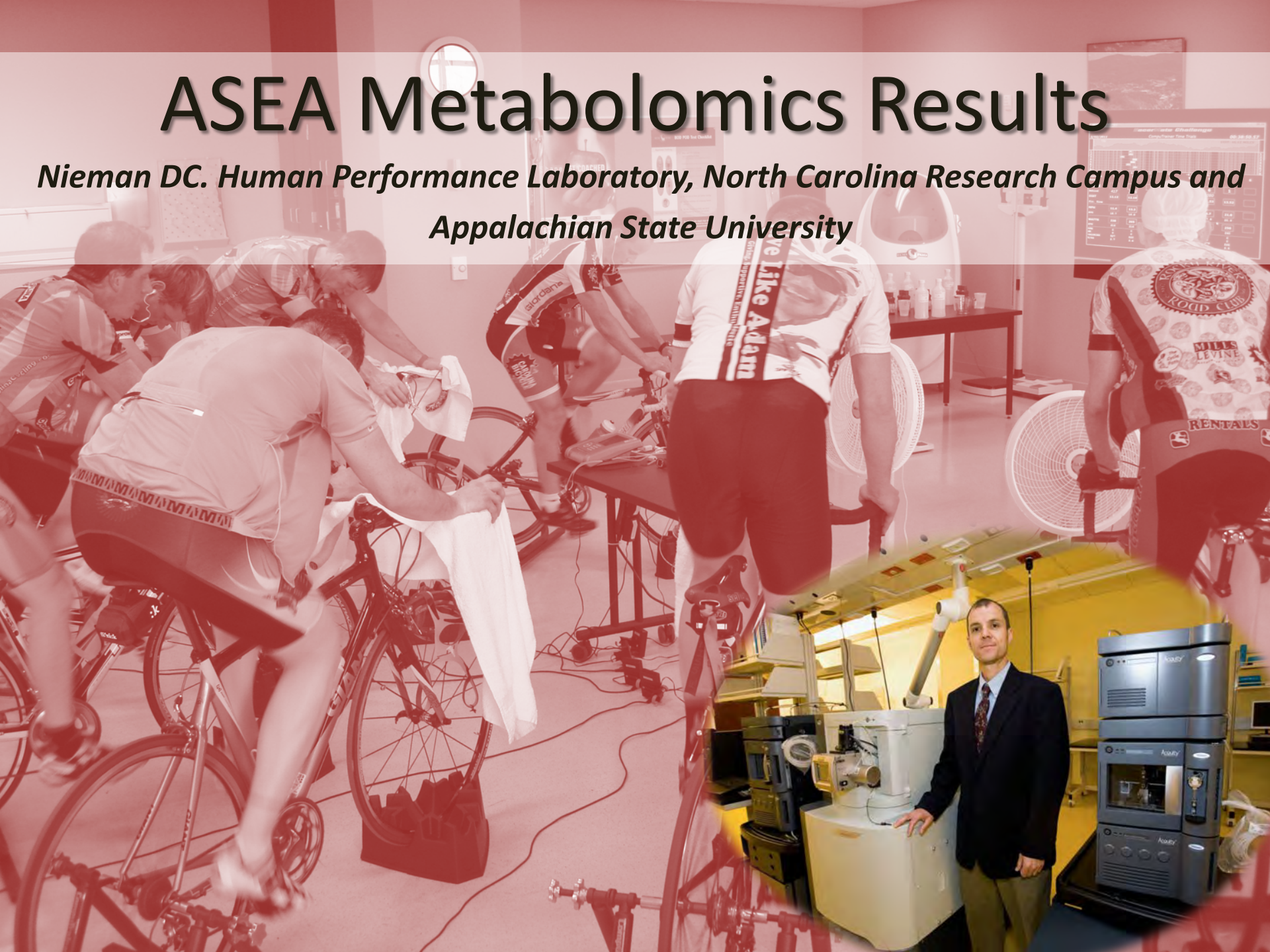
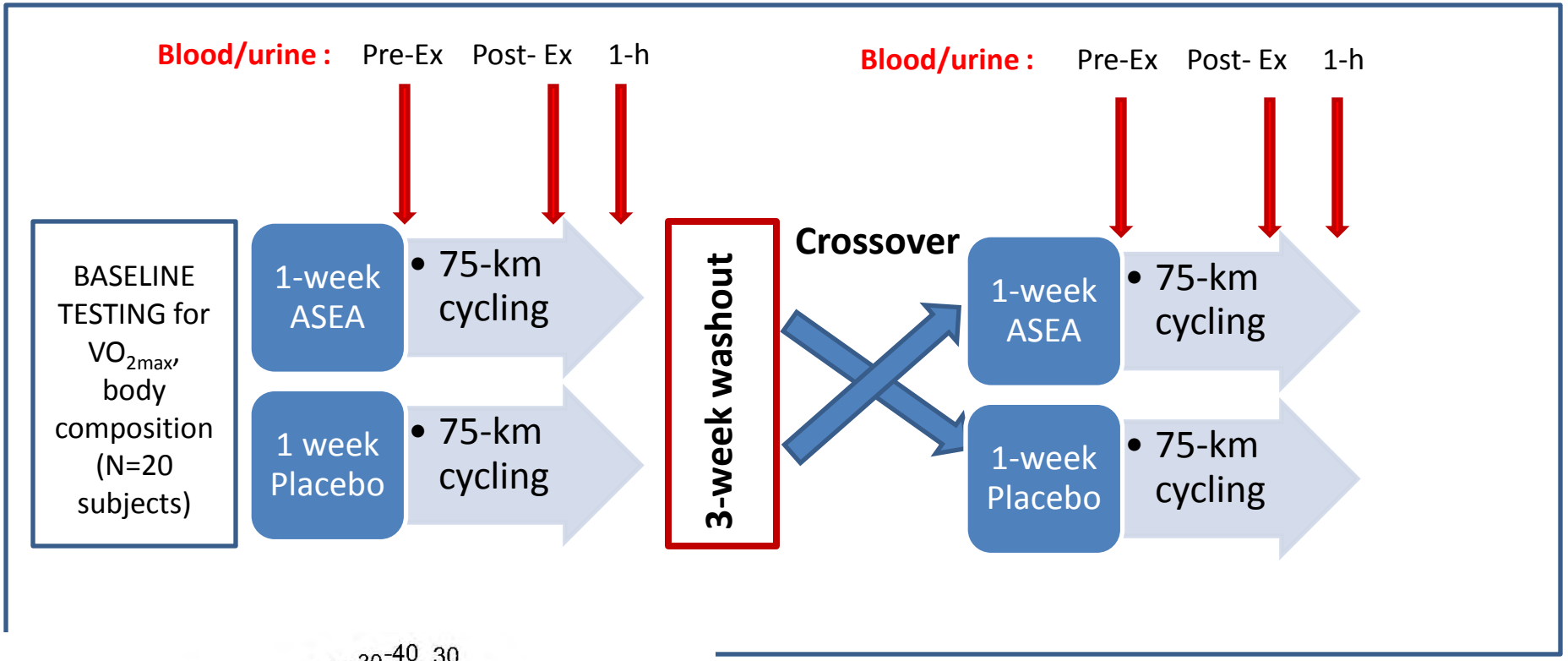
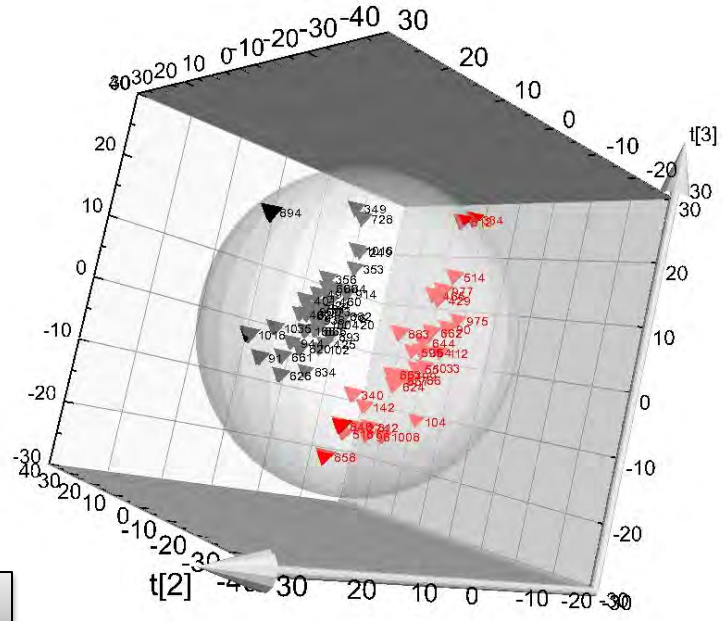
ASEA Metabolomics Results

Nieman DC. Human Performance Laboratory, North Carolina Research Campus and Appalachian State University



Metabolomics Laboratory, North Carolina Research Campus, David H. Murdock Research Institute





Metabolomics: Goal is to measure the influence of ASEA on small molecules (metabolites) that shift in response to supplementation. The shift in metabolites, depending on the nutritional product, may represent effects on inflammation, oxidative stress, and physiologic stress.

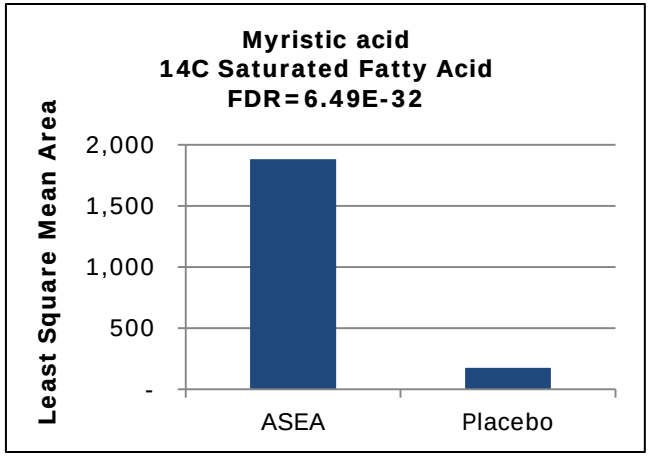
Slide 2

Working Summary

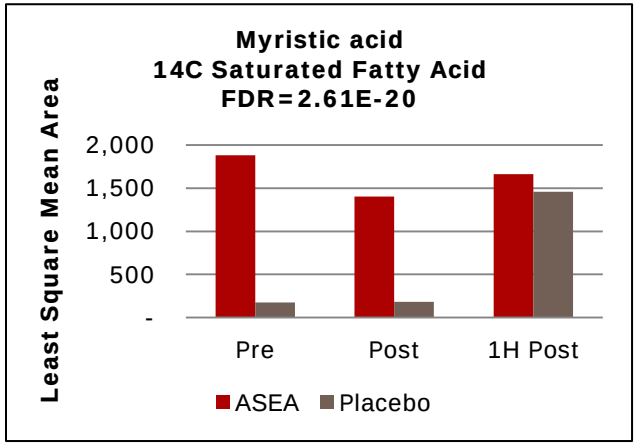
- Seven days ingestion of ASEA (relative to placebo) caused an extensive mobilization of free fatty acids from adipose tissue in male cyclists.
- Athletes on ASEA for 7-days started the 75-km cycling trial with high blood free fatty acids leading to increased fat oxidation and a sparing of amino acids (and potentially muscle glycogen).
- ASEA intake was associated with a large increase in serum ascorbic acid levels (probably from the adrenal cortex).
- Serum creatinine and urea also increased post-exercise.

<u>Finding 1:</u> Ingestion of ASEA beverage for one week strongly increased serum fatty acids levels (most likely from adipose tissue).

1) **Chronic Effect:** Higher fatty acid levels pre-exercise (several types of fatty acids --- see slides).



2) **Acute Effect:** Increased fatty acid oxidation and mobilization during exercise (placebo condition was linked to a late mobilization).

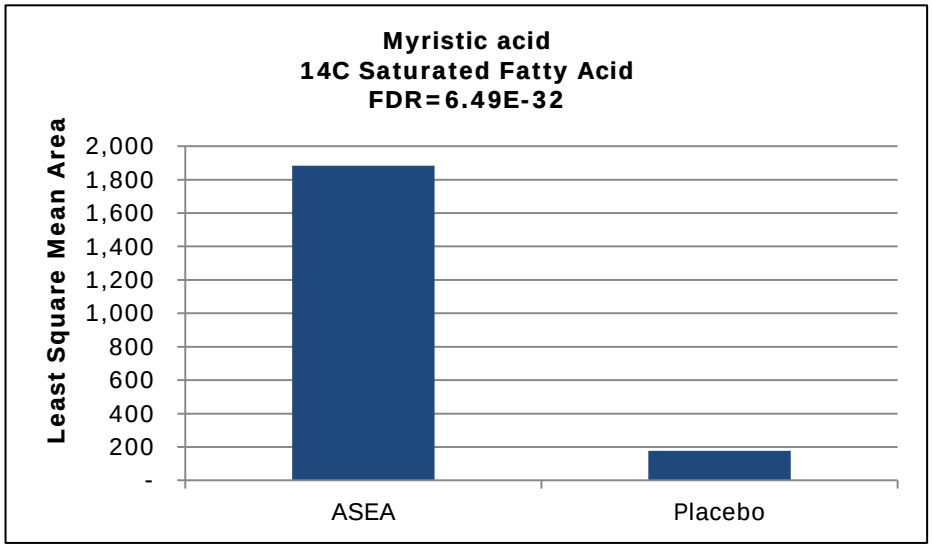


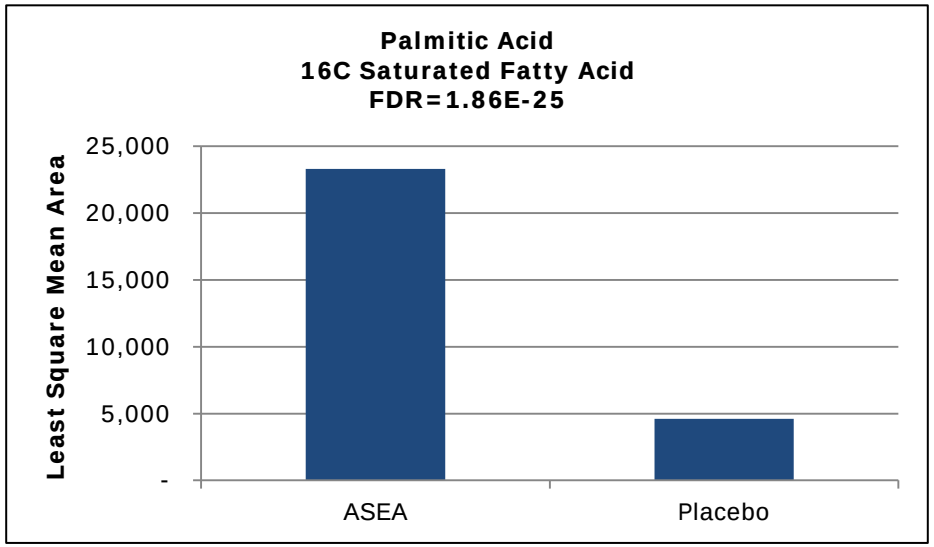
Triglyceride Mobilization: corresponding with the increase in free fatty acids, glycerol was higher at baseline (indicative of extensive adipose triglyceride hydrolysis).

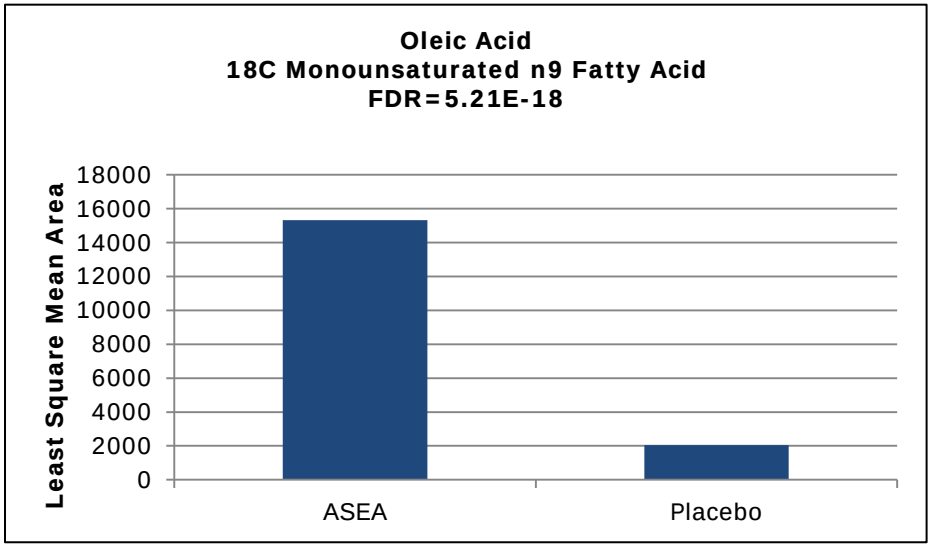
TG Hydrolysis

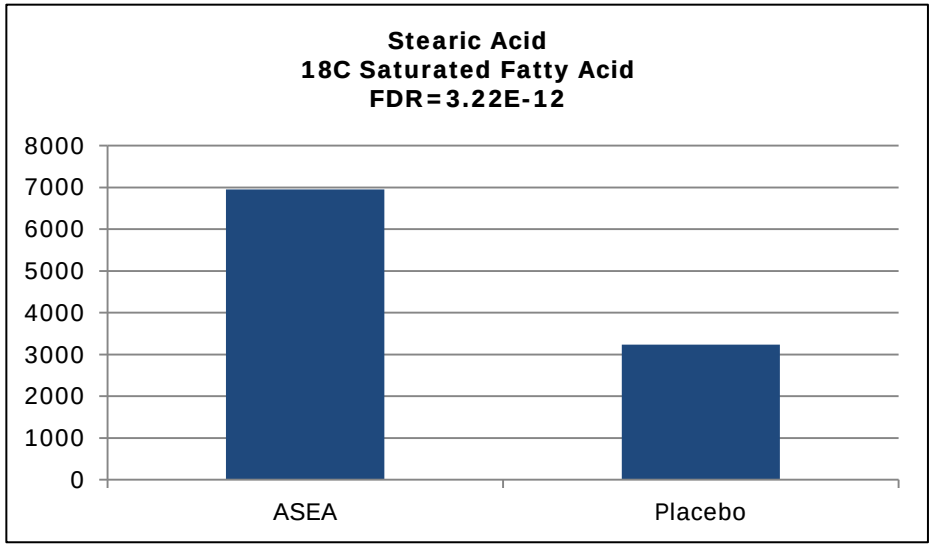
↑ FFAs + ↑ Glycerol with ASEA

Post 7-day Ingestion:
Fatty Acids Higher in ASEA vs. Placebo

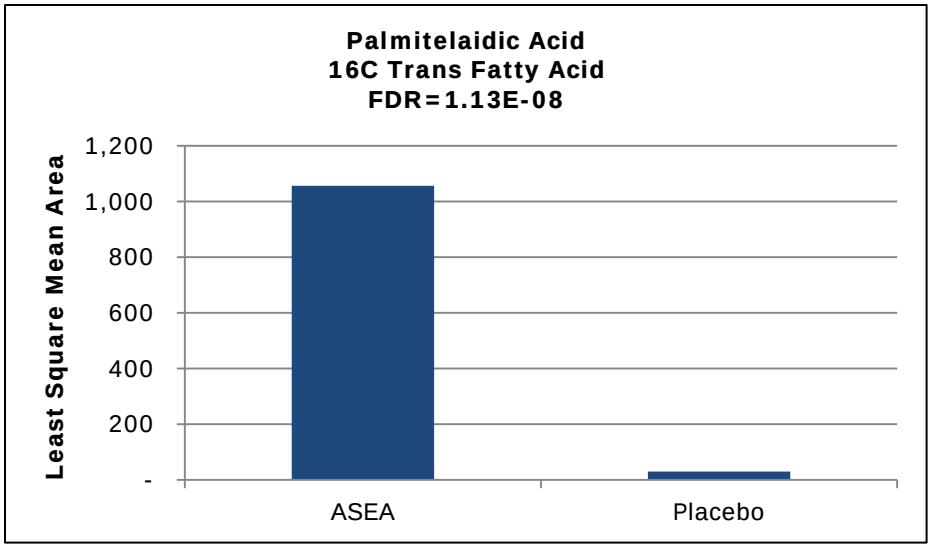


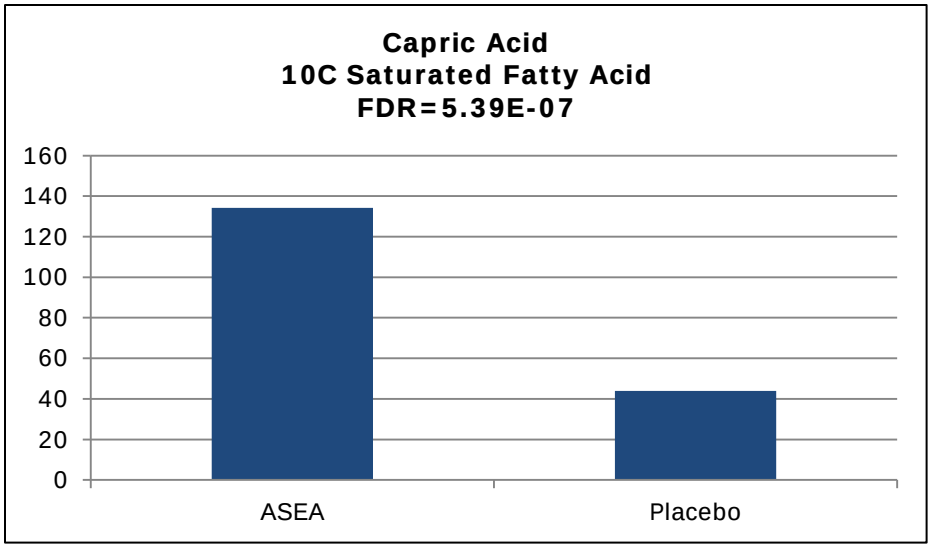


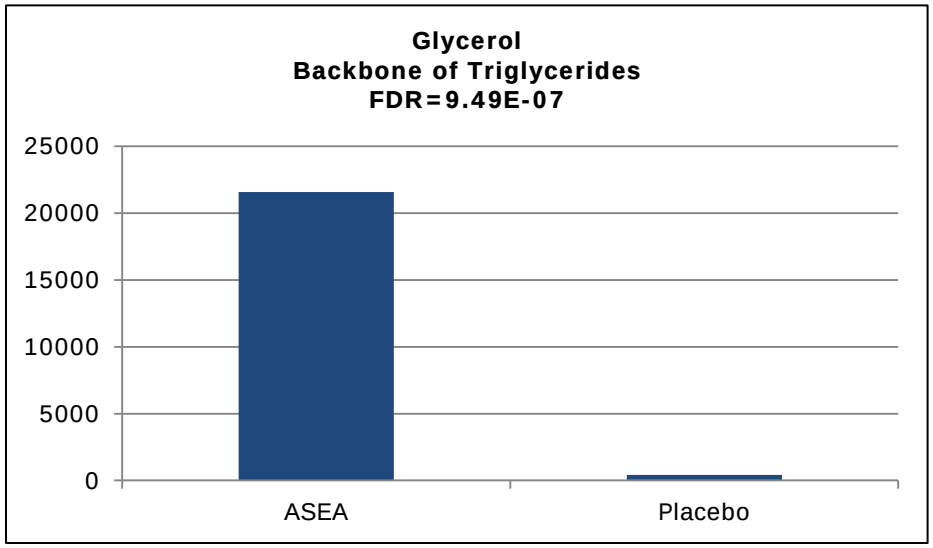




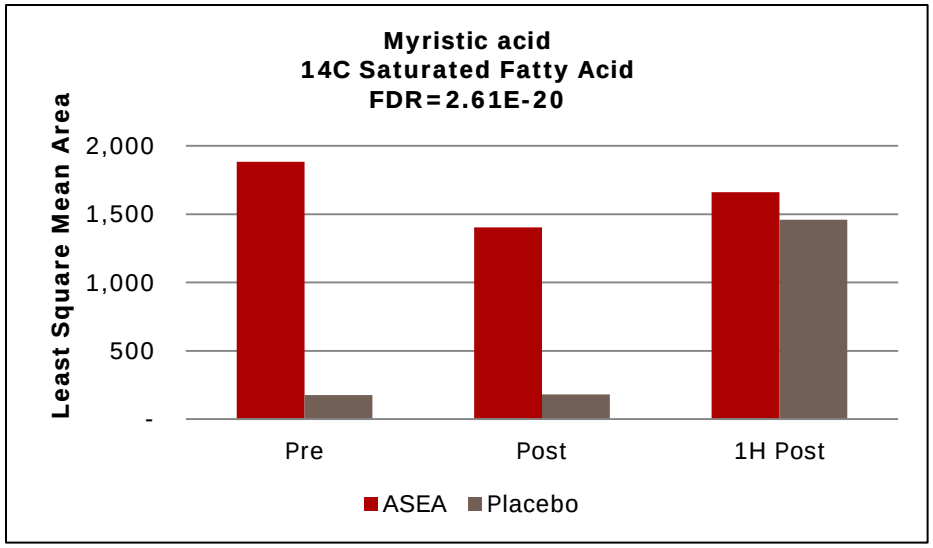
7-days Ingestion of ASEA
Fatty Acids and Glycerol Backbone: Higher in ASEA vs. Placebo

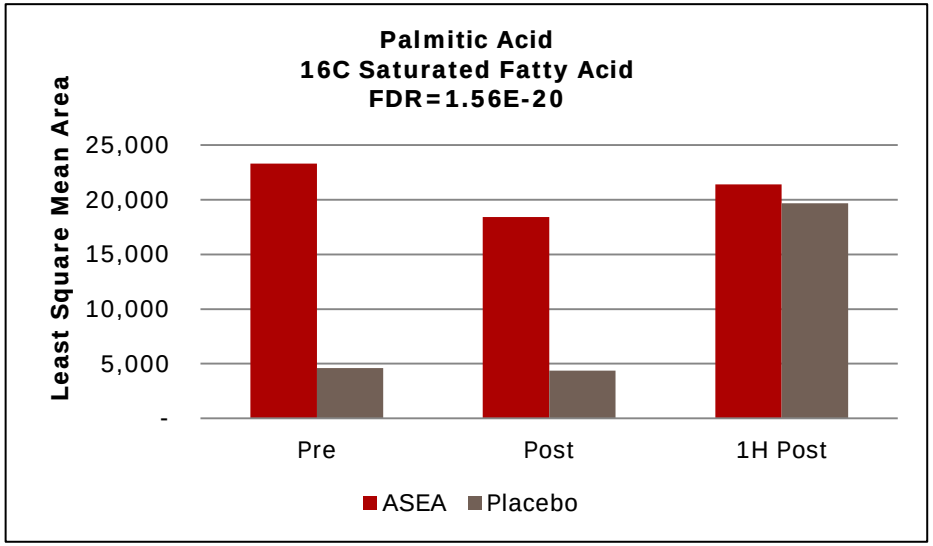


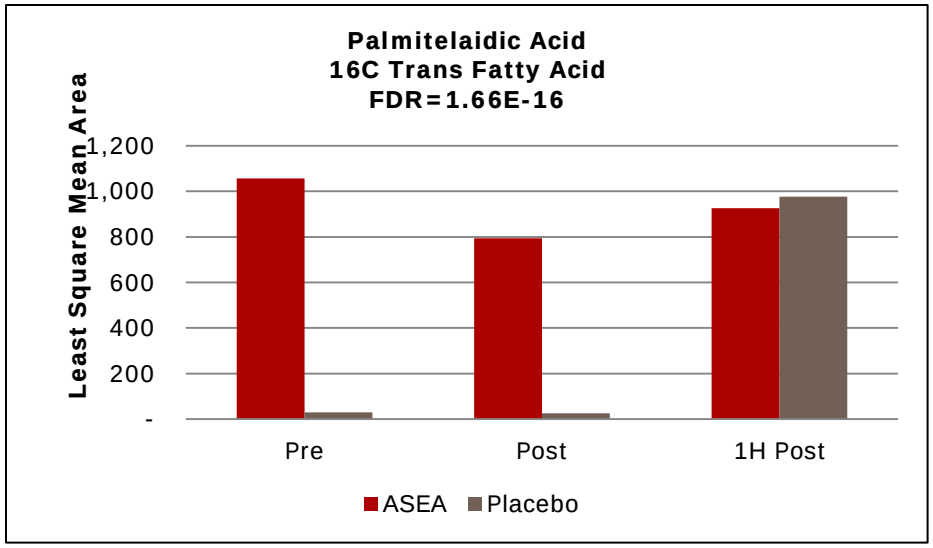


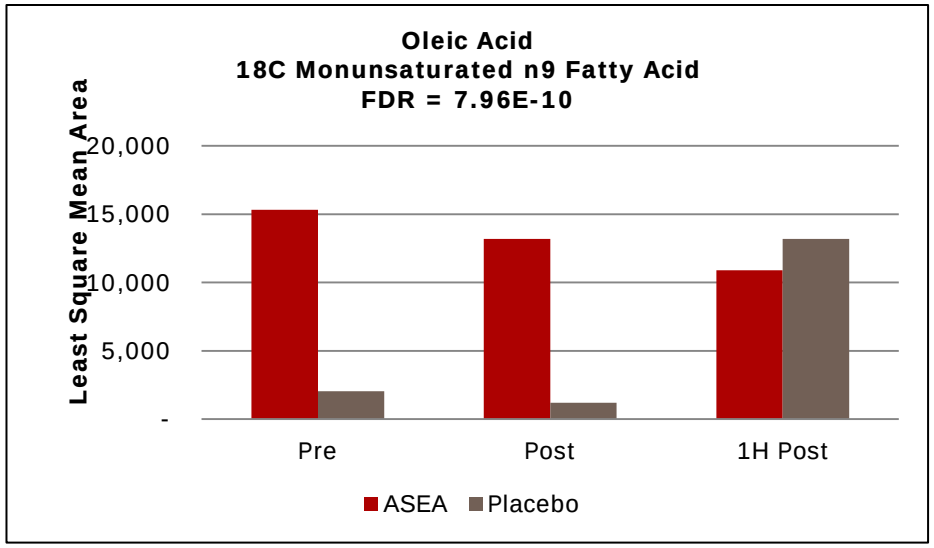


Serum Fatty Acids During Exercise









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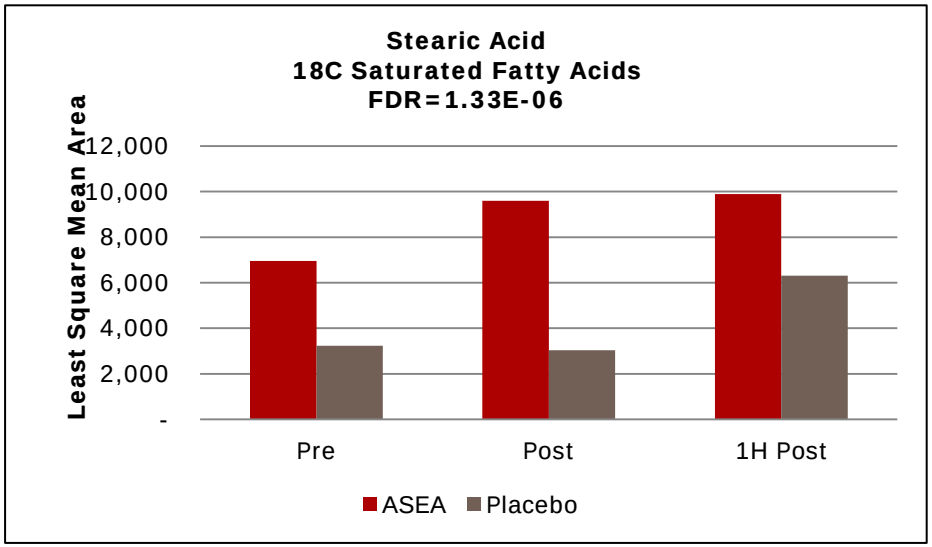

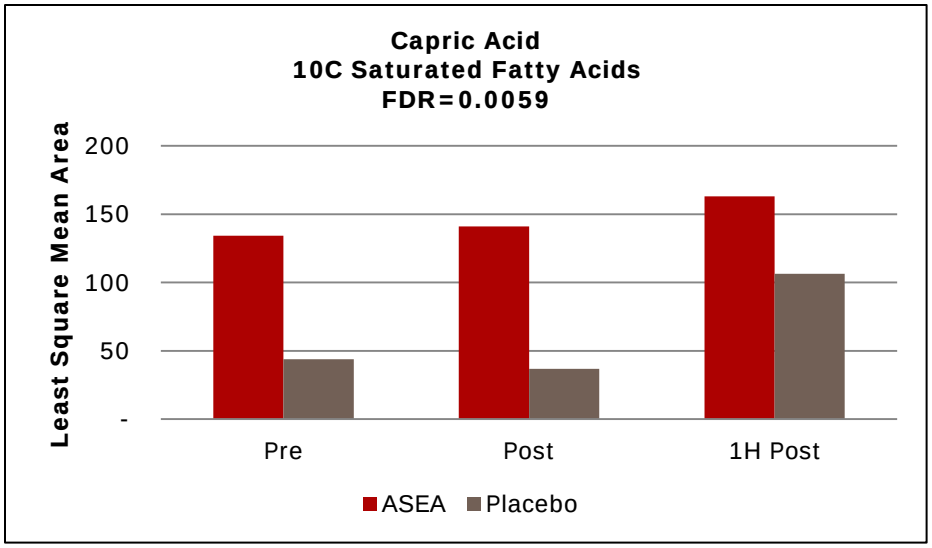

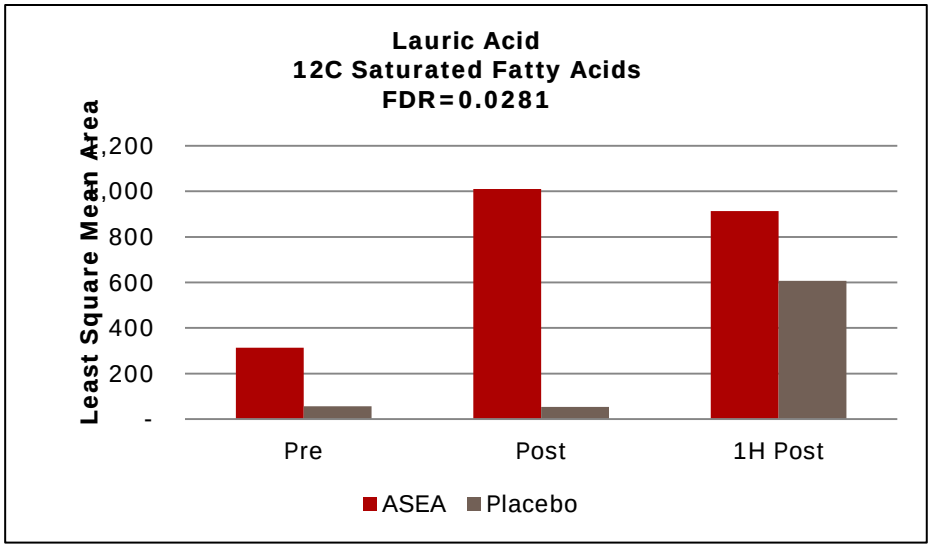

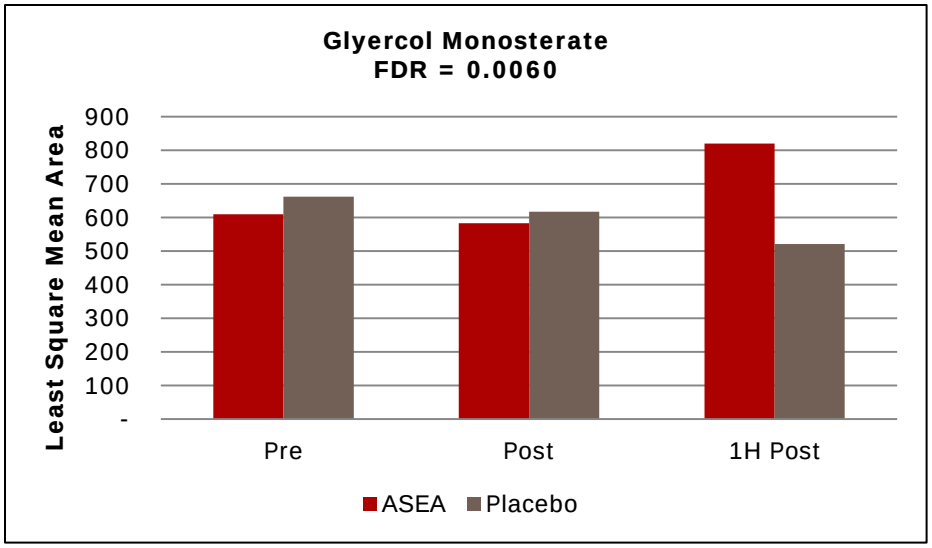

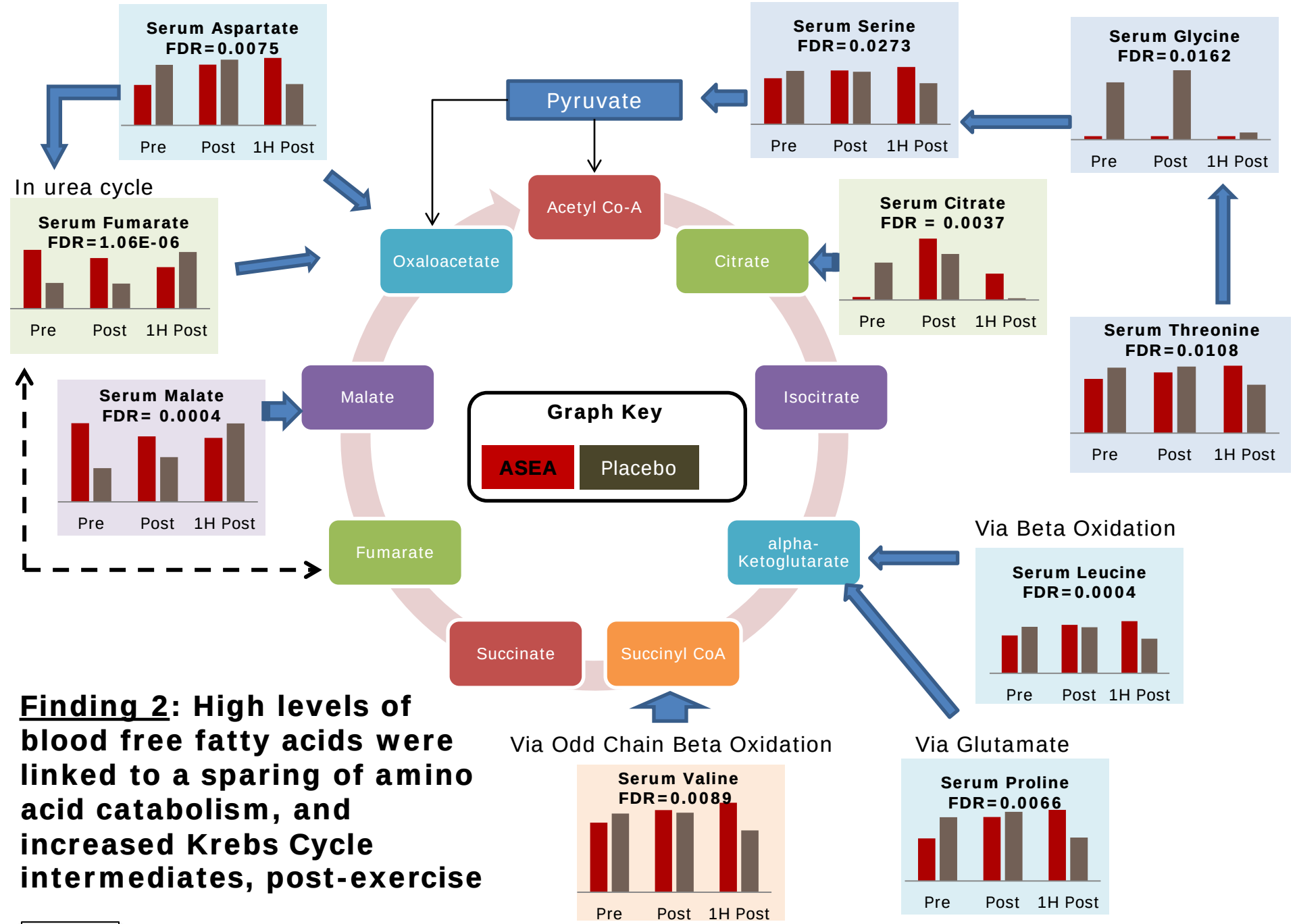

<u>Finding 2</u>: High levels of blood free fatty acids were linked to a sparing of amino acid catabolism, and increased Krebs Cycle intermediates, post-exercise

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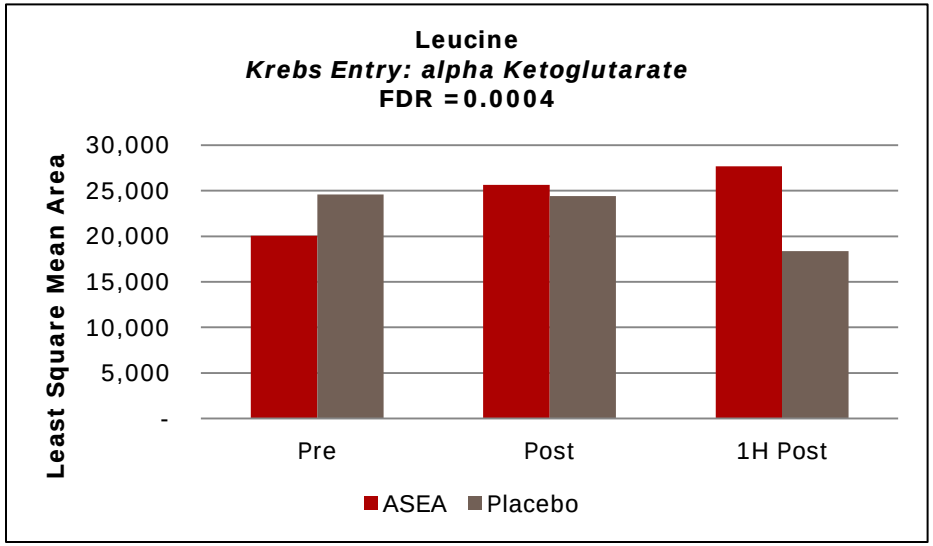
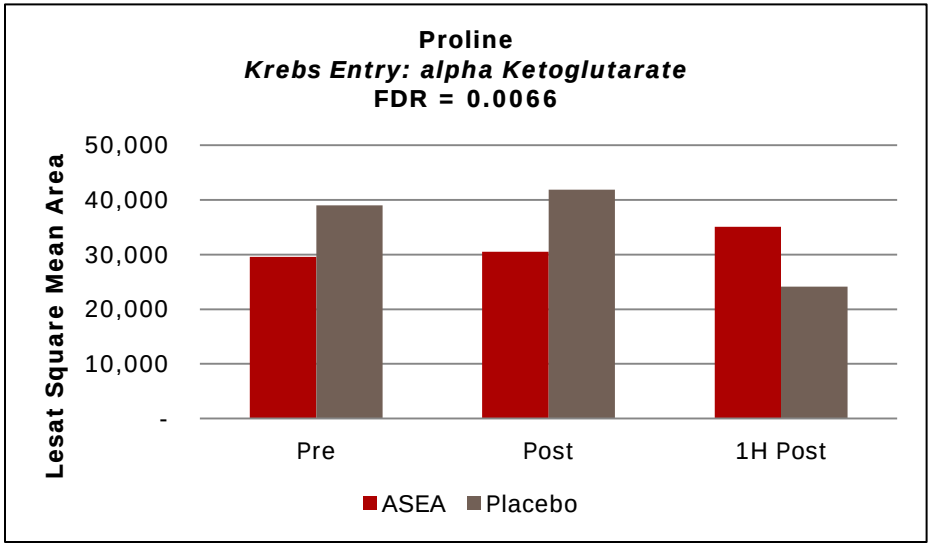
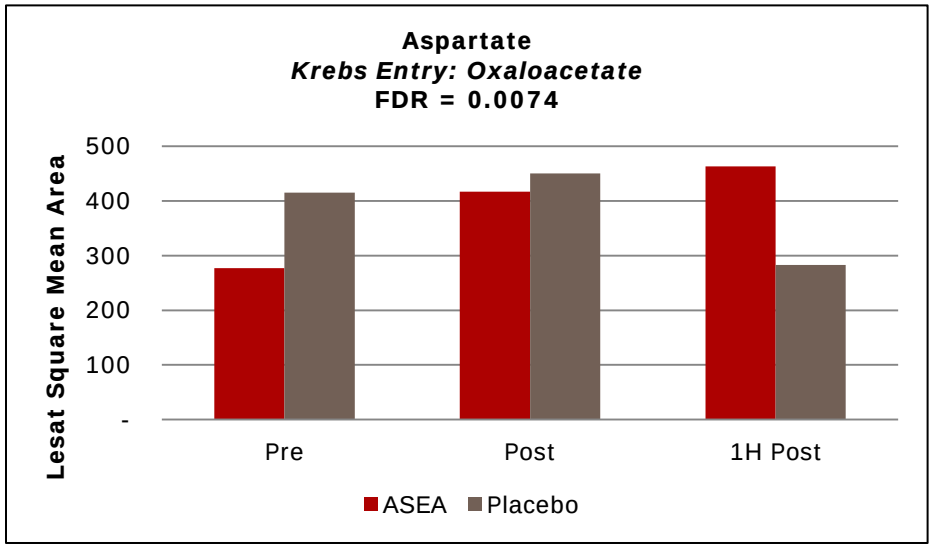
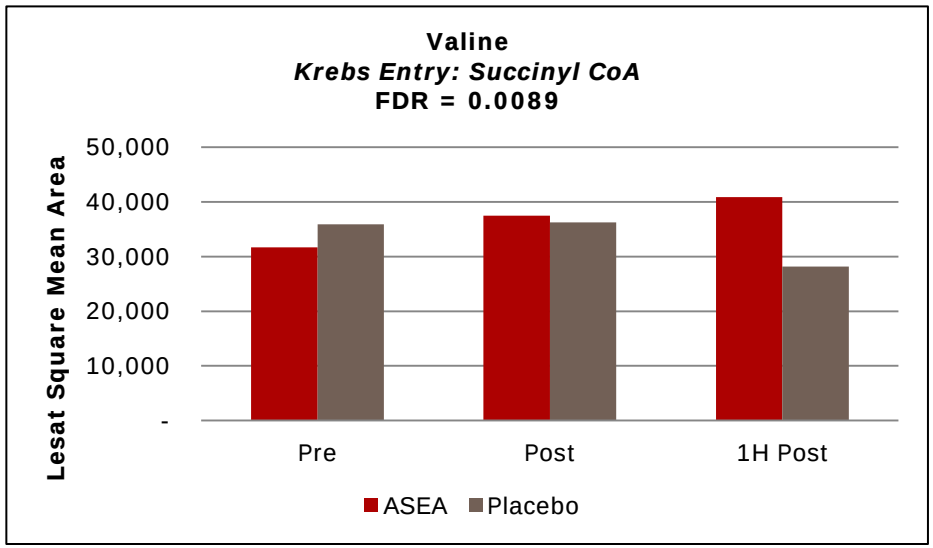
Serum Amino Acids at Pre, Post, and 1H Post-Exercise "Sparing" of Amino Acids with ASEA

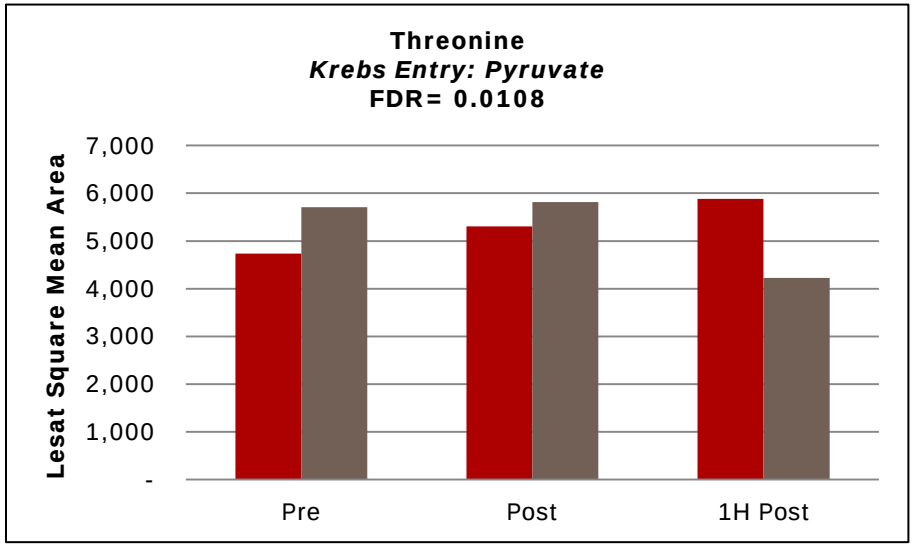


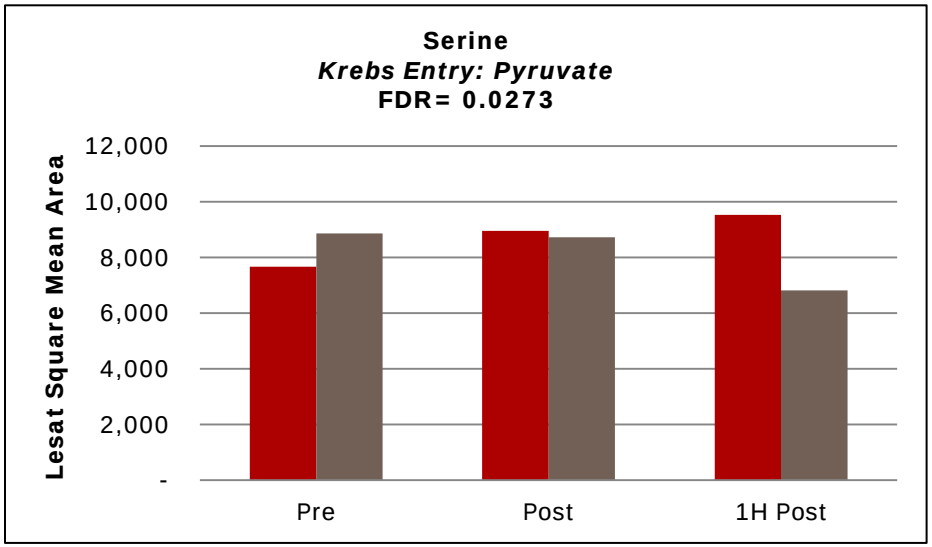


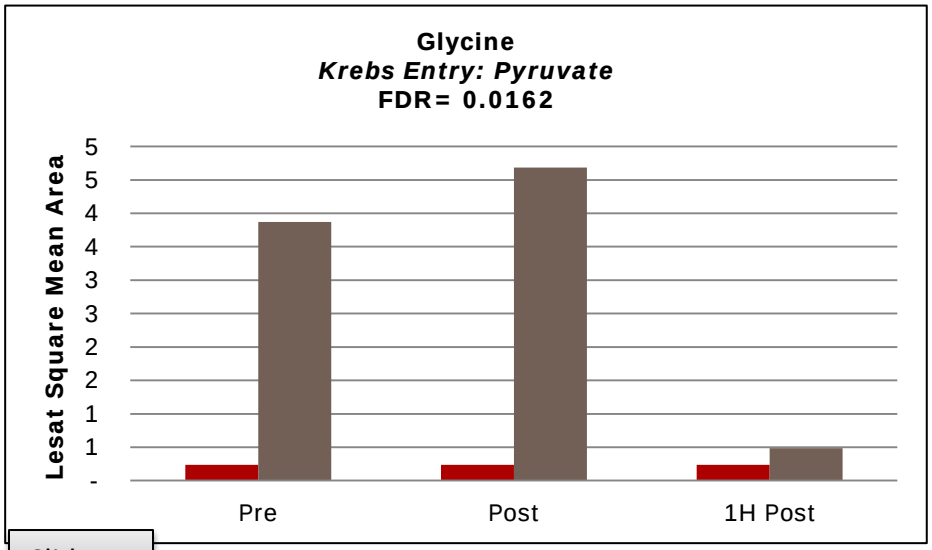


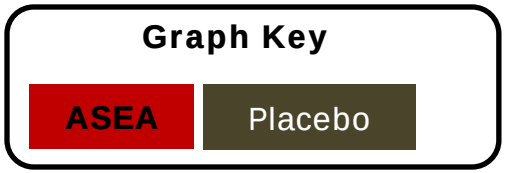


Serum Amino Acids at Pre, Post, and 1H Post-Exericse
"Sparing" of Amino Acids with ASEA









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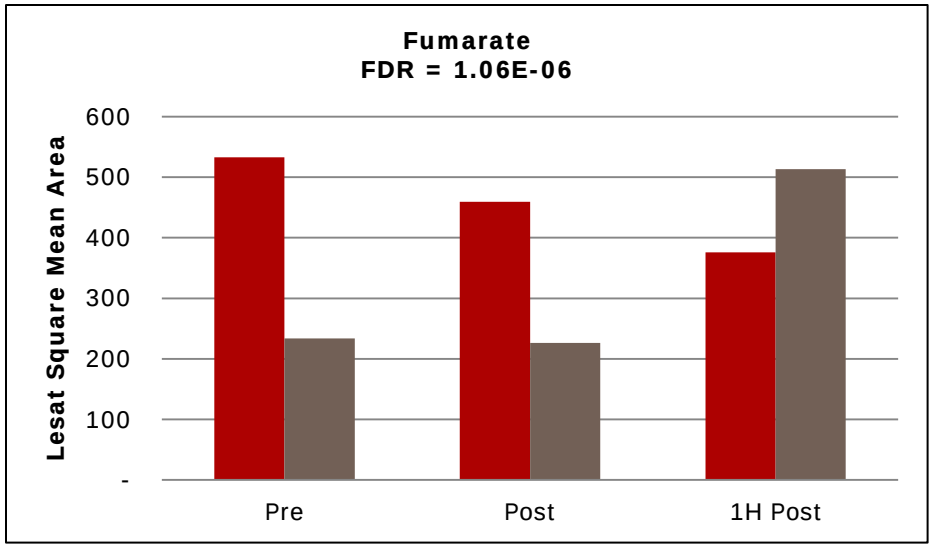
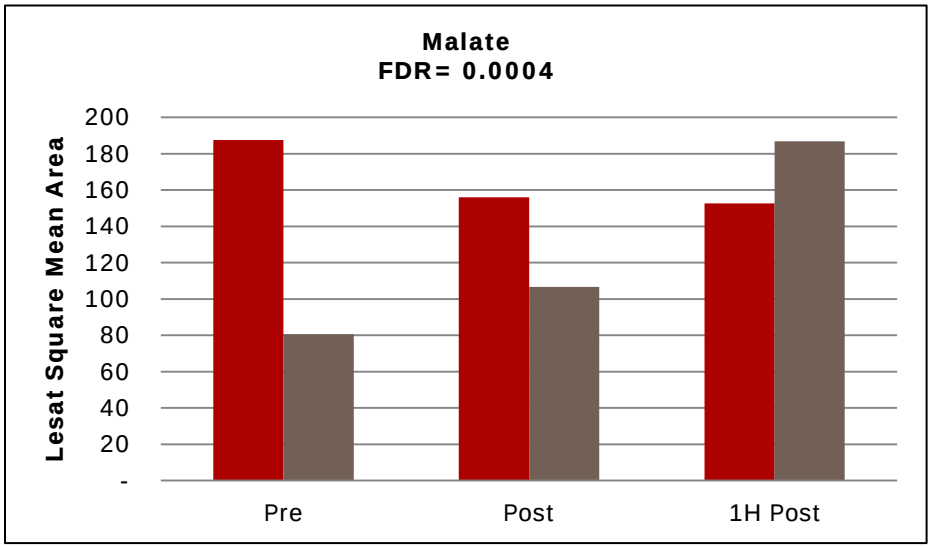
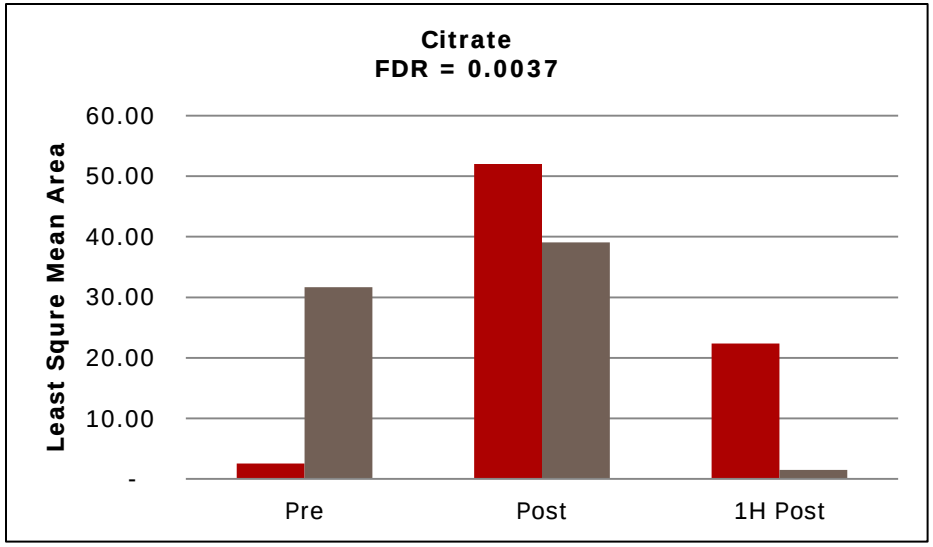
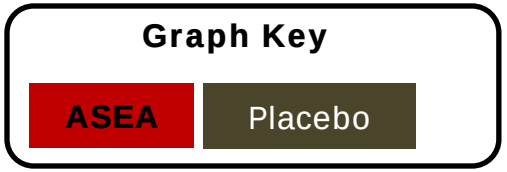
Serum Krebs Intermediate at Pre, Post, and 1H Post-Exercise
Higher Levels with ASEA









Slide 12

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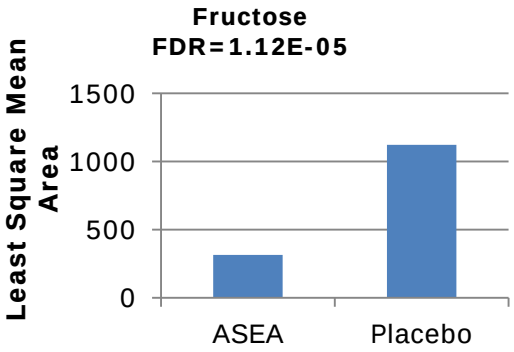
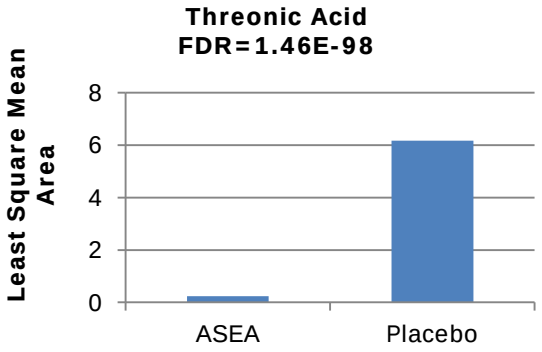
3) Ascorbic Acid Metabolism:

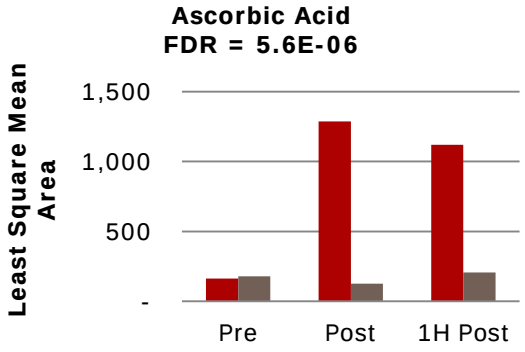
ASEA supplementation appears to be affecting ascorbic acid both acutely and chronically.

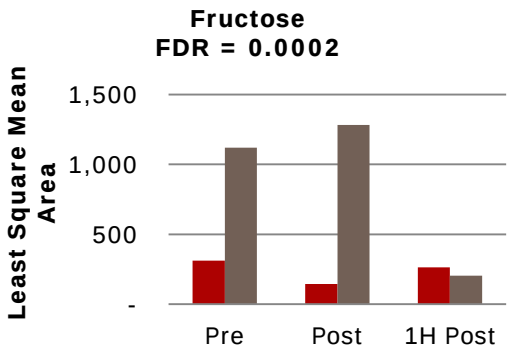
Chronic Differences: ASEA group has lower baseline levels of fructose and lower levels of threonic acid. Fructose is broken down into ascorbic acid which is further metabolized into threonic acid. This could be suggestive of higher ascorbic acid production but no differences in groups were detected at baseline.

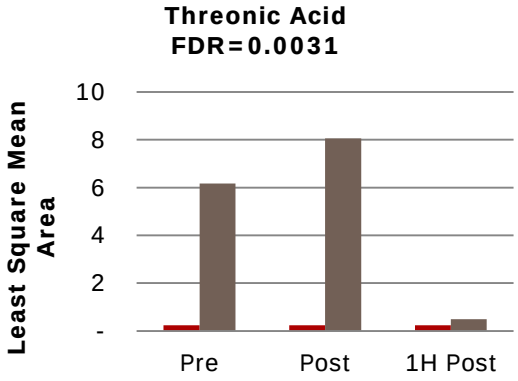




Acute Differences: ASEA group has higher levels of ascorbic acid, an antioxidant, and lower levels of both fructose and threonic acid.



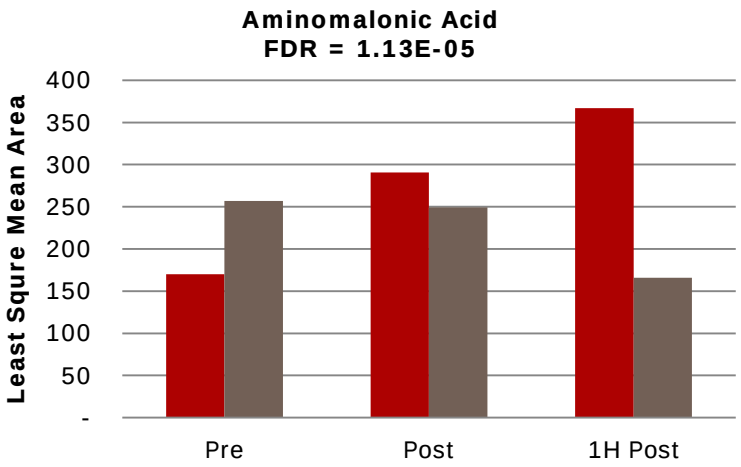




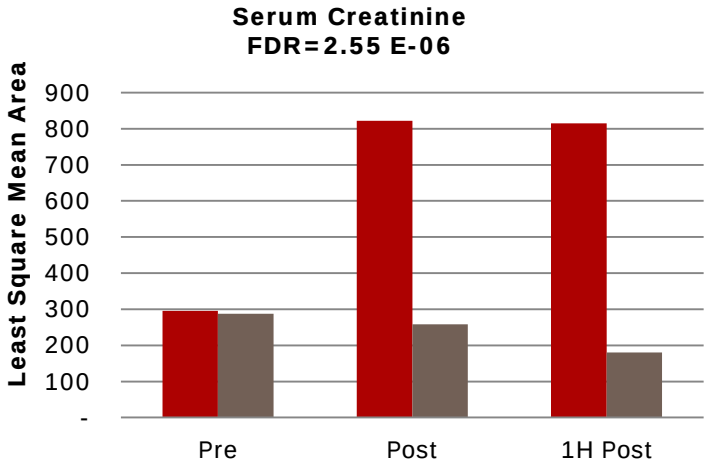
Graph Key

ASEA | Placebo

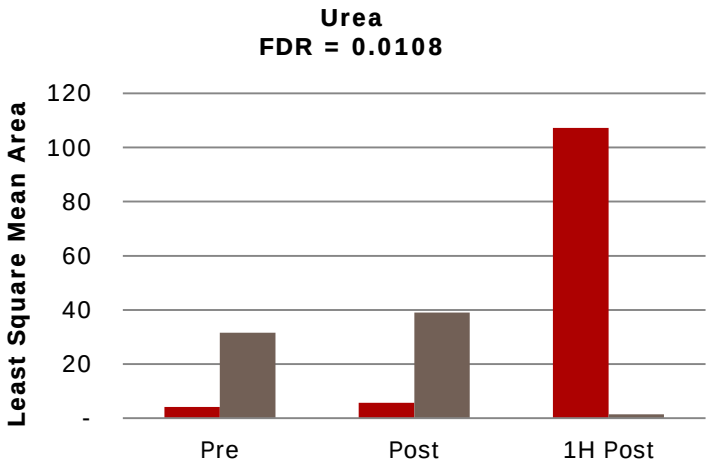
4) Other Changes. Some other changes were found both acutely and chronically that require further investigation into implications.



Plays role in binding calcium to protein



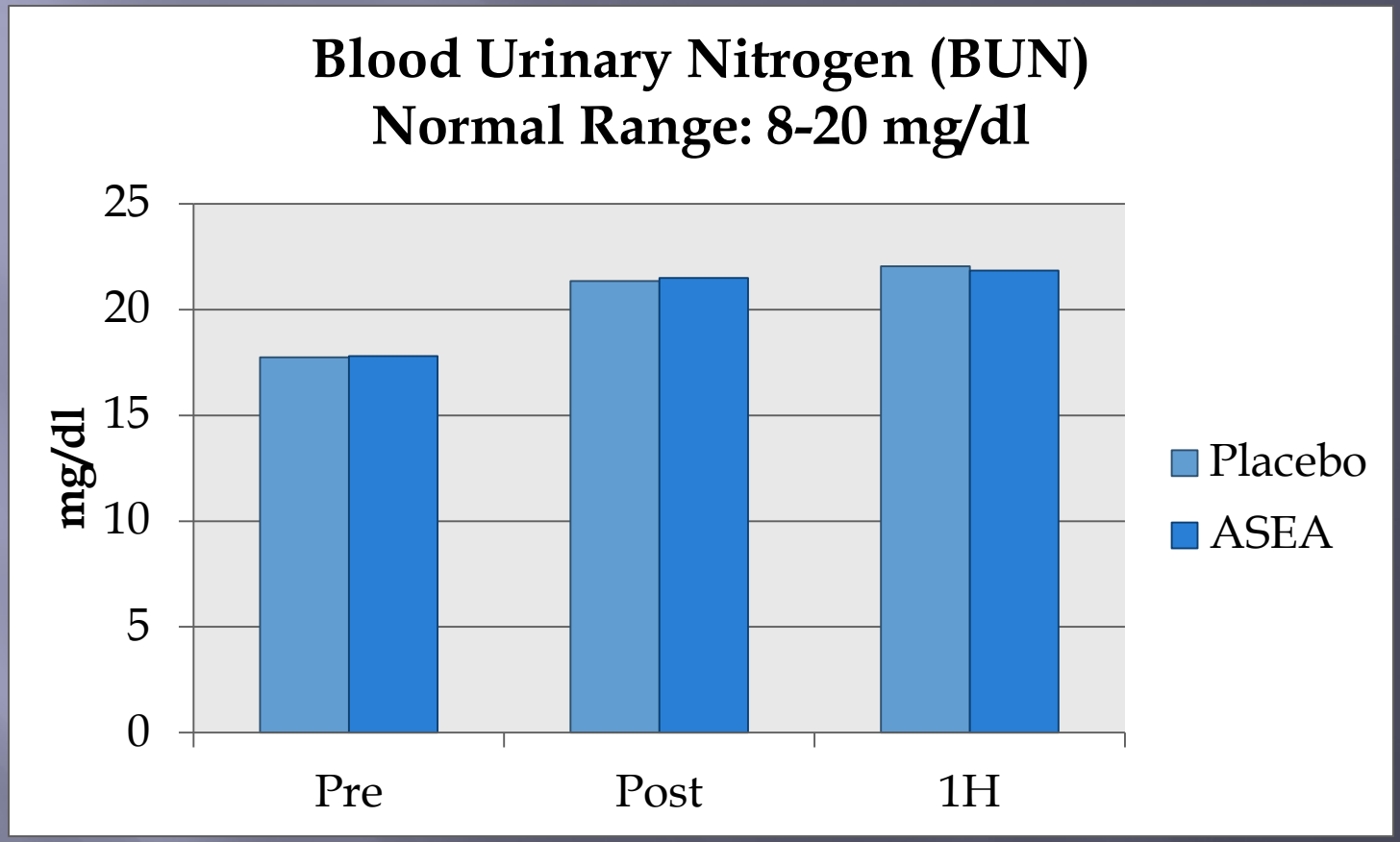
Breakdown product of creatine



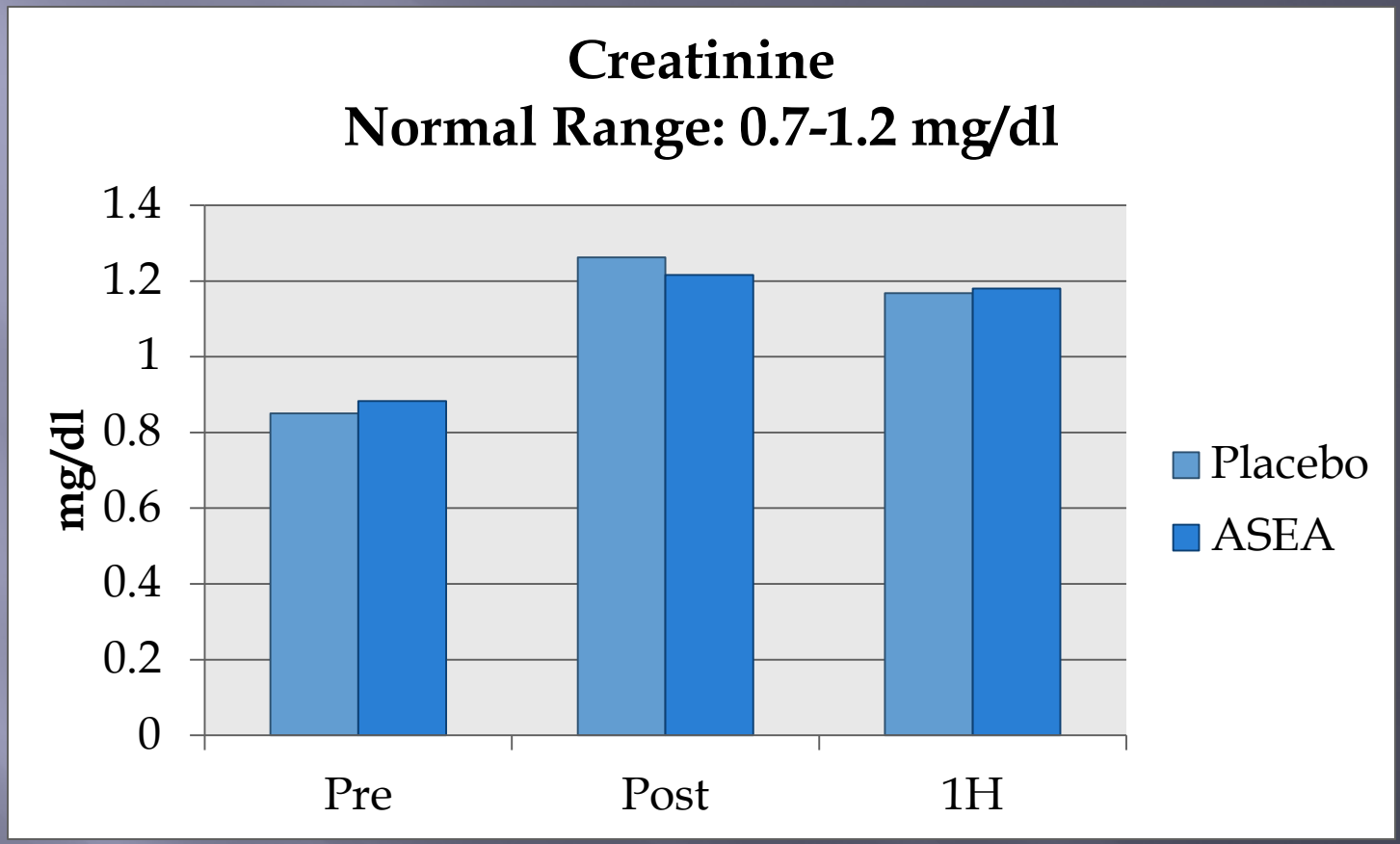
Formed in liver; Removal of nitrogen and ammonia

Graph Key

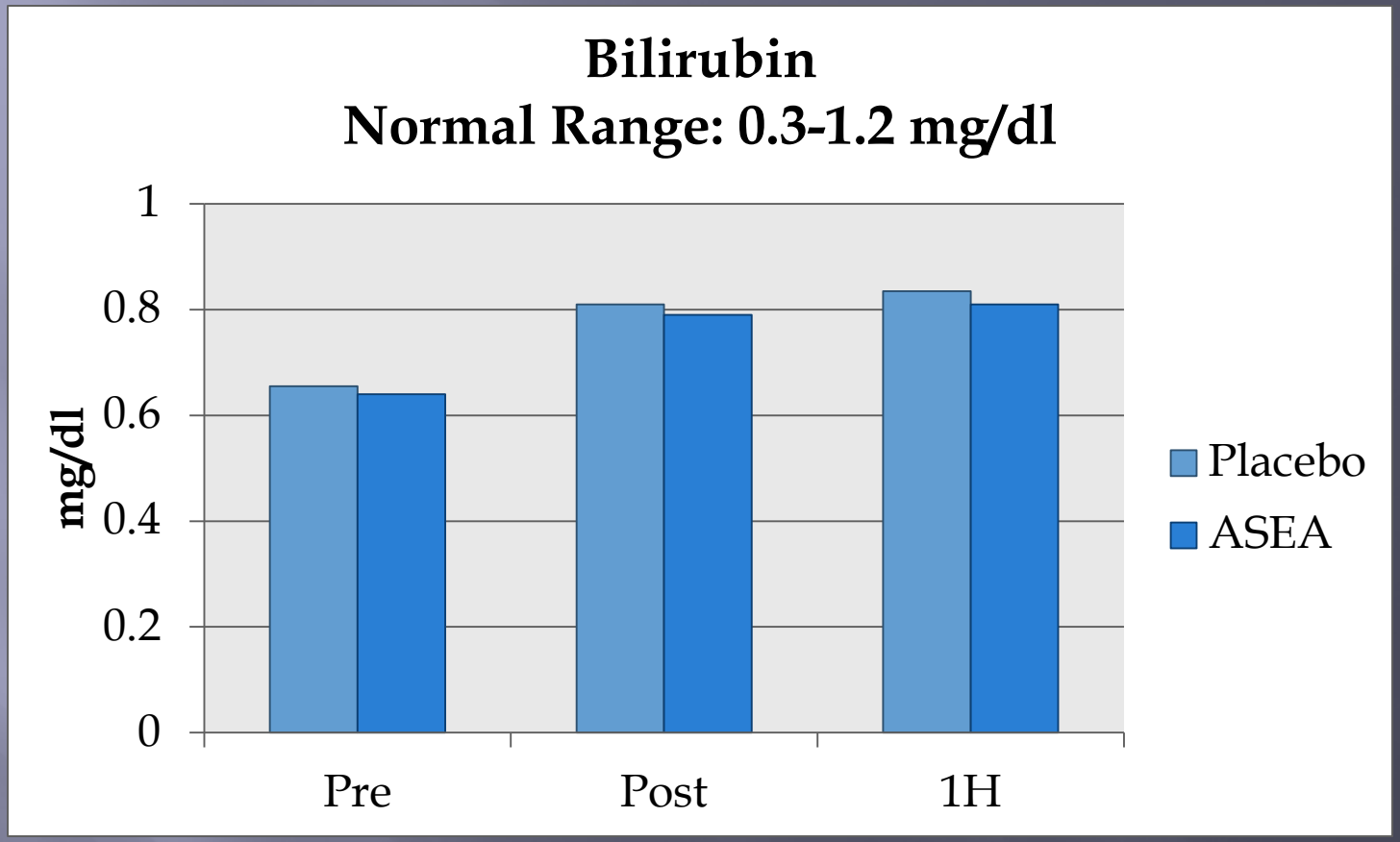
ASEA Placebo



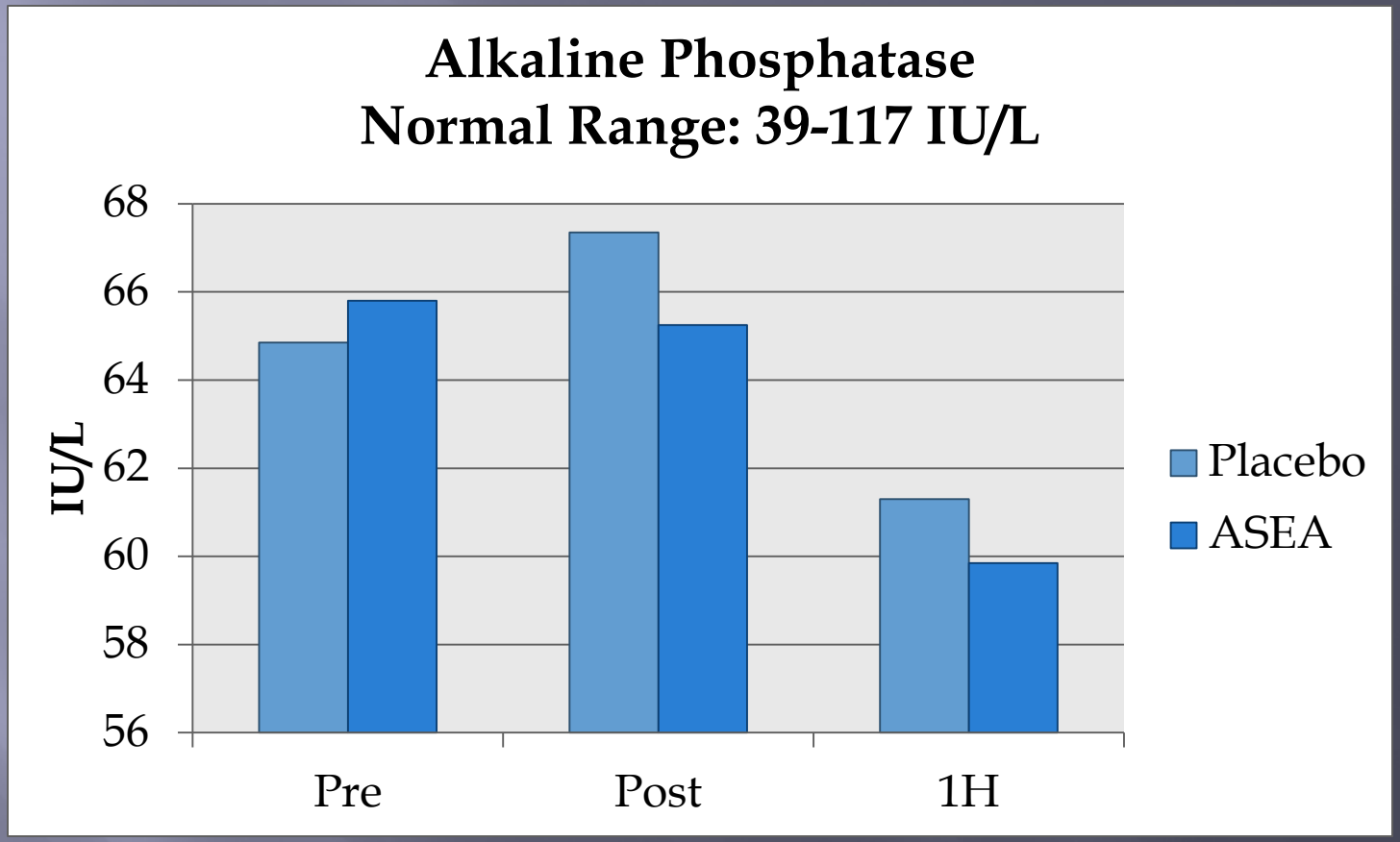
BUN levels did not differ between treatment (treatment x time p-value=0.9743)



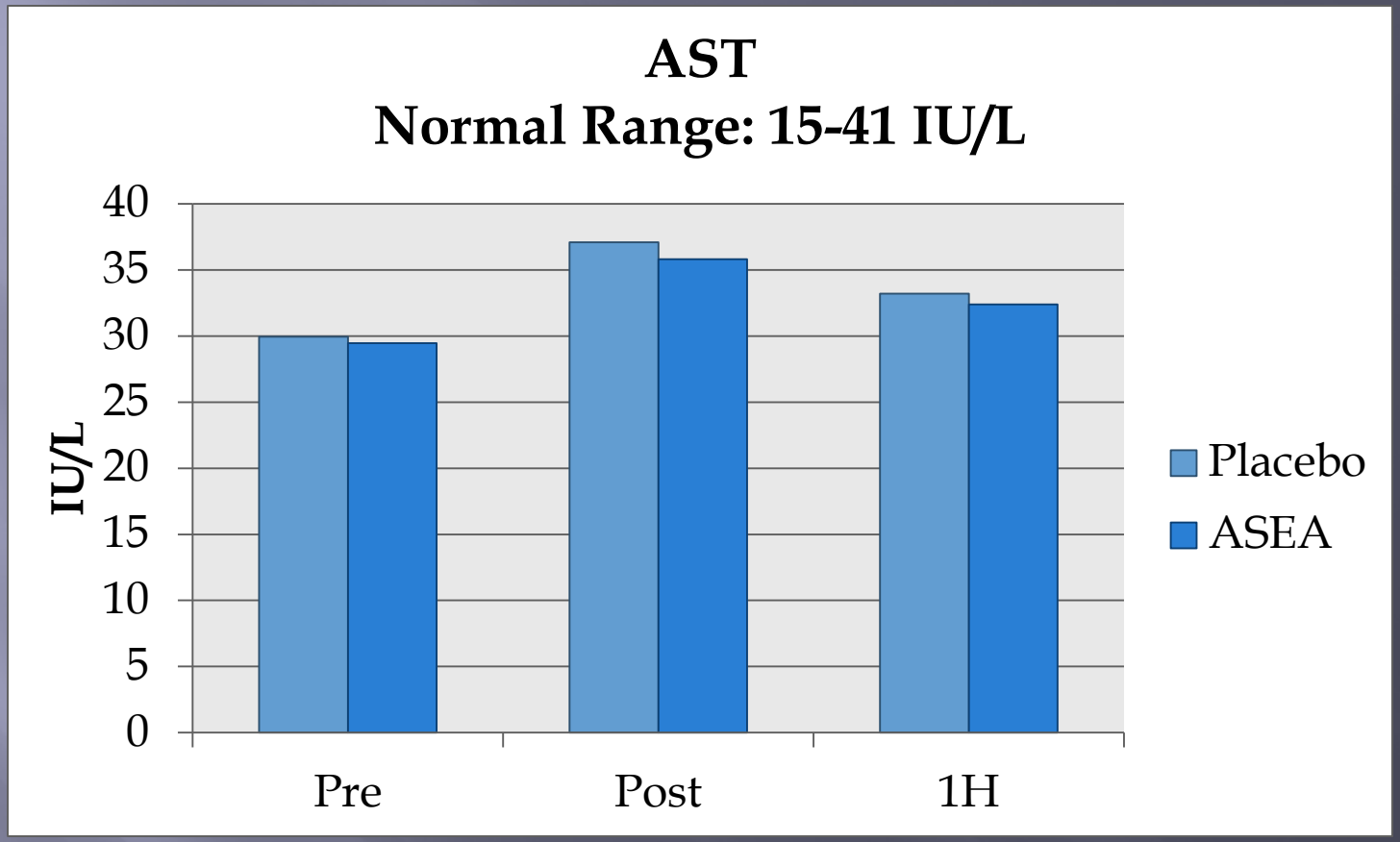
Creatinine levels did not differ between treatment (treatment x time p-value=0.7717)



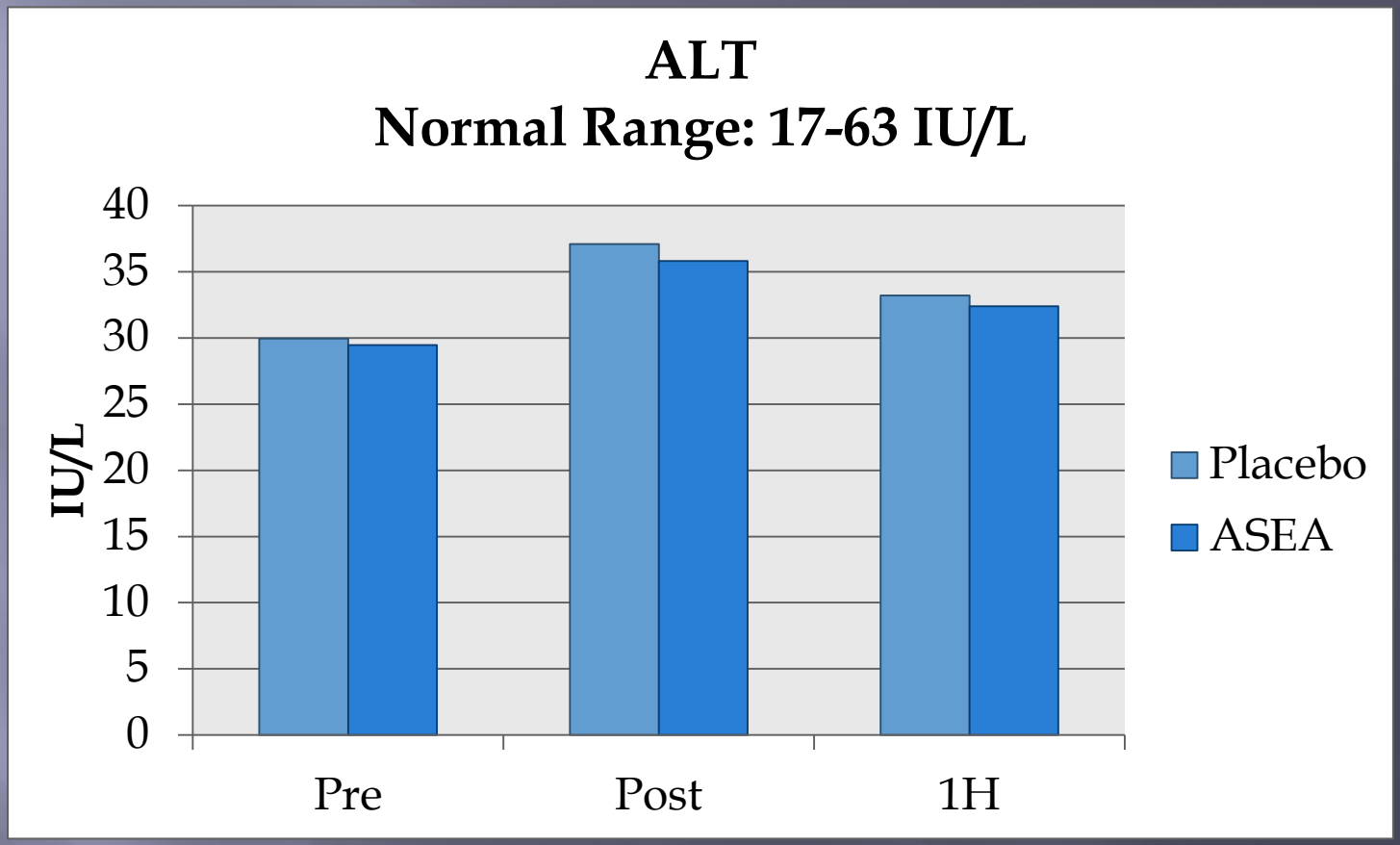
Bilirubin levels did not differ between treatment (treatment x time p-value=0.9971)



Alkaline Phosphatase levels did not differ between treatment (treatment x time p-value=0.8819)



AST levels did not differ between treatment (treatment x time p-value=0.9546)



ALT levels did not differ between treatment (treatment x time p-value=0.9739)