Estrogens and Gut Health
CWHW Research Forum
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Estrogens in Target Organ Systems

Exposures

Bisphenol A
Example Project

Figure 1. Project overview

Xenoestrogens (BPA, BPS, BPF)

Specific Aim 1
- Microbiome
  - Predictive metabolomics
  - Bacterial perturbation

Specific Aim 2
- Intestinal Inflammation And Tumor Progression
  - Microbiota-modified metabolites of XEs
- Novel microbiome-produced ERE ligands (i.e. HIL)

Specific Aim 3
- Intestinal Inflammation And Tumor Progression
  - AhR-Dependent Intestinal Response
    - Colonic epithelia
    - Physiological effects
    - AhR signaling and gene expression
  - Crosstalk
    - AhR ligands/activity
    - ER ligands/activity

Direct Response

Liver metabolism
CAPTURING MEASURES OF ENERGY BALANCE AND APPETITE IN HUMAN STUDIES

Dr. Jessica McNeil
CWHW Research Forum
University of North Carolina, Greensboro
April 9th, 2021

Energy Balance Protocol – In-Lab Assessments

= 6 hours

Anthropometrics and RMR
Appetite
Standard Breakfast
Thermic Effect of Food
Appetite
Olfactory Sensitivity
Food Reward
Ad libitum Lunch
Food Reward

Energy Balance Protocol – Out-of-Lab Assessments

= 36 hours

Ad libitum Energy Intake
Total Energy Expenditure

Alternative Protocol – In-Lab Assessments
THANK YOU!

FOLLOW-UP QUESTIONS:
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(JESSICA MCNEIL)

Previous Studies

<table>
<thead>
<tr>
<th>Study Exposures or Interventions</th>
<th>Study Outcomes</th>
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</thead>
<tbody>
<tr>
<td>-Menstrual Cycle</td>
<td>-Energy Intake (1 meal and over 2 days)</td>
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<tr>
<td>-Menopausal Transition</td>
<td>-Energy Expenditure (RMR+TEF+PAEE)</td>
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<tr>
<td>-Acute Exercise Manipulations</td>
<td>-Body weight and Body Composition</td>
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<tr>
<td>-Acute Dietary Manipulations</td>
<td>-Subjective Appetite Ratings</td>
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<tr>
<td>-Acute Sleep Manipulations</td>
<td>-Orexigenic (ghrelin) and Anorexigenic hormone levels (leptin, PYY, CCK)</td>
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<tr>
<td>-Exercise and/or Dietary Interventions</td>
<td>-Satiety Quotient (Δ mm/kcal)</td>
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<td></td>
<td>-Food “wanting” and “liking”</td>
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<td></td>
<td>-Olfactory Sensitivity</td>
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Olfactory Sensitivity

3 Tests
- Olfactory Threshold
- Olfactory Determination
- Olfactory Identification

Food Reward

Leeds Food Preference Questionnaire

“how much do you want some of this food now?”
“How pleasant would it be to experience a mouthful of this food now”
Ad libitum Energy Intake

Food menu

1. cereal
2. oatmeal with fruit
3. yogurt with granola
4. smoothie
5. avocado toast
6. scrambled eggs with spinach
7. vegetable stir-fry
8. quinoa salad
9. protein smoothie

Food and Brain (FoB Study)
CWHW Research Forum

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FoB: Design
Aim: Examine the Impact of food availability and stress on brain responses to palatable or healthy foods

n=20
18+ yrs old
Receiving Food Assistance
Early
Late

FoB: Imaging
fMRI Blocks (10 images, 3 s each)

Early Benefits Scan
- Structural
- fMRI (Food Images)
- Resting State

Late Benefits Scan
- Structural
- fMRI (Food Images)
- Resting State
- DTI

FoB: Future
Target Outcomes
- Identify trends in brain activation
  - Healthy
  - Palatable
  - Healthy > Palatable
  - Palatable > Healthy
- Identify associations with
  - Food Inventory
  - Perceived Stress
  - Benefit Status

Potential Next Steps
- Finish analyzing data
- Stress and Future Food Purchases
- Explore relationships
- Future management of food benefits
- Does heightened stress response predict future

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