

Hormone Variability, Lean Soft Tissue, and Muscle Quality Predict Variability in Adipose Tissue

Blood Flow in Perimenopausal Females.

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INTRODUCTION

- Perimenopause is marked by fluctuations in estrogen (E_2) and progesterone (P_4), which may contribute to alterations in body fat percentage (BF%), lean soft tissue (LST) and muscle quality assessed by echo intensity (EI) [1,2].
- Adipose tissue (AT) blood flow is a key determinant in regulating fat metabolism, influencing the balance between lipid mobilization (lipolysis) and deposition [3].
- Hormonal and body composition changes around perimenopause may impair AT blood flow and favor fat storage leading to reduced lipolysis and systemic fat oxidation, as indicated by lower glycerol and an elevated respiratory quotient (RQ), respectively [4].
- These alterations are important to understand as they can impact training outcomes, recovery, and body compositions goals in perimenopausal clients.

PURPOSE

- To examine the impact of E_2/P_4 ratio, BF%, LST, RQ, and muscle quality on AT blood flow and glycerol concentrations in perimenopausal females.

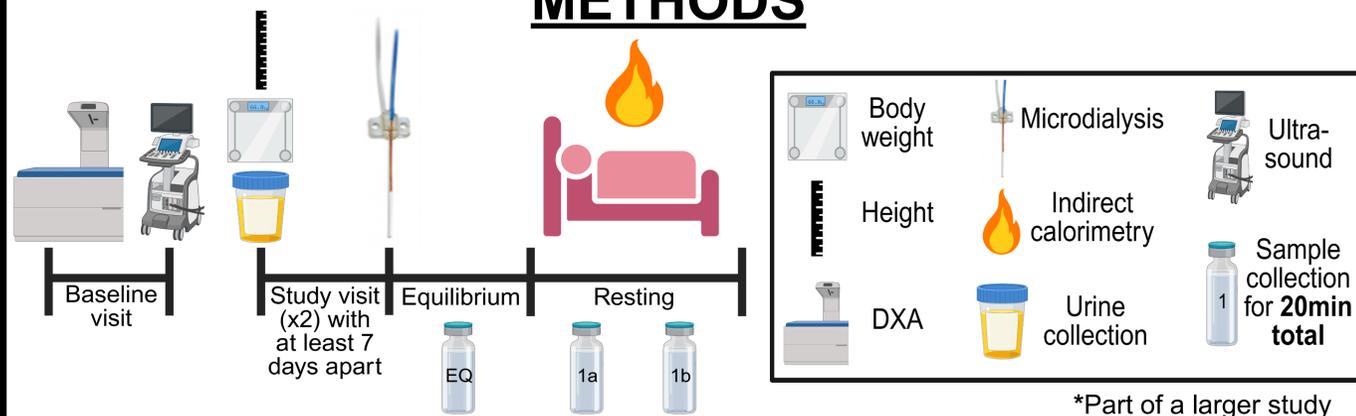
PARTICIPANTS

- 9 perimenopausal females (age: 49 ± 5 years; BMI: 31.6 ± 3.31 kg/m²)
- ≥ 38 years; decrease in cycle regularity or no menstrual bleeding in the previous 3 months with some bleeding in the previous year.

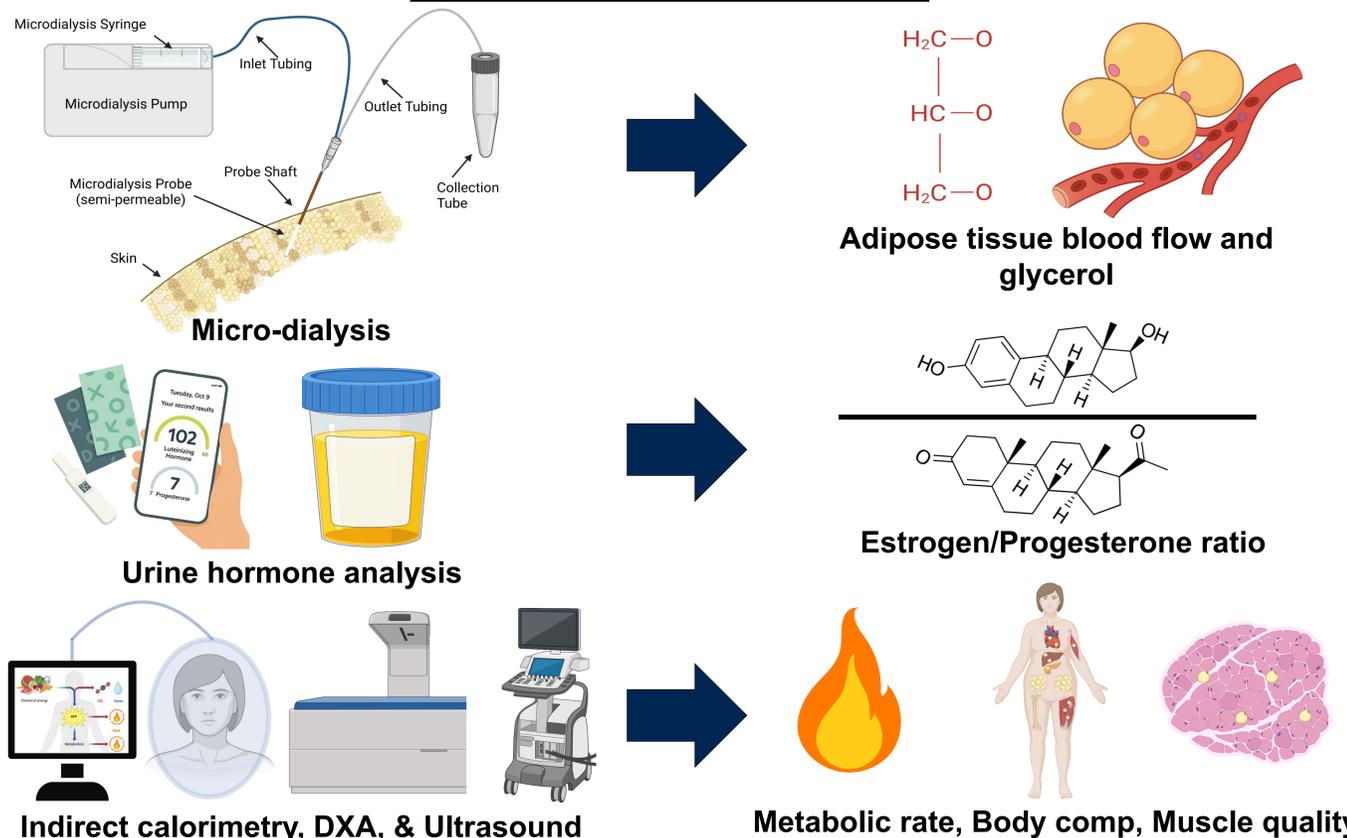
PRACTICAL APPLICATION

Improving lean soft tissue and muscle quality may help regulate adipose tissue blood flow at rest during perimenopause, despite hormonal fluctuations. However, additional factors likely influence lipolysis, highlighting the need for targeted exercise and nutrition strategies.

METHODS



STUDY OUTCOMES



RESULTS

- AT blood flow was negatively associated with E_2/P_4 (Figure 1). Pearson correlations examined associations between study outcomes.

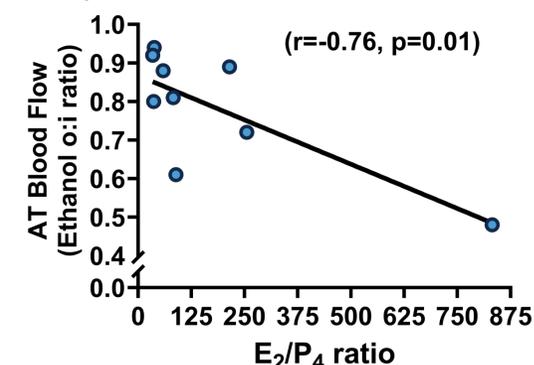


Figure 1. Relationship between estradiol-to-progesterone (E_2/P_4) ratio and adipose tissue (AT) blood flow. Pearson correlations were used to examine associations between E_2/P_4 ratio and AT blood flow with age as a covariate.

- LST, muscle quality, and E_2/P_4 variability were significant predictors of AT blood flow variability between visits (Figure 2).

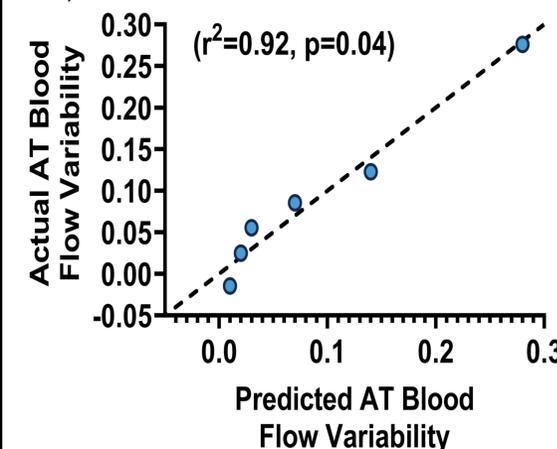


Figure 2. Actual versus predicted AT blood flow variability across study visits. A multiple linear regression model was used to determine the relationship between predicted and observed AT blood flow variability, with LST, muscle quality (echo intensity), and E_2/P_4 ratio variability included as significant predictors.

- AT glycerol concentrations were not significantly associated with any outcome variable ($p > 0.05$).

CONCLUSIONS

These data show that greater AT blood flow was associated with a lower E_2/P_4 ratio. AT blood flow variability was predicted by LST, EI, and E_2/P_4 ratio variability. However, AT glycerol concentrations were not significantly predicted by any of the examined variables.

REFERENCES

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