

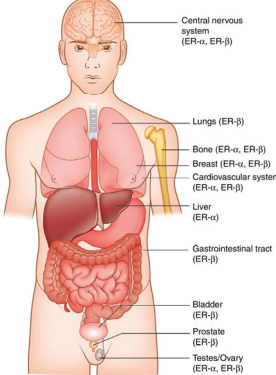
# Estrogens and Gut Health

CWHW Research Forum

Clinton Allred, Ph.D.  
cdallred@uncg.edu

1

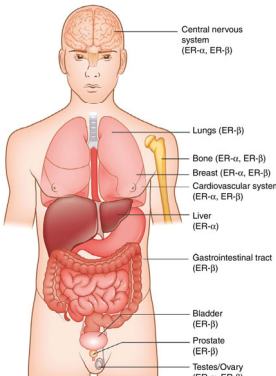
## Estrogens in Target Organ Systems

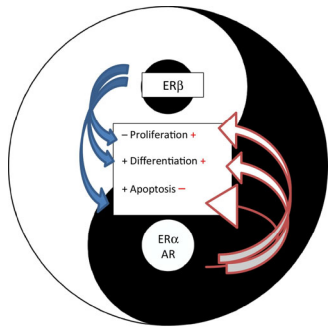


Trends in Pharmacological Sciences

2

## Estrogens in Target Organ Systems

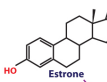




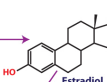
Trends in Pharmacological Sciences

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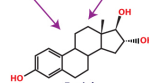
## Exposures



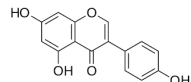
Estrone




Estradiol




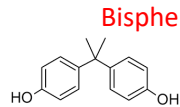
Estriol




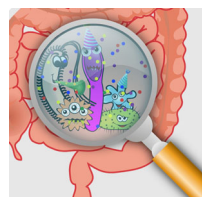
Genistein







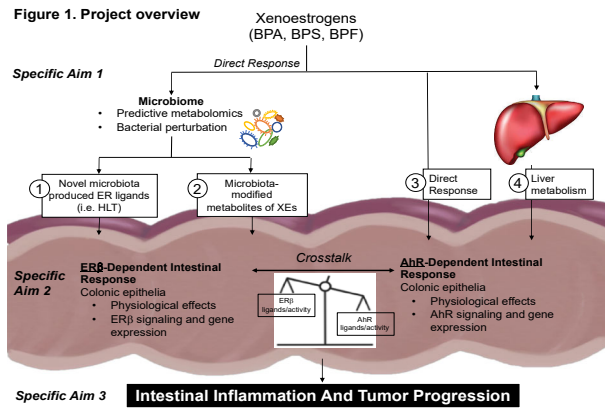
Bisphenol A





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## Example Project



# CAPTURING MEASURES OF ENERGY BALANCE AND APPETITE IN HUMAN STUDIES

**Dr. Jessica McNeil**  
 CWHW Research Forum  
 University of North Carolina, Greensboro  
 April 9<sup>th</sup> 2021

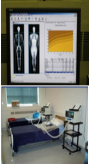
1

## 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

VAS T-0



VAS T-30


VAS T-60

VAS T-90


VAS T-120

VAS T-150


VAS T-180




Olfactory Sensitivity




Food Reward



Ad libitum Lunch



Food Reward



Arrival

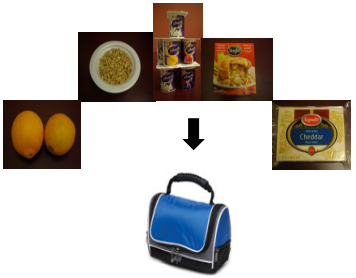
Leave the laboratory


2

## Energy Balance Protocol – Out-of-Lab Assessments

≈ 36 hours

Ad libitum Energy Intake
Total Energy Expenditure





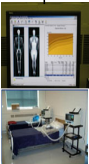
Leave the laboratory


Return to the laboratory

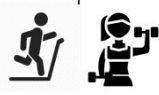
3


## Alternative Protocol – In-Lab Assessments


Anthropometrics and RMR
Standard Breakfast
Acute Exercise Interventions
Food Reward
Ad libitum Lunch
Food Reward















Arrival

Leave the laboratory

4

**THANK YOU!**

**FOLLOW-UP QUESTIONS:**  
**JNMCNEIL2@UNCG.EDU**  
**(JESSICA MCNEIL)**




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### Previous Studies

| Study Exposures or Interventions       | Study Outcomes   |
|--|--|
| -Menstrual Cycle                       | -Energy Intake (1 meal and over 2 days)                                  |
| -Menopausal Transition                 | -Energy Expenditure (RMR+TEF+PAEE)                                       |
| -Acute Exercise Manipulations          | -Body weight and Body Composition  |
| -Acute Dietary Manipulations           | -Subjective Appetite Ratings   |
| -Acute Sleep Manipulations             | -Orexigenic (ghrelin) and Anorexigenic hormone levels (leptin, PYY, CCK) |
| -Exercise and/or Dietary Interventions | -Satiety Quotient ( $\Delta$ mm/kcal)                                    |
|  | -Food "wanting" and "liking"   |
|  | -Olfactory Sensitivity   |

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### Olfactory Sensitivity



**3 Tests**  
 Olfactory Threshold  
 Olfactory Determination  
 Olfactory Identification




Pennmemorycenter.org

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### 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?"




Not at all | | Extremely

Finlayson et al., Appetite, 2008, 50(1): 120-127.

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## Food and Brain (FoB Study)

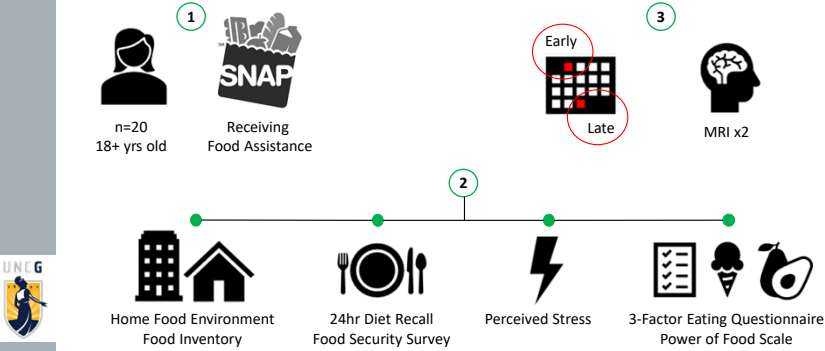
CWHW Research Forum

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jmdharod@uncg.edu

1

### FoB: Design

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



**1** n=20 18+ yrs old Receiving Food Assistance (SNAP)

**2** Home Food Environment Food Inventory, 24hr Diet Recall Food Security Survey, Perceived Stress

**3** Early, Late, MRI x2, 3-Factor Eating Questionnaire Power of Food Scale

2

### FoB: Imaging

**Early Benefits Scan**

- Structural
- fMRI (Food Images)
- Resting State

**Late Benefits Scan**

- Structural
- fMRI (Food Images)
- Resting State
- DTI

**fMRI Blocks (10 images, 3 s each)**

| Neutral             | Palatable            | Neutral               | Healthy              |
|---------------------|----------------------|-----------------------|----------------------|
| Block 1: Leaves     | Block 2: Fruit       | Block 3: Shopping bag | Block 4: Broccoli    |
| Block 5: Flowers    | Block 6: Food items  | Block 7: Shopping bag | Block 8: Sandwich    |
| Block 9: Butterfly  | Block 10: Food items | Block 11: Flashlight  | Block 12: Watermelon |
| Block 13: Telephone |                      |                       |                      |

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### 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 😊
  - Resting State & DTI analysis
- Explore relationships
  - Stress and Future Food Purchases
  - Does heightened activity in reward centers to palatable food predict future management of food benefits
  - Does heightened stress response predict future

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