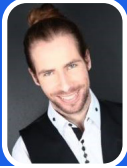


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Metabolomic biomarker candidates for skeletal muscle loss in collagen-induced arthritis (CIA) model

Statement of the Problem: There is no consensus on the diagnosis or treatment of RA muscle loss. We aimed to investigate metabolites in arthritic mice urine as biomarkers of muscle loss.

Methodology & Theoretical Orientation: DBA1/J mice comprised collagen-induced arthritis (CIA) and control (CO) groups. Urine samples were collected at 0, 18, 35, 45, 55, and 65 days of disease and subjected to nuclear magnetic resonance spectroscopy. Metabolites were identified using Chenomx and Birmingham Metabolite libraries. The statistical model used principal component analysis, partial least-squares discriminant analysis, and partial least-squares regression analysis. Linear regression and Fisher's exact test via the MetaboAnalyst website were performed (VIP-score).

Findings: Nearly 100 identified metabolites had CIA vs. CO and disease time-dependent differences ($p < 0.05$). Twenty-eight metabolites were muscle-associated: carnosine (VIPs 2.8×10^2) and succinyl acetone (VIPs 1.0×10) showed high importance in CIA vs. CO models at day 65; CIA pair analysis showed histidine (VIPs 1.2×10^2) days 55 vs. 65, histamine (VIPs 1.1×10^2) days 55 vs. 65, and L-methionine (VIPs 1.1×10^2) days 0 vs. 18. Carnosine was fatigue- (0.039) related, creatine was food intake- (-0.177) and body weight- (-0.039) related, and both metabolites were clinical score- (0.093; 0.050) and paw edema- (0.125; 0.026) related.

Conclusion & Significance: Therefore, muscle metabolic alterations were detected in arthritic mice urine, enabling further validation in RA patients' urine, targeting prognosis, diagnosis, and monitoring of RA-mediated muscle loss.

Recent Publications

1. Correa LB (2022) Protective effect of methyl gallate on murine antigen-induced arthritis by inhibiting inflammatory process and bone erosion. *Inflammopharmacology*. Online ahead of print.
2. Alabarse PVG (2021) Metabolomic Biomarker Candidates for Skeletal Muscle Loss in the Collagen-Induced Arthritis (CIA) Model. *Journal of Personalized Medicine* 26;11(9):837.
3. Soares MPR (2019) The use of apocynin inhibits osteoclastogenesis. *Cell Biology International* 43(5):466-475.

Biography

Paulo Vinicius Gil Alabarse has expertise in rheumatoid arthritis and related muscle loss, as well as osteoarthritis. His research focuses on searching for novel drugs for the treatment of osteoarthritis and search for a metabolic biomarker of muscle loss targeting diagnosis, follow-up, and treatment response to improve individual disease progress and treatment response.

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