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Carnosine and Kidney Diseases: What We Currently Know?

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Abstract

Carnosine (beta-alanyl-L-histidine) is an endogenously synthesised dipeptide which is present in different human tissues e.g. in the kidney. Carnosine is degraded by enzyme serum carnosinase, encoding by CNDP1 gene. Carnosine is engaged in different metabolic pathways in the kidney. It reduces the level of proinflammatory and profibrotic cytokines, inhibits advanced glycation end products' formation, moreover, it also decreases the mesangial cell proliferation. Carnosine may also serve as a scavenger of peroxyl and hydroxyl radicals and a natural angiotensin-converting enzyme inhibitor. This review summarizes the results of experimental and human studies concerning the role of carnosine in kidney diseases, particularly in chronic kidney disease, ischemia/reperfusion-induced acute renal failure, diabetic nephropathy and also drug-induced nephrotoxicity. The interplay between serum carnosine concentration and serum carnosinase activity and polymorphism in the CNDP1 gene is discussed. Carnosine has renoprotective properties. It has a promising potential for the treatment and prevention of different kidney diseases, particularly chronic kidney disease which is a global public health issue. Further studies of the role of carnosine in the kidney may offer innovative and effective strategies for the management of kidney diseases.

Keywords: CNDP1 gene; Carnosine; chronic kidney disease; diabetic nephropathy; renoprotection; serum carnosinase..

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