

Disrupted Alpha-Ketoglutarate Homeostasis: Understanding Kidney Diseases from the View of Metabolism and Beyond

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Abstract

Alpha-ketoglutarate (AKG) is a key intermediate of various metabolic pathways including tricarboxylic acid (TCA) cycle, anabolic and catabolic reactions of amino acids, and collagen biosynthesis. Meanwhile, AKG also participates in multiple signaling pathways related to cellular redox regulation, epigenetic processes, and inflammation response. Emerging evidence has shown that kidney diseases like diabetic nephropathy and renal ischemia/reperfusion injury are associated with metabolic disorders. In consistence with metabolic role of AKG, further metabolomics study demonstrated a dysregulated AKG level in kidney diseases. Intriguingly, earlier studies during the years of 1980s and 1990s indicated that AKG may benefit wound healing and surgery recovery. Recently, interests on AKG are arising again due to its protective roles on healthy ageing, which may shed light on developing novel therapeutic strategies against age-related diseases including renal diseases. This review will summarize the physiological and pathological properties of AKG, as well as the underlying molecular mechanisms, with a special emphasis on kidney diseases.

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Biography

Zhen-Nan Ye has his expertise in Nephrology and specialize in conditions that affect the kidney. He also treat associated issues like high blood pressure, fluid retention, and electrolyte and mineral imbalances. In addition, these specialists are in charge of kidney dialysis treatment — both hemodialysis and peritoneal

dialysis — and kidney transplants and their follow-up care. Specialized doctors who have received advanced training in the field of nephrology. He completed medical school and a fellowship with board certification in their specialty.