Comprehensive biomarkers of accelerated aging and mortality risk in end-stage renal disease

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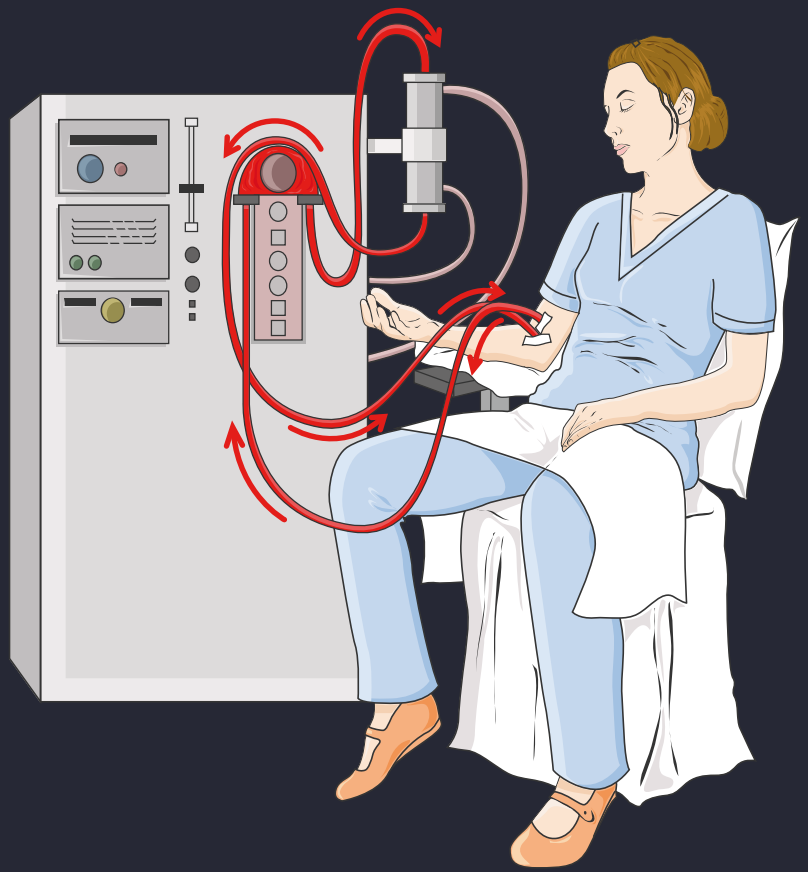


Motivation

- Accelerated aging is a process associated with the accumulation of harmful changes in the body and an increased risk of disease and death.
- Despite advances in the treatment of chronic kidney disease (CKD) and optimization of the hemodialysis process in end-stage renal disease (ESRD), morbidity and mortality in this group of people remain constantly high.
- Identification of markers of accelerated aging and mortality risk will allow finding possible interventions to increase the duration and improve the quality of life of patients.

Participations

50:50 Sex

24–89 Age

Total - 420 people: men and women aged 24 to 89 years.

Groups

- CONTROL
- ESRD

01

ELISA

To determine the concentration of FGF21, GDF15 and CXCL9

02

MILLIPLEX

Multiplex analysis of cytokines (46 biomarkers)

03

DNA methylation

Illumina Infinium Methylation EPIC BeadChip

04

Elastic Net regression model

To develop a model that can predict the chronological age

Acceleration of biological age in ESRD group

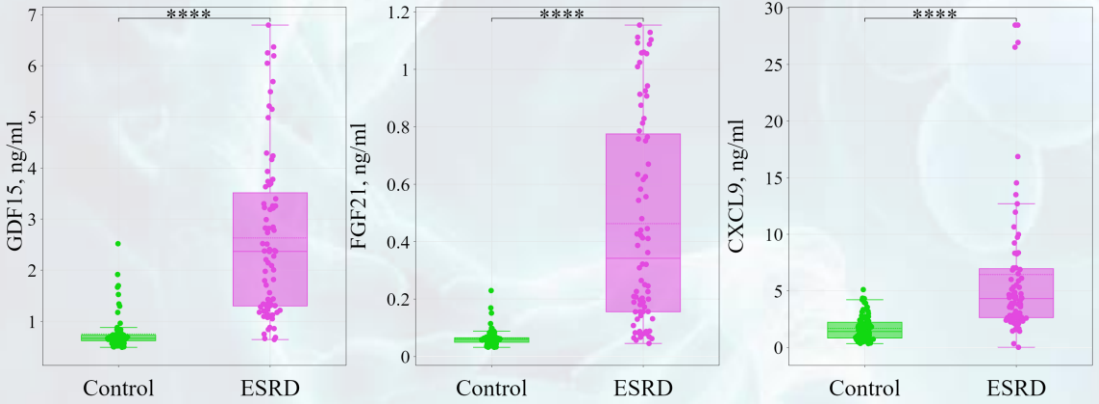
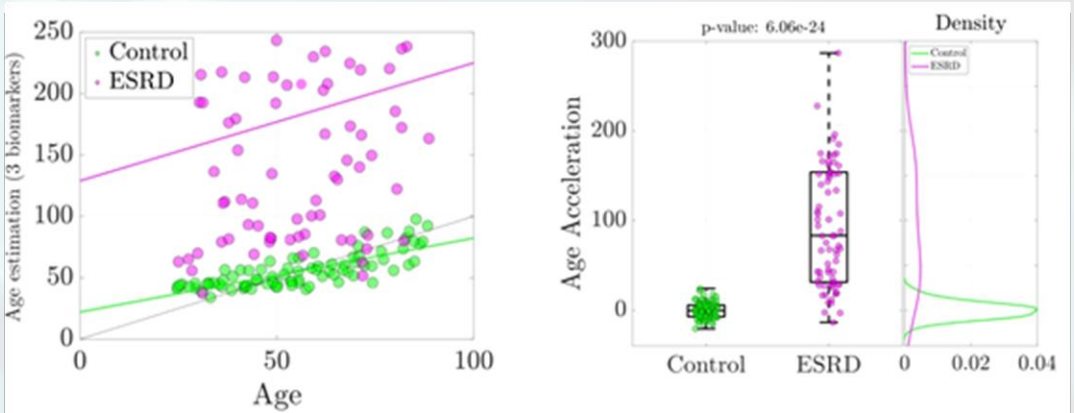


Fig. 1. Results of GDF15, FGF21 and CXCL9 biomarkers quantification in blood plasma in the control group and patients with end-stage CKD (ESRD);
****: p ≤0,0001 (Mann-Whitney test)

Fig. 2. Age-Estimation Clock in the control group and the ESRD group. Left: estimated age (color circles) and linear regression fits (color lines) against chronological age for both groups. Right: age acceleration defined as the difference between the Age-Estimation Clock and chronological age for the control and ESRD groups (Mann-Whitney p-value $6.06*10^{-24}$).



One-year survival prognoses in ESRD group

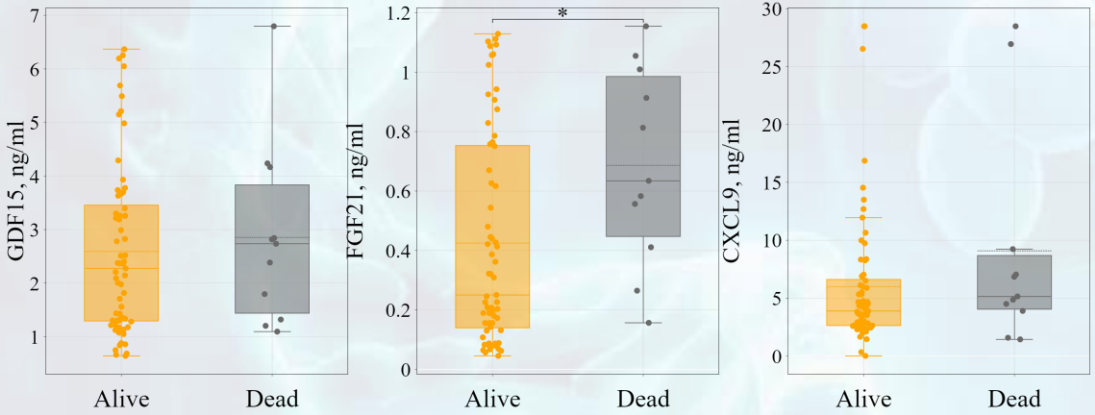
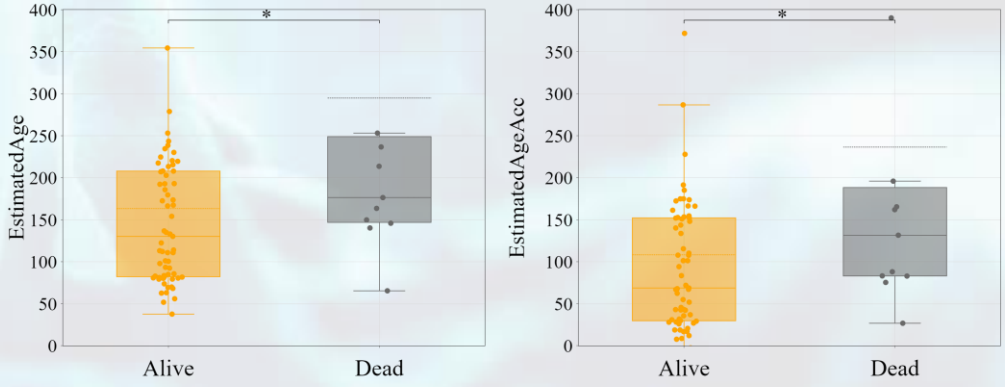


Fig. 3. Results of GDF15, FGF21 and CXCL9 biomarkers quantification in blood plasma in groups of patients with end-stage CKD (ESRD) with different disease outcomes;
*- p<0,05 (Mann-Whitney test)

Fig. 4. Age-Estimation Clock in the groups of alive and dead patients. Both estimated age and estimated age acceleration demonstrate significant difference between the groups;
*- p<0,05 (Mann-Whitney test)



Conclusion

These findings, together with the evidence on the high prognostic value of FGF21 as a risk of mortality factor in patients with ESRD, opens up the possibility of further improvement of the model's predictive value and the risk group identification.

Thanks!

Do you have any questions?

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