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Revealing Healthy Aging: AI-Derived Facial Biomarkers for Early Detection and Patient-Centered Preventive Longevity Medicine

In longevity medicine, biological aging is commonly assessed using abstract biomarkers such as epigenetic clocks, blood-based parameters, and multi-omics data. While scientifically robust, these measures are often difficult for patients to intuitively understand and therefore provide limited motivational value for long-term therapy adherence.

We present an artificial intelligence-based approach that performs holistic facial analysis to derive three clinically interpretable indices: the Facial Youthfulness Index, Facial Aesthetic Index, and Skin Quality Index. These indices reflect systemic aging processes, including inflammaging, hormonal alterations, oxidative stress, and lifestyle-related effects.

Beyond static assessment, the system quantifies individual improvement potential and generates structured, personalized treatment strategies. This enables the face to serve as a visible, longitudinal outcome marker for longevity interventions, ranging from lifestyle modification and supplementation to regenerative and preventive medical therapies.

By translating molecular and systemic aging processes into an immediately perceivable and clinically actionable metric, this approach bridges the gap between biological aging assessment and patient-centered motivation, offering a novel tool for outcome monitoring and adherence optimization in longevity medicine.

Biography

Dr. Rainer Pooth is the Managing Director of ICAAN GmbH, a company based in the Frankfurt Rhine-Main Metropolitan Area, Germany. With an academic background from Johann Wolfgang Goethe University Frankfurt am Main, he combines scientific expertise with leadership experience in industry and innovation. In his executive role, Dr. Pooth is involved in strategic management, organizational development, and advancing the objectives of ICAAN GmbH.

Throughout his professional career, Dr. Pooth has contributed to the intersection of research, technology, and business development. His expertise reflects a commitment to applying scientific knowledge and strategic approaches to create innovative solutions and foster collaboration between academic and industrial environments. As a leader, he supports the growth of his organization while promoting research-driven approaches and sustainable advancement.