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[Commentary] Insulin Sensitizers like Metformin and GLP1 with Degludec as Anti-Aging

Amr Ahmed[1], Maher Akl[2]

1 Ministry of Health Saudi Arabia
2 Mansoura University

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Abstract

This commentary discusses the role of albumin, a crucial protein in human plasma, in the process of aging, and its connection to insulin signaling. The piece explores the potential of insulin sensitizers, specifically Metformin and GLP1 with Degludec, as innovative therapeutic strategies for promoting healthy aging. The work underlines the need for further research in understanding the multifunctional capabilities of albumin and its modulation by insulin sensitizers.

Amr Ahmed*

The public health department, Riyadh First Health Cluster, Ministry of Health, Saudia Arabia, Phone: +966 59 731 0032, E-mail: drmedahmed@gmail.com, ORCID iD: 0000-0003-3477-236X

Maher Monir. Akl

Department of Chemistry, Faculty of Science, Mansoura University, 35516, Mansoura, Egypt. Phone: +201020432031, E-mail: maherakl555@gmail.com, ORCID iD: 0000-0001-5480-1688

*To whom correspondence should be addressed

I am writing to discuss the potential role of insulin sensitizers, specifically Metformin and GLP1 with Degludec, as anti-aging agents. The focus of this discussion revolves around the protein albumin, its functions, and its association with age-related changes. Albumin, the most abundant protein in human blood plasma, plays a crucial role in transporting substances throughout the bloodstream. However, its functions extend beyond mere transportation and encompass tasks such as binding hydrogen ions, hormone transport, toxin neutralization, and drug distribution. Recognizing the significance of these functions, it becomes imperative to maintain albumin levels consistently throughout life to counteract the adverse effects of aging. [1] Recent research has shed light on the correlation between decreasing albumin levels and the aging process. A 2018 study identified circulating albumin as the most important biomarker in predicting an individual's biological age, surpassing even glucose levels in significance.[2] Another study in 2019 demonstrated that maintaining albumin levels is vital for preserving neurological health, as disruptions in the blood-brain barrier, associated with albumin deficiency, led

to cognitive impairment and neurological aging in mice.[3]

Despite the critical role of albumin and its decline with age, current medical understanding categorizes this decline as a natural and unavoidable process. However, as more studies highlight the importance of albumin, this perception may change. It is crucial for individuals to be aware of the multifaceted functions of albumin and to question the assumption that decreasing levels are inconsequential in the context of aging. [4] Moreover, diabetes, characterized by dysregulated glucose, lipid, and protein metabolism, has been extensively studied in relation to albumin production. Insulin, a key regulator of glucose and lipid metabolism, has also been found to influence albumin gene expression. Disruption of insulin signaling in mice resulted in decreased albumin secretion, while the deletion of Forkhead Box O1 (Foxo1) rescued this decrease. These findings suggest that Foxo1 acts as a repressor of albumin expression, emphasizing the intricate connection between insulin and albumin. [5]

Additionally, investigations into the interaction between Human Serum Albumin (HSA) and native human insulin and its fragments revealed that HSA can bind to these components, inhibiting their aggregation. The formation of amyloid structures was observed in samples containing native insulin or its fragments, while HSA complexes showed distinct secondary structures. These results indicate that HSA interaction prevents aggregation, further highlighting the importance of albumin in maintaining protein homeostasis. [6] In a groundbreaking experiment, researchers delivered unmodified serum albumin to middle-aged mice, diluting the presence of damaged albumin and reversing the detrimental responses to pro-aging signals in the blood. This intervention resulted in a significant increase in lifespan, with female mice experiencing a 17.6% extension and male mice a 20.3% extension. The treated mice also exhibited improved physical capabilities, including increased grip strength and better performance in cognitive tests. [7]

In conclusion, the role of albumin in the aging process and its association with insulin signaling and protein metabolism demonstrate the potential of insulin sensitizers like Metformin and GLP1 with Degludec as anti-aging agents. Further research is necessary to explore the mechanisms underlying the interaction between insulin, albumin, and aging, with the aim of developing interventions that can effectively counteract age-related decline. Understanding the multifunctional capabilities of albumin and its modulation by insulin sensitizers may pave the way for innovative therapeutic strategies to promote healthy aging.

Statements and Declarations

The authors declare that there are no conflicts of interest.

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