Cranberry-derived proanthocyanidins improve grip strength and balance in a dyslipidemic rodent model

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Introduction

- Cardiovascular disease (CVD) is the leading cause of mortality worldwide and can be debilitating on functional capacity (FC)[1]
- FC is the ability to perform activities of daily living and integrates the health of the cardiovascular, skeletal muscle and pulmonary systems[2]
- Diet and exercise can improve FC in patients with CVD[3]

Hypothesis & Objectives

We hypothesize that chronic consumption of A-type proanthocyanidins (PAC-1) will improve strength, aerobic endurance, and balance/motor coordination in a dyslipidemic rodent model.

Therefore, our aim was to Investigate the effect of 4 weeks of chronic PAC-1 consumption on:

- Grip strength
- Dynamic muscular endurance
- Aerobic endurance
- Balance and motor coordination

Sources

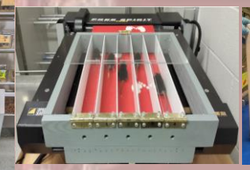
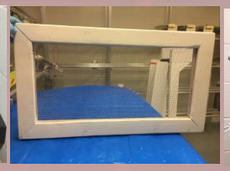
1. Beverly & Budoff, 2020
2. Arena et al, 2007
3. Tang et al, 2014

Materials and methods

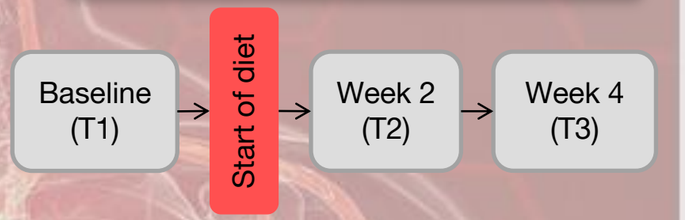
Mice
- ApoE -/-
- 12-16 m/o; males

Diets
- CON: high-fat diet (HFD); 60% total calories coming from fat
- EXP: HFD + PAC-1 (0.035 mg PAC-1/day)

Functional Tests
- Grip strength: wire hang test → max hanging time (in mins)
- Dynamic muscular endurance: climbing test → total time to complete 5 ascents (in s)
- Aerobic endurance: rodent treadmill test → time to exhaustion at 17 m/s (in mins)
- Balance and motor coordination: rotarod test → time to failure (in mins)

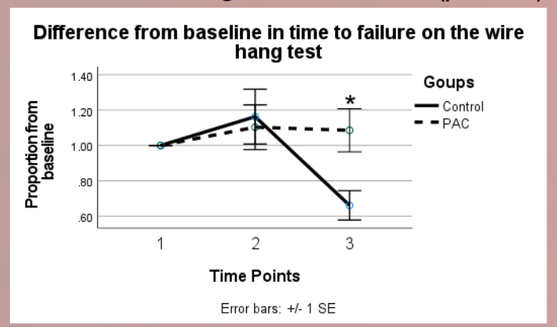




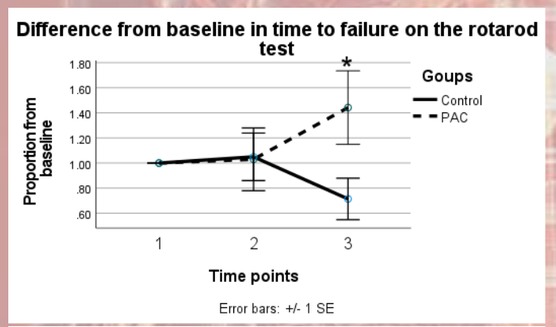

Timeline

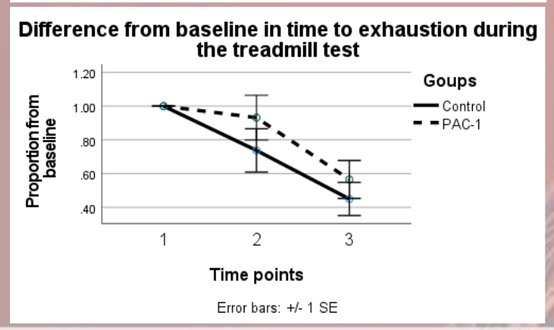


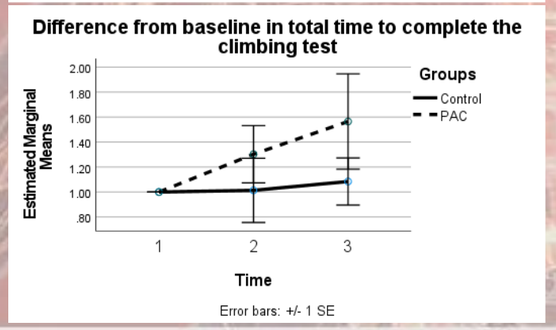
Results

- Scores on the wire hang test and on the rotarod test improved by 50% and 40%, respectively, in the EXP group after 4 weeks. ($p<0.05$)
- No changes were observed for any functional test after 2 weeks and for the treadmill and climbing test at week 4 ($p>0.05$)









Conclusions

- PAC-1 supplementation significantly improves strength and motor control
- Our data suggest that a longer exposure time is required to observe benefits on functional capacity, which implies that PAC-1 may modulate metabolic and neuromuscular changes over time

For further information

More information on this and related projects can be obtained from Francis Parenteau at Concordia University, 7141 Sherbrooke St W, Montreal, QC, H4B 1R6
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