DETRIMENTAL EFFECT OF LARD-BASED DIET ON MITOCHONDRIAL RESPIRATORY CHAIN COMPLEXES AND OXIDATIVE STRESS

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Background: Animal-based fat have been suggested to adversely affect of myocardial function, however its effect on mitochondrial energetics and oxidative stress has not been fully characterized.

Methods: We assessed the effect of a non-lard based (NLBD: PicoLab Rodent Diet 20, 5053; containing unsaturated fatty acids from plants and fish) and lard-based (LBD: OpenSource Diet, D12450B consisting of saturated and monounsaturated fatty acids) diets on mitochondrial function and oxidative stress in ventricular myocardium from mice (1 month old male C57BL/6J). Both diets were similar in calories derived from proteins (20-23% of total energy); carbohydrates (65-70%), and fat (10-12%).

Results: After 10 weeks, the weight of LBD fed mice was greater than NLBD (32.14±2.87 vs. 26.50±1.29 g, p<0.05) and the activities of myocardial electron transport chain complexes I (p<0.05), III (p<0.05), I-III, (p<0.01), and IV (p<0.001) were significantly reduced (Fig.1 A, B). There were no differences in complex II, II-III, V, and citrate synthase (CS) activities (Fig.1 A, C). The changes in mitochondrial enzymes activities were accompanied by increased malondialdehyde (MDA) levels (p<0.001) (Fig.1 D), a lipid peroxidation product and a marker of oxidative stress.

Conclusions: Thus, the composition and not necessarily the amount of dietary fat influence myocardial energetics and oxidative stress with the potential for adverse effects on myocardial function.