Journal of Cytokine Biology
ISSN:2576-3881

Natalia S, J Cytokine Biol 2021, 6:2

Short Commentary Open Access

Multiple Role of Relanase

Natalia Serwin

Department of Laboratory Medicine , Pomeranian Medical University in Szczecin, Poland

*Corresponding author: Natalia Serwin, Department of Laboratory Medicine , Pomeranian Medical University in Szczecin, Poland; E-mail: natser@pum.edu.pl

Received: March 7, 2021; **Accepted**: March 15, 2021; **Published**: March 26, 2021

Abstract

Renalase is both an enzyme and a cytokine that functions as a signaling molecule involved in cell survival. Its level increases significantly during chronic kidney disease which is accompanied by normal renalase excretion. It remains an unresolved link between kidney diseases and hypertension and is a promising factor in limiting their adverse effects.

Renalase (RNLS) is a small flavoprotein produced mainly by the kidney. The latest investigations show, that RNLS might be an "organolase" as the RNLS gene is expressed in many other cells and tissues, including the nervous system, endocrinal and digestive tract organs, lungs, or heart in humans and some other mammals [1]. RNLS shows both intracellular and extracellular activity. Intracellular RNLS acts as an enzyme that in the presence of FAD cofactor oxidizes 2- and 6- DHNAD(P) to β-NAD(P)H, which is its biologically active form. This action prevents toxicity resulting from inhibition of many βNAD(P)H-dependent enzymes and reactions. In turn, extracellular renalase, as well as RP-200 and RP-220 peptides which are fragments of the protein, activate some of the signaling pathways, including Akt and MAP kinases, and therefore promoting cell survival. This activity is mediated by binding of renalase to its recently discovered receptor – plasma membrane Ca2+-ATPase-4b (PMCA4b), which is the main form of this pump in erythrocytes, cells that are involved in renalase transport [2].

Immortalized Despite discrepancies in observed serum renalase levels in humans, most analyzes indicate that serum RNLS levels are significantly increased in people with chronic kidney disease (CKD). This relationship, as in the case of many other markers, would indicate the usefulness of the RNLS concentration assessment in the diagnosis and prognosis of kidney diseases and accompanying disorders. The small size of the molecule (36kDa) suggests that it should be easily filtered by the glomeruli, especially in renal pathology, where this barrier is disrupted enough to enable the escape of large molecules, including albumin. In CKD patients, serum renalase remains at a significantly higher level what shows, that this protein is not only overproduced in CKD, but also stopped from escaping the blood by a yet unknown mechanism that occurs during kidney injury or dysfunction, but not in healthy individuals. This assumption is supported by the fact, that both urinary renalase itself and after normalization to creatinine do not differ between healthy adults and renal patients [2, 3].

Whether serum renalase overload it is a result of overexpression and overproduction, increased release from erythrocytes, or “recycling” needs more investigation. Apart from exploring renalase role ins cell signaling, this should be based on analysis of renalase and NADPH-dependent cellular metabolism and respiration cycles in CKD and related diseases, as well as on renalase effect on the calcium metabolism, what taken together with observed in CKD low levels of this macroelement and increased level of renalase should be carefully analyzed.

REFERENCES

1. Wisniewska M, Serwin N, Dziedziejko V, Marchelek-Mysliwiec M, Dolegowska B, et al. (2019) Chronic kidney disease is associated with increased levels of renalase in serum and decreased in erythrocytes. Pol Arch Intern Med.790-7.

2. Serwin NM, Wiśniewska M, Cecerska-Heryć E, Safranow K, Skwirczyńska E , et al. (2020) Serum-to-urine renalase ratio and renalase fractional excretion in healthy adults and chronic kidney disease patients. BMC Nephrol.

3. Wang J, Qi S, Cheng W, Li L, Wang F, et al. (2008) Identification, expression and tissue distribution of a renalase homologue from mouse. Mol Biol Rep.613–620.