Fatty acid binding protein 3 (FABP-3) is a potential mediator of muscle damage in inflammatory myopathies and its serum level decreases in response to a combined exercise program.

Léa Debrut[1, 2], Quentin Toumazeau[1], Giulia Quiring[1], Pauline Silverstrin[1], Alizée Heit[1], Anne-Laure Charles[1], Bernard Geny[1, 3], Alain Meyer[1, 4], Margherita Giannini[1, 4]

[1] *UR3072 Research Centre of Biomedicine Strasbourg, University of Strasbourg, France*
,
[2] *Faculty of Sport Sciences, European Centre for Education, Research and Innovation in Exercise Physiology (CEERIPE), University of Strasbourg, Strasbourg, France*
,
[3] *Physiology and Function Explorations Department, Strasbourg University Hospitals, Strasbourg, France*
,
[4] *Physiology and Muscle Function Explorations Department, Referral Centre for Systemic Rare Autoimmune Diseases, Strasbourg University Hospitals, Strasbourg, France*

Introduction

Inflammatory myopathies (IM) are autoimmune diseases characterized by chronic skeletal muscle inflammation and weakness. In most patients, muscle weakness persists despite low disease activity under immunosuppressants. This condition, referred to as “damage”, is associated with increased disability, and lacks both biomarker and effective pharmacological treatment.

Combined aerobic and resistance exercise (CARE) program improve muscle strength, exercise capacity and quality of life in patients with IM-damage, but the underlying mechanisms remain unclear.

We recently demonstrated that elevated FABP3 serum levels correlated with International Myositis Assessment & Clinical Studies Group (IMACS) muscle damage scores in patients with IM-damage, suggesting a role for FABP3 in the pathophysiology of damage and its potential utility as a biomarker.

Therefore, this study aims to investigate whether a CARE program in patients with IM-damage modifies circulating FABP3 levels.

Methods

Fifty patients with IM-damage were prospectively enrolled in a 12-week CARE program consisting of 3 sessions/week. Each session included 30min of aerobic exercise (70% of VO2max), followed by 20min of resistance exercise (30-40% of maximal strength).

FABP3 serum levels, measured by enzyme-linked immunosorbent assay, were assessed at baseline and after the completion of the training program, along with patient-related outcomes (PRO: perceived fatigue assessed by PROMIS-7 questionnaire, perceived physical disability assessed by PROMIS-20, and disability assessed by the Health Assessment Questionnaire

[HAQ]), exercise capacity (VO2max during an incremental ramp cycling exercise on an ergometer and walking distance during the 6-minute walk test), muscle strength (MMT-8 and grip strength assessed using a hand-held dynamometer), and myositis-related damage (assessed using the Myositis Damage Index [MDI] validated by IMACS).

Results

Twenty-five patients already completed the protocol. Training significantly improved PROMIS-7 score, exercise capacity, and muscle strength, while reducing FABP3 serum levels (Δ=-425.6±829.3pg/mL, p=0.025). MDI severity and extent scores did not change after training

FABP3 serum levels correlated with (i) patient-reported outcomes (PROMIS20: R=0.38 ; p<0.01 and HAQ: R=0.38 ; p<0.01), (ii) exercise capacity (VO2max: R=-0.39 ; p<0.01 and 6-min walk test: R=-0.53 ; p<0.0001), (iii) muscle strength (MMT-8: R=0.32 ; p<0.05 and grip strength: R=-0.44 ; p<0.05), and (iv) muscle extent and severity MDI (both R=0.52, p<0.05).

Conclusions

FABP3 serum levels is a biomarker of IM-related muscle damage, and its reduction is associated with the response to a CARE program. Knowing the role of FABP3 in the transport of fatty acids to mitochondria, this myokine might contribute to the pathophysiology of IM-related damage.
Topic/s: Exposome
