



● DAY
TWO

Personalized Nutrition by Prediction of Post-meal Blood Glucose Levels

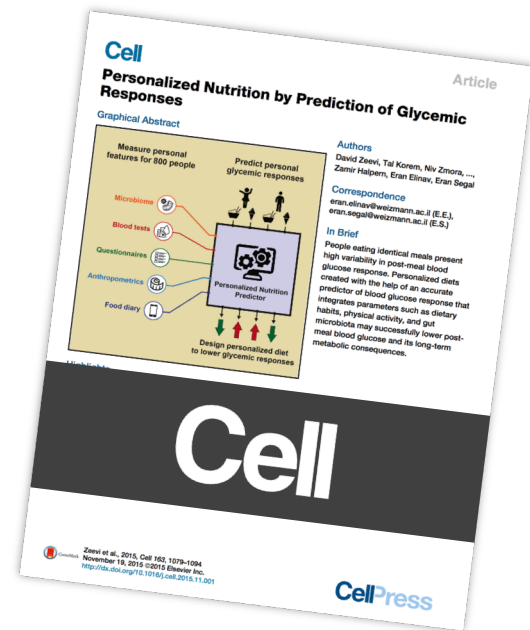
Microbiome Forum | Probiotics Congress 2018



Prof. Eran Elinav
M.D. Ph.D



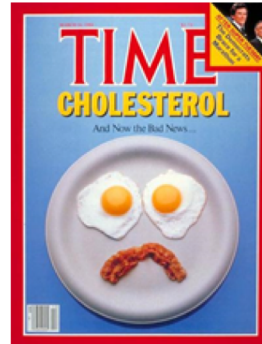
Prof. Eran Segal
Ph.D



What is the Best Diet for Humans?



1972



1984



1999



2002



2003

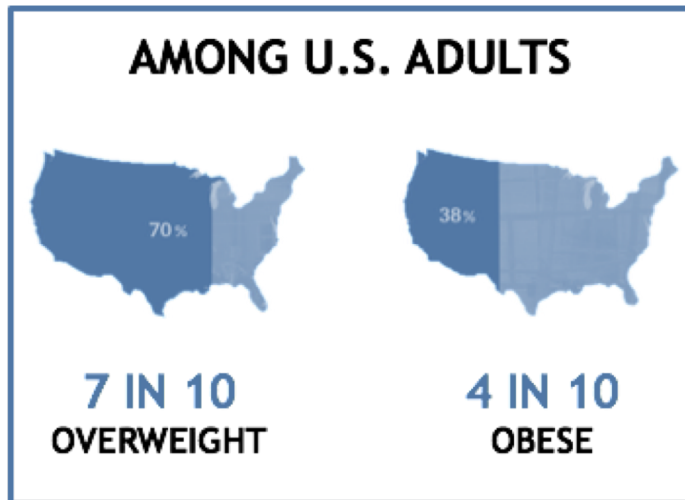


2011



2014

The Metabolic Disease Epidemic



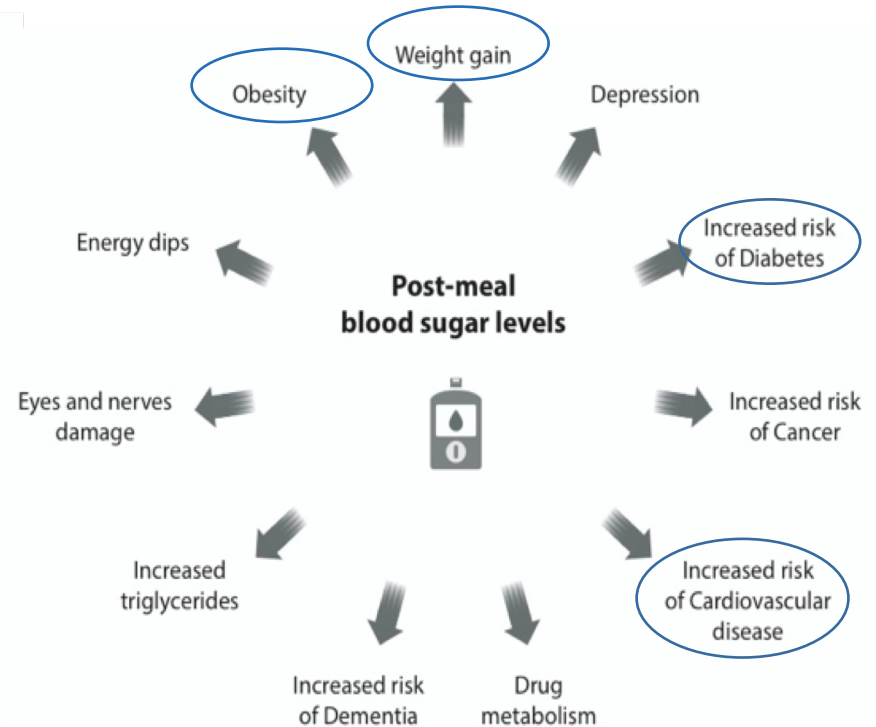
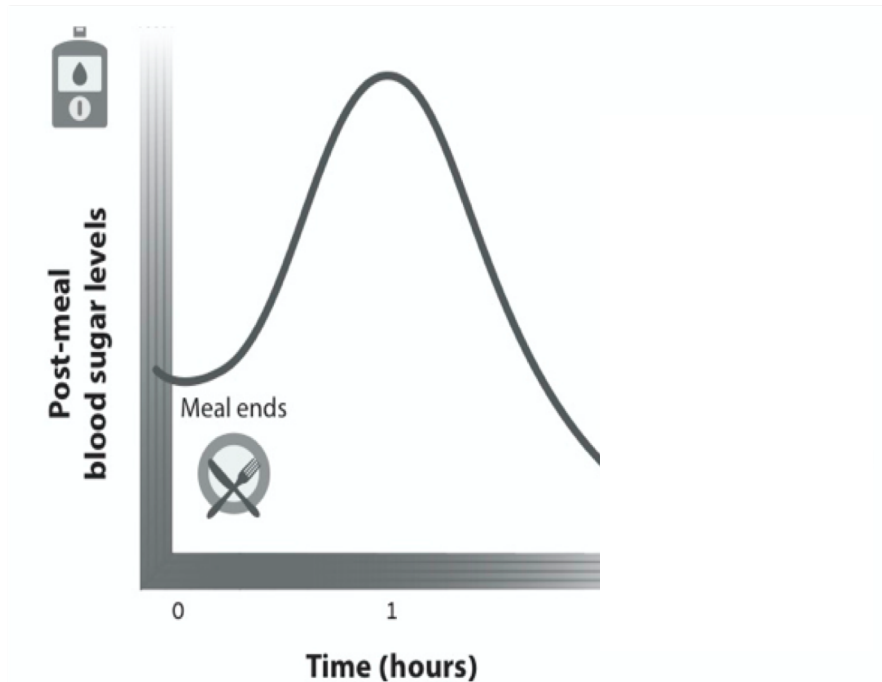
THE GLOBAL PREVALENCE OF DIABETES
AMONG ADULTS HAS RISEN
**FROM 4.7% IN 1980
TO 8.5% IN 2014**



THE COST OF DIAGNOSED DIABETES IN 2012 WAS
\$245 BILLION

Flegal *et al.*, JAMA 2014; WHO 2016; American Diabetes Association 2014

Meal Glucose Response as a Measure of Health



Meal Glucose Response as a Measure of Health

- Direct measure of meal effects
- Immediate feedback
- High Resolution
- Risk factor for many diseases



Continuous Glucose Monitor

Easy to measure

THE PERSONALIZED NUTRITION PROJECT

50,000 MEALS



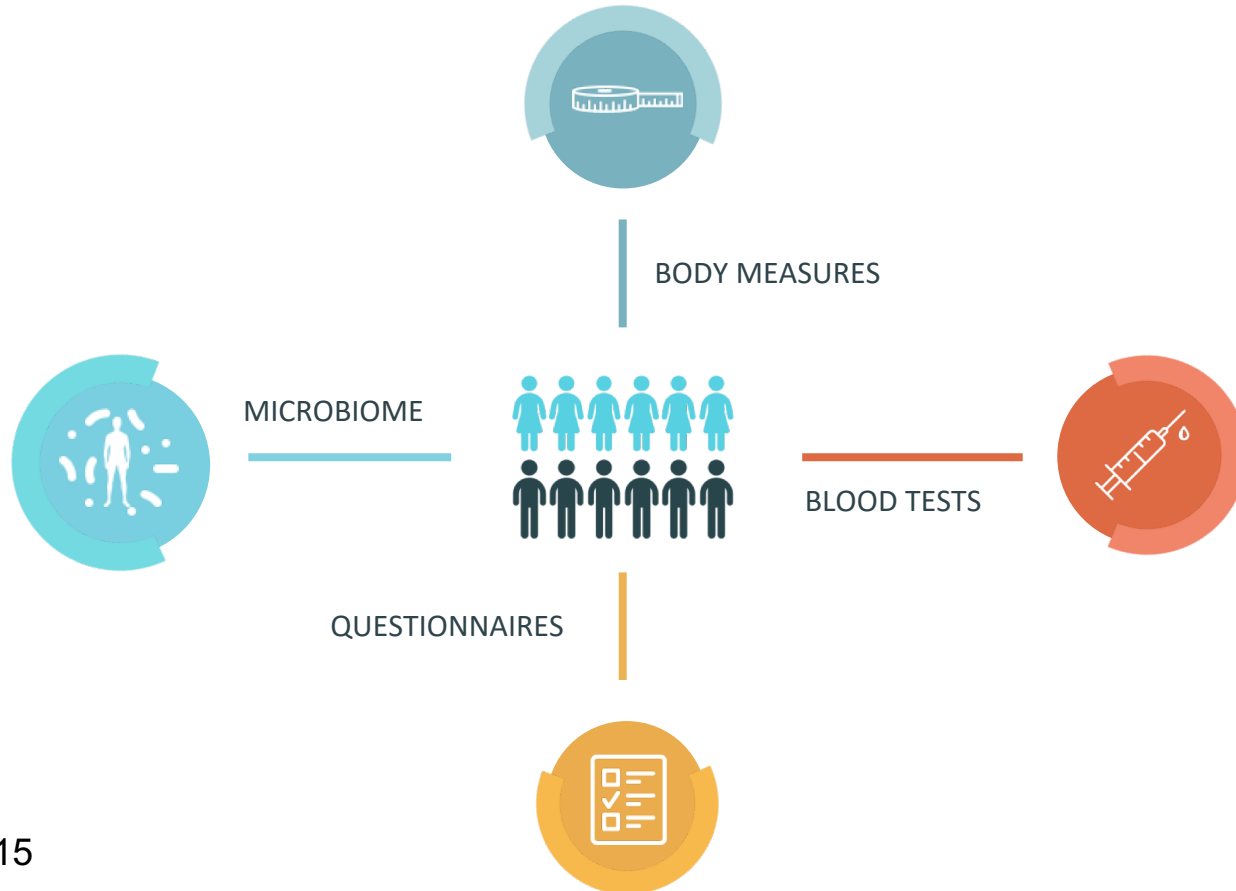
1,000 PARTICIPANTS



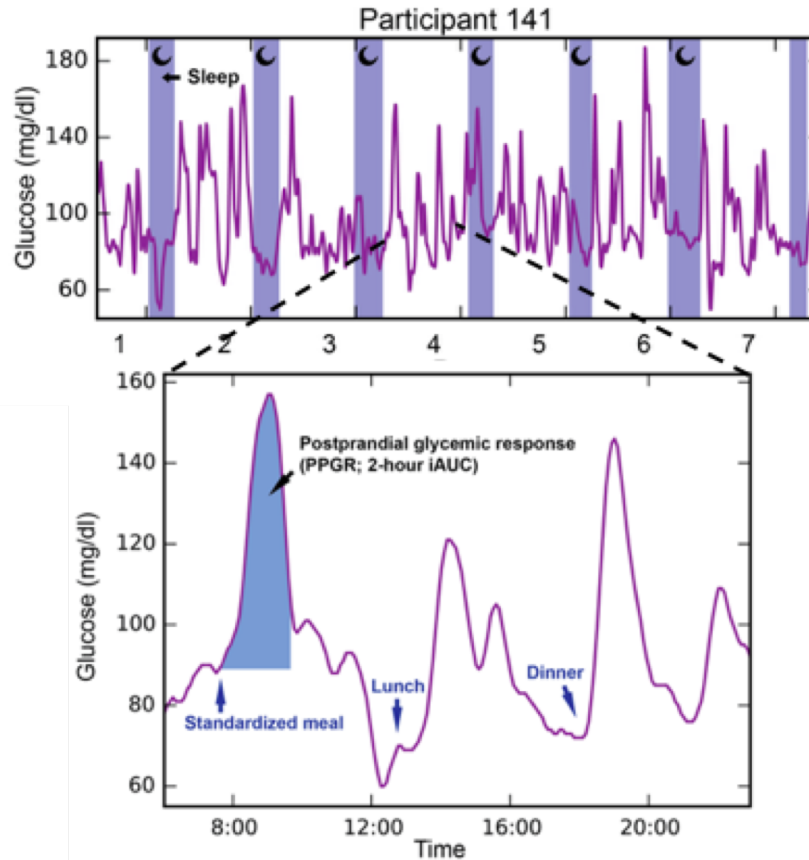
2,000,000 GLUCOSE MEASUREMENTS



The Personalized Nutrition Project - 1000 Participants



Continuous Glucose Measurement

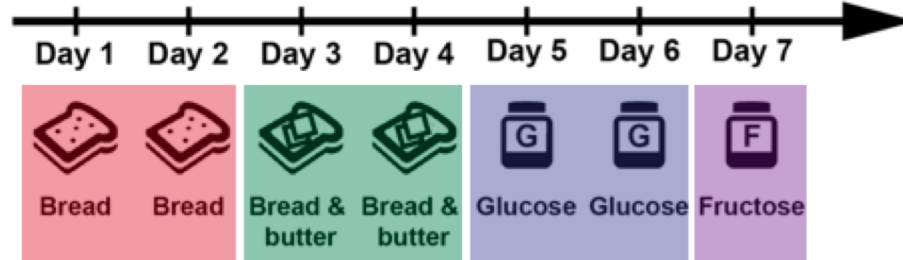


Response to Standardized Meals

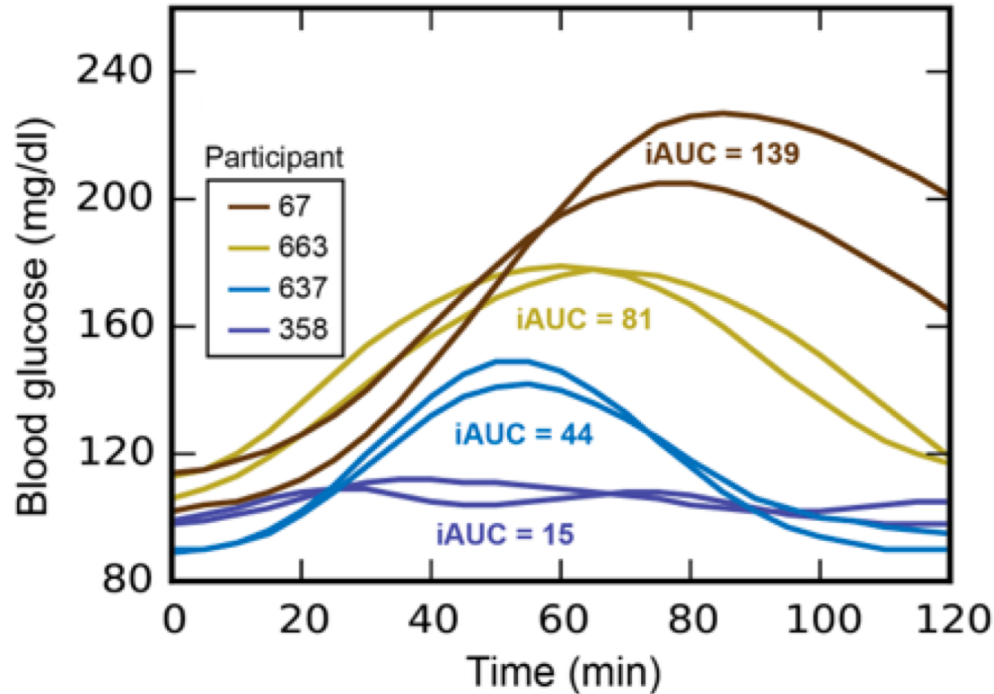
800 x



Standardized meals (50g available carbohydrates)



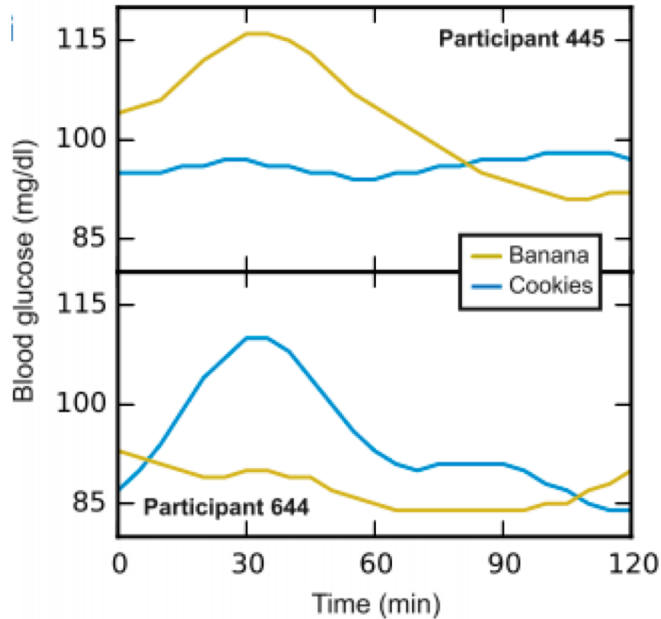
People Respond Differently to the Same Food



Standardized meal
response reproducibility

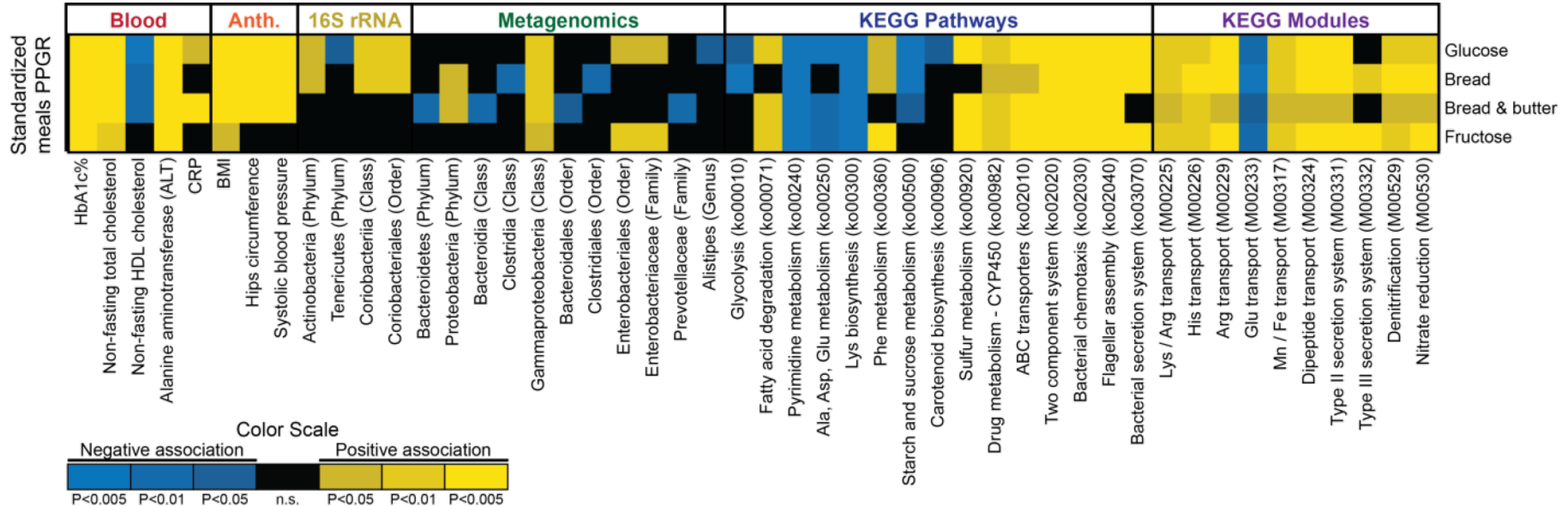
0.7-0.77

Personalized Responses to Foods

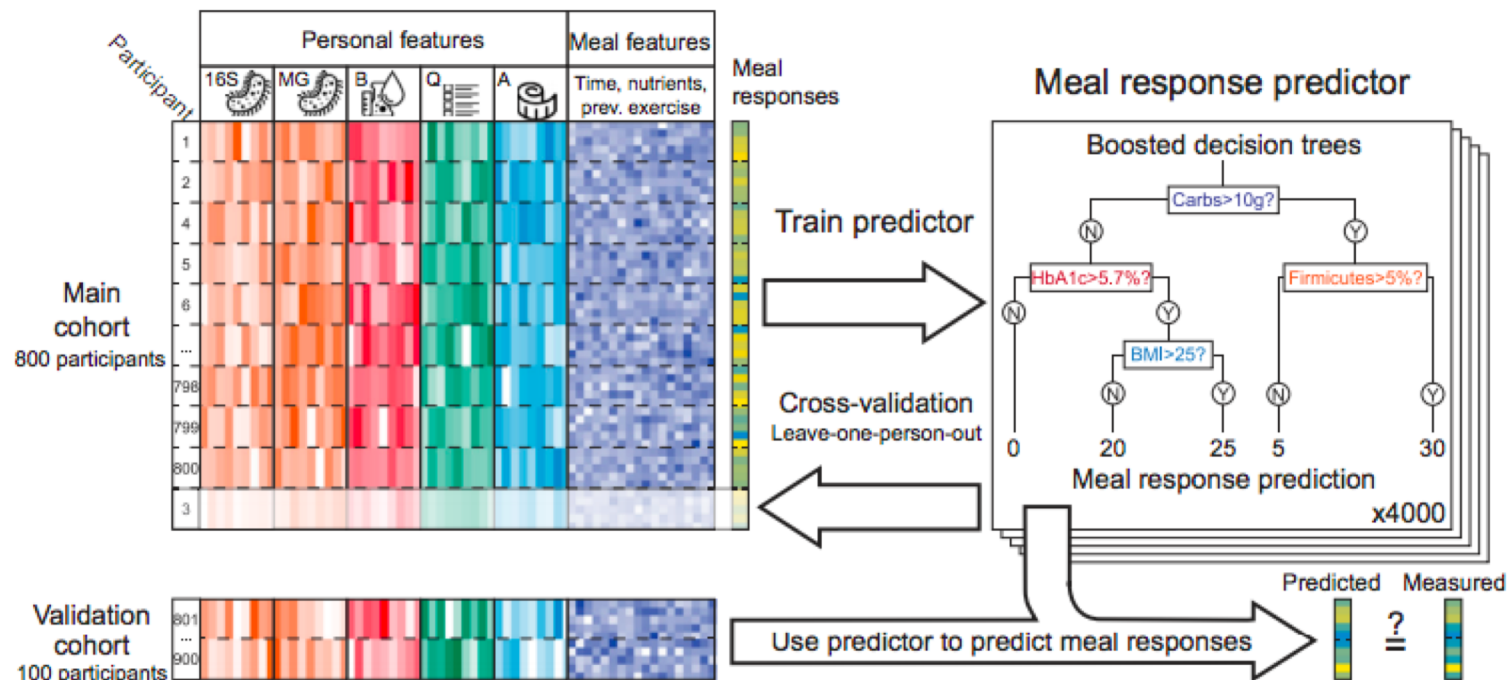


What is the efficacy of general dietary recommendations?

Meal responses correlate with microbiota



Predicting Glucose Meal Responses



Accurately Predicting Glucose Responses

Of explainable variance*

State of the Art -
Carbohydrate Counting

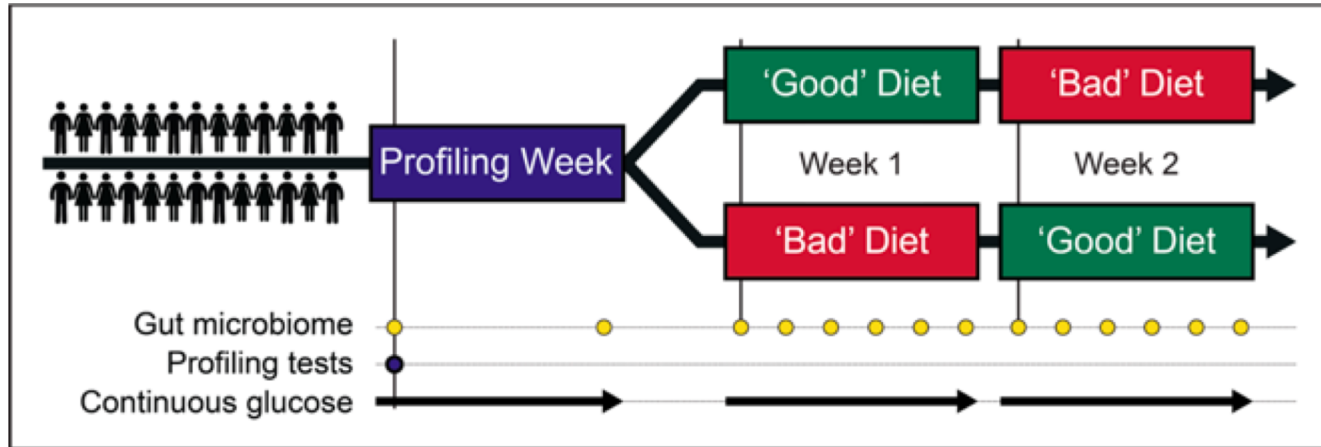
24%

Personalized Nutrition
Project

78%

* Using reproducibility of standardized meals as maximal explainable variance

Personally Tailored Diets



Intervention



Muesli



Sushi



Marzipan



Corn & Nuts



Coffee & Chocolate



Eggs & Bread



Pita & Hummus



Edamame



Noodles



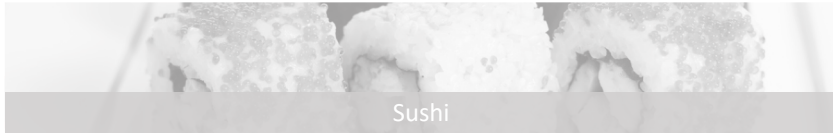
Ice Cream

Can you
guess the
good diet?

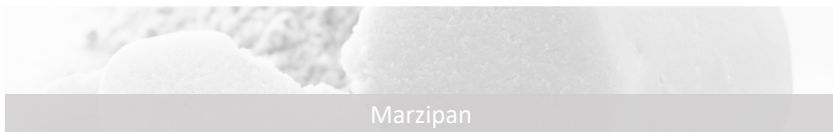
Intervention



Muesli



Sushi



Marzipan



Corn & Nuts



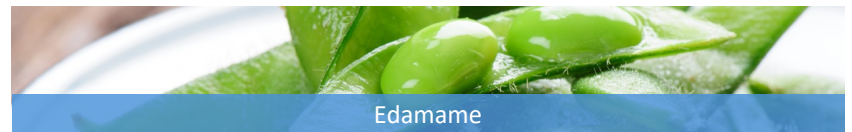
Coffee & Chocolate



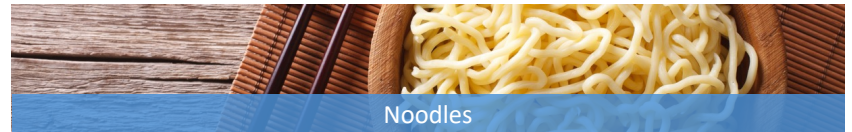
Eggs & Bread



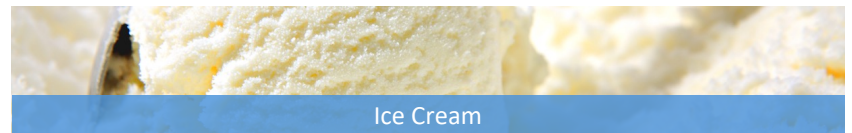
Pita & Hummus



Edamame

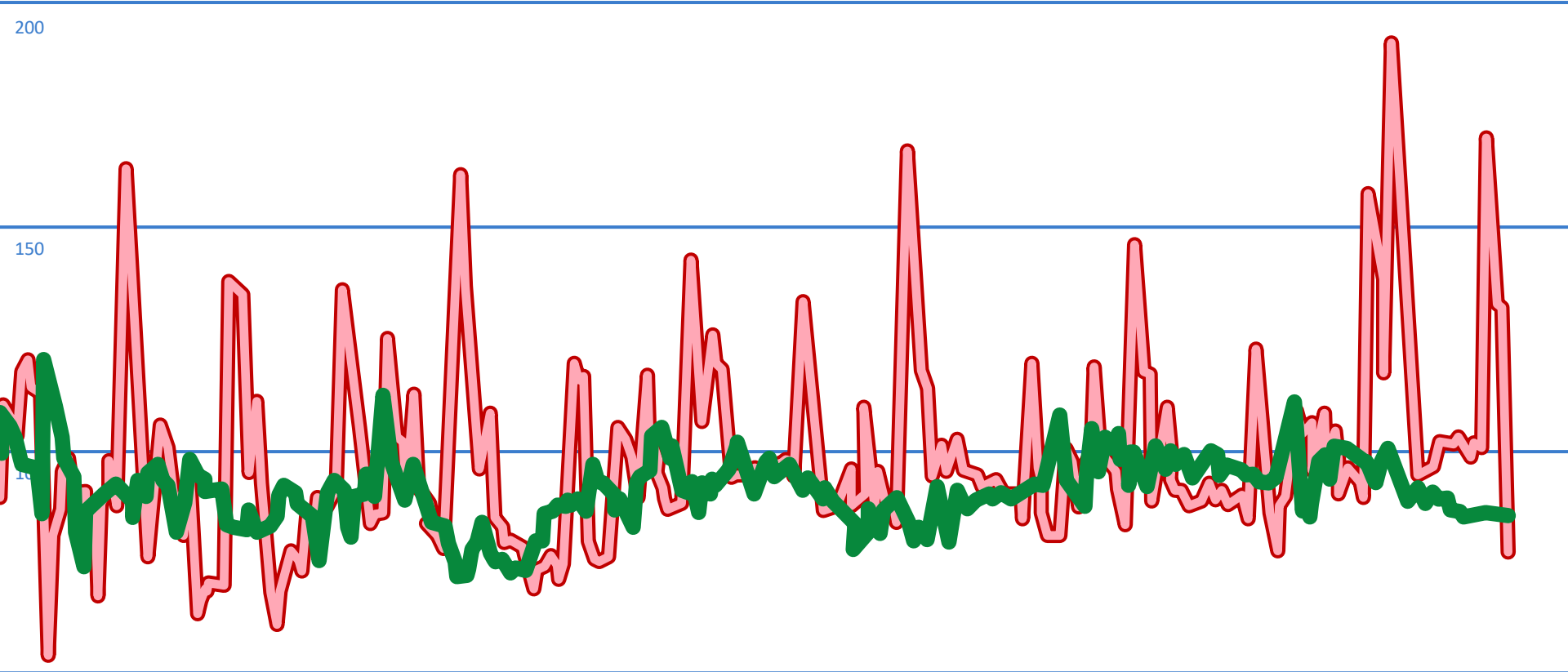


Noodles

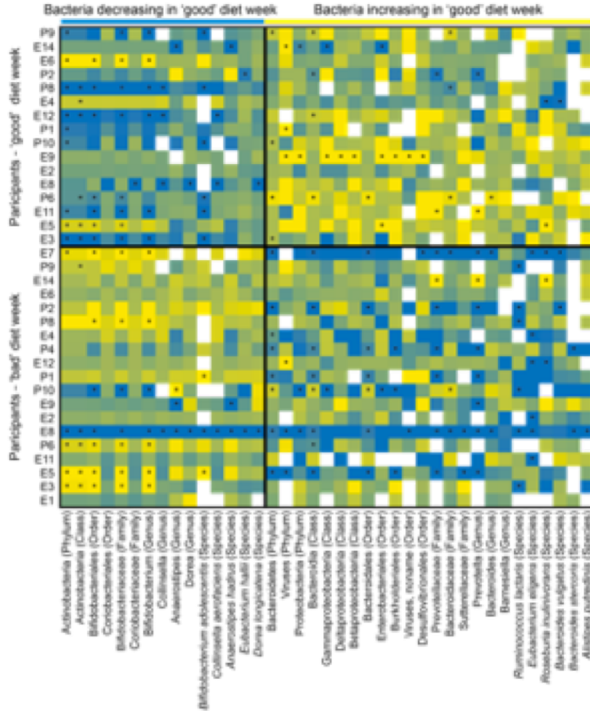


Ice Cream

Intervention

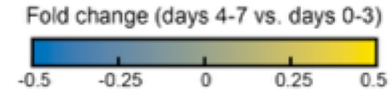


Dietary Interventions Induce Consistent Microbiota Changes




- *Bifidobacterium adolescentis* decreases following the 'good' diet week
- Low levels associate with greater weight loss (Santacruz et al., 2009)

- *Roseburia inulinivorans* increases following the 'good' diet week
- Low levels associate with T1DM (Qin et al., 2012)



The Glycemic-Control Product



Profile Eating habits Life style Medical

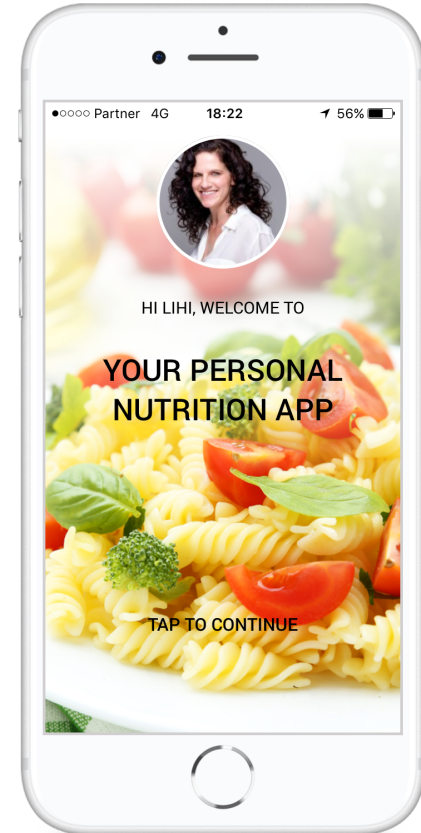
Life style

14 When do you usually get up in the morning on a working day? HH:MM

15 At what time do you usually go to sleep on a working day? HH:MM

16 How many hours per day do you sleep during mid-day (if you do)?

- Less Than Half Hour
- Half Hour To One Hour
- One Hour To Two Hours
- More Than Two Hours
- None





Applicability to US population

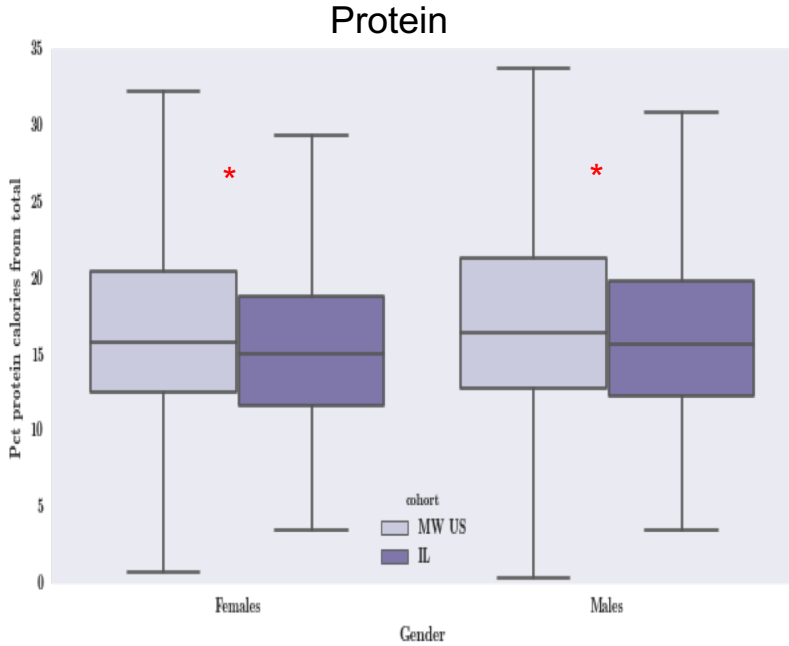
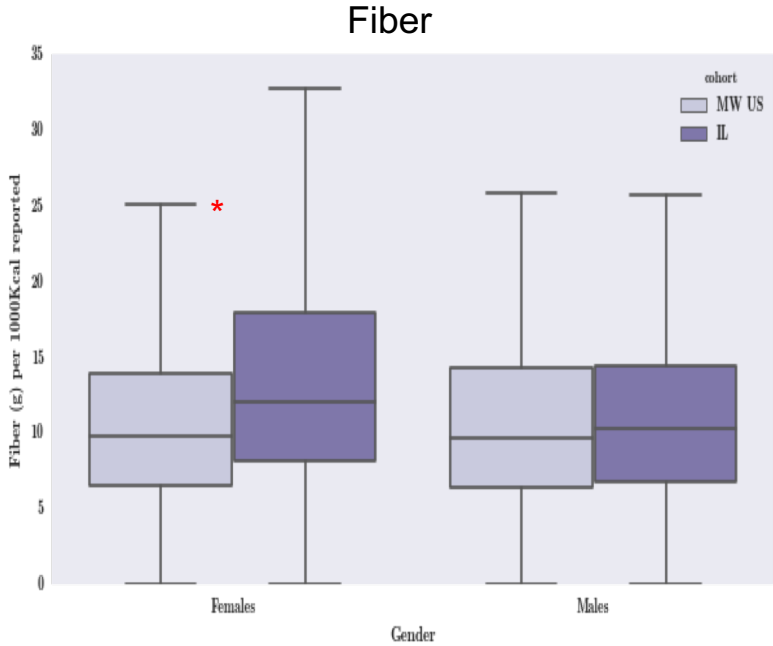
Applicability to US Population



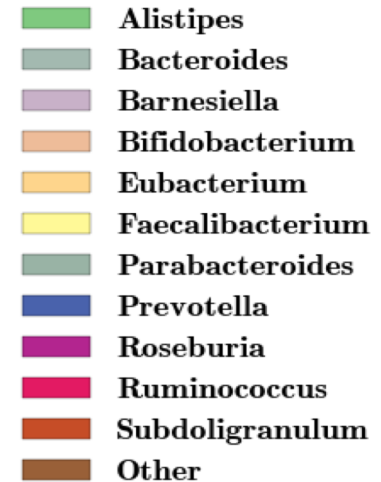
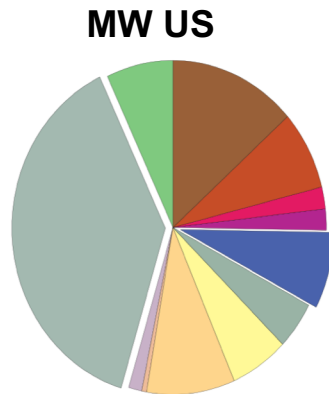
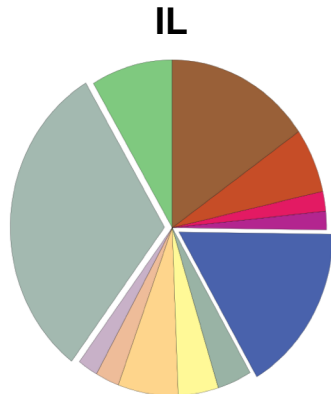
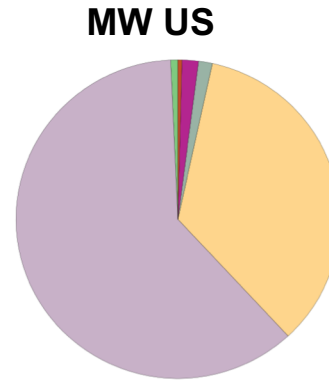
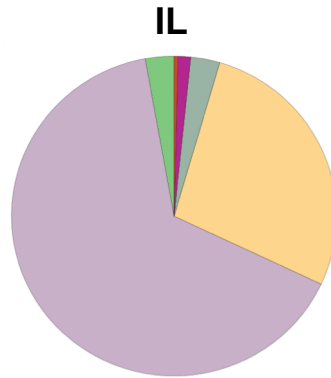
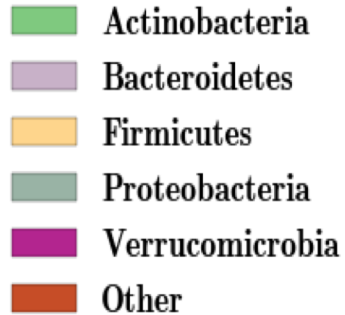
Midwestern cohort of 325 participants

Mendes-Soares et. al - in review.

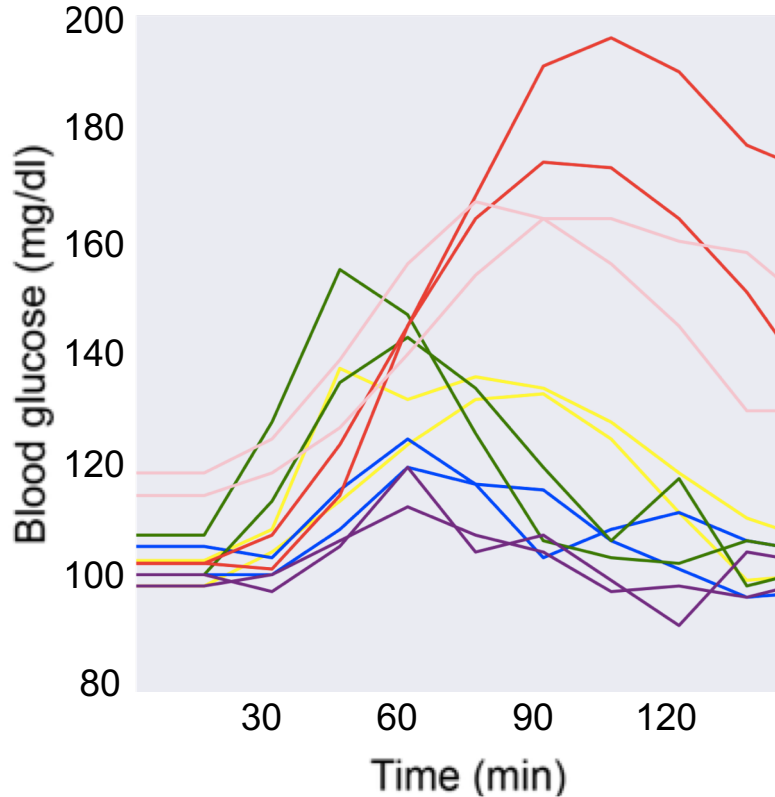
US and IL Cohorts Differ in Eating Habits



US and IL Cohorts Differ in Microbiome Composition



People Respond Differently to the Same Food



Standardized meal
response reproducibility

0.66

Accurately Predicting Glucose Responses in US participants

Of explainable variance*

State of the Art -
Carbohydrate Counting

37%

Israel-based Model

81%

Combined Model

88%

* Using reproducibility of standardized meals as maximal explainable variance



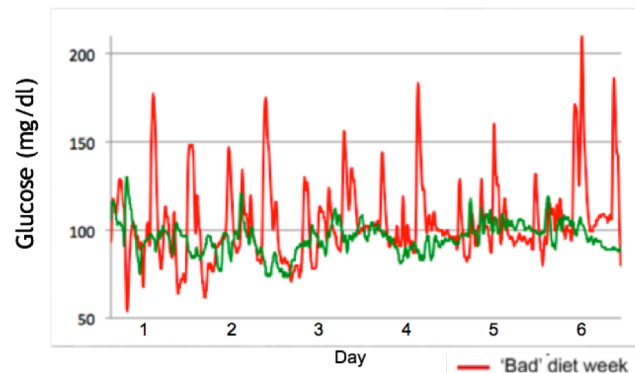
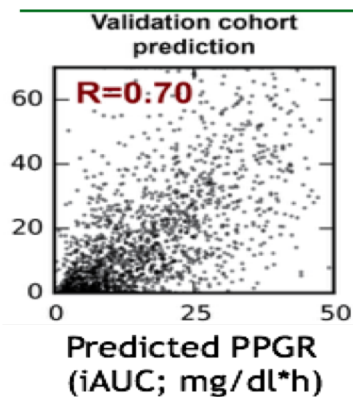
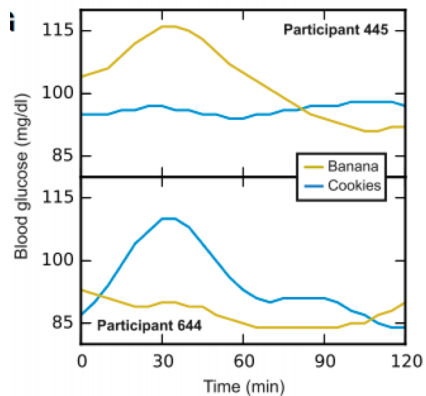
Long-Term Efficacy

Reduced HbA1c% Following 3M of DayTwo Diet

HbA1c% Reduction Correlates with Compliance

What is the right diet?

What is the right diet for ME?



State of the Art –
Carbohydrate
Counting

37%

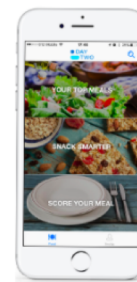
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Of explainable variance



Acknowledgments

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Thank you!

● DAY
▬ TWO