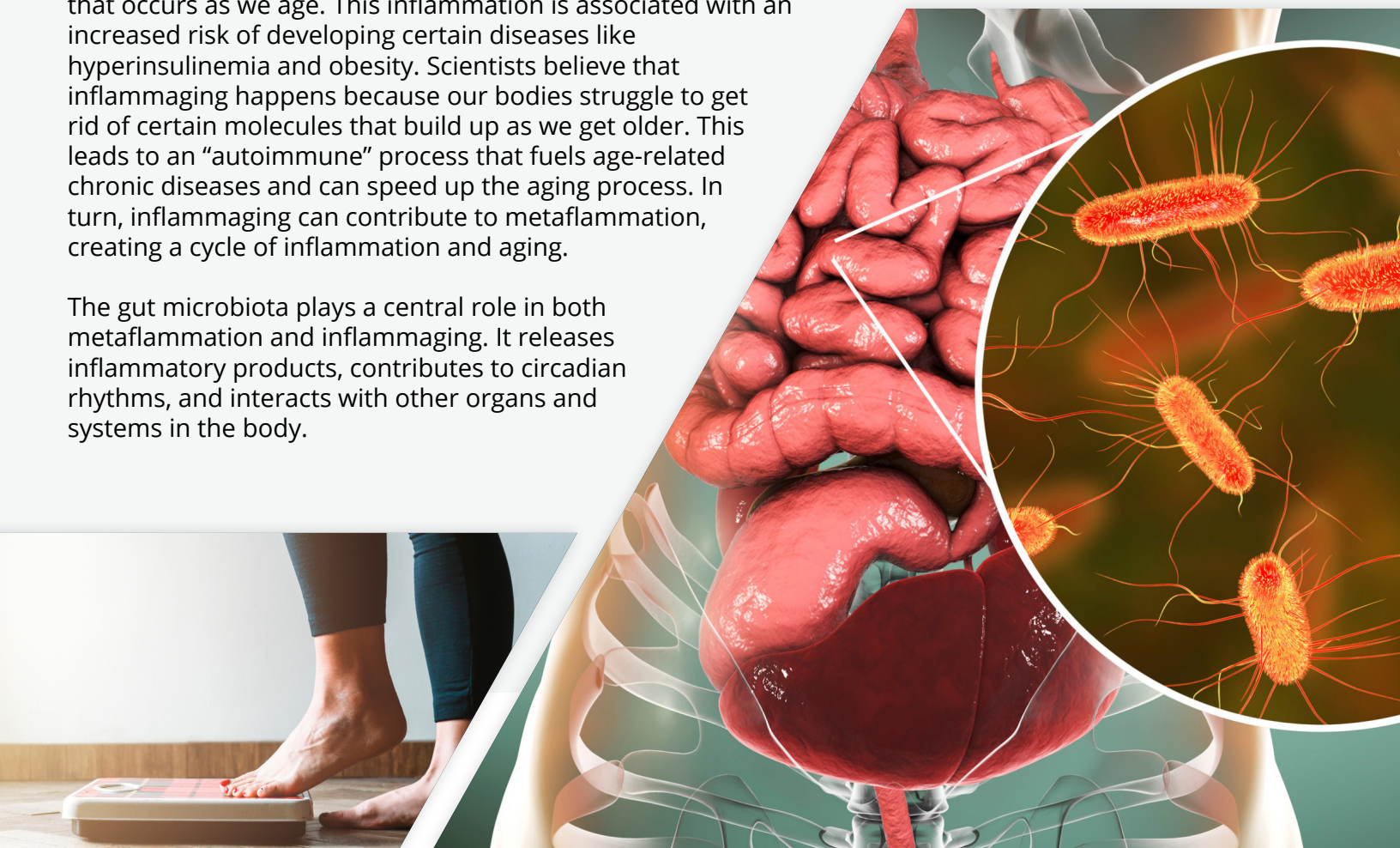
METAFLAMMATION

A term used to describe a state of chronic low-grade inflammation that arises from disrupted metabolic pathways. It closely resembles inflammaging in terms of clinical presentation and possible pathogenic factors. Metaflammation can be triggered by factors such as diet, stress, sleep quality, and drug history. It is often associated with metabolic diseases like obesity and type 2 diabetes that lead to Hyperglycemia and dyslipidemia, which promote immune system stimulation, senescent cells accumulation, epigenetic changes, and alterations in microbiota.

INFLAMMAGING

A term used to describe the chronic, low-level inflammation that occurs as we age. This inflammation is associated with an increased risk of developing certain diseases like hyperinsulinemia and obesity. Scientists believe that inflammaging happens because our bodies struggle to get rid of certain molecules that build up as we get older. This leads to an “autoimmune” process that fuels age-related chronic diseases and can speed up the aging process. In turn, inflammaging can contribute to metaflammation, creating a cycle of inflammation and aging.

The gut microbiota plays a central role in both metaflammation and inflammaging. It releases inflammatory products, contributes to circadian rhythms, and interacts with other organs and systems in the body.



The Gut-Immune Connection

The gut-immune connection refers to the bidirectional relationship between the gut and the immune system. The gut, specifically the gut microbiome, plays a crucial role in maintaining immune homeostasis and overall health. The gut microbiota, a diverse community of microorganisms, interacts with the immune system and helps regulate immune responses.

This interaction between the gut and the immune system is important for various aspects of immune function, including the development and training of immune cells, the maintenance of immune balance, and the defense against pathogens. Signals travel between the gut and the immune system through neural, endocrine, immune, and humoral pathways, shaping immune response.

Disruptions in the gut-immune connection, such as dysbiosis or imbalances in the gut microbiota, have been associated with various health conditions, including infections, autoimmune diseases, chronic inflammation, and even certain types of cancer. Maintaining a healthy gut-immune connection is crucial for overall well-being and may have implications for disease prevention and treatment.

The gut-skin connection is an extension of the gut-immune connection. The gut microbiota also influence the health and function of the skin. Dysbiosis or imbalances in the gut microbiota can impact the immune response in the skin, leading to the development or exacerbation of skin conditions such as atopic dermatitis, psoriasis, acne vulgaris, and dandruff. The gut microbiota communicates with the skin through various mechanisms, including immune signaling molecules and metabolites produced by the gut microbiota.

Diet plays a significant role in the gut-skin connection. Consuming a fiber-rich diet, for example, supports a diverse and balanced gut microbiota. Fiber acts as a prebiotic, nourishing beneficial gut bacteria that produce short-chain fatty acids, which regulate immune responses and promote a healthy gut environment. On the other hand, dietary choices like a high-protein diet can alter the gut microbiota composition and trigger immune responses, potentially affecting skin health.

In summary, the gut-immune connection refers to the relationship between the gut and the immune system, with the gut microbiota playing a crucial role in maintaining immune homeostasis. This connection extends to the skin, where imbalances in the gut microbiota can impact the immune response and contribute to the development or exacerbation of skin conditions. Diet, particularly fiber intake, can influence this relationship by supporting a healthy gut microbiota and immune function, as well as alter a person's biological age.



Aging Clock Assessments and Clinical Practice

Aging clock assessments in clinical practice involve the use of various methods and tools to measure biological age and predict the rate of aging in individuals. These assessments provide valuable insights into an individual's overall health and aging process, enabling targeted interventions and personalized care. Biological age, which is determined by biological markers rather than chronological age, is estimated using aging clocks that analyze biological data like DNA methylation patterns or gene expression levels. The goal is to predict all-cause mortality and offer actionable insights to promote healthy aging. By assessing biological age, healthcare professionals can identify potential health risks and develop interventions to prevent or manage age-related diseases. Aging clocks also help identify specific mechanisms associated with aging, providing targets for preventative medicine and interventions to modulate biological processes that contribute to the shift from healthy functioning to aging and age-related diseases.



COSMECEUTICALS

in the context of skincare, are products that contain active ingredients with a clear and defined biological effect on the skin. Coined by dermatologist Dr. Albert Kligman in 1984, cosmeceuticals are distinct from cosmetics and pharmaceuticals. While not classified as drugs, they often contain vitamins, minerals, and other active ingredients similar to pharmaceutical and nutraceutical products. Cosmeceuticals are designed to provide both cosmetic and therapeutic benefits to the skin.



WHAT ARE ADVANCED GLYCATION END PRODUCTS (AGE'S)?

Advanced Glycation End products (AGE's) are compounds that are formed in the body when fat and protein combine with sugar. They are a type of chemical compound that can contribute to the development of various diseases. AGEs can accumulate in high levels in the body and increase the risk of many diseases, including insulin resistance, diabetes, and heart disease. They are also believed to play a role in aging and age-related chronic diseases.

HOW DO ADVANCED GLYCATION END PRODUCTS (AGE'S) DEVELOP?

AGEs can develop in the body through a process called glycation. Glycation occurs when sugar molecules bind to proteins or fats without the involvement of enzymes. This process can happen naturally in the body, but it can also be accelerated by certain factors, such as high blood sugar levels, oxidative stress, and inflammation.



WHAT ARE THE DIETARY SOURCES OF ADVANCED GLYCATION END PRODUCTS (AGE'S)?

Some modern foods contain relatively high amounts of AGEs, mostly due to popular cooking methods that expose food to dry heat. Foods that are cooked at high temperatures, such as grilled, fried, or roasted foods, tend to have higher levels of AGEs. Processed and packaged foods may also contain higher levels of AGEs due to the manufacturing processes involved. Specifically, processed canned meats and nuts have been found to have the highest levels of AGEs, while fruits, vegetables, and butter have lower levels. It is important to note that the modern diet is a significant source of AGEs.

WHAT ROLE DO ADVANCED GLYCATION END PRODUCTS (AGE'S) PLAY IN SKIN AGING?

AGEs are thought to play a role in the aging process, including skin aging. They can affect nearly every type of cell and molecule in the body and are believed to contribute to age-related chronic diseases. In the context of skin aging, AGEs can induce crosslinking of collagen, which can cause vascular stiffening and the entrapment of low-density lipoprotein particles in the artery walls. AGEs can also cause glycation of LDL, which can promote its oxidation. These processes are considered to be factors in the development of atherosclerosis.

Reducing dietary exposure to AGEs may help mitigate the risk of developing chronic conditions associated with an increase in AGEs, including skin aging. It is also important to note that while dietary AGEs may contribute to the body's pool of AGEs, other factors such as endogenous formation and metabolic processes also play a role, without even considering the impact of mental health.



The Link Between Mental Well-Being and Skin Health and Aging

The connection between mental well-being and skin health and aging is an area of growing interest. While the exact mechanisms and relationships are still being explored, there is evidence to suggest that psychological factors can influence skin health and aging in various ways.

PSYCHOLOGICAL STRESS AND SKIN HEALTH

Psychological stress can have a significant impact on the skin. When individuals experience psychological stress, hormones are released that can affect the skin's physiology. Stress can lead to increased inflammation, impaired skin barrier function, and altered immune responses, which may contribute to the development or exacerbation of skin conditions such as acne, eczema, psoriasis, and rosacea.

PSYCHOLOGICAL FACTORS AND SKIN DISORDERS

In some cases, skin problems can be the outward manifestation of underlying mental disorders. Skin picking, for example, can be a symptom of obsessive-compulsive disorder, attention-deficit disorder, or addiction. Addressing the underlying psychological factors is crucial in the treatment of such conditions.

MIND-BODY STRATEGIES FOR SKIN HEALTH

Various mind-body strategies have been found to be beneficial for both mental well-being and skin health. Focused breathing, mindfulness meditation, and relaxation techniques have been used successfully in the management of skin conditions such as acne, alopecia areata, atopic dermatitis, and psoriasis. These techniques can help reduce stress levels and improve overall skin health.

THE IMPACT OF MENTAL HEALTH ON SKIN AGING

Skin aging is influenced by various factors, including genetics, lifestyle, and environmental exposures. Mental health can also play a role in the aging process. Chronic psychological stress has been associated with immune dysfunction, oxidative damage, and DNA damage, which are potential mechanisms involved in skin aging. While more research is needed to fully understand the link between psychological stress and skin aging, interventions targeting stress reduction may have potential benefits for skin health.



The Impact of Skin Diseases on Mental Health

Inversely, skin diseases can have a significant impact on mental health and well-being. The visible nature of many skin conditions can affect a person's self-esteem, body image, and overall quality of life. Here are some ways in which skin diseases can influence mental health:

SELF-ESTEEM AND BODY IMAGE

Skin conditions such as acne, psoriasis, vitiligo, eczema, and others can have a profound impact on a person's self-esteem. Visible skin symptoms can lead to feelings of self-consciousness, embarrassment, and social anxiety. Individuals may experience negative body image and a reduced sense of self-worth due to the perceived stigma associated with their skin condition.

PSYCHOLOGICAL DISTRESS AND EMOTIONAL WELL-BEING

Living with a skin disease can cause psychological distress and emotional challenges. Chronic itching, pain, discomfort, and the unpredictability of flare-ups can lead to frustration, irritability, and feelings of helplessness. Anxiety and depression are also common among those with skin conditions, as they may face challenges related to social interactions, relationships, and daily functioning.

SOCIAL ISOLATION AND STIGMATIZATION

Skin diseases can result in social isolation and stigmatization. People with visible skin conditions may experience judgment, misunderstanding, and discrimination from others. This can lead to feelings of shame, self-consciousness, and reluctance to engage in social activities or form relationships. The fear of negative reactions from others can further contribute to social withdrawal and a diminished quality of life.

IMPACT ON DAILY LIFE AND ACTIVITIES

Skin diseases can affect daily life and activities. The physical symptoms, discomfort, and self-consciousness associated with skin conditions may limit individuals' participation in certain activities, such as swimming, sports, or wearing certain types of clothing. This can lead to a sense of restriction and a decrease in overall enjoyment and engagement in life.

PSYCHOSOCIAL SUPPORT AND COPING STRATEGIES

Seeking psychosocial support and developing coping strategies are vital for individuals with skin diseases. Connecting with support groups, counseling services, or online communities can provide a sense of belonging, understanding, and emotional support. Developing effective coping mechanisms, such as practicing self-care, maintaining a positive mindset, and seeking professional help when needed can also help individuals navigate the emotional challenges associated with skin diseases.

Exosomes in Cosmetics/Skincare and Anti-Aging

Exosomes are small extracellular vesicles released by cells. These vesicles are packed with various bioactive molecules, including proteins, lipids, and nucleic acids (such as RNA). Exosomes also play a crucial role in cell-to-cell communication, facilitating the transfer of these molecules between cells. This is important because this transfer can influence numerous physiological and pathological processes. Therefore, exosomes have gained attention in the field of cosmetics, skincare, and anti-aging due to their potential therapeutic benefits for skin health and rejuvenation.

ROLE OF EXOSOMES IN COSMETICS/SKINCARE

Exosomes have been explored for their use in cosmetics and skincare products due to their ability to modulate the microenvironment of cells, regulate gene expression, and induce cell differentiation, which can have a positive impact on skin health. Here are some key points regarding the use of exosomes in cosmetics/skincare:

1

Skin Rejuvenation

Exosomes are used as anti-aging ingredients in medical-grade skincare products and cosmetic procedures. They can promote skin rejuvenation by enhancing cellular repair and regeneration.

2

Delivery of Therapeutic Agents

Exosomes can be loaded with therapeutic agents, such as anti-inflammatory drugs or small interfering RNAs (siRNAs), and used to deliver these agents directly to the affected areas of the skin. This targeted delivery system shows promise in reducing skin inflammation and improving various dermatological conditions.

3

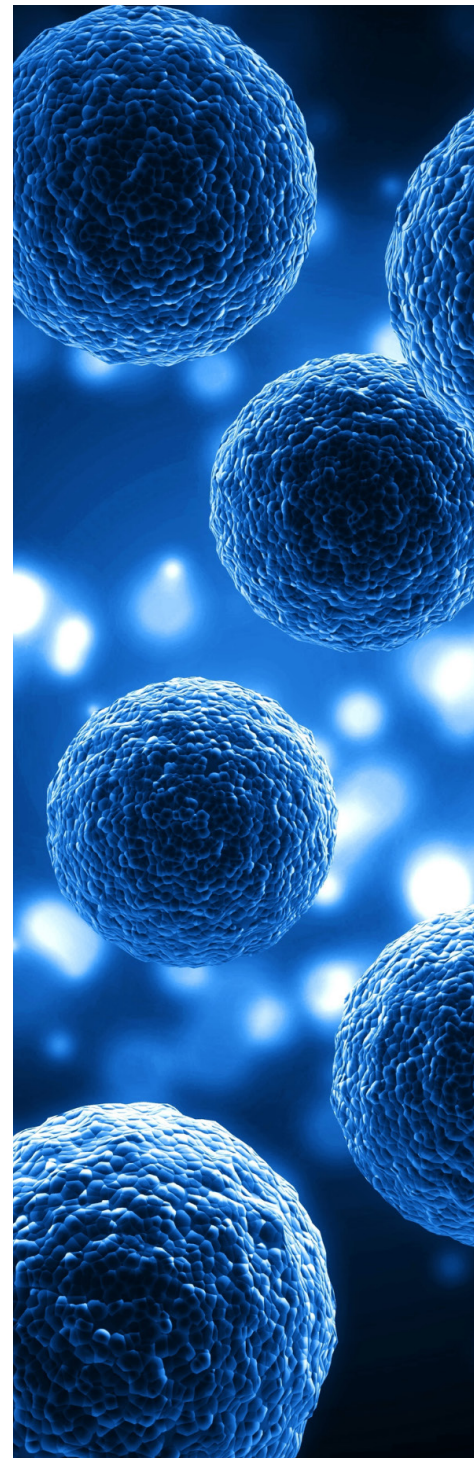
Collagen and Elastin Production

Studies have shown that exosomes derived from stem cells can penetrate the skin and increase collagen and elastin production while reducing the expression of enzymes that degrade these proteins. This suggests their potential use in anti-aging cosmetics and skin rejuvenation.

4

Wound Healing

Exosomes have also been investigated for their potential in wound healing. They can promote tissue repair and regeneration, making them a promising ingredient in skincare products for wound healing purposes.



CORE ASPECTS OF INTEGRATIVE MEDICINE



Whole-Person Care

Treating the mind, body, and spirit as an integrated whole.



Patient Participation

Encouraging active involvement in the healing process and decision-making.



Prevention and Wellness

Emphasizing healthy lifestyle choices and proactive measures to maintain well-being.



Natural Healing

Utilizing natural therapies and techniques to support the body's innate healing abilities.

Complementary Modalities



NATUROPATHIC MEDICINE

This discipline emphasizes the body's innate ability to heal itself. Naturopathic doctors use natural therapies, including nutrition, herbal medicine, and lifestyle counseling, to support and stimulate the body's self-healing processes.



AYURVEDIC MEDICINE

Originating in India, Ayurvedic medicine is one of the world's oldest holistic healing systems. It focuses on balancing the body's energies, or doshas, through diet, herbal treatments, yoga, and meditation to promote health and prevent illness.



TRADITIONAL CHINESE MEDICINE (TCM)

TCM includes a variety of practices such as acupuncture, herbal medicine, and tai chi. It is based on the concept of balancing the body's vital energy, or qi, and aims to restore harmony between the body and its environment.



FUNCTIONAL MEDICINE

This approach aims to address the root causes of disease by considering the interactions between genetic, environmental, and lifestyle factors. Functional medicine practitioners use a systems-oriented approach to personalize care and promote optimal health and wellness. There is a greater reliance on laboratory testing when assessing imbalances.



LearnSkin was founded by dermatologists and integrative medicine practitioners with a mission to support colleagues interested in whole patient care. Our goal is to share the latest in scientific research and treatment options from both Western and Eastern medicine to meet the growing demand for responsible, high-quality, and evidence-based education that bridges conventional and complementary approaches. [Visit our website here](#)

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