Impact of irisin, an exercise mimetic, in renal lipotoxicity

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BACKGROUND

Exercise training improves chronic kidney disease induced by obesity

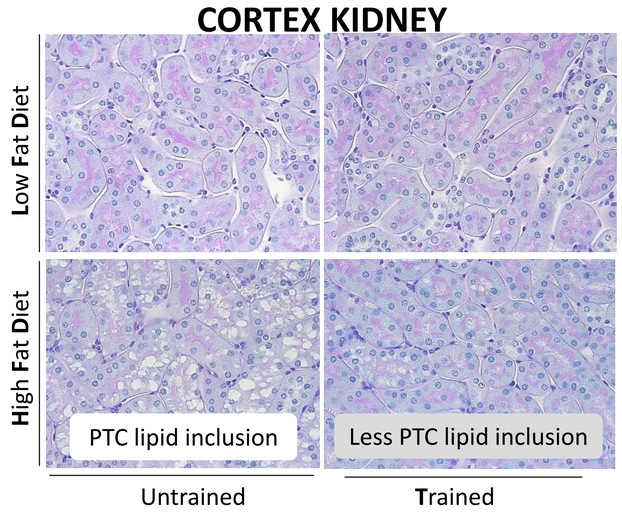
The growing increase of obesity intensifies the incidence of chronic kidney disease (CKD) across the world. Our group demonstrated that the AMP-activated protein kinase (AMPK) dysregulation is a key driver of the obesity-induced CKD progression.

Decleves AE et al., 2011
Decleves AE et al., 2014

Our lab developped an *in vivo* model of trained mice to activate AMPK.

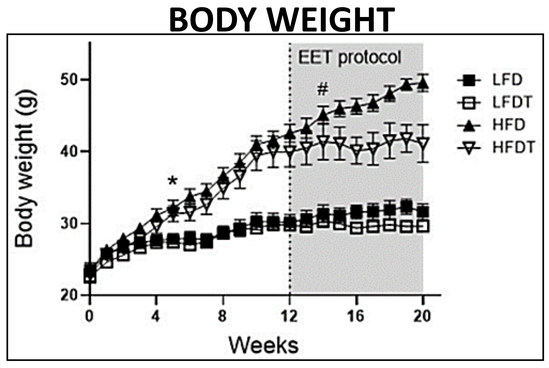
Juszczak F. et al., 2021

CORTEX KIDNEY

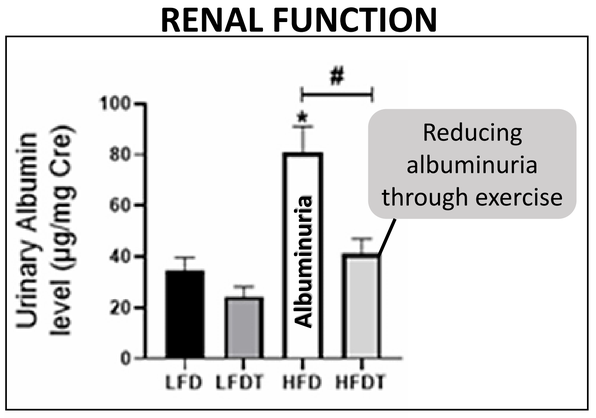


Cortex renal photomicrography colored with Periodic acid Shiff.
PTC for Proximal Tubular Cells

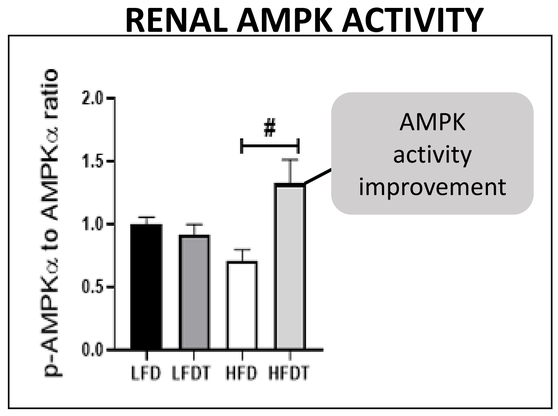
BODY WEIGHT



RENAL FUNCTION



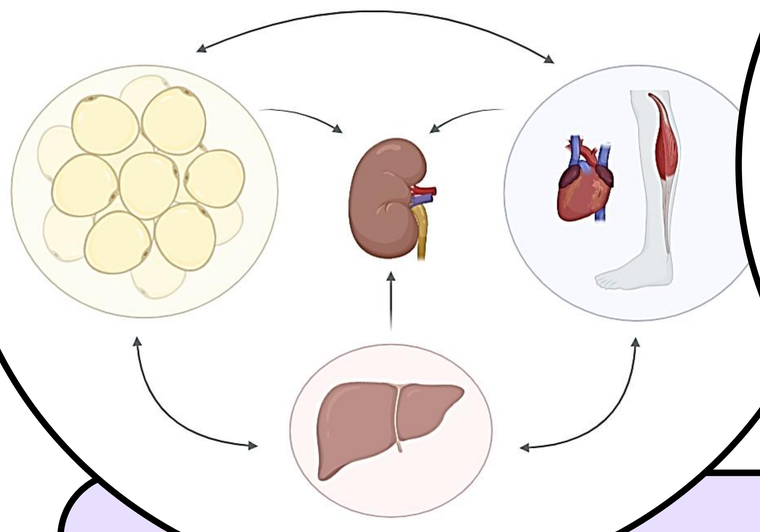
RENAL AMPK ACTIVITY



One way ANOVA followed by Newman-Keuls. * p ≤ 0.05 versus LFD, # p ≤ 0.05 versus HFD. n =6-8 in each group.

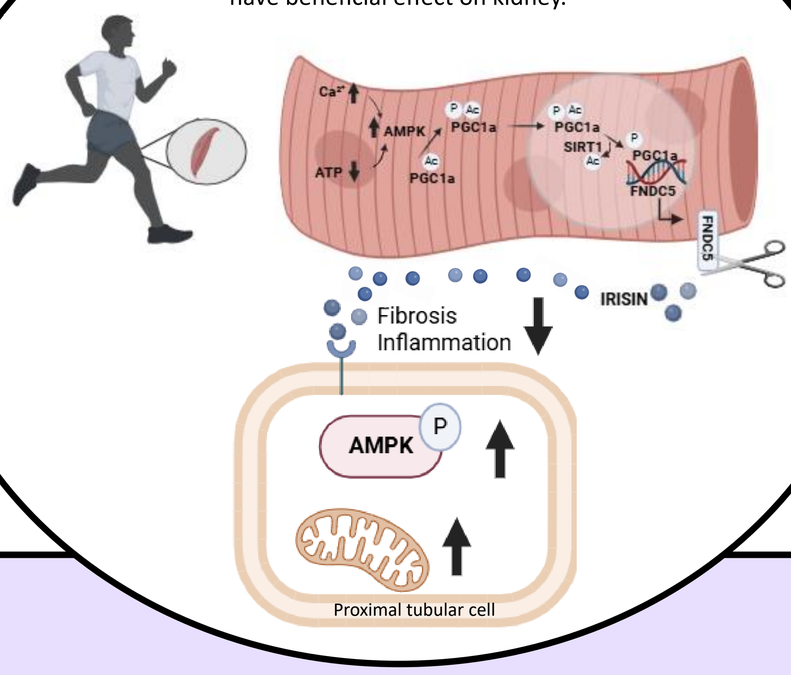
Organ Cross Talk

Organs communicate each other via organokine secretion. We hypothesize that myokines produced during exercise are involved in the beneficial effects of EET on renal impairments.



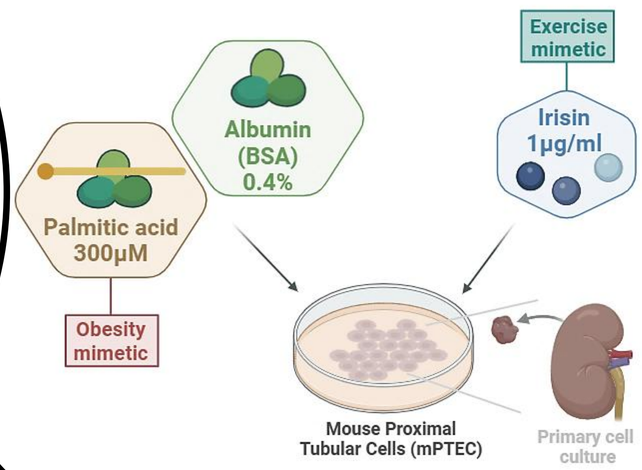
Irisin

Among myokines, irisin has been recently highlighted to have beneficial effect on kidney.



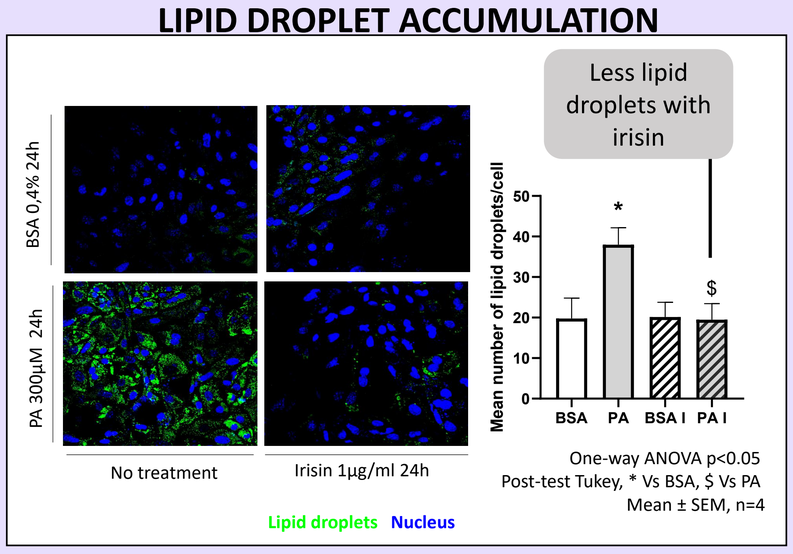
Materials and method

Primary proximal tubular epithelial cells (mPTEC) isolated from mouse kidneys are exposed to palmitic acid (PA) or its vehicle, with or without irisin treatment



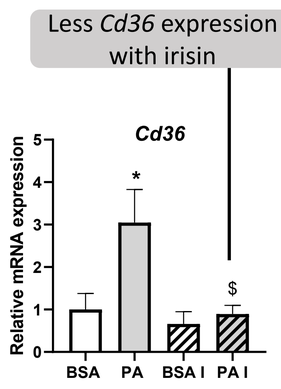
CURRENT DATA

LIPID DROPLET ACCUMULATION



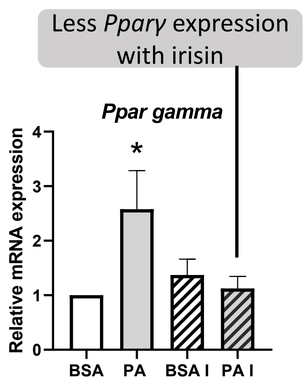
One-way ANOVA p<0.05
Post-test Tukey, * Vs BSA, $ Vs PA
Mean ± SEM, n=4

FATTY ACID TRANSPORTER



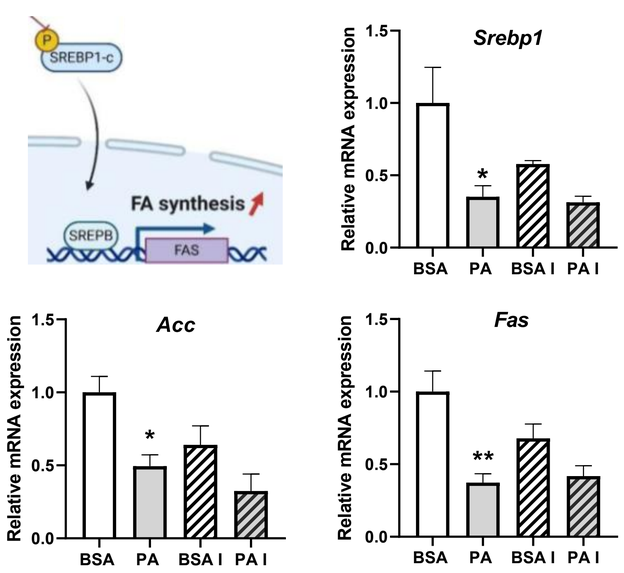
One-way ANOVA p<0.05
Post-test Tukey, * Vs BSA, $ Vs PA
Mean ± SEM, n≥4

Cd36 TRANSCRIPTION FACTOR



One-way ANOVA p<0.05
Post test Tukey, * Vs BSA,
p=0.0965 entre PA et PAI
Mean ± SEM, n≥8

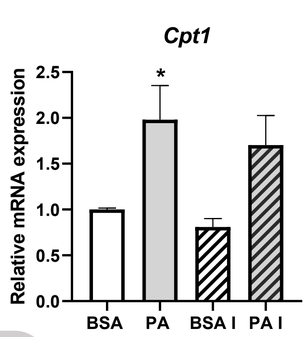
LIPOGENESIS



One-way ANOVA p<0,005 Post-test Tukey, * Vs BSA Mean ± SEM, n≥4

No lipogenesis and βoxidation gene expression variation with irisin

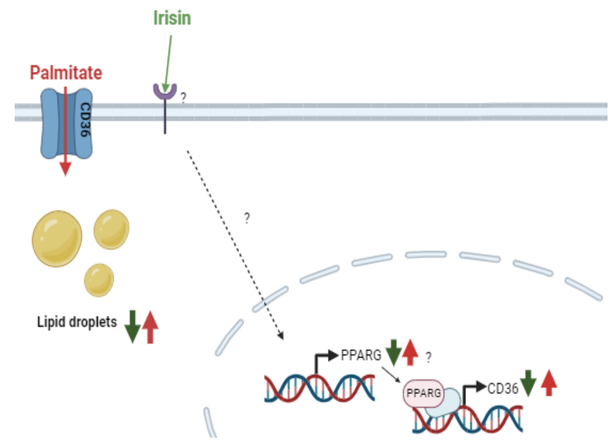
β OXIDATION



One-way ANOVA p<0,01
Post-test Tukey, * Vs BSA
Mean ± SEM, n=10

CONCLUSION

Overall, our findings suggest that irisin mitigates renal lipotoxicity, possibly by modulating PPAR-gamma/CD36 signaling.



PROSPECTS

- Elucidate the mechanisms of Irisin/ PPAR-gamma/CD36 signaling
- Analyze AMPK activation
- Invertigate mitochondrial function

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