Urine metabolic profile in rheumatoid arthritis development
Schrader de Oliveira, Marianne; Bartikoski, Barbara; de Souza Silva, Jordana; Cavalheiro do Espirito Santo, Rafaela; Young, Stephen; Xavier, Ricardo

License: Creative Commons: Attribution-NonCommercial (CC BY-NC)

Document Version
Peer reviewed version

Citation for published version (Harvard):

Link to publication on Research at Birmingham portal

Publisher Rights Statement:
Checked for eligibility: 31/07/2019

This article has been accepted for publication in Annals of the Rheumatic Diseases, 2019 following peer review, and the Version of Record can be accessed online at: http://dx.doi.org/10.1136/annrheumdis-2019-eular.6086
© Author(s) (or their employer(s)) 2019. Reuse of this manuscript version (excluding any databases, tables, diagrams, photographs and other images or illustrative material included where a another copyright owner is identified) is permitted strictly pursuant to the terms of the Creative Commons Attribution-Non Commercial 4.0 International (CC-BY-NC 4.0) http://creativecommons.org

General rights
Unless a licence is specified above, all rights (including copyright and moral rights) in this document are retained by the authors and/or the copyright holders. The express permission of the copyright holder must be obtained for any use of this material other than for purposes permitted by law.

• Users may freely distribute the URL that is used to identify this publication.
• Users may download and/or print one copy of the publication from the University of Birmingham research portal for the purpose of private study or non-commercial research.
• Users may use extracts from the document in line with the concept of 'fair dealing' under the Copyright, Designs and Patents Act 1988 (?)
• Users may not further distribute the material nor use it for the purposes of commercial gain.

Where a licence is displayed above, please note the terms and conditions of the licence govern your use of this document.

When citing, please reference the published version.

Take down policy
While the University of Birmingham exercises care and attention in making items available there are rare occasions when an item has been uploaded in error or has been deemed to be commercially or otherwise sensitive.

If you believe that this is the case for this document, please contact UBIRA@lists.bham.ac.uk providing details and we will remove access to the work immediately and investigate.
Urine Metabolic Profiles in Rheumatoid Arthritis Development

Marianne Schrader de Oliveira, Paulo Vinicius Alabarse, Rafaela Cavalheiro, Stephen Peter Young, Ricardo Machado Xavier

Abstract

Introduction: Rheumatoid arthritis (RA) is a chronic inflammatory disease characterized by increased mortality and associated with metabolic disorders including dyslipidaemia, insulin resistance and cachexia. Since the metabolomic profile is known to vary in response to different inflammatory conditions, metabolite analysis could substantially improve diagnosis and prognosis.

Objective: To analyse the urine metabolic profile and assess its correlation with body composition parameters and disease activity of RA patients.

Methods: Seventy-nine RA patients, according to ACR/EULAR 2010 classification criteria, aged between 40 and 70 years, were recruited and followed for 12 months. Disease activity, body composition, fatigue and urine metabolome were measured. Body composition was assessed by total body dual-energy x-ray absorptiometry (DXA) for measurement of appendicular lean mass index (ALMI). Disease activity was assessed by Disease Activity Score-28 (DAS28) with erythrocyte sedimentation rate (ESR). Fatigue as assessed by the Functional Assessment of Chronic Illness Therapy (FACIT). Nuclear Magnetic Resonance (NMR) spectroscopy measurements were performed to evaluate the profile of metabolic changes during the disease development, resulting in the identification of 48 metabolites in urine collected at the baseline and after one year. Frequency analysis, Pearson Correlation and Multivariate data analysis with orthogonal projections to latent structures (OPLS) method were performed and a statistical significance was considered as p<0.05.

Results: The study population was characterized by the majority of women (86.7%), mean age 56 years old, around 80% with anti-CP and Rheumatoid Factor reagent. During the one year of follow-up, there was no huge substantial variation in the DAS28 measurement (baseline: 3.8, after 12 months: 4.0). It is for this reason, we believe that we could not find any significant correlation between the metabolome pattern and DAS28 score (p>0.05). However, there was a significant increase of methyl-histidine, creatinine, L-serine and urea by during the development of the disease, metabolites that are involved in the muscular metabolism pathways. Fatigue was positively correlated with L-serine/creatinine (r: -0.4, p<0.001). Appendicular lean mass index (ALMI) also presented a difference when correlated to the increase of urea and creatinine (r: 0.3, p<0.019).

Conclusion: The potential biomarkers indicated that the RA metabolic disturbance might be associated with inflammation, injury, fatigue and amino acid metabolism. These findings suggest that urine metabolome analysis may be an interesting approach to monitoring rheumatological disease related to RA.
to muscle changes and fatigue, which are of major concern to patients, and this that could be more-further explored in future trials studies.