# The relationship between renalase together with catecholamines and anti-aging factors - sirtuin 1 and αKlotho in hemodialysis patients.

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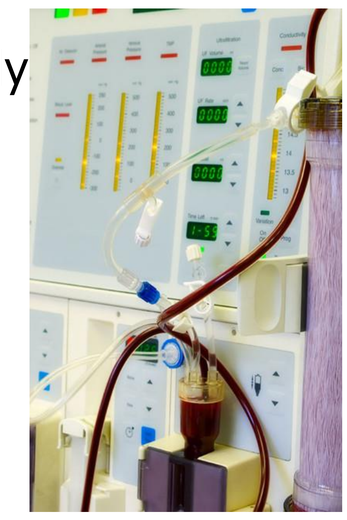


## Objective

Sirtuin1 (SIRT1) and Klotho are considered as anti-aging factors. SIRT1 due to anti-apoptotic, anti-oxidative and anti-inflammatory effect is involved in several diseases as diabetes or cardiovascular disorders. SIRT1 improves glucose tolerance, reduces hyperinsulinemia and enhances systemic insulin sensitivity. It is also an important nehroprotective factor, especially in the diabetic kidney disease. Its renal overexpresion is an answer to the oxidative stress. Klotho is primary produced in kidneys. Its deficiency is associated with renal disease progression and heart disease. Klotho deficiency in patients with chronic kidney disease can also prompt to vessels calcification and salt-dependent hypertension. Studies on animals indicated nephroprotective role of Klotho by the impact on renin-angiotensin-aldosteron system activity. Renalase is synthesized by kidneys as well. It can degrade the catecholamines *in vitro* study and in that way have an hemodynamic effect *in vivo.* Renalase deficiency in animals was characterized by hypertension, tachycardia, catecholamines elevation and ischaemic heart failure. We previously indicated higher renalase concentration in patients with chronic kidney disease comparing to healthy volunteers, especially in those without residual renal function and with coronary artery diseases.

## Design and methods

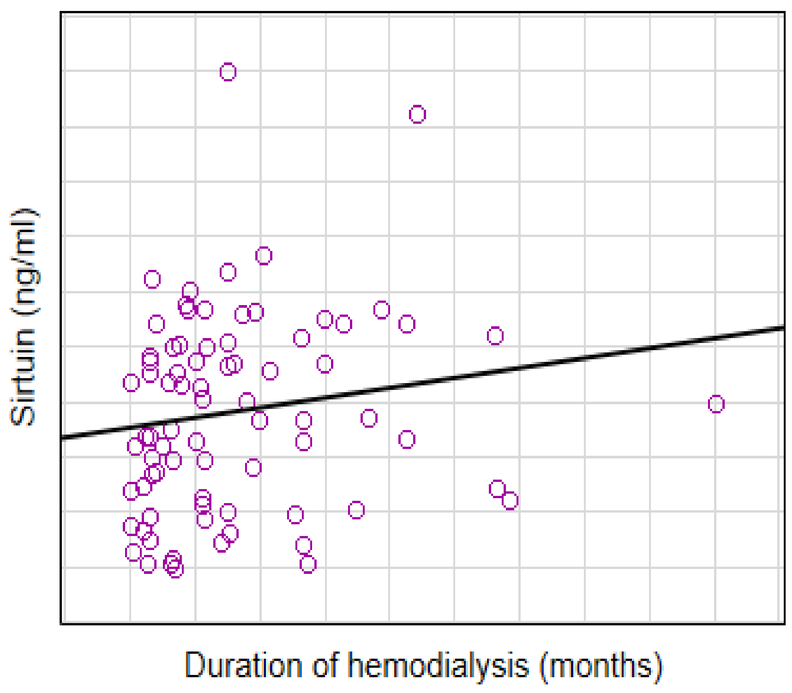
The aim of the study was to asses the relationship between renalase together with catecholamines and anti-aging factors - Sirtuin1 and αKlotho in hemodialysis (HD) patients comparing to healthy volunteers in regard to age, blood pressure control, cardiovascular disease and time of dialysis.

The concentration of renalase, catecholamines – norepinephrine (NE) and dopamine, SIRT1 and αKlotho was evaluated using ELISA test in 103 HD patients, median age 62 years and in 21 volunteers. The blood pressure control and echocardiography were assessed.

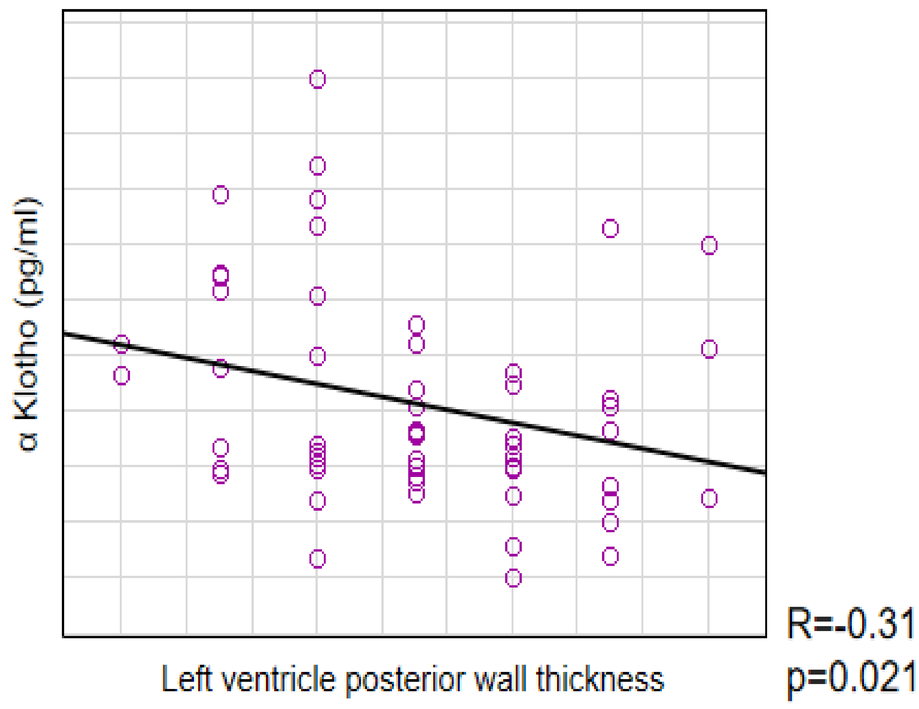
## Results

SIRT1 level as well as renalase and NE was higher (28.42 vs 2.71 ng/ml, p<0.0001; 27.53±7.18 vs 3.86±0.73 µg/ml, p<0.001, 0,61 vs 0,39 ng/ml, p<0,05 respectively) while αKlotho and dopamine were lower (433.9 vs 756.63 pg/ml, p<0.0001; 57,38 vs 123,04 pg/ml, p<0,05, respectively) in HD comparing to control group. SIRT1 positively correlated with the time of HD. αKlotho negatively correlated with left ventricular posterior wall thickness. Renalase negatively correlated with age and residual renal function. αKlotho negatively correlated with NE. No correlation was found between renalase and anti-aging factors.

Relationship between Sirtuin1 and the time of hemodialysis




Relationship between αKlotho and left ventricular posterior wall thickness




## Conclusions

The elevated SIRT1, renalase and NE as well as lowered αKlotho concentration is associated with impaired kidney function. The decreased αKlotho level and it's negative correlation with NE may indicate the heart hyperthrophy and cardiac problem in maintained dialysis. Though, the role of renalase, SIRT1 and αKlotho as biomarkers/predictors of oxidative stress, inflammation and cardiovascular diseases in renal patients needs further examination.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