

Le Bonheur Children's Hospital: The Importance of Diets in Liver Metabolism

Jocelyn Galindo, Class of 2021, Undeclared

Le Bonheur Children's Hospital Pediatric Obesity Program - Memphis, Tennessee

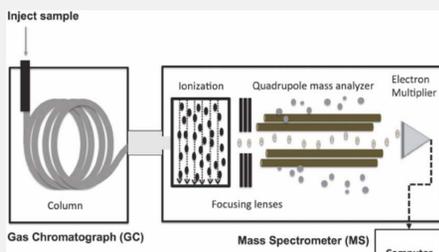
Funded by CHW under the Health Grand Challenges

Introduction

- Pediatric Obesity Program focusing on metabolic pathways
- Intersection of social and clinical
- Short term effects of high fat dietary intake with carb restriction on lipogenesis and TG synthesis (using stable isotope analysis) w/focus on Oleate

Objective of Internship

To better my understanding of Gas Chromatography-Mass Spectrometry and to apply research skills in order to continue the analysis of past research on ketogenic diet.



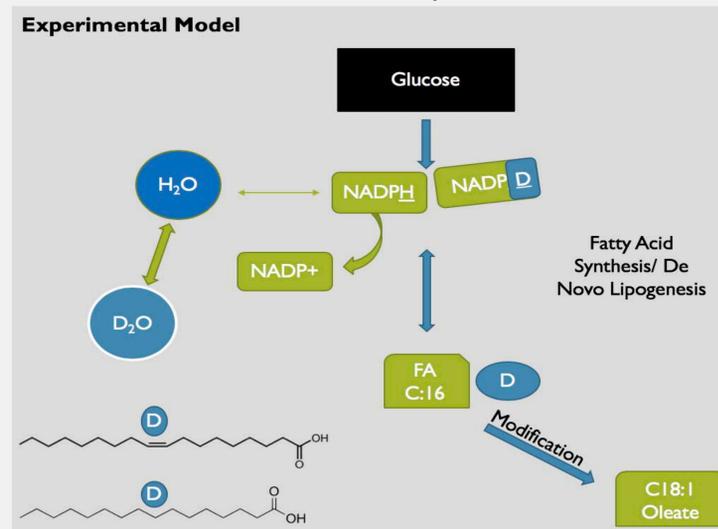
Main mechanism used to analyze fatty acids.

Work profile

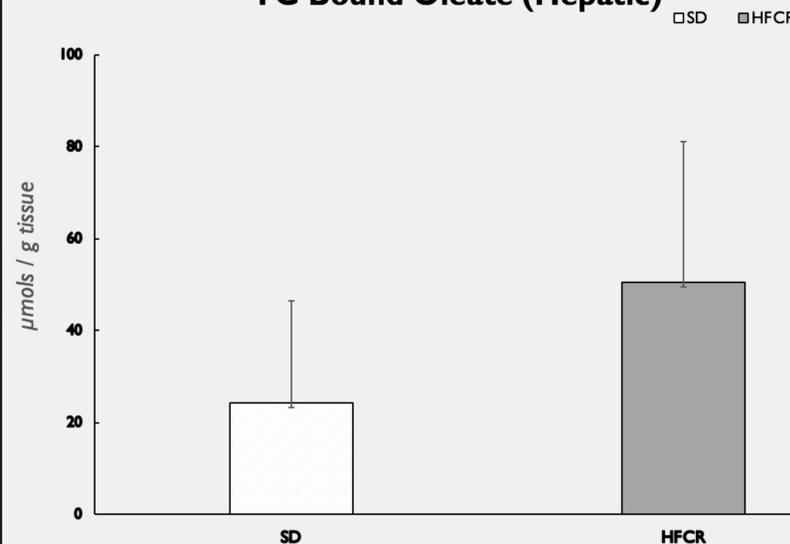
- Meetings with PI over relevant literature & discussing past work
- Going over lab skills (standard curves)
- Shadow at Healthy Lifestyle or Endocrine Clinic under Dr. Han
- Attend Journal Club & Pediatric Department Meetings
- Worked on fatty acid assays/ preparing samples for GC-MS

Experimental Model

- 4 diets over 4 weeks (rats)
- Standard Diet (SD), Low Fat (LF), High Fat (HF-Mix), High Fat, Carb Restriction (HF-CR)
- Experimental day: given heavy water injection
- Rat livers excised/blood samples taken



TG Bound Oleate (Hepatic)



Fume hood where samples are prepped for GCMS purposes.

Analytical Methods

- Tissue weighing
- ethanol KOH hydrolysis
- Samples "acidified" to collect free fatty acids
- Concentrations determined with internal standard
- Palmitate derivatized with TMS (silicon based agent)

Oleate_DNL

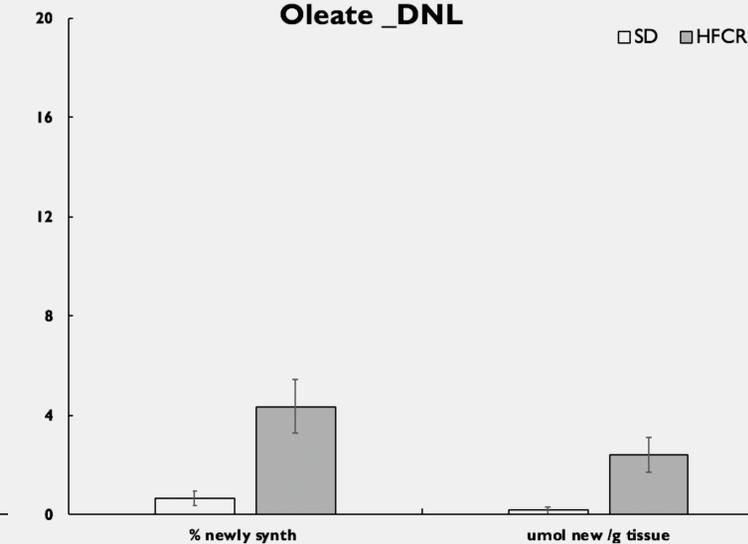


Figure 1 & 2: Baseline amount of Oleate found in liver; oleate present in De Novo Lipogenesis

Results

My project involved seeing whether liver synthesized Oleate through lipogenesis. Using heavy water methodology, GCMS is able to detect whether or not Oleate is being newly synthesized (De Novo Lipogenesis) or not since the HF-CR diet contains huge amounts of Oleate. However, the results are unexpected as blunting persists; newly synthesized Oleate is not being made through De Novo Lipogenesis if oleate is high in diet. This is the liver's response to taking lipids and modifying them for other uses.

Reflection:

This experience allowed me to view a different side of public health that I usually wouldn't be exposed to so early in my undergraduate career as I saw the inner workings of research and departments.

Acknowledgements

- I would like to thank:
- Dr. Michelle Puchowicz, Aarti Sethuraman and Prahlad Rao for being amazing advisors
 - Dr. Joan Han for allowing me to shadow in different clinics
 - Le Bonheur and UTHSC for allowing me to gain insight on the intricacies of pediatric research
 - Health Grand Challenge through CHW for funding my summer internship and providing me the support I needed