Introduction

- Studies have been structured around male anatomy and physiology, disregarding female representation. Today, females are still underrepresented in health literature.
- Research indicates sex disparities in diagnosis and treatment efficiency, particularly in gastrointestinal diseases, with limited options for females despite higher prevalence.
- Connecting gut motility and menstruation symptoms will help physicians and females to understand more about menstruation, which will hopefully increase the accuracy and efficiency of female diagnosis.
- Research Question: How does gut motility change throughout the different phases of the menstrual cycle, specifically during hormonal fluctuations found throughout the menstrual phase, ovulation, and mid-luteal phase?
- Hypothesis: Transit time, an indicator of gut motility, will increase as estrogen levels rise, leading up to ovulation. Transit time will also increase as progesterone levels rise during the luteal phase.

Methodology

- The Smart Underwear Device will be used to measure flatus frequency, volume, and composition. It is approximately the size of a quarter and is completely non-invasive. The device can be comfortably worn over several days and is activated via a switch.

Methodology Flowchart

- Participants are selected
- Smart Underwear detects when flatus is released
- Calculate times between meals and flatus
- Correlate transit time to phases of menstrual cycle
- Statistical indices regarding gut motility and the menstrual cycle
- Pilot Study

Illustrative Data

- Top graph: shows sample data of the intensity and frequency of flatulence in a single participant wearing the device for one week. Each spike represents one flatulence.
- Bottom graph: shows how much the participant wore the device on each day.

The Smart Underwear Device

Figure 1. Wearing location of the Smart Underwear Device and close-up of the Smart Underwear Device. The Smart Underwear device will be used to measure flatus frequency, volume, and composition. It is approximately the size of a quarter and is completely non-invasive. The device can be comfortably worn over several days and is activated via a switch.

Future Goals

- Incorporating luteinizing hormones
- Obtaining IRB approval to use LH to get more specific time frames for ovulation
- Increasing our sample size to 25 participants for the case study and increasing the number of menstrual cycles studied for each participant.

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References

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