Introduction

Epilepsy is the fourth most common neurological disorder in the US impacting ~1% of the population and of those, 30% are resistant to traditional drug treatments, a condition known as refractory epilepsy. One of the oldest alternative treatment options is the Ketogenic diet (KD). The specific mechanism behind the KDs success remains ambiguous, however current research suggests it functions through a metabolic switch of the main fuel sources from carbohydrates to fatty acids. The findings of this study further support the importance of considering liver metabolism as the metabolic dynamics of epilepsy continue to be studied and may uncover metabolic targets which could be used to develop more effective treatment options for refractory epilepsy.

Methods

Liver samples were extracted from mice in the conditions displayed to the left, and then analyzed using GC-TOF-MS. Mice were fed milk derived exosomes in accordance with their group.

Fig. 1. Ven diagram showing ANOVA results considering interactions (top) and the corresponding heatmap results (bottom) for both brain (A) and Liver (B) analysis.

Fig. 2. Heatmap results for pairwise analysis of brain (A) and liver (B) data. Variable controlled stated in lower right-hand corner of each heatmap (4 for each organ). Heatmap results based on T-Test analysis results.

Conclusions

• Our analysis demonstrates significant changes associated with seizure presence across liver and brain samples
• Results of comparison across pairwise results reveal proteins of high interest for focused analysis
• These results indicate possible presence of metabolic targets for future analysis
• Future research will continue with pathway analysis of current results
• Future research will also compare previous metabolic analysis with current proteomic analysis
• Future research could further investigate these metabolic targets for development of new treatment options