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Roles of Advanced Glycation End Products (AGEs) and Insulin-Like Growth Factor Binding Protein-3 (IGFBP-3) in Age-related Chronic Kidney Disease

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The prevalence of chronic kidney disease (CKD) increases with age, especially among individuals aged 65 and older. Advanced glycation end products (AGEs) and elevated insulin-like growth factor binding protein-3 (IGFBP-3) expression are closely associated with kidney dysfunction in aging.

AGEs contribute to renal aging by activating the receptor for AGEs (RAGE), leading to inflammation, fibrosis, oxidative stress, and cellular senescence, ultimately accelerating renal decline. Increased IGFBP-3 expression, inversely correlated with estimated glomerular filtration rate (eGFR) in CKD patients, also promotes apoptosis. In studies on aged mice, treatments with an AGE inhibitor (aminoguanidine) and a neutralizing antibody against IGFBP-3 effectively alleviated kidney pathology.

These findings suggest that AGEs and IGFBP-3 interact to drive age-related renal dysfunction and highlight potential therapeutic strategies targeting AGEs-regulated IGFBP-3 signaling for combating CKD associated with aging

