



# Personalized Probiotics for Weight Management

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11.11.21

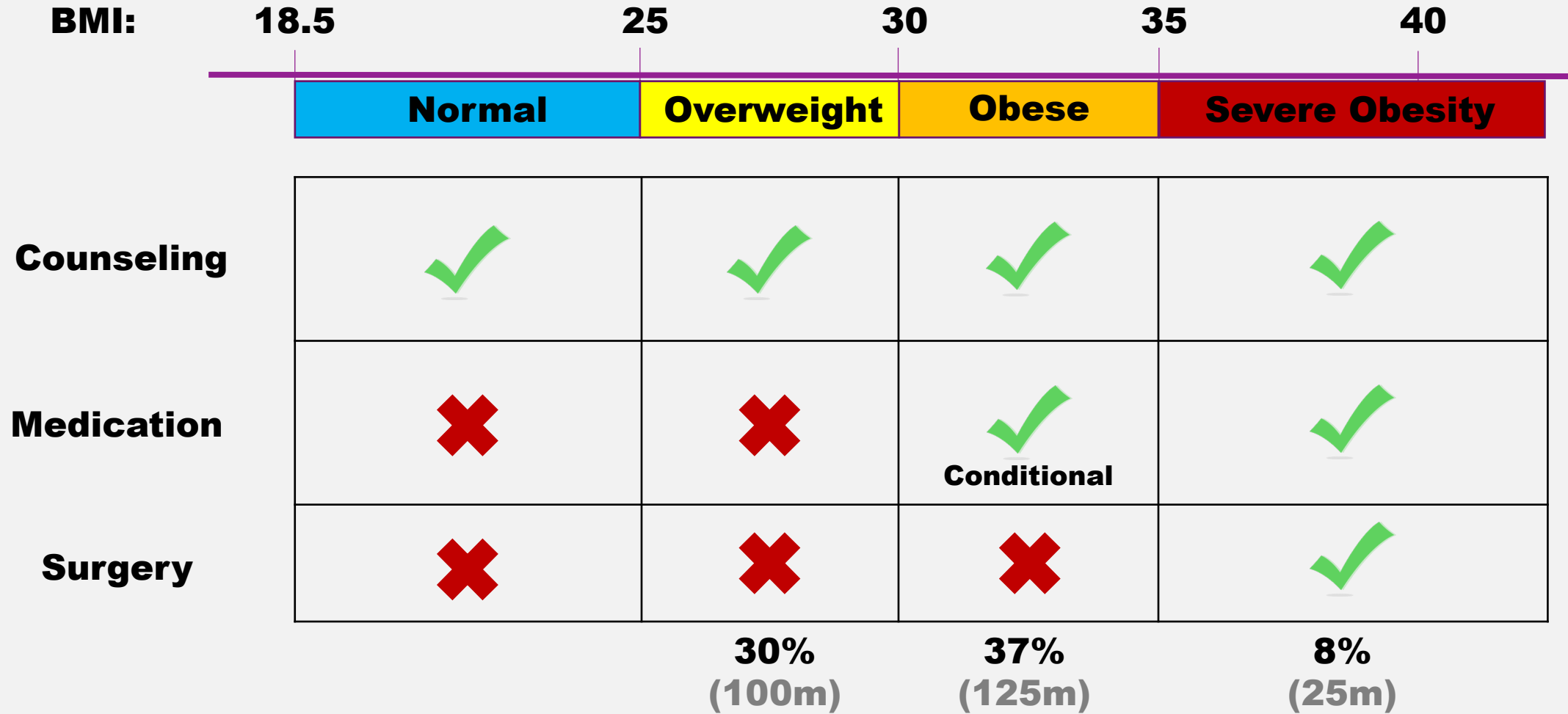
# Obesity is a Prevalent and Costly Chronic Disease

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- **3 out of 4 (250m)** adults in the US (20+) are Overweight or Obese
- **12 out of 19** clinicians say affordability is a key barrier

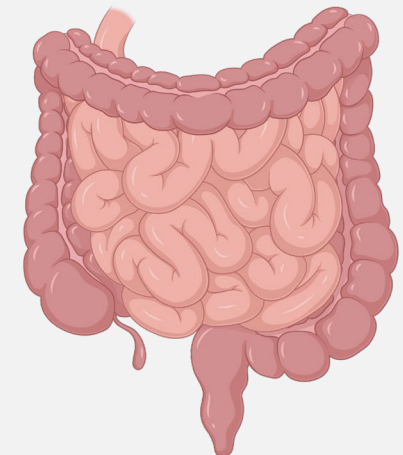
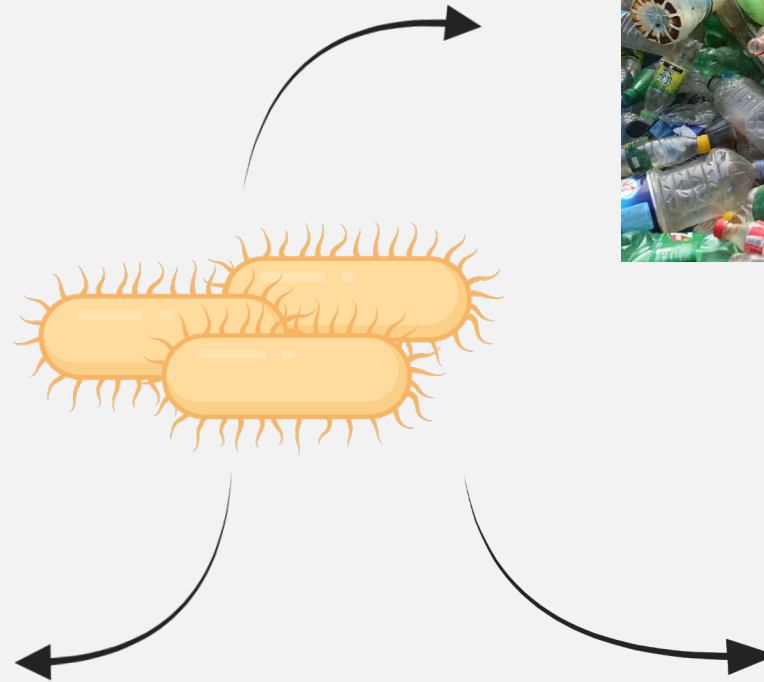


# BMI-gated Insurance Coverage Excludes Significant Portions of Treatable Population



# Bacteria Evolve in Response to their Environment

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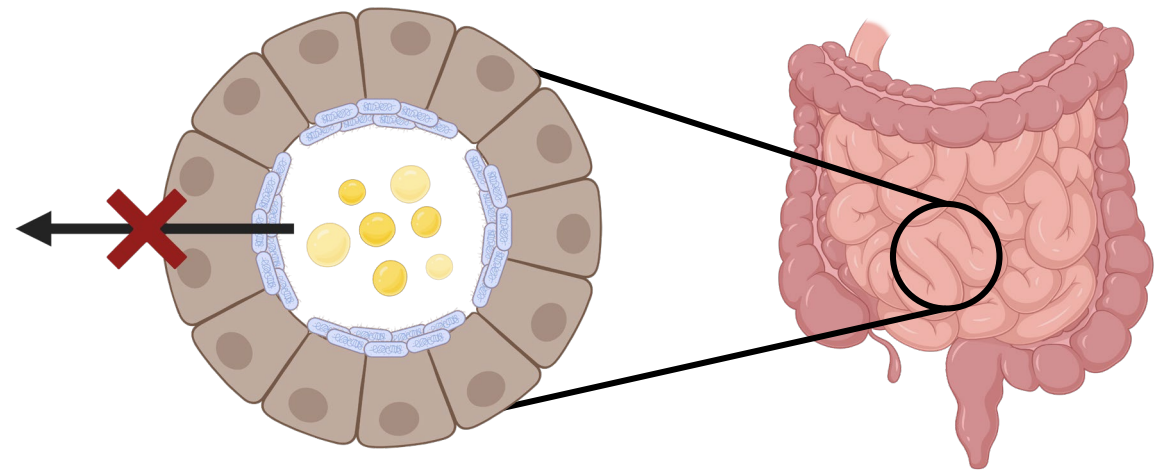


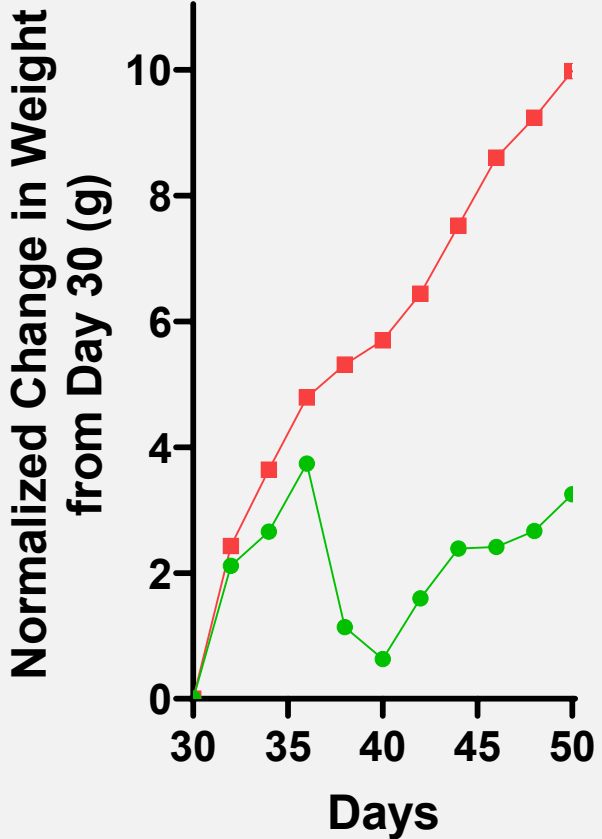
# Introducing YouBiotics: An Engineered Probiotic for Weight Management

## Once/Day Probiotic Supplement



## YouBiotics Remove Fat Before it Can Be Absorbed





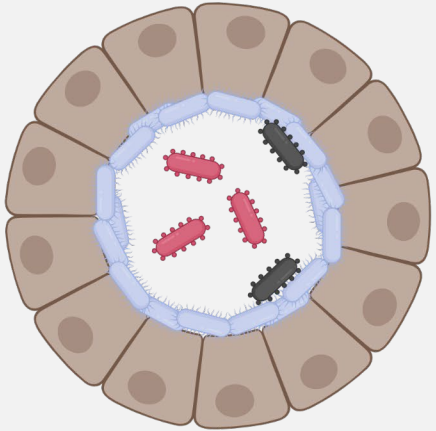
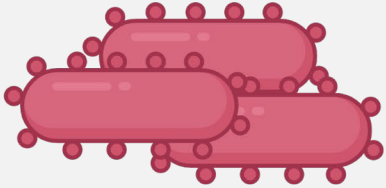
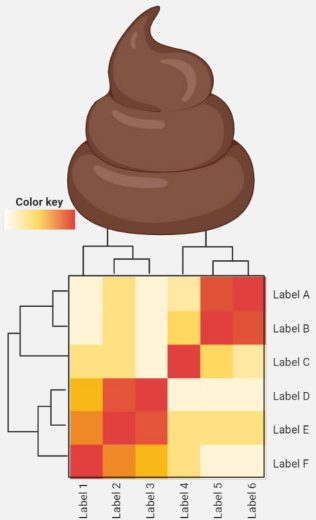
● YouBiotics    ■ Untreated



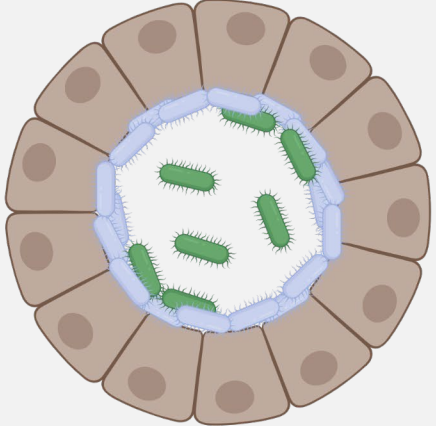
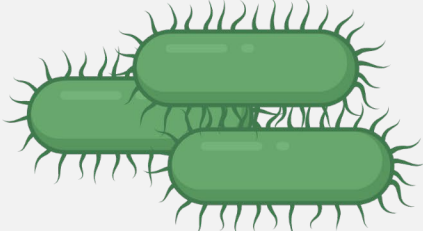
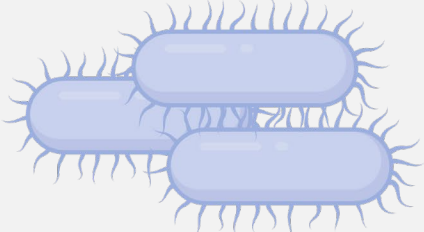
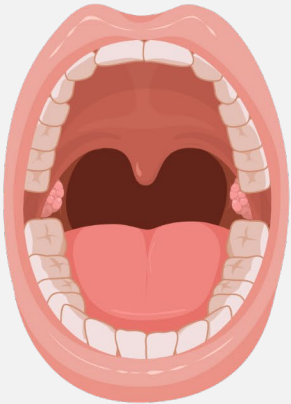
**20% Difference in Body Weight** | Mice On A High-Fat-Diet (N=6 per group) (50 Days)

**Unlike Existing Personalized Probiotics Companies, YouBiotics Re-Administers An Individual's Own Bacteria**

# “Customized” Probiotics



# YouBiotics



# YouBiotics is Unlike **OTC Probiotics** and **Therapeutics**



**YouBiotics**



**GLP1 Agonists**

<b>Side Effects</b>	<ul style="list-style-type: none"> <li>• <b>GI</b></li> <li>• <b>Flatulence</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>GI</b></li> <li>• <b>Flatulence</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Kidney</b></li> <li>• <b>Liver</b></li> <li>• <b>Loose Stool</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Kidney</b></li> <li>• <b>Liver</b></li> <li>• <b>Cardiac</b></li> </ul>	<ul style="list-style-type: none"> <li>• <b>Kidney</b></li> <li>• <b>Pancreatitis</b></li> <li>• <b>Nausea</b></li> </ul>
<b>Monthly Cost</b>	<b>\$499</b>	<b>\$150</b>	<b>\$65 - \$102</b>	<b>\$281</b>	<b>\$701 - \$1,385</b>
<b>Class</b>	<b>Customized OTC Probiotics</b>	<b>Personalized Probiotic</b>	<b>FDA Weight Loss Drug</b>	<b>FDA Weight Loss Drug</b>	<b>FDA Weight Loss Drug</b>
<b>Sampling</b>	<b>Fecal</b>	<b>Oral</b>			



# U.S. Market Size

## Beachhead



**Weight Loss & Weight Management Diet Market (2020)**

## Expansion Markets



**Probiotic Supplement Market (2020)**



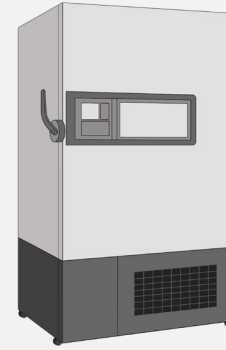
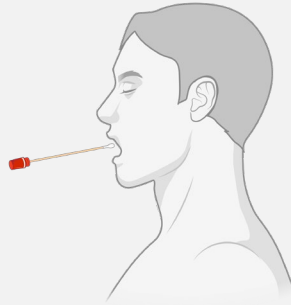
**Cholesterol Testing & Services Market (2019)**



**Retailers or DTC**  
Oral Sample Kit

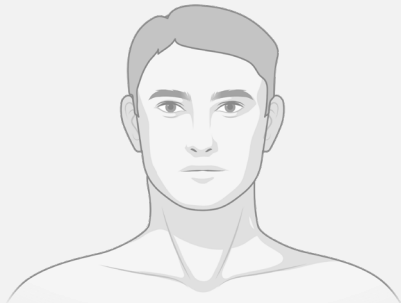


**One-Time Oral Sample**  
Customer



**Storage**

# Customer Relationship Model



**Monthly**  
**Fulfillment**



**Patent Application**  
WO2019168990A1

**Microbiome**  
**Engineering**

# Business Model



**Subscription Model**  
3, 6, 12+ months

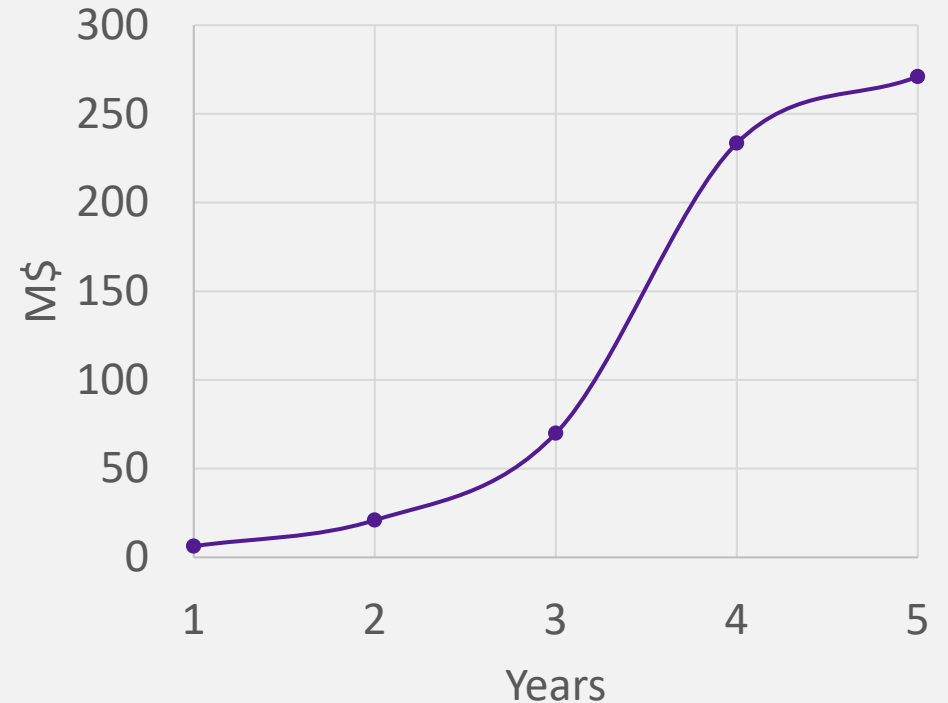
**One Month Supply**

**COG:** \$30  
**Sales Price:** \$120  
**Gross Margin:** \$150 (80%)

## Market Capture

**Year 1:** 3M (1.2%)  
**Year 3:** 29M (11.6%)  
**Year 5:** 96M (38.4%)

## Revenue Estimate – Beachhead Market (US Weight Loss & Diet Mgmt)

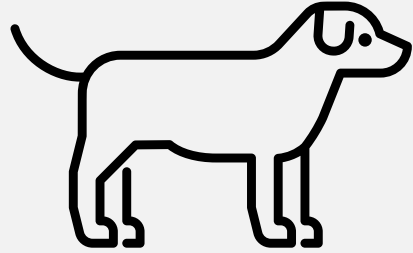


# Next Steps



**Fat Removal  
Mechanism**  
(\$30K)

**Michael G. Wells  
Pitch Competition  
Winnings**



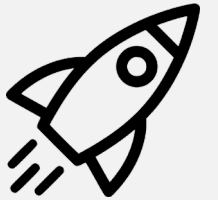
**Preclinical Study**  
(\$60k)



**Clinical Safety &  
Efficacy**  
(N $\approx$ 60; ~\$500k)



**Food Supplement  
FDA Approval**



**Launch**

2021

2022

2023

2024

2025

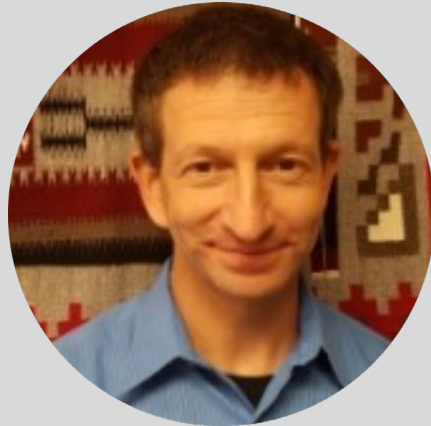
# Meet the YouBiotics Team

Dr. Abhinav  
Acharya



ASSOCIATE PROFESSOR  
ARIZONA STATE UNIVERSITY  
CHEMICAL ENGINEERING

Dr. Jonathan  
Krakoff (NIH)



CHIEF OF OBESITY AND  
DIABETES CLINICAL RESEARCH  
NIH NIDDK

Matthew Borrelli



PHD CANDIDATE  
UNIVERSITY OF PITTSBURGH  
CHEMICAL ENGINEERING

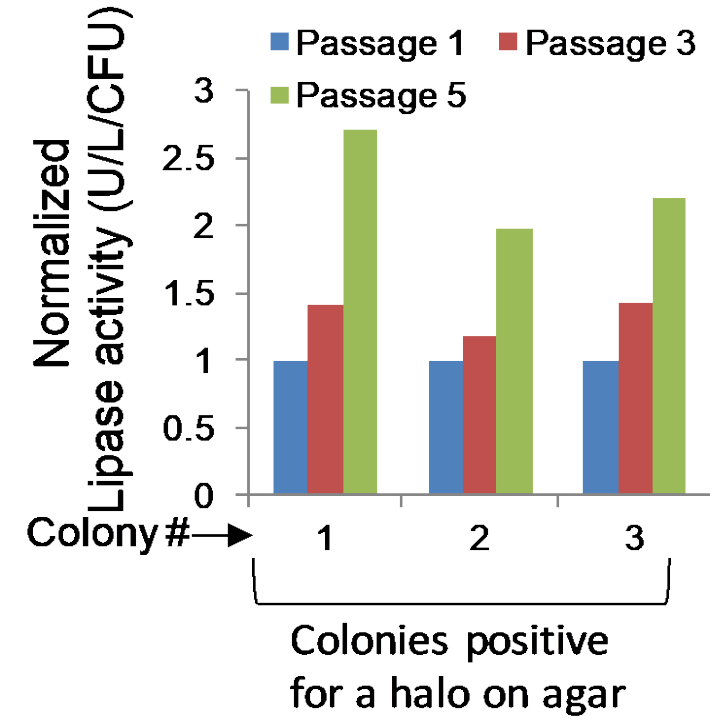
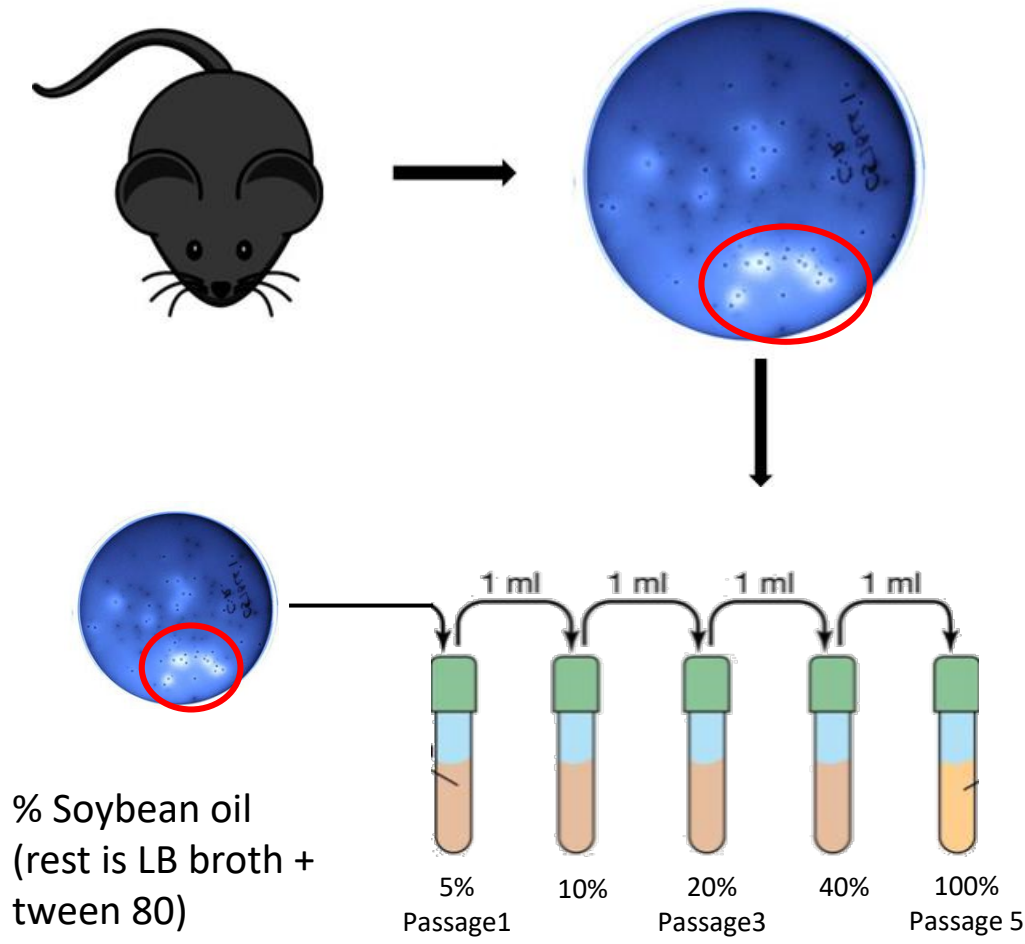
Dr. Steven R. Little



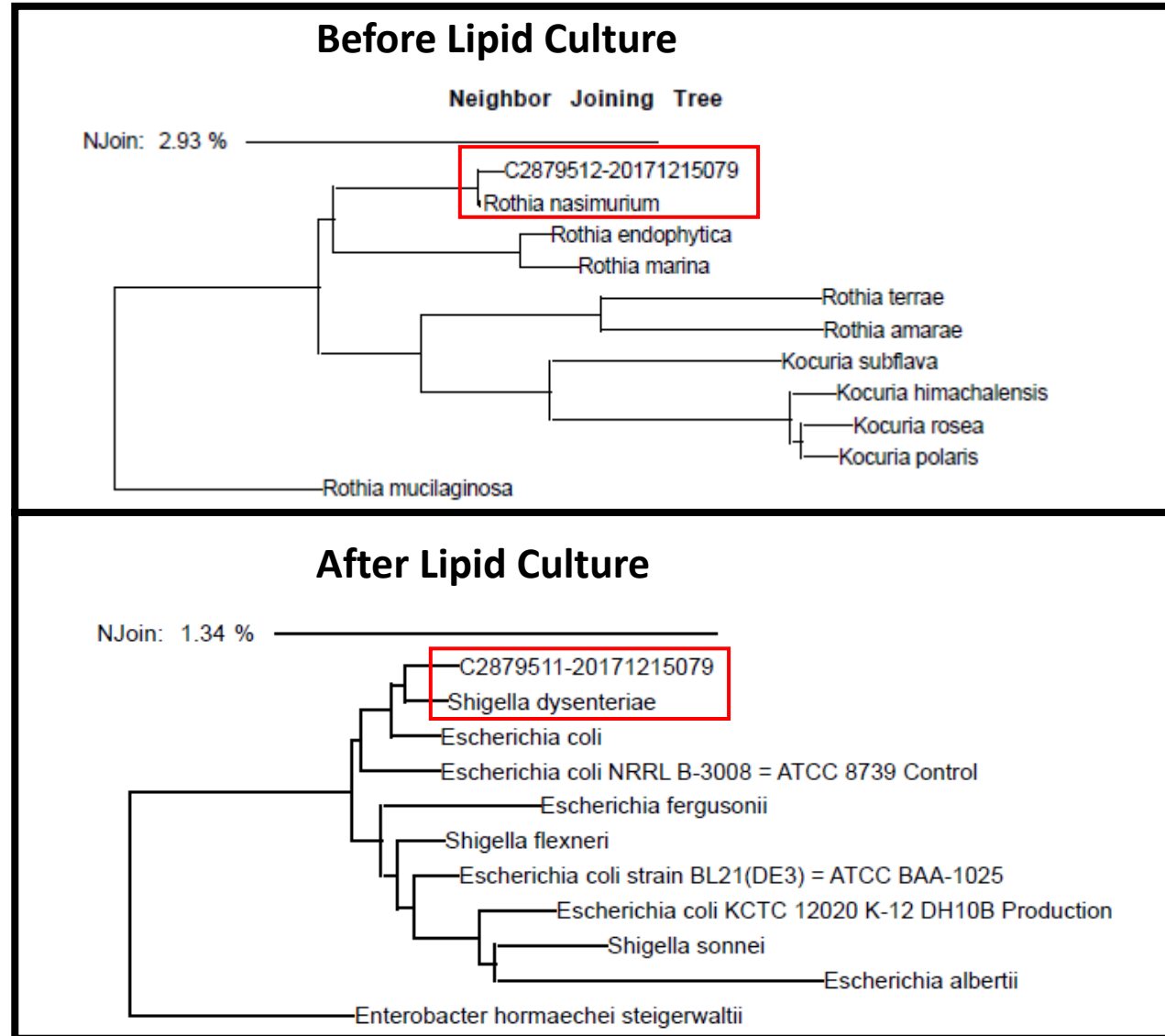
WILLIAM KEPLER WHITEFORD  
ENDOWED PROFESSOR AND  
CHAIR  
UNIVERSITY OF PITTSBURGH  
CHEMICAL ENGINEERING

# Reference Data

# Subsequent Passage of Increasing Lipid Environmental Stress Generates Bacteria with Enhanced Lipase Secretion



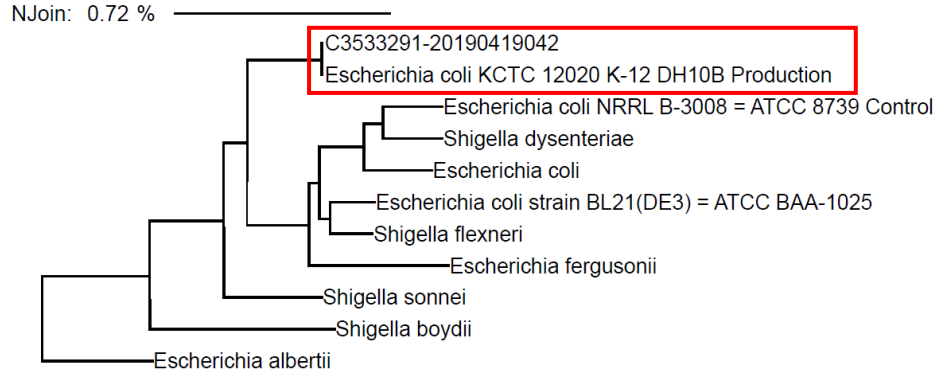
# 16S RNA Sequencing Indicates Bacterial Populations Shift Toward Shigella or E-Coli Strains



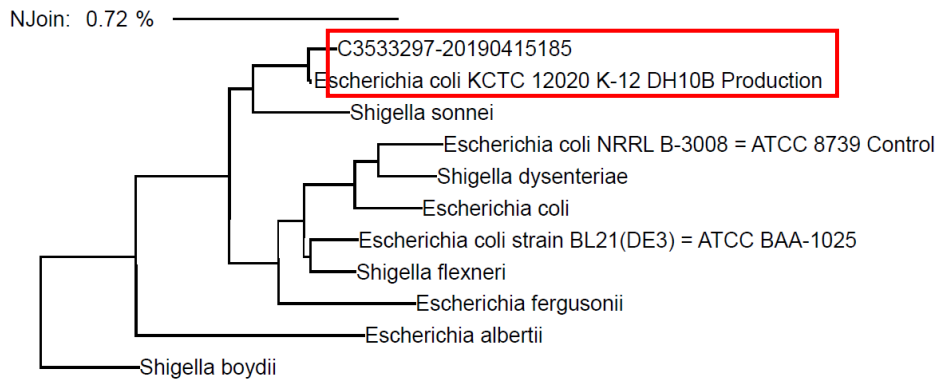


# 16S RNA Sequencing of Canine & Human Samples Show Similar Population Shifts

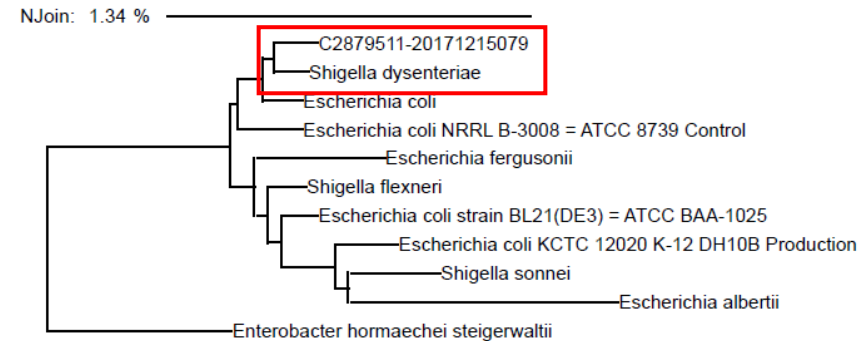
## Canine



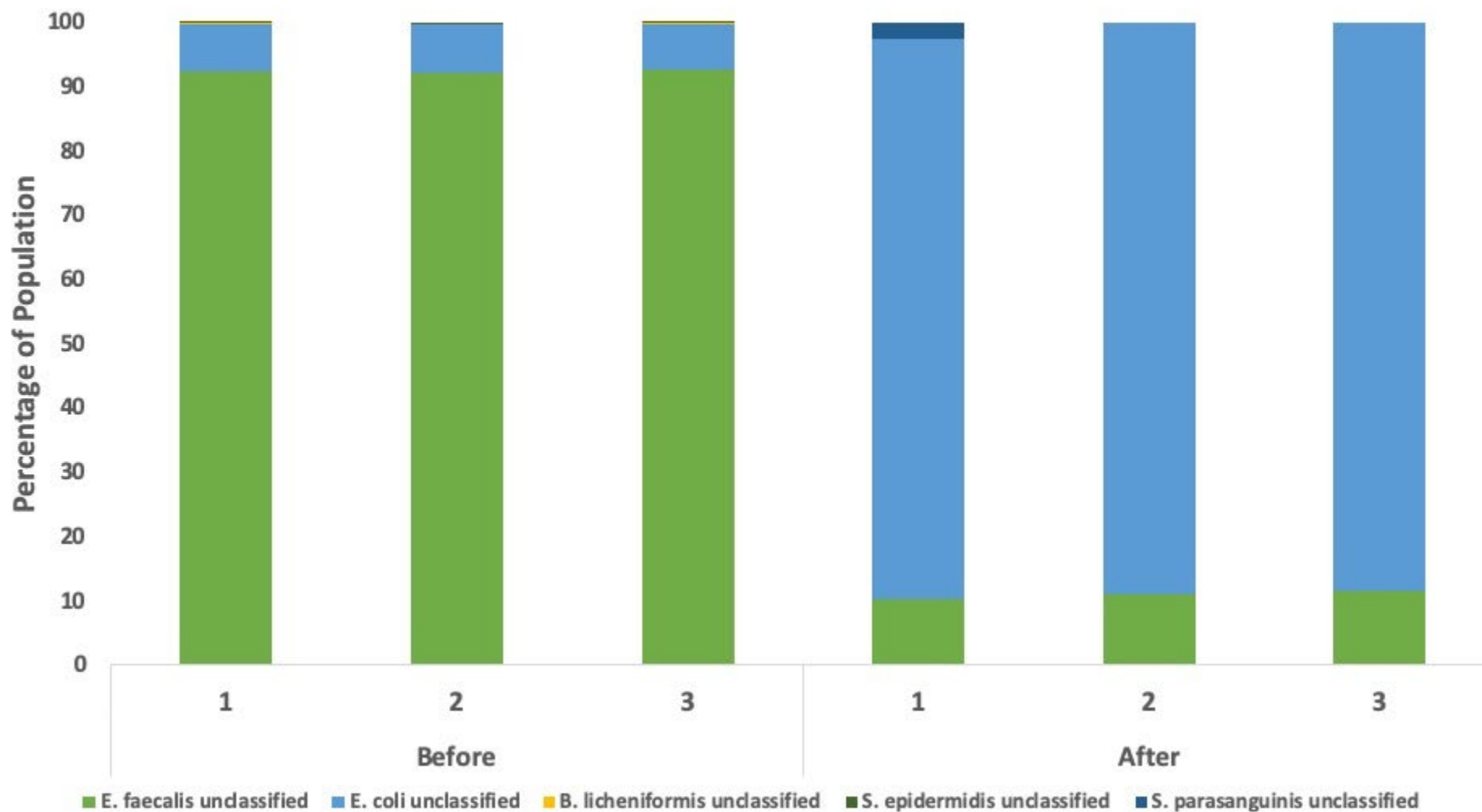
## Human



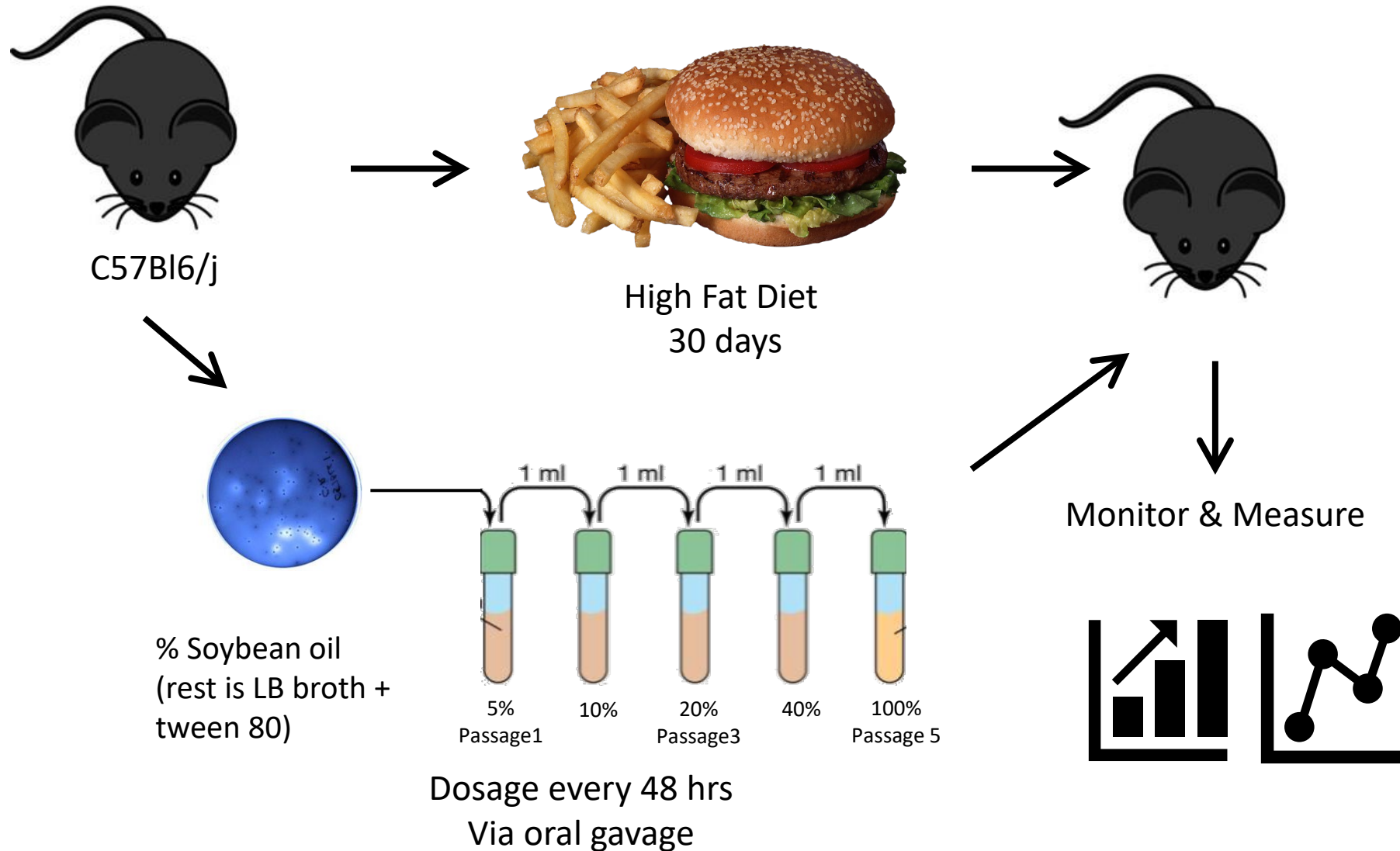
## Mouse



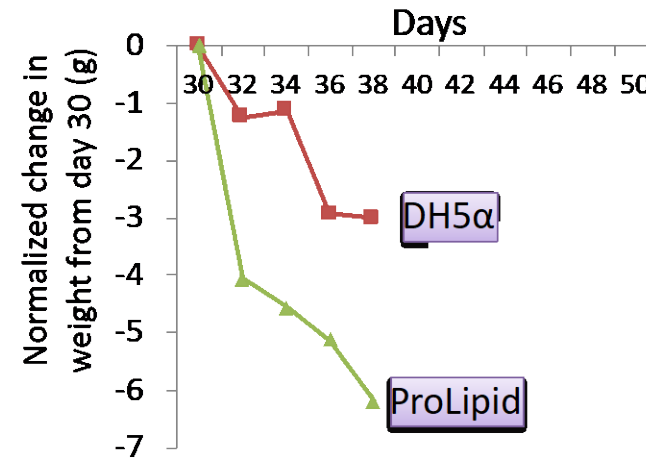
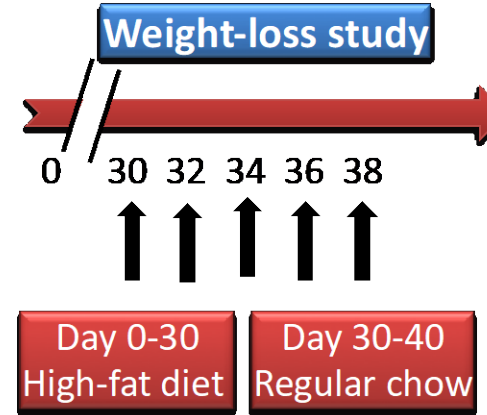
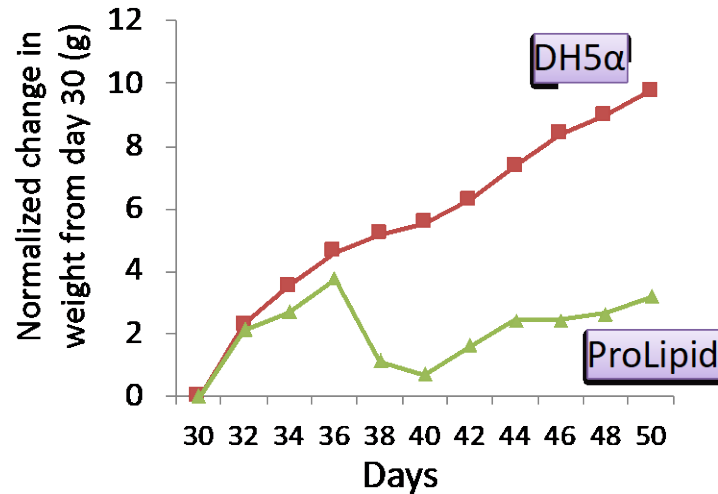
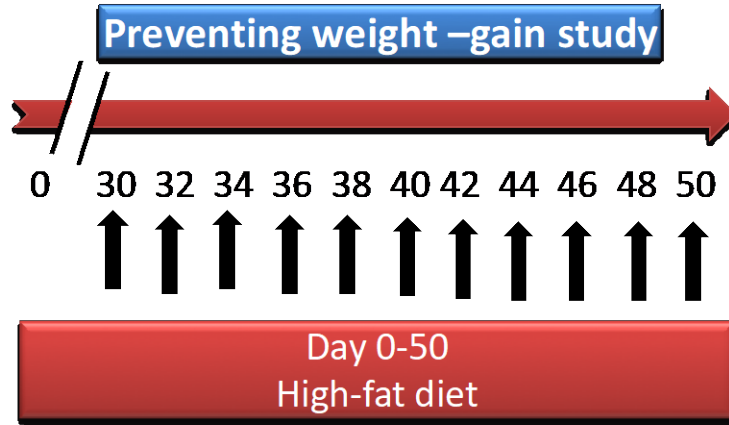
# Genetic Sequencing of Whole Colony Populations Indicate That This Lipase Secreting Population is Pre-Existing



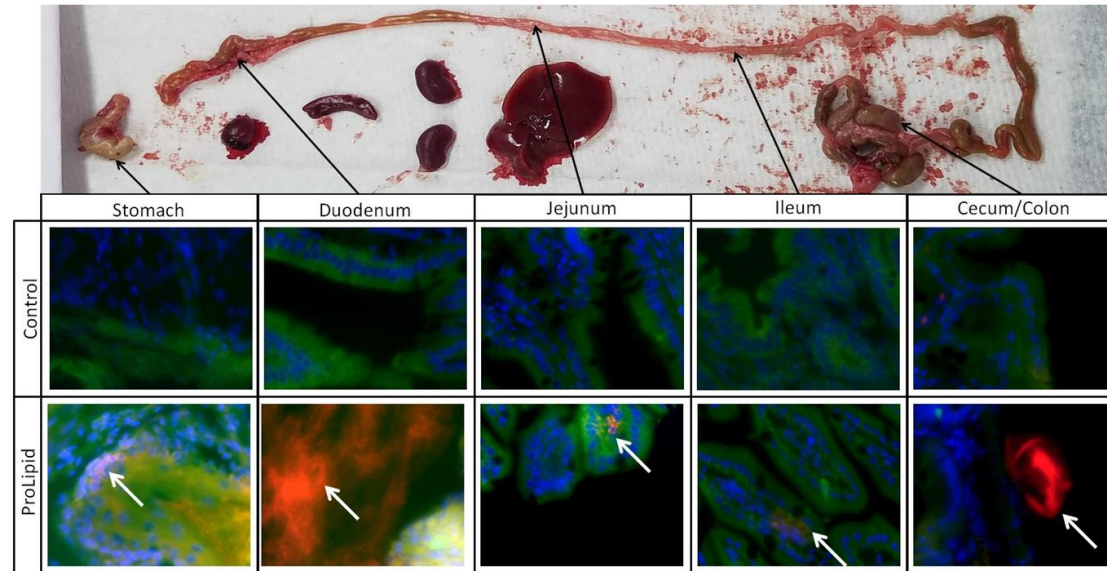
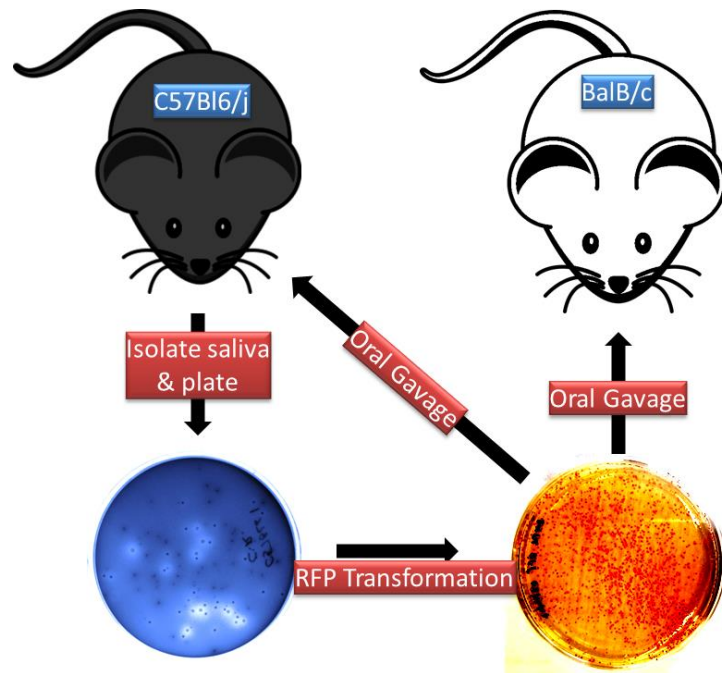
# Animal Model of Fat Induced Obesity and Probiotic Generation



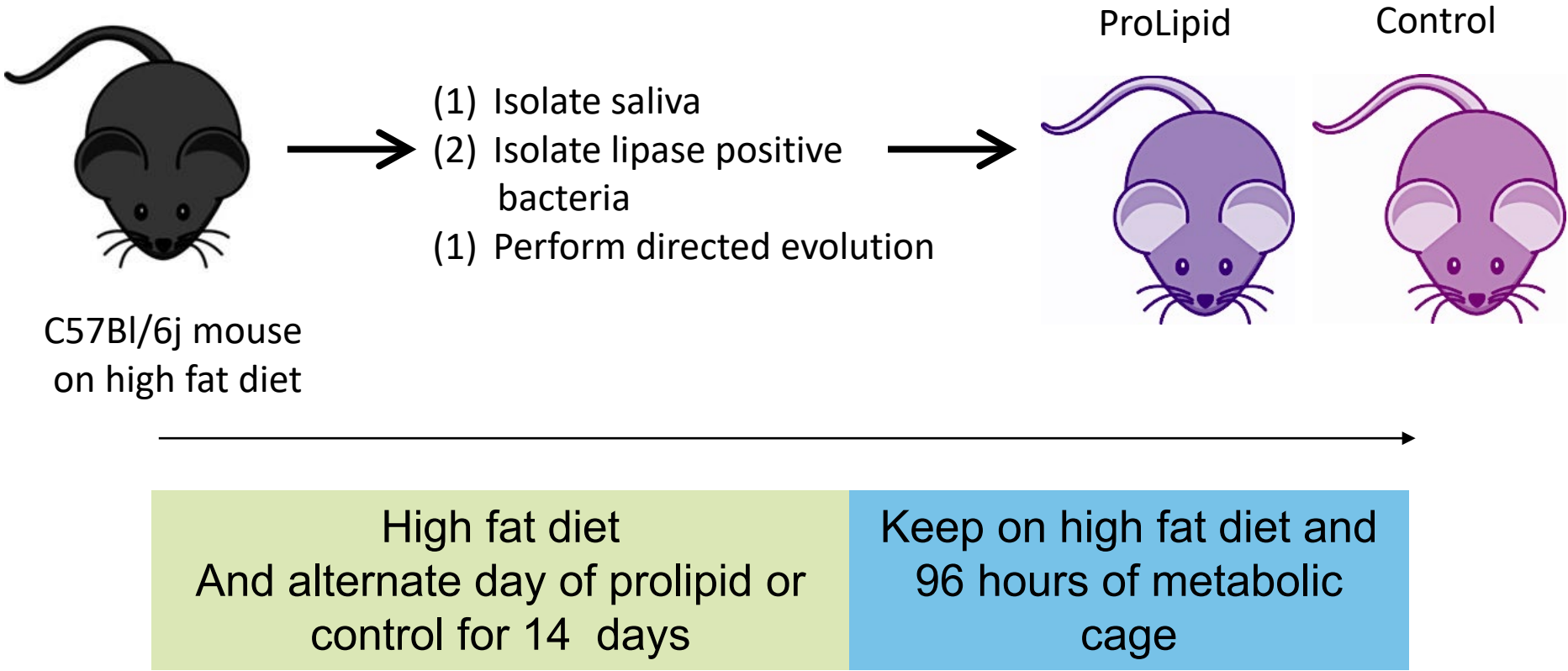
# YouBiotics Prevent Weight Gain without a Diet Change and Enhance Weight Loss Following Diet Change



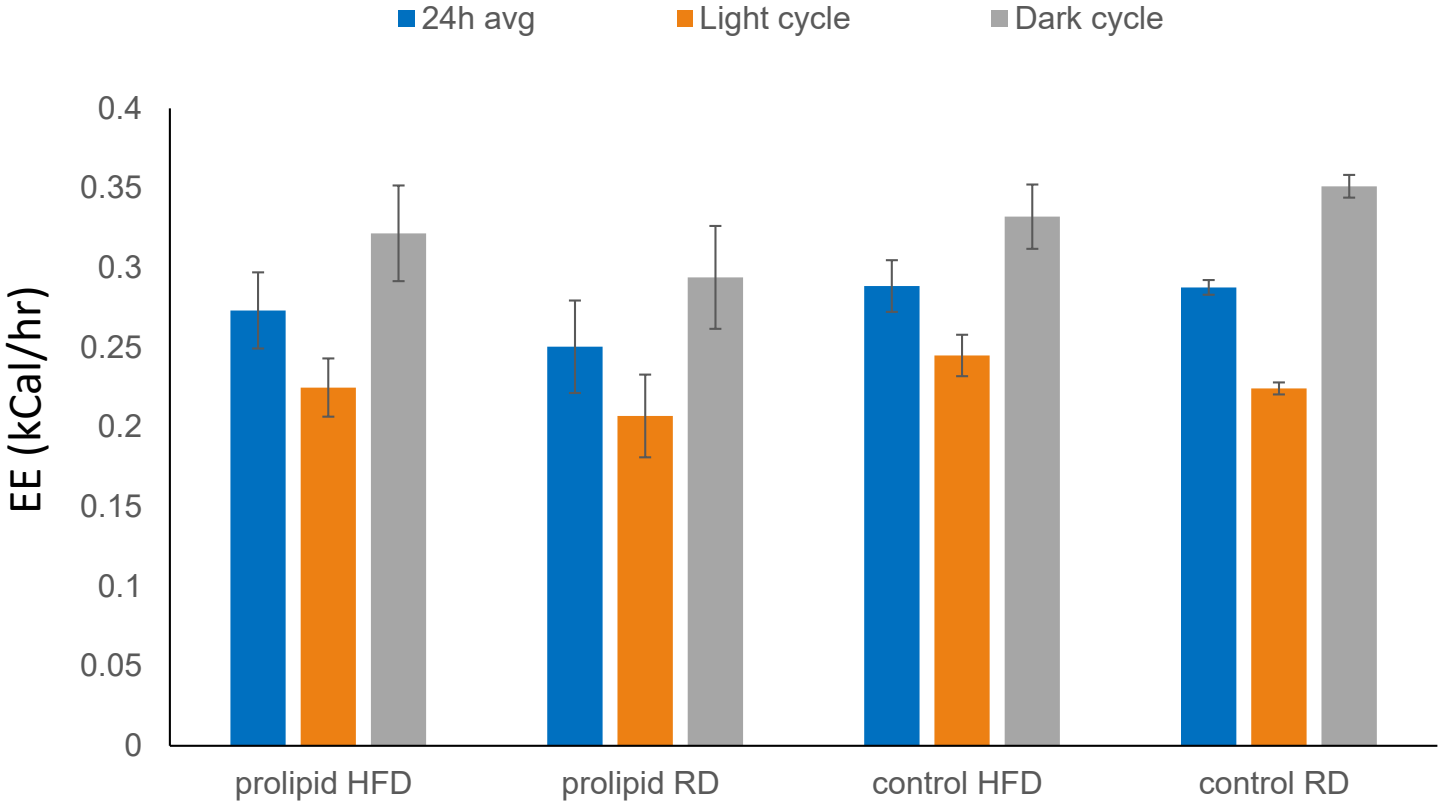
# B6-Derived YouBiotics Colonize in B6 Mice, But Not BalB/C Mice



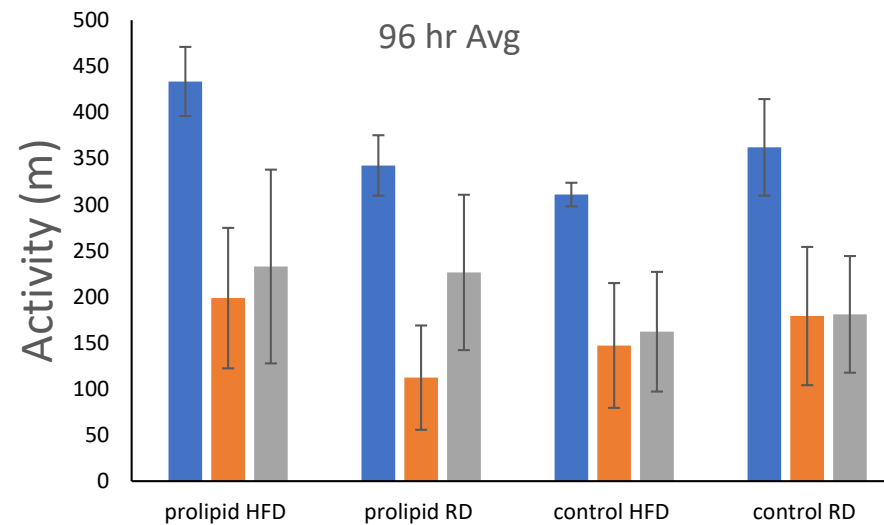
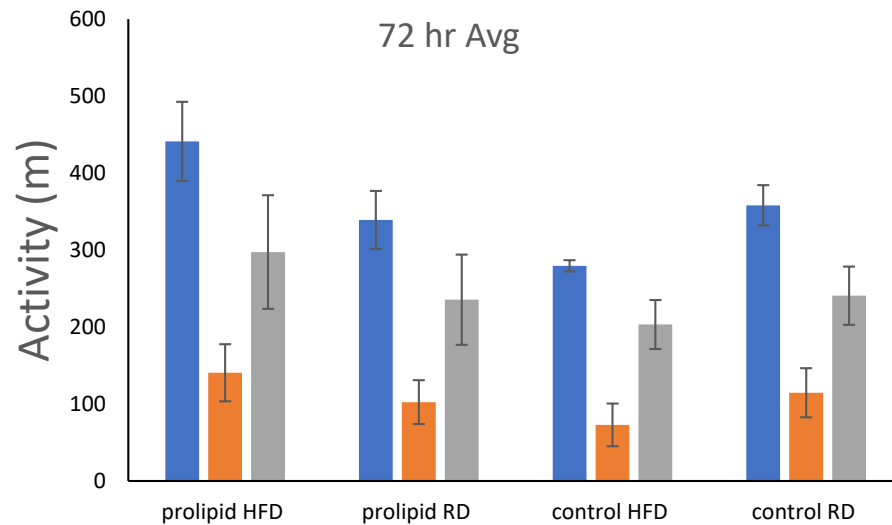
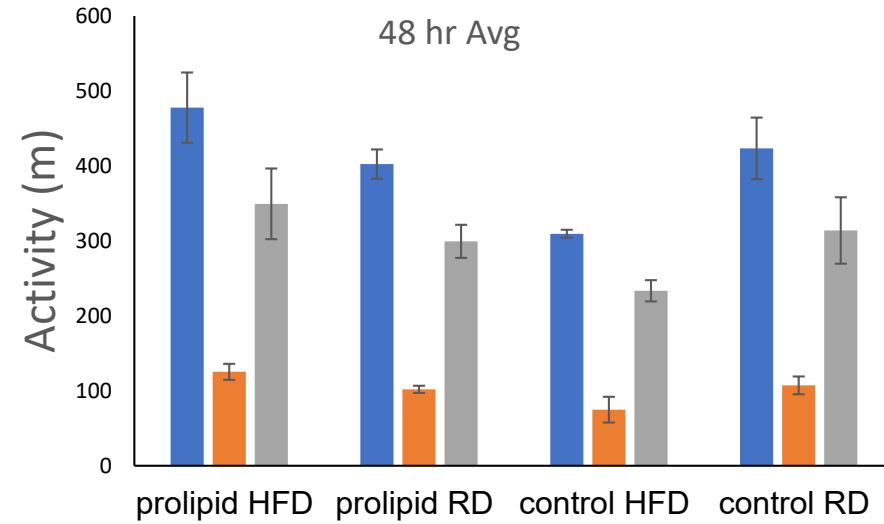
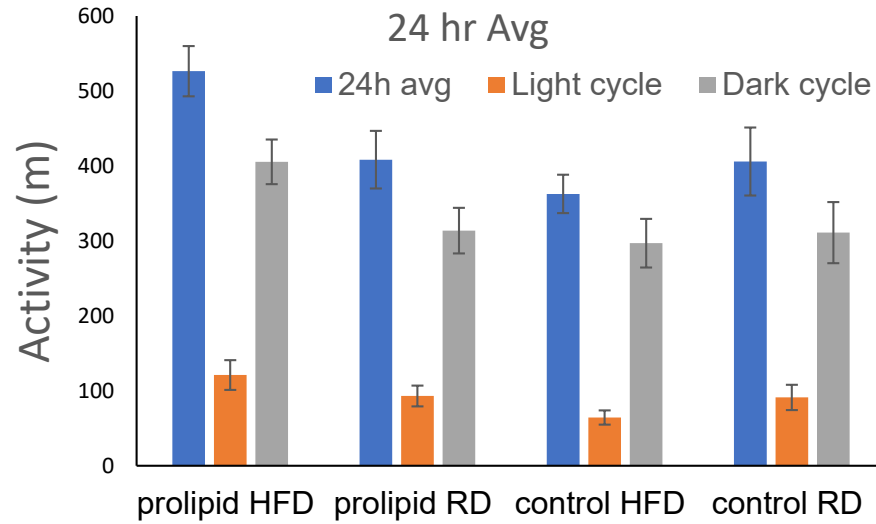
# Metabolic Cage Study Design



# No Statistically Significant Difference in EE

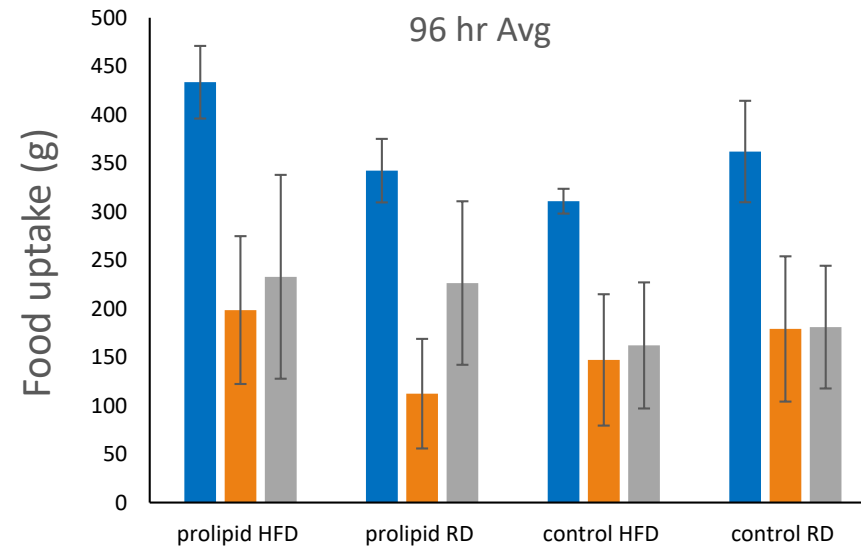
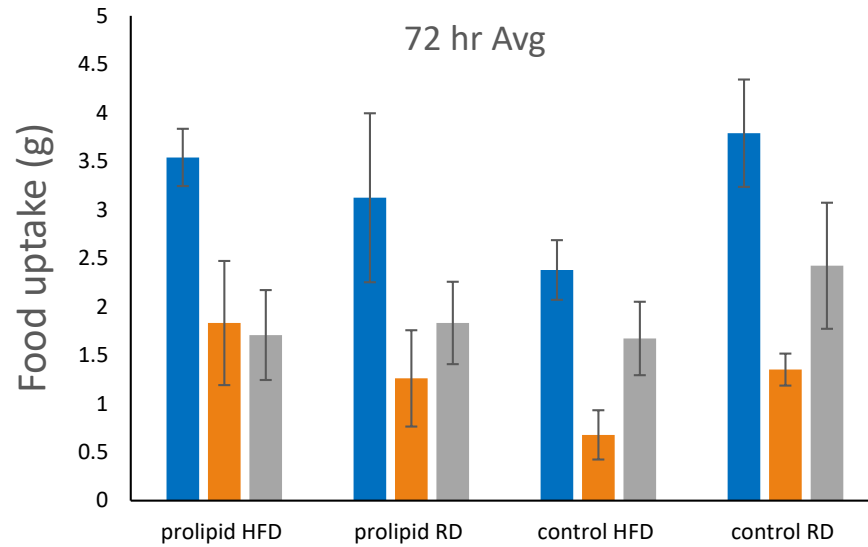
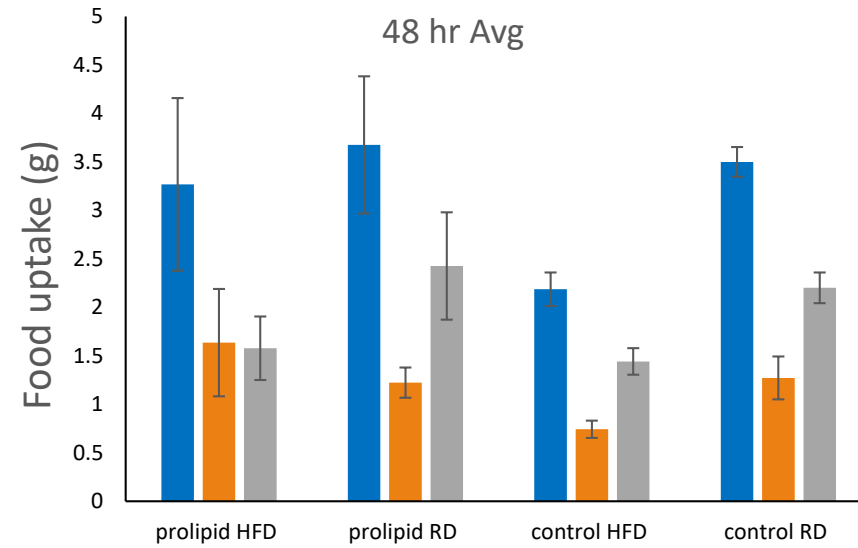
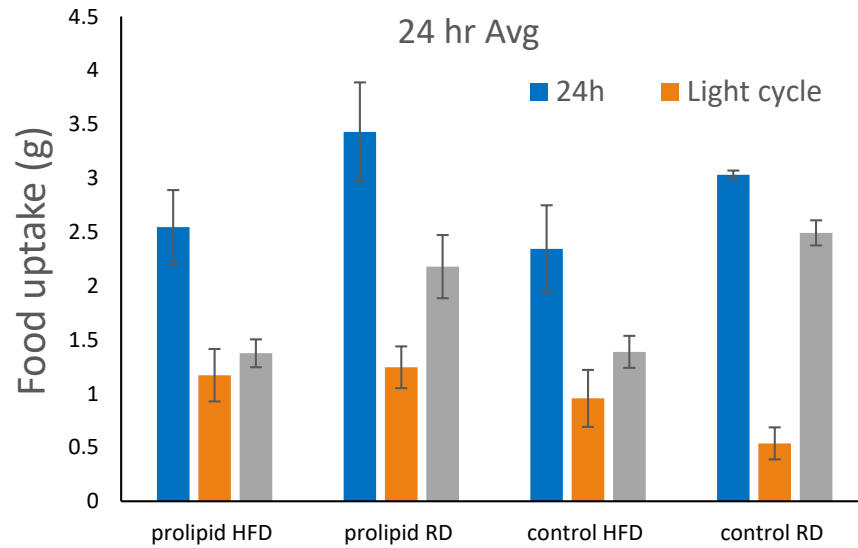


# Slight Increase in Activity for Prolipid HFD Compared to Control HFD

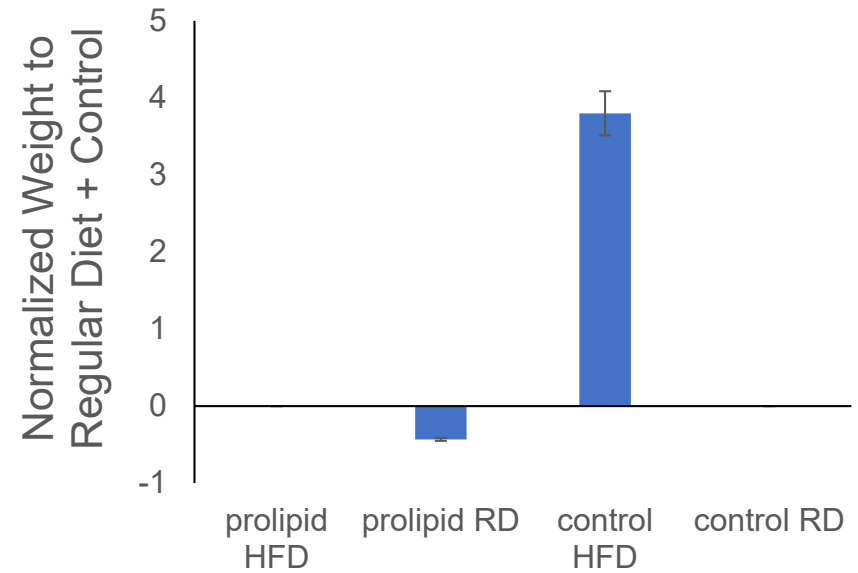
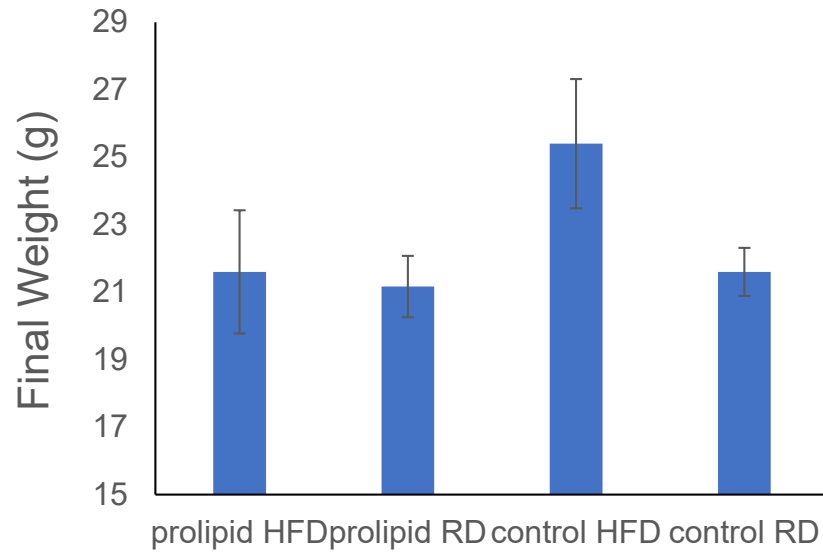




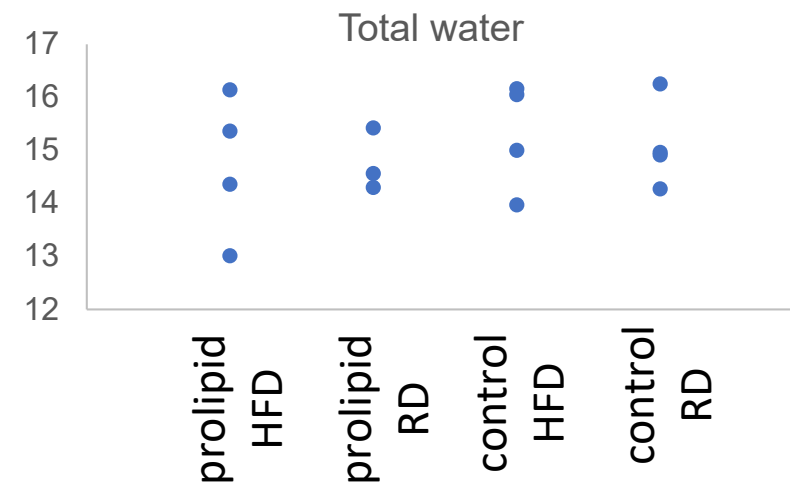
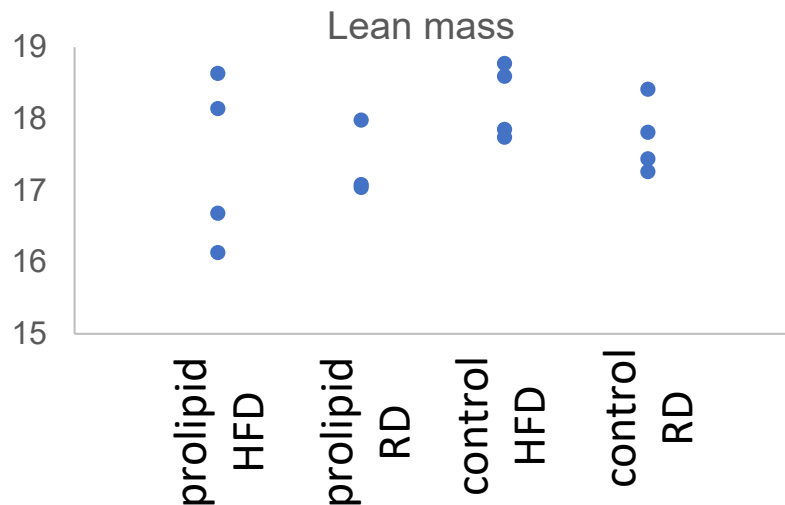
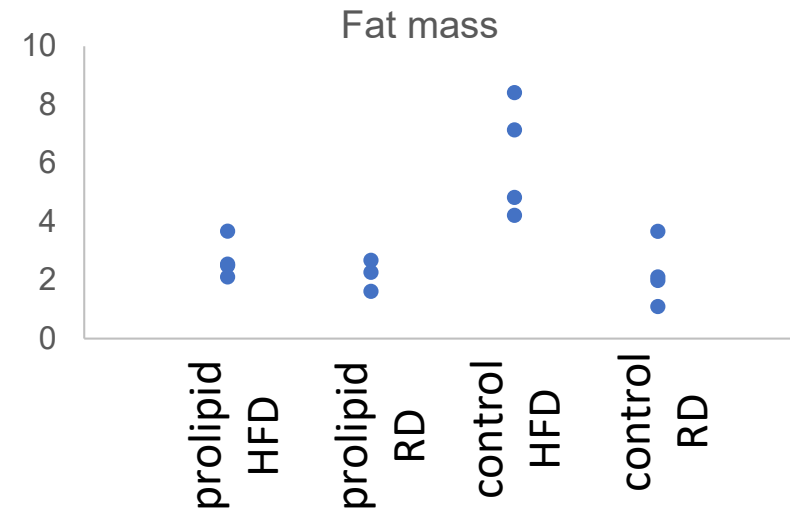
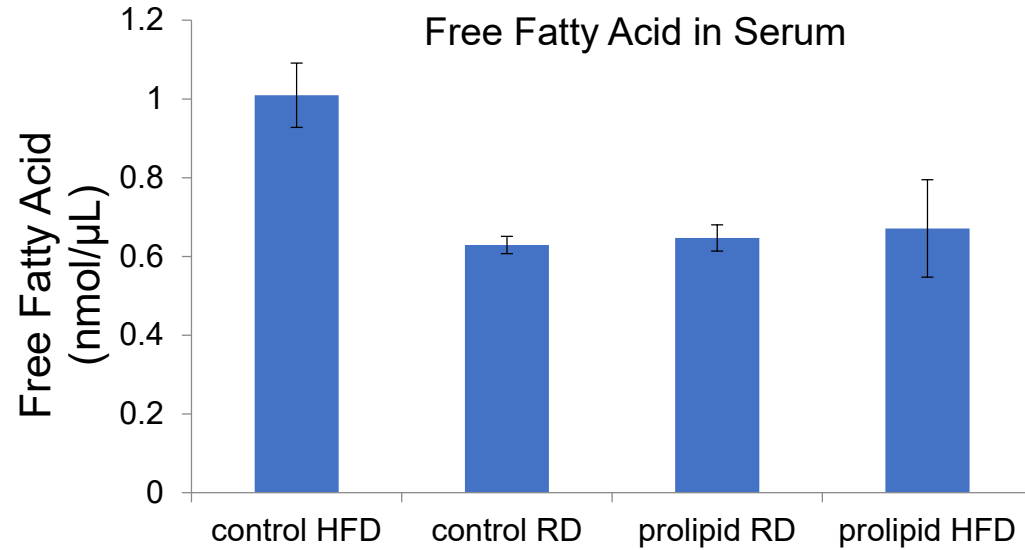
# No Statistically Significant Difference in Food Uptake



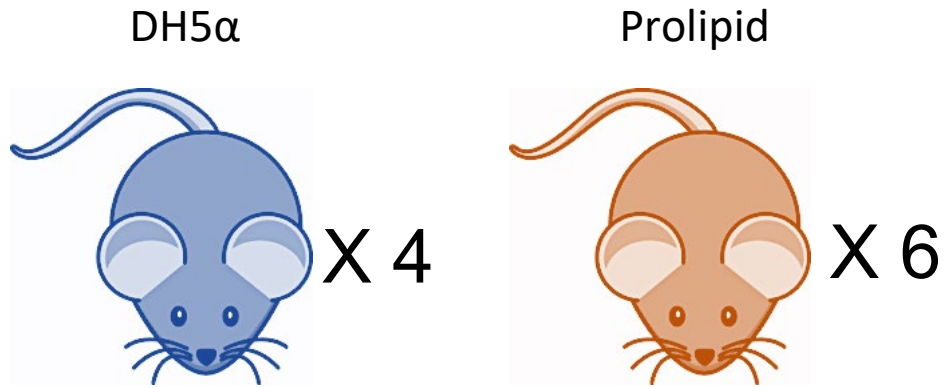
# Final Animal Weights



# Circulating Fats and Deposited Fat in Tissues Significantly Increased Only in the Control HFD Group

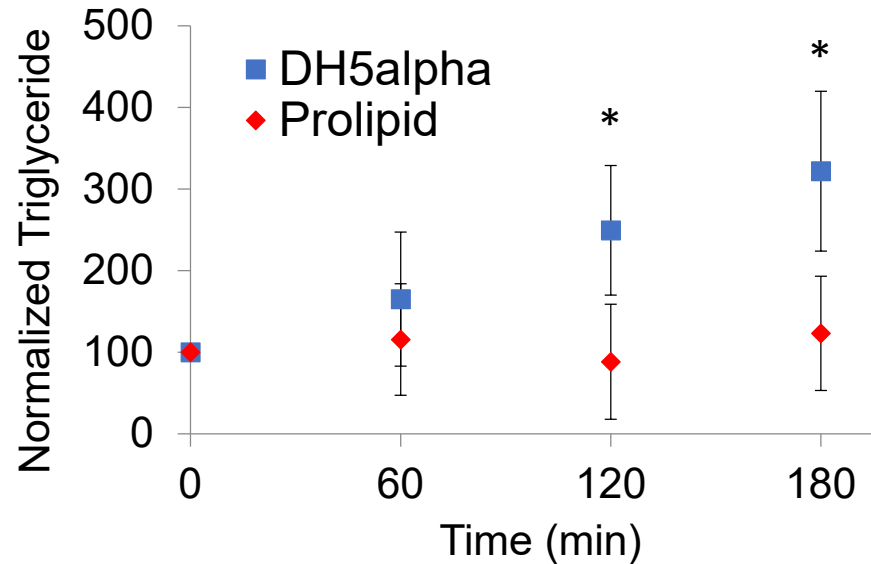


# YouBiotics Prevent Fat Uptake in Real-time

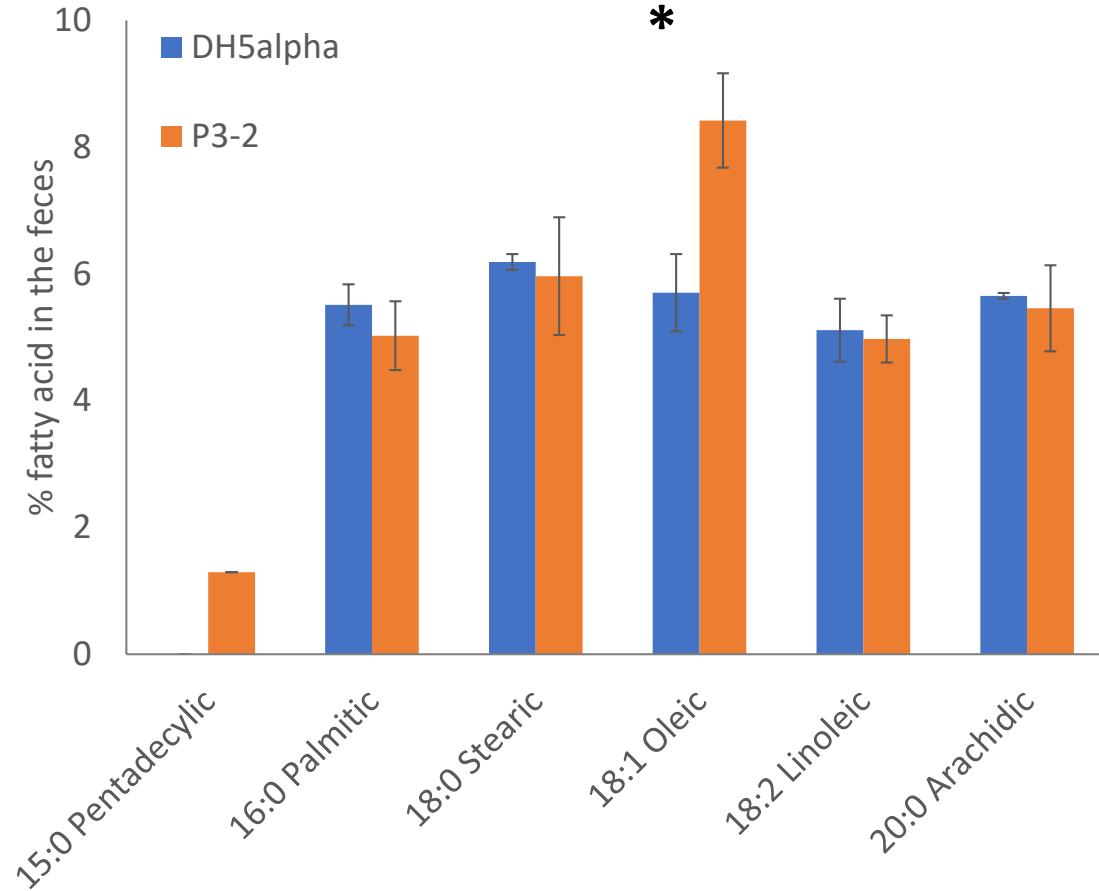
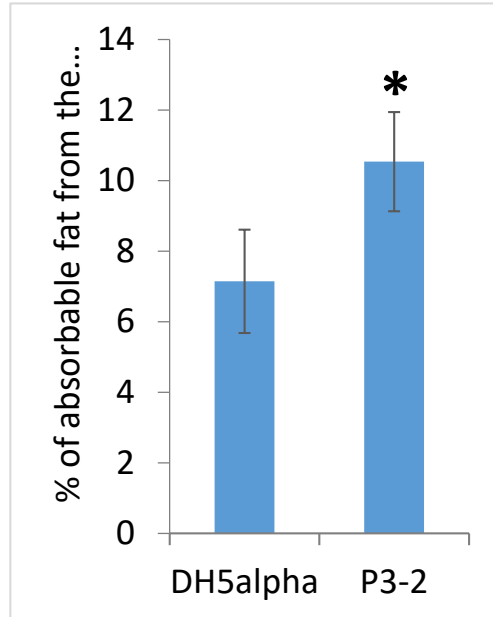


Oral gavage of soybean oil mixed with YouBiotics or DH5α

**\* Significant difference  
p-value <0.05  
Average +/- stdev**



# Fecal Fat Excretion Was Significantly Increased in Mice Receiving YouBiotics



Fatty Acid	Soybean Oil (%)
Palmitic	10.5
Stearic	2.7
Oleic	20.8
Linoleic	58.6
Linolenic	5.0

# In Vitro Culture of YouBiotics with Soybean Oil Shows Bacteria Directly Convert and Manipulate Fats

