

## Renalase: A Novel Molecule of Clinical Importance

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Identification of a novel molecule is always important to solve the puzzle of nature. Many scientists are therefore eager to identify a new molecule that may give a new direction to the existing way of solving a problem or to provide a better explanation of a known event. However, not all the newly discovered molecule does show a direct relevance to a clinical problem. Renalase, a flavin adenine dinucleotide (FAD)-dependent amine oxidase, appears to be an exception. Renalase was discovered by a group of investigators headed by Prof. Gary Desir at the Yale University School of Medicine in 2005<sup>1,2</sup>. In their first report, they showed that renalase is secreted by the kidney into the blood and is capable of metabolizing catecholamines (dopamine, epinephrine and norepinephrine)<sup>1</sup>. Although the renalase gene expression in human was found highest in the kidney it was also detectable in the heart, skeletal muscle and small intestine. The most striking clinically relevant finding was the identification of a markedly reduced plasma renalase concentration in patients with end-stage renal disease. Interestingly, animal studies demonstrated that the renalase infusion could decrease cardiac contractility, heart rate and blood pressure in rats<sup>1</sup>. Subsequent studies found decreased plasma and tissue levels of renalase in animal models of hypertension and chronic kidney disease<sup>3</sup>. Interestingly, renalase knockout mice were found hypertensive and they showed increased sympathetic tone and elevated levels of plasma and urinary catecholamines in absence of any significant alteration in renal function<sup>4</sup>. Human studies also demonstrated an inverse relationship between plasma renalase level and systolic blood pressure in patients with resistant hypertension<sup>5</sup>. Moreover, a functional mutation in renalase gene has been found to be associated with essential hypertension<sup>6</sup>. Linking the findings obtained so far, it has been

concluded that renalase deficiency, resulting from chronic kidney disease or genetic alteration, may induce hypertension and cardiovascular disease through decreased catabolism of catecholamines. Thus renalase is currently a highly promising and an active area of research in the field of renal and cardiovascular diseases. Basic research at the molecular and biochemical level should be conducted to answer a number of clinically relevant questions including the involvement of renalase in diabetes and diabetic complications and the possibility of use of recombinant renalase as a therapeutic agent in diseases like chronic renal disease or resistant hypertension.

### References

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