Study Number: STUDY2025-00000283
IRB Approved
4/14/2026

HRP-503-NON-EXEMPT STUDY PROTOCOL

Expedited and Convened Board Research Protocol Template Instructions:

This template is designed for investigator-initiated research studies written and designed by a Purdue University investigator.

All sections must be addressed. Respond to all applicable instruction prompts. For those that do not apply, type "N/A." Once complete, upload the documents on the protocol page of the application SmartForm.

Text in **BLACK** font and the gold instruction boxes must remain on the page and unchanged.

Complete the template and any appendices** (located in the PERA library after October 27th) relevant to your research design (e.g., waivers, special populations including children, devices, drugs).

Research includes:	Complete Document:
Adults with Impaired Decision-Making Capability	Appendix A
Children	Appendix B
Deception	Appendix C
Devices	Appendix D
Drugs, Biologics, Dietary Supplements, Foods	Appendix E
Genetic Testing	Appendix F
Multiple Research Sites	Appendix G
Non-English Speaking Individuals	Appendix H
Pregnant Women and Fetuses	Appendix I
Prisoners	Appendix J
Radiation	Appendix K
Repositories	Appendix L
Waiver of Documentation of Consent/Parental Permission	Appendix M
Waiver of Parental Permission Process	Appendix N
Waiver or Alteration of Informed Consent Process	Appendix O

**Appendices are currently still under development and will be released as they are completed. Please check the PERA Go-Live Page for updates and to download these documents. Consent templates and all other guidance may still be found on the Purdue IRB website

Study Number: STUDY2025-00000283
IRB Approved
4/14/2026

Study Title: Slowly Digestible Carbohydrates for GLP-1 Secretion

Principal Investigator/Faculty Advisor	Name: Bruce Hamaker
	Department: Food Science
	Telephone Number: 765-494-5668
	Email Address: hamakerb@purdue.edu
Student Investigator (if applicable)	Name: Erica de Jong
	Current Academic Status: Graduate Research Assistant
	Department: Food Science
	Telephone Number: 219-895-0620
	Institutional Email Address: dejonge@purdue.edu

Table of Contents

1. Abbreviations and Definitions

SDC: slowly digestible carbohydrate
GLP-1: glucagon-like peptide-1
VAS: visual analog scale
CRC: Clinical Research Center
STON: Stone Hall
MK: Metabolic Kitchen
CSTI: clinical science and technological institute
GRAS: generally regarded as safe

2. Background and Rationale

2.1 Summarize and synthesize the available research, including published data, to provide justification for the study.

Our laboratory is investigating the physiological outcomes and health benefits of the consumption of high-quality carbohydrates, specifically related to activation of innate glucagon-like peptide-1 (GLP-1) for gut-brain axis satiety response and appetite control. We have found in rodents that slowly digestible carbohydrates (SDCs) which digest into the distal small intestine (ileum) trigger the enteroendocrine L-cells located there to secrete GLP-1 (Hasek et al., 2018; Lim et al., 2021). While GLP-1 receptor agonist drugs (e.g., Ozempic and Monjaro) improve weight management and mitigate obesity-related complications, they have high discontinuation rates due to adverse side effects. Researching dietary strategies to naturally activate the gut-brain axis and stimulate endogenous GLP-1 offers significant potential for weight management without side effects.

In the current study, we will evaluate the ileal-digesting SDC dose required to elicit a clinically meaningful GLP-1 response and the duration of elevated plasma GLP-1 post-consumption. We aim to address two questions: What amount of such SDC maximizes GLP-1-mediated satiety, and does the impact to satiety continue in a second meal? Our overall goal is to maximize ileal-digesting SDC's potential use as a food-based agent for weight loss.

References:

Hasek, L.Y., Phillips, R.J., Zhang, G., Kinzig, K.P., Kim, C.Y., Powley, T.L. and Hamaker, B.R., 2018. Dietary slowly digestible starch triggers the gut–brain axis in obese rats with accompanied reduced food intake. Molecular Nutrition & Food Research, 62(5), p.1700117.

Lim, J., Ferruzzi, M.G. and Hamaker, B.R., 2021. Dietary starch is weight reducing when distally digested in the small intestine. Carbohydrate Polymers, 273, p.118599.

3. Objectives

3.1 Describe the purpose of the study.

The purpose of this study is to gain an understanding of the relationship between consumption of ileal-digesting SDC, the resulting GLP-1 secretion, and its impact on satiety.

Primary Objectives and Outcome Measures

3.2 Describe the study objectives and outcomes.

Objective 1: To determine the impact of 20, 40, 60 g of SDC compared to a maltodextrin control on total plasma GLP-1 concentrations at baseline and 15, 30, 60, 90, 120, and 180 minutes post-consumption of SDC.

Outcome: Increasing elevation in plasma GLP-1 levels in response to differing dosage levels of SDC at 3 h post-consumption.

Secondary Objectives and Outcome Measures

3.3 Describe any secondary objectives and outcomes if applicable.

Secondary Objective 1: Measure satiety at baseline, 60, 120, 180 minutes and after a second meal.

Secondary Objective 2: To determine the impact of 20, 40, 60 g of SDC compared to a maltodextrin control on total plasma glucose concentrations at baseline and 15, 30, 60, 90, 120, and 180 minutes post-consumption of SDC.

Secondary Objective 3: To determine the impact of 20, 40, 60 g of SDC compared to a maltodextrin control on insulin concentrations at baseline and 15, 30, 60, 90, 120, and 180 minutes post-consumption of SDC.

Secondary Objective Outcomes: Improving satiety and lowering of glycemic response after ileal-digesting SDC consumption.

4. Study Design & Procedures

	Y	N	Comments
4.1 Is this a multi-site study?	☐	☒	If yes, complete the Multi-Site Research appendix.
4.2 Does the research involve the use of an approved drug or biologic, use of an unapproved drug or biologic, or use a food or dietary supplement intended to diagnose, cure, treat, or mitigate a disease or condition?	☐	☒	If yes, complete the Drugs Appendix
4.3 Does the research involve the use of a device to evaluate its safety or effectiveness?	☐	☒	If yes, complete the Device Appendix

4.4 Provide information about all research interventions and activities that are to be performed.

This is a double-blinded acute clinical study where participants will come to the Clinical Research Center (CRC in STON) 4 times to ingest carbohydrate-containing isocaloric

beverages and blood will be taken postprandially at time points up to 3 hours to measure GLP-1.

Screening visits will be performed by the research team in the CRC Room 144 or Room 124, depending on room availability. All study visits will be performed by the research team in the CRC Room 147. These study visits include blood draws and satiety questionnaires.

All treatment beverages will be prepared by reconstituting starch with potable water by the research team just prior to participants' consumption in the Metabolic Kitchen (MK) Room 140. All blood draws will be performed by a trained phlebotomist in the CRC Room 147. All processing of samples (i.e. blood) will be performed by the research team in CRC Room 149A.

The first two eating occasions, packaged meals, and each secondary test meal will be prepared by a certified food service provider and dietician, Amy Wright, in the MK Room 140. The meal will be distributed by the research team to all participants in the CRC Room 144 or 124, depending on room availability.

Research Design

4.5 Identify the research design appropriate to answer the question(s) under study.
- Describe the type of research proposed (e.g. experimental, correlational, survey, qualitative).
- Describe the specific study design that will be used (e.g. pre-test /post-test control group design, cross-sectional design; prospective longitudinal cohort design, phase III double-blind randomized control group design).
- Describe the study intervention (e.g., procedure, therapy, curriculum) and/or investigational agent (e.g., drug, device, procedure, therapy) that is being evaluated

The study experimental design is a double-blinded 4-arm acute human cross-over study with 19 participants. Individuals will visit the CRC in STON 4 times, separated by at least a 1-week washout period. The entire study is intended to be about 6-7 weeks long, provided the washout periods are around 1 week. Individuals will consume an ileal-digesting SDC (raw corn starch) beverage or a maltodextrin control with timed postprandial blood draws up to 3 hours to test for blood glucose, insulin, and GLP-1 concentrations. The participants will not know which treatment they are given because the treatment will be labeled with a randomized three-digit code with no meaning to the individual. After participant enrollment, randomization will be performed by independent study staff (Anna Clapp) who will not have contact with participants. Randomization for allocation of participants into treatment groups and the order of treatment arms will occur through Excel using randomize and Latin square functions. Please note that Anna R Clapp is responsible for deidentifying information and will maintain data confidentiality and follow HIPAA-protection regulations.

Key study personnel will weigh the amounts of maltodextrin or SDC corresponding to the four treatment arms into zipper bags. Maltodextrin and the chosen SDC are both fine powdery white substances and appear identical. Each treatment is 75g in total; therefore, the quantity looks and feels identical too. Using a randomizing function excel, Anna R Clapp will generate 3-digit numerical codes for each treatment arm. She will label all of the pre-weighed bags belonging to each treatment. In this way, study personnel will be blinded to which treatment is in which bag.

Participants will remain blinded to the treatment given. Just prior to treatment consumption at the study visit, a research team member will reconstitute the deidentified treatment zipper bag with 200 g of purchased potable water in a glass. The research team member will label the glass with the randomized 3-digit code from the zipper bag. No extensive prep is required since it is food-grade GRAS starch and water. Therefore, no adverse effects related to food safety or product handling are expected. Lastly, since the starches appear identical in color, texture, mass, and solubility, this will aid in keeping participants blinded to the treatment they receive.

Detailed Study Procedures

4.6 Describe the selected procedures sufficiently to justify their use in answering the defined research question(s).

Interested participants will use the QR code on the recruitment flyer to complete a pre-screening form via Qualtrics, an online survey system. (The prescreening Qualtrics survey is attached in the Local Documents section.)

After completing the pre-screening form via Qualtrics, individuals who fall within the inclusion criteria will be contacted via their provided contact information and invited to attend the screening visit.

Our group has used this method before in similar clinical studies and have been successful in recruiting participants.

In the screening visit:

1. First, a research team member will obtain consent for the screening process. They will do this through discussion with the potential participant. The screening process asks questions like a participant's name, best method of contact, and questions like, "Do you have a gastrointestinal disorder or a gastrointestinal irritation?" The screening also requires consent for a blood draw to test HbA1c and blood glucose. The research team member will ask the potential participant if they have any questions, if they understand, and ask an open-ended question like, "If you consent to participant in this screening process today, can you describe to me what will happen during the screening?" Through discussion, the research team and the participant can be assured that there is full understanding. Potential participants who choose to voluntarily participate in the screening process will sign the Consent Form for Screening. The following statement will be made clear to participants taking part in the screening: "Your participation in this study is voluntary. You may choose not to participate or, if you agree to participate, you can withdraw your participation at any time without penalty or loss of benefits to which you are otherwise entitled."
2. If consent is obtained, then a research team member will discuss the questions from the prescreening questionnaire with the subject to confirm responses and understand their dietary habits and lifestyle.
3. Subject height and weight will be taken to calculate BMI to confirm they fall within 18.5-24.9 kg/m^2.

4. Fasting blood glucose and Hemoglobin A1C will be tested by blood draw (3 mL ~ 0.61 tsp) and sent to IU Health for analysis. (Analysis going outside of the University are coded and do not contain direct identifiers.) These two measurements will be confirmation that the individuals are not diabetic and have normal blood glucose levels. **NOTE**: Since HBA1C and fasting blood glucose test results are available ≥24 hrs later, the research team will assume that each potential participant will meet the inclusion criteria. Therefore, the screening process will proceed. Each potential participant will be walked through the entirety of the consent form for enrollment as written below and in Section 7.2.
5. Key personnel will provide subjects with a full overview of the study. They will walk through the entirety of the consent form. Key personnel will explain the test procedures for the appropriate fasting window, appetite ratings, blood sampling, and the second meal. They will discuss a weekly visit date that best fits the participant's schedule to mitigate potential dropout and encourage compliance. Finally, key personnel will confirm the study schedule and the method of contact with participants, either through email or text. Each potential participant will take home a copy of the Consent Form for Enrollment (unsigned) for their information.

Approx 24hrs after screening, before attending two eating occasions:

Once HbA1C results are received from IU Health, the research team will analyze the results to confirm participant eligibility. Each participant will be notified via their provided method of contact whether their results confirm or deny their participation within 2-4 days. If they are eligible, they will be invited to the first eating occasion involving a standardized fixed meal where they will choose to sign the Consent Form for Enrollment.

Eating occasions before official study visits:

Eligible potential participants will be asked to attend two eating occasions involving a standardized fixed meal (e.g., spaghetti) to reduce potential effects of meal novelty on intake. The fixed meal is 6 fl oz of water and 500 kcal of spaghetti presented in a black slanted bowl prepared by a dietician, Amy Wright, from Purdue Nutrition Science in the MK Room140 in the CRC in the CTSI human testing facility at STON at Purdue University.

At the first fixed meal eating occasion, the research team will take eligible potential participants into CRC Room 144 or 124 individually. They will be handed another copy of the Consent Form for Enrollment (NOTE: they were given one at the screening visit). Although the research team has already walked through the consent form in depth during the screening visit, a second quicker overview will be given again. Potential participants who choose to voluntarily participate in the study will sign the section on the consent form that indicates consent for enrollment into the study. Again, the following statement will be made clear to participants taking part in the screening: "Your participation in this study is voluntary. You may choose not to participate or, if you agree to participate, you can withdraw your participation at any time without penalty or loss of benefits to which you are otherwise entitled." (More about the consent process is in Section 7.2)

After signing the consent form, then the enrolled participants will eat the fixed meal.

At the second fixed meal eating occasion, enrolled participants will eat the fixed meal. Afterwards, they be given a prepackaged standardized meal prepared by a certified food service provider, Amy Wright, to consume as dinner the night before the first study visit. This meal will be two Lean Cuisine Chicken Alfredo entrées, two Hawaiian rolls, two pats of butter, a cup of mandarin oranges, and 8oz of 1% milk.

In the following 4 visits:

Test meals will be prepared at the CTSI human testing facility at STON in the MK Room 140. All the ingredients will be purchased from approved food manufacturers and have GRAS classification.

Test meals will consist varying g of a raw corn starch-based beverage (SDC) or maltodextrin (control) given 3 h prior to the second (lunch) meal, consisting of ingredient proportions as follows:

Control Meals:

1. 200 g of water (for reconstitution) and 75 g maltodextrin

Experimental Meals:

2. 200 g of water (for reconstitution) + 20 g SDC + 55 g maltodextrin
3. 200 g of water (for reconstitution) + 40 g SDC + 35 g maltodextrin
4. 200 g of water (for reconstitution) + 60 g SDC + 15 g maltodextrin

Ingredients will be reconstituted right before consumption in the MK by a member of the reserach team with purified water in glass cups to prevent starch from remaining on the sides of the cup. Participants will consume this treatment in the CRC Room 147 in the CTSI human testing facility at STON. This study will consist of four visits where each participant will consume one of the four test meals in the early morning of each visit around 9am. There will be one week separating each visit to allow washout of any possible effect of the test meal.

> (Randomization for allocation of participants into treatment groups and the order of treatment arms will occur through Excel using randomize and Latin square functions by Anna R Clapp. Please note that Anna R Clapp is responsible for deidentifying information and will maintain data confidentiality and follow HIPAA-protection regulations.)

Study Visits:

On the day prior to testing, subjects will receive a standard meal prepared by a certified food service provider, Amy Wright. (The meal composition is mentioned above in the subheading labeled “Eating occasions before official study visits”.) Testing will consist of 4 study visits lasting no more than 4 hours each.

Subjects will be required to fast overnight for 12 hours prior to each study visit and not consume any foods before coming to the CRC (morning arrival of approximately 8:45 am). Upon arrival,

participants will be asked when they last ate. They will fill out a satiety questionnaire for baseline values. Next, they will be directed to a reclining phlebotomy chair in Room 147 for venous catheter placement. At each study visit, blood will be drawn before meal consumption (baseline) and after the treatment SDC meal consumption at 15, 30, 60, 90, 120, and 180 minutes using a venous catheter. Participants will be encouraged to relax. They may read, watch movies, and relax during the study visit while study staff, including a trained phlebotomist, monitors them for any adverse events. A total blood volume of approximately 56 mL (~11.4 teaspoons) will be taken through these 7 draws at two tubes of 4 mL (0.81 teaspoons in 4 mL x 2 = 1.62 teaspoons per timepoint. Across the entire study, approximately 227 mL (~45.4 teaspoons) of blood will be collected. Spun plasma will be analyzed for glucose, insulin, and total GLP-1.

An appetitive rating questionnaire will be issued at baseline, 60, 120, 180 minutes at each session for subjects to rate their feelings of hunger and fullness via the Qualtrics online survey system.

The carbohydrate-containing beverage will be consumed within a 10-minute period. At the end of the 3-hour window, subjects will be given a fixed second meal of spaghetti for consumption and another satiety (hunger and fullness) rating will be recorded before and after the meal to understand possible effects of SDC on satiety in a second meal. The fixed spaghetti meal contains 500 kilocalories, and its macronutrient breakdown is attached in the “Local Documents” section. A typical lunch-consuming American received 29% of total daily calories from lunch which equates to roughly 580 calories based on a 2000 kilcalorie diet (Sebastian, 2024). We will provide a second meal less than the average American’s lunch intake so that participants do not eat until satiation.

After a Study Visit:

In order to maintain contact with participants and ensure continuation throughout the whole clinical study, follow-up reminders will be sent to each participant before their next study visit. Reminders to arrive to the CRC on the scheduled day and time will be sent via the participant’s provided method of contact. However, after the end of the study (i.e. after completion of all 4-arms) there will be no further contact between the study personnel and participants.

References:

Sebastian, R. S., Hoy, M. K., Murayi, T., Goldman, J. D., & Moshfegh, A. J. (2024, April 1). Lunch consumption by U.S. adults. FSRG Dietary Data Briefs - NCBI Bookshelf. https://www.ncbi.nlm.nih.gov/books/NBK604047//

4.7 Describe procedures for data collection. Be sure to specify the source records that will be used to collect data about participants.
Upload all surveys, scripts, and data collection forms/spreadsheets to the Other Attachments section of the SmartForm.

Data that will be collected:

- Descriptive information (biological sex, height, weight, birth date, BMI, lifestyle)
- Appetitive ratings (i.e., hunger and fullness)
- Blood draw at screening for fasting blood glucose and Hemoglobin A1C
- Consecutive venous blood draw for 3 hours for monitoring glucose and GLP-1 levels
    - During the study visits = [baseline (1 tube glucose + 1 tube GLP-1) + 6 time points (2 tube per time point—1 for glucose + 1 for GLP-1)] = 14 tubes x 4 mL = 56 mL or ~11.4 teaspoons per treatment.
    - Total = (14 tubes per treatment x 4 arms) = 56 tubes x 4 mL each = 224 mL +3 mL taken during screening for HbA1C = 227 mL (46 teaspoons) in total.

4.8 Describe the timeline for participant evaluations and the duration of project participation, for both individual study activities and total study participation, when applicable. List or provide a visual schedule (table, flowchart) of study activities (e.g., visits, contacts/touchpoints with participants, screening procedures, randomization/stratification procedures, etc.).

Include:

- Only those procedures that contribute to participant eligibility, study objectives and endpoints.
- The expected window of time for each activity (e.g., day 4 +/- 2 days, weeks 2-5, Month 1, 1st trimester, post-activity 1 month), as applicable to the study.

Each enrolled subject's participation will last approximately five to six weeks, including a Screening Visit, two pre-study standardization lunches, and four Study Visits.

Participant Recruitment (2-4 weeks prior to screening visits)

- Prescreening Questionnaire through QR code for eligibility

Screening Visit (any time 1-2 weeks prior to Week 1)

- A single visit lasting about 20-30 minutes
- Sign written consent form for screening process
- Measure height and weight to calculate body mass index
- Blood taken for fasting glucose and HbA1c
- Collect $25 compensation

Receive HbA1C and fasting blood glucose results (~24 hrs after screening)

- Research team contacts eligible potential participants to confirm their eligibility within 2-4 days of received results.

Two Free Lunches (Week 1: two separate days within the range of Day 0-6)

NOTE: At first eating occasion, sign written consent for enrollment. There will be enrollment of 19 participants, deidentification, and randomization of treatment arm order and treatment groups.

- Consume a standardized test meal (30-45 minutes)
- Collect $25 compensation for each lunch ($50 total)
- Take home the first standardized prepackaged meal

The Evening before Study Visit 1

- Consume a provided packaged dinner
- Overnight 12 hour fast with only water

Study Visit 1 (Week 2: 1 day within the range of Day 7-13)

- A visit from 8:45 am - 12:45pm (4 hours)
    - Consume a randomized test beverage (10 minutes)
    - Blood draw 7x (3 hours)
    - Take a satiety questionnaire 5x
    - Consume a standardized lunch (30-45 minutes)
- Take home a standardized pre-packaged meal for study visit 2
- Collect $75 compensation

Washout (≥7 days)
The Evening before Study Visit 2

- Consume a provided packaged dinner
- Overnight 12 hour fast with only water

Study Visit 2 (Week 3: 1 day within the range of Day 14-20, ≤ 7 days after Study Visit 1)

- A visit from 8:45 am - 12:45pm (4 hours)
    - Consume a randomized test beverage (10 minutes)
    - Blood draw 7x (3 hours)
    - Take a satiety questionnaire 5x
    - Consume a standardized lunch (30-45 minutes)
- Take home a standardized pre-packaged meal for study visit 3
- Collect $75 compensation

Washout (≥7 days)
The Evening before Study Visit 3

- Consume a provided packaged dinner
- Overnight 12 hour fast with only water

Study Visit 3 (Week 4: 1 day within the range of Day 21-27, ≤ 7 days after Study Visit 2)

- A visit from 8:45 am - 12:45pm (4 hours)
    - Consume a randomized test beverage (10 minutes)
    - Blood draw 7x (3 hours)
    - Take a satiety questionnaire 5x
    - Consume a standardized lunch (30-45 minutes)
- Take home a standardized pre-packaged meal for study visit 4

- Collect $100 compensation

Washout (≥7 days)
The Evening before Study Visit 4

- Consume a provided packaged dinner
- Overnight 12 hour fast with only water

Study Visit 4 (Week 5: 1 day within the range of Day 28-34, ≤ 7 days after Study Visit 3)

- A visit from 8:45 am - 12:45pm (4 hours)
  - Consume a randomized test beverage (10 minutes)
  - Blood draw 7x (3 hours)
  - Take a satiety questionnaire 5x
  - Consume a standardized lunch (30-45 minutes)
- Collect $100 compensation

END OF STUDY – no long-term follow-up

For a graphic timeline of the study see “SDC and GLP-1 Clinical Schedule” in attached documents.

4.9 Describe plans for long-term follow-up once all research-related procedures are complete, if any, and specify what data will be collected during this period.

There will be no long-term follow-up. No further data will be collected from participants after the study is completed.

Alternatives to Participation

4.10 Indicate any alternatives to participating in the research, if applicable, including available procedures outside the research that may be advantageous to the participant.

N/A

5. Participant Population

5.1 Specify the participant population(s). **Check all participant groups that apply.** For any population other than adults, complete the applicable appendix referenced on Page 1.

☒ Adults
☐ Adults with impaired decision-making capacity
☐ Children
☐ Economically or educationally disadvantaged
☐ Immigrants

☐ Non-English-speaking individuals
☐ Pregnant women/fetuses (only if pregnant women will be intentionally recruited and/or studied)
☐ Prisoners
☐ University Students
☐ Employees

5.2 Describe the sample population from which the study team plans to either recruit or access private, identifiable information for the research. If student subject pools are involved, please specify the applicable pool.

Healthy population, adults 18 – 45 yrs, men or women

5.3 Create a numbered list of the inclusion/eligibility criteria that define who will be included in the final study sample (e.g., age, gender, condition). These are the characteristics that every potential participant must satisfy to qualify for the study.

Inclusion:

1. Healthy population
    a. Self-report
2. BMI between 18.5 and 24.9 kg/m^2
    a. Self-reported in prescreening questionnaire
    b. Confirmed in screening with height and weight measurements
3. Adults 18 – 45 years old
    a. Self-report in prescreening questionnaire
    b. Verified by birthdate
4. Men or women
    a. Self-report in prescreening questionnaire
5. Able to read/speak English
    a. Self-report in prescreening questionnaire
6. Fasting blood glucose levels ≤100 mg/Dl
    a. Assessed in screening visit with finger-stick laboratory value
7. HbA1c ≤ 5.7%
    a. Assessed in screening visit with blood draw

All inclusion criteria except HbA1c will be reviewed and confirmed by key study personnel at the end of the screening visit. HbA1c will be sent to IU Health for analysis, and results will be received the following day. Then, key study personnel will review and officially confirm eligibility.

5.4 Describe why certain populations may be excluded/ineligible for study participation. These are factors that would cause harm or increased risk to the participant, or that preclude the

participant's full adherence with or completion of the study. Exclusion criteria should be appropriate for the study design and level of risk to participants.

- Provide a statement that all individuals meeting any of the exclusion criteria will be excluded from study participation and then list each criterion.
- Provide a justification if specific populations will be excluded from the study to establish that inclusion is inappropriate with respect to the health/safety of the participants or for the purpose of the research.

All individuals meeting any of the exclusion criteria will be excluded from study participation. The exclusion criteria are as follows:

1. Participants with 18 > Years of Age > 45 will be excluded.
    a. assessed by birthdate
2. Subjects with 18.5 kg/m² > BMI > 24.9 kg/m² will be excluded.
    a. assessed by height and weight
3. Diabetic individuals will be excluded.
    a. assessed by fasting blood glucose and HbA1c levels in the screening visit
4. Individuals with history of gastrointestinal disease will be excluded from the study.
    a. assessed by self-report from prescreening questionnaire
5. Pregnant or nursing women will be excluded.
    a. assessed by self-report from prescreening questionnaire
6. Individuals taking GLP-1 medications, or on weight-loss diets or restrictive eating patterns will be excluded.
    a. assessed by self-report from prescreening questionnaire
7. Individuals suffering from dairy or gluten intolerance or allergies will be excluded.
    a. Assessed by self-report from prescreening questionnaire

Most of the criteria are assess by self-report through the prescreening survey. For example, a participant may indicate they are 22 years old in the survey. Then during the screening visit, study personnel will ask them for their birthdate to confirm they are the age they self-reported. All exclusion criteria except HbA1c will be reviewed and confirmed by key study personnel at the screening visit. HbA1c will be sent to IU Health for analysis, and results will be received the following day. Then, key study personnel will review, officially confirm eligibility, then reach out to participants to notify them if they are eligible.

Number of Participants

5.5 The number of participants is defined as the number of individuals who agree to participate (i.e., those who provide consent or whose records are accessed) even if all do not prove eligible or complete the study. The total number of research participants may be increased only with prior IRB approval.

Indicate the number of participants to be enrolled locally by Purdue researchers.	19
For multi-site studies, indicate the total number of participants to be enrolled across all sites.	N/A

5.6 Explain how this number was derived (e.g., meets statistical power, limited population). If applicable, explain how many individuals are expected to agree to participate and how many evaluable participants are needed to conduct the study (excluding screen failures).

Power calculations were completed using a paper by Wachters-Hagedoorn et al. (2006). The values derived from this paper include: n=7, difference in AUC (120-240) of uncooked corn starch (UCCS) versus glucose = 837 pmol/L (two-sided p value = 0.002). The reference paper does not include a standard deviation (SD), rather the standard error of the means (SEM) is provided. However, the SD can be inferred from the mean, p value, and number of participants resulting in 425 pmol/L UCCS/glucose difference AUC from 120-240 min. We want to be able to detect differences of about 40% of the magnitude of what was observed in the paper (i.e., 334.8 pmol/L).

We used an online statistical calculator for our power calculations. We used a two-sided alpha level of 0.05 adjusted for multiple comparisons across six treatments (Bonferroni-adjusted α=0.01), 80% power. This results in a total sample size of 16. Adjusting for a 20% dropout rate, the total number of participants to be enrolled is n=19.

References:

Wachters-Hagedoorn, R. E., Priebe, M. G., Heimweg, J. A. J., Heiner, A. M., Englyst, K. N., Holst, Jens. J., Stellaard, F., & Vonk, R. J. (2006). Rate of Intestinal Glucose Absorption Is Correlated with Plasma Glucose-Dependent Insulinotropic Polypeptide Concentrations in Healthy Men. *The Journal of Nutrition*, *136*(6), 1511–1516. https://doi.org/10.1093/jn/136.6.1511

Dhand, N. K., & Khatkar, M. S. (2014). Statulator: An online statistical calculator. Sample Size Calculator for Comparing Two Paired Means. http://statulator.com/SampleSize/ss2PM.html

Participant Identification

5.7 Describe how potential participants will be identified (e.g., advertising, individuals known to the investigators, record review).

Subjects will be recruited using flyers posted around campus or by word of mouth from individuals known to the research team.

5.8 Explain how the investigator(s) will gain access to this population, as applicable, and provide evidence that you will be able to recruit the necessary number of participants to complete the study.

Using recruitment flyers with QR codes to the pre-screening survey, interested individuals will reach out to the research team. (The prescreening Qualtrics is attached in the Local Documents section of the IRB submission.)

After completing the pre-screening form via Qualtrics, individuals who fall within the inclusion criteria will be contacted via email and invited to attend the screening visit. Key personnel will meet with individuals who meet the eligibility criteria to provide them with an overview of the

study. Key personnel will explain the test procedures for the appropriate fasting window, appetite ratings, blood sampling, and the second meal. They will discuss a weekly visit date that best fits the participant's schedule to mitigate potential dropout and encourage compliance.

Our group has used this method before in similar clinical studies and been successful in recruiting participants.

Participant Recruitment and Selection

5.9 Describe how potential participants will be screened or otherwise determined to be eligible.

In the screening visit:

6. First, a research team member will obtain consent for the screening process. They will do this through discussion with the potential participant. The screening process asks questions like a participant's name, best method of contact, and questions like, "Do you have a gastrointestinal disorder or a gastrointestinal irritation?" The screening also requires consent for a blood draw to test HbA1c and blood glucose. The research team member will ask the potential participant if they have any questions, if they understand, and ask an open ended question like, "If you consent to participant in this screening process today, can you describe to me what will happen during the screening?" Through discussion, the research team and the participant can be assured that there is full understanding. Potential participants who choose to voluntarily participate in the screening process will sign the Consent Form for Screening. The following statement will be made clear to participants taking part in the screening: "Your participation in this study is voluntary. You may choose not to participate or, if you agree to participate, you can withdraw your participation at any time without penalty or loss of benefits to which you are otherwise entitled."
7. If consent is obtained, then a research team member will discuss the questions from the prescreening questionnaire with the subject to confirm responses and understand their dietary habits and lifestyle.
8. Subject height and weight will be taken to calculate BMI to confirm they fall within 18.5-24.9 kg/m^2.
9. Fasting blood glucose and Hemoglobin A1C will be tested by blood draw (3 mL ~ 0.61 tsp) and sent to IU Health for analysis. (Analysis going outside of the University are coded and do not contain direct identifiers.) These two measurements will be confirmation that the individuals are not diabetic and have normal blood glucose levels. **NOTE**: Since HBA1C and fasting blood glucose test results are available ≥24 hrs later, the research team will assume that each potential participant will meet the inclusion criteria. Therefore, the screening process will proceed. Each potential participant will be walked through the entirety of the consent form for enrollment as written below and in Section 7.2.
10. Key personnel will provide subjects with a full overview of the study. They will walk through the entirety of the consent form. Key personnel will explain the test procedures for the appropriate fasting window, appetite ratings, blood sampling, and the second meal. They will discuss a weekly visit date that best fits the participant's schedule to

mitigate potential dropout and encourage compliance. Finally, key personnel will confirm the study schedule and the method of contact with participants, either through email or text. Each potential participant will take home a copy of the Consent Form for Enrollment (unsigned) for their information.

Approx 24hrs after screening, before attending two eating occasions:

Once HbA1C results are received from IU Health, the research team will analyze the results to confirm participant eligibility. Each participant will be notified via their provided method of contact whether their results confirm or deny their participation within 2-4 days. If they are eligible, they will be invited to the first eating occasion involving a standardized fixed meal, where they will choose to sign the Consent Form for Enrollment.

5.10 Describe how, when, and who will recruit participants for the study. Identify general strategies for participant recruitment and retention (e.g. use of research participant pools, patient advocacy groups, online recruitment services, community advisors, newspaper, local flyers) and indicate where recruitment will occur. Include rationale for why the strategy will be appropriate for reaching the targeted study population

Using posters and spoken word, key personnel will recruit and screen participants for the study in the weeks prior to its initiation. Recruitment will occur on Purdue West Lafayette campus.

5.11 Explain how the recruitment process respects potential participants' privacy.

- Using a query to identify potentially eligible individuals prior to accessing identifiable information directly.
- Accessing educational records in a private setting.
- Limiting the number of study team members accessing identifiable information.

Prescreening will be done through a Qualtrics survey, and those meeting the inclusion/exclusion criteria will be contacted through their provided method of contact to schedule a screening visit. During the Screening Visit, each participant will be met individually at a separate time and in a designed meeting area.

The HIPAA- protected data and blood draw information from the individuals whose are determined ineligible through screening, will be destroyed as soon as their ineligibility is determined. However, the study team will keep a record of how many individuals were eliminated at screening compared to how many were enrolled.

All data will only be accessible to the research team. Efforts will be made to limit the use and disclosure of study data to the team members who need it.

6. Cost to Participants and Incentives to Participate

Potential Costs/Reimbursements

6.1 Describe any potential costs participants will incur as a result of study participation (e.g., parking). Indicate here which costs, if any, will be reimbursed or covered by the study.

Minor potential costs may include minor physical discomfort from blood draws, the disruption of daily activities, and the cost of a participant's time incurred as a result of participation will be covered by the compensation described below. Parking at the CRC on Purdue's campus will not be reimbursed.

Incentives

6.2 Describe any compensation or other incentives (e.g., cash payments, gift cards, classroom extra credit) that will be offered to potential participants. Include the amount and timing of all incentives or compensation, the form of compensation (e.g., cash, check, gift card), and how the compensation will be received (e.g., mailed, in person, online). This information must also be included in the consent form.

Subjects will receive pro-rated compensation for their time and compliance with test procedures. Subjects will be compensated for $425 in total throughout the study. All subjects will be required to fill out and sign a payment log with the Food Science Department Business Office after each payment.

Screening Visit- $25

Two free lunches (Week 1) - $25 each = $50

Study Visit (Week 2) - $75

Study Visit (Week 3) - $75

Study Visit (Week 4) - $100

Study Visit (Week 5) - $100

Compensation for Research-Related Injury

6.3 If the research involves **greater than minimal risk to participants**, describe the available compensation in the event of research related injury or explain why no compensation is available.

N/A

7. Informed Consent/Assent Process

7.1 Specify the consent process(es) to be used for the study.
Check all processes that apply.
For any waivers or alterations, complete the applicable appendix.

- ☒ Informed Consent with Written Signature (e.g., on paper)
- ☐ Informed Consent with Electronic Signature
  Note: If the method used to obtain electronic signatures does not qualify as a legally valid signature, also check "Waiver of Consent Documentation."
- ☐ Waiver of Consent/Parental Permission Documentation
- ☐ Deception (i.e., procedure in which investigators deliberately mislead participants during research by withholding information or providing false information).
  Note: If this is selected, also check "Waiver or Alteration of the Consent Process."
- ☐ Waiver or Alteration of the Consent Process
- ☐ Waiver of the Parental Permission Process

7.2 Describe the consent process. Explain when and where consent will be obtained and how participants or their legally authorized representatives will be provided sufficient opportunity to consider participation. Indicate who on the study team will conduct the consent process.

The approved copy of both consent forms, Consent Form for Screening and the Consent Form for Enrollment, will be stamped with the IRB's approval and returned to us for use. The consent process for the screening visit will occur at the start of the screening visit. The consent process for enrollment into the study will start during the screening visit (as the research team will explain the everything that the study entails to the potential participant being screened) and be completed when an eligible participant chooses to sign the form at the first eating occasion.

Consent Form for Screening

For the consent form for the screening visit, a member of the study personnel will give a copy of the approved consent form to the potential participant. The study personnel will then explain the screening process and full study and walk through the consent form. Study personnel will ask open-ended questions to address any potential questions. Examples of these questions may include:

> "Just so I know I explained everything clearly, can you walk me through what you think will happen today at the screening?"
> "How do you feel about the blood draw involved?"
> "What concerns do you have about participating in screening?"
> "What questions do you have for us?"

Finally, study personnel will also ask close-ended questions such as, "Do you understand?" and "Do you have any further questions?". Only the subjects who want to participate will sign and date the form, and the following message will be made clear: "Your participation in this screening is voluntary. You may choose not to participate or, if you agree to participate, you can withdraw your participation at any time without penalty or loss of benefits to which you are

otherwise entitled." After the discussion, both the subject and the researcher will be assured of mutual understanding voluntary participation.

Consent Form for Enrollment

For the consent form for enrollment into the study, a member of the study personnel will give a copy of the approved consent form to the eligible participant. The study personnel will then explain the study and walk through the consent form. Study personnel will ask open-ended questions to address any potential questions. Examples of these questions may include:

> "Just so I know I explained everything clearly, can you walk me through what you think will happen at a study visit?"
> "How do you feel about the study timeline and procedures for data collection involved?"
> "What concerns do you have about participating?"
> "What questions do you have for us about the study?"

Finally, study personnel will also ask close-ended questions such as, "Do you understand?" and "Do you have any further questions?". Only the subjects who want to participate will sign and date the form, and the following message will be made clear: "Your participation in this study is voluntary. You may choose not to participate or, if you agree to participate, you can withdraw your participation at any time without penalty or loss of benefits to which you are otherwise entitled." After the discussion, both the subject and the researcher will be assured of mutual understanding voluntary participation.

The consent form for enrollment will be signed after a potential participant's HbA1C and fasting blood glucose results have been received. This form will be signed at the start of the first eating occasion of the standardized fixed meal. This is after eligibility is confirmed and just before the study official begins.

7.3 Specify who will provide consent or permission (i.e., participant, legally authorized representative, parent and/or guardian) and how consent will be documented. If you are not collecting signatures, provide justification for a waiver of documenting consent.

Screened and eligibile participants will be asked to provide consent by reading the informed consent form and to sign it.

7.4 Explain how the possibility of coercion or undue influence will be minimized in the consent process.

Participants will be fully informed of their right to not sign the form. This is explained in the text of the informed consent form.

8. Privacy of Participants

8.1 Describe the steps that will be taken to protect participants' privacy and make them feel at ease with the research situation in terms of the questions being asked and the procedures being performed.

During the prescreening and the initial meeting each participant will be met individually at a separate time and in a designed meeting area. The data generated from participants deemed ineligible through the pre-screening would be destroyed.
During the study visits, five to six participants will consume the experimental test meal at the same time. However, each participant will be in a separate phlebotomist chair six feet apart from another individual in the CRC Room 147.

Although sample collecting (blood) will be the same for each individual, data evaluation and analysis will not be conducted until after the end of the visit and will only be accessible by staff working on the project.

9. Confidentiality and Management of Data

	Y	N	Comments
9.1 Does the research involve obtaining and storing participants' data for future, unspecified, research?	☐	☒	

9.2 Describe the steps that will be taken to secure study data. If research data/samples will be coded, describing how access to the "key" for the code will be limited. Include description of security measures (password-protected database, locked drawer, other) applied to protect the code key. List the positions of persons with access to the code key.

The records of enrolled subjects' self-reported screening information and their progress in the study will be kept in a confidential HIPAA-protected folder in Purdue Box or a locked filing cabinet in a secure, locked location in the Department of Food Science on the Purdue campus. Data will be accessible to the principal investigator and study personnel. A copy of the subject's signed consent form, screening information, and progress, which includes all data collected while a participant is enrolled, will be retained for at least three years after termination of the study. At that time, they will be destroyed. If the documents are physical, they will be shredded. HIPAA-protected data and blood samples from individuals determined ineligible through screening will be destroyed as soon as their ineligibility is determined. However, the study team will keep a record of how many individuals were eliminated at screening compared to how many were enrolled. If a participant enrolls, yet withdraws from the study, their protected health information data will be removed at the point of dropout. However, a copy of the signed consent form, record of payment will be retained (See Section 9.4 for more on withdraw).

The confidentiality of any computer record will also be carefully guarded by avoiding the inclusion of subjects' names on any data file. The HIPAA-protected information will be collected

via Qualtrics, stored in a HIPAA-protected folder on Box. No information by which subjects can be identified, such as names, will be published. Anna R Clapp, study team member, will access to the code key for identifiable information and will be in charge of deidentifying information into numerical codes for the rest of the study team.

9.3 Describe any procedures that will be used for quality control of collected data.

Data will be evaluated continuously (after every washout week) by the research team to ensure that no abnormalities occur. Drs. Hamaker and Cantu-Jungle and their team will be conducting the study and are responsible for data safety monitoring.

9.4 Describe how data will be handled study wide.

The information will be stored electronically on Purdue Box or on a Purdue-owned password-protected computer. (See Sections 9.2; 9.5-9.9)

If a participant requests to drop out from the study, their request will be honored immediately. After a participant drops out, Anna R Clapp will be notified as soon as possible. She will remove their HIPAA-protected information from the point of dropout.

If a participant drops out at any time, they will be given the opportunity to request withdraw of consent. If a participant chooses to withdraw consent at any time, they may request the destruction of any identifiable, coded, and unanalyzed stored biological samples. It is important to note that de-identified data or data incorporated into completed analyses may not be able to be withdrawn. If a participant withdraws and requests the withdraw of their data, then no further use will be made of those materials, nor will data be retained for research purposes.

Records of their signed consent form and record of payment will be retained (see Section 9.2 for similar information).

The study team will not do anything beyond the scope of this study and what is covered in the IRB with the sample of participants.

9.5 Specify the identifiable information that will be included in the data.

None. Names of subjects on all records and their birthdates will be collected at screening and de-identified at enrollment by replacing names with numerical codes. Identifiable information will be destroyed after three years, as previously described in Section 9.2.

9.6 Specify where and how data will be stored and for how long.

Paper data will be stored in PI Hamaker's locked office filing cabinet in a locked office and electronic files will be stored in Purdue Box, with HIPAA information in a HIPAA-protected folder on Box, as previously mentioned in Section 9.2. After three years from the end of the study, data will be destroyed. Paper data will be shredded, while electronic data will be permanently deleted.

9.7 Specify who will have access to the data.

Data will be accessible to the principal investigator, Dr. Bruce Hamaker, co-investigator researcher, Dr. Thaisa Cantu-Jungles, and Erica de Jong, a student. Anna R Clapp, the responsible party for identifiable information, will have access to data for the purpose of data confidentiality. Anna Clapp will have access to data to ensure study personnel remain blinded and will ensure personally identifiable information adheres to HIPAA-protection regulations.

9.8 Specify who will be responsible for receipt or transmission/transport of the data and how transmission/transport will occur.

N/A

Click or tap here to enter text.

9.9 Indicate what will happen to identifiable data at the end of the study (e.g., kept identifiable, coded, deidentified). If identifiers will be maintained, provide the rationale supporting this request. If the data will be deidentified, describe the process.

Names of subjects and treatment arms on all records will be de-identified at enrollment by study team member, Anna R Clapp, by replacing names with numerical codes. Anna R Clapp will retain the linkage file for the identifiable information. At the end of the study, new unique codes will be assigned to replace the numerical codes for participants and treatments to further ensure confidentiality. At the end of the study names will be destroyed.

9.10 If data will be shared broadly with outside groups, specify what will be shared, with whom, in what form (e.g., identifiable, coded, deidentified/anonymized).

N/A

9.11 If data will be shared broadly with outside groups or databases, specify whether participants will have the ability to opt-in or remove the data from these outside groups later if they choose. Generally, if the data are identifiable, a participant should be able to withdraw them unless retention is required under federal regulation.

See Section 9.4

9.12 Certificate of Confidentiality (*type n/a if not applicable)*

N/A

10. HIPAA Research Authorization

PHI is health information that is individually identifiable and created or held by a covered entity. Health information is considered individually identifiable when it contains one or **more *HIPAA Identifiers*** or when there is a reasonable basis to believe the information can be used to identify an individual.

For more information, see ***The HIPAA Privacy Rule*.**

10.1 Is individually identifiable Protected Health Information (PHI) subject to the **HIPAA Privacy Rule** requirements to be accessed, used, or disclosed in the study?

- ☒ No
- ☐ Yes

NOTE: The PHI obtained as part of this research must not be reused or disclosed to any other person or entity other than those with IRB approval, except as required by law or for authorized oversight of the research project, without additional approval. IRB approval must be obtained for other research involving the use or disclosure of this PHI.
The Protected Health Information (PHI) collected for this study includes name, date of birth, and points of contact (email and phone number). This information is for identification and recruitment purposes only. Any PHI collected from a potential participant who is deemed ineligible through prescreening will be destroyed. The PHI collected from enrolled participants will be kept private. PHI will only be accessed by study personnel who need it. PHI will not be published or used after the clinical trial is completed.

10.2 If PHI is accessed, used, or disclosed, specify how authorization requirements will be met (**check all that apply**). For any waivers or alterations, complete the applicable appendix.

- ☐ Written Authorization
- ☐ Partial Waiver (for identification and recruitment purposes only)
- ☐ Full Waiver (authorization will not be obtained)
- ☐ Alteration (written authorization will not be obtained or all required elements will not be included)

NOTE: Purdue University will not waive HIPAA Authorization for third parties. If you are receiving PHI from another covered entity (not Purdue), then you will need to obtain a full or partial waiver of authorization from them.

10.3 Explain how the requested PHI (i.e., HIPAA identifiers and associated health information) are the minimum necessary information to accomplish the research objectives.

N/A

Information such as names, emails, and phone numbers are necessary to establish and maintain contact with participants. It allows for two-way communication between study personnel and the participant. Asking for the date of birth and past and current medical conditions (as specified in the exclusion criteria) is necessary to verify eligibility for the inclusion criteria of this study.

11. Reasonably Anticipated Benefits

11.1 List the potential benefits that participants may expect as a result of this research study. If there are no direct benefits to individual participants, indicate so.

There are no direct benefits to participants.

Potential Societal Benefits:

11.2 List the potential benefits that society and/or others may expect as a result of this study.

The study may provide important information about health benefits from the consumption of high-quality carbohydrates and their potential in reducing appetitive response. Data from this study might be translated efficiently into nutritional claims and dietary recommendations for individuals with complications of obesity and type II diabetes.

12. Risks, Harms, & Discomforts

Potential Risks, Harms, and/or Discomforts

12.1 Describe all reasonably expected risks, harms, and/or discomforts that may apply to the research. At a minimum, include the risk of breach of data confidentiality. **Discuss severity and likelihood of occurrence.** As applicable, include potential risks to an embryo or fetus if a woman is or may become pregnant. Consider the range of risks, including physical, psychological, social, legal, economic, and any other potential risk to the study population. Address both immediate and long-term risks.

Minor potential risks to subjects include slight discomfort during the consecutive venous blood draw in the first four hours on each test day. Bruising, venous clot or infection are risks of catheter placement for blood draws. Also, some people feel weak or light-headed at the thought or sight of blood. No adverse events or weakness, even slight, is anticipated based on the low volume of blood taken during each study visit.

There is a minor risk associated with a breach of confidentiality pertaining to the information gathered from the subjects. However, all physical copies of information and records of subjects

will be behind two locks in a secure location on the Purdue campus or stored digitally in HIPAA-protected Box.

Consumption of 60g of raw corn starch, during the experimental arms, may bring a small potential risk for gastrointestinal discomfort like bloating or gas. These symptoms typically resolve on their own within a short period and do not usually require medical attention. The likelihood of this minor discomfort is minimal as similar quantities of carbohydrates are frequently consumed by the average individual. The risks of being in this study are like those in normal life.

There are no risks associated with consumption of 60 g of maltodextrin.

Risk Mitigation

12.2 Describe how risks, harms, and/or discomforts will be minimized. Address all risks described in the section above.

A trained phlebotomist will perform all blood draws and venipuncture to minimize the risk of puncture site bruising, venous clot, or infection.

Participants will be monitored by key study personnel and a trained phlebotomist in the CRC at all times during each study visit. More specifically, participants will be monitored during blood draws for signs of weakness or light-headedness. Key study personnel will ask participants questions like, ”Can you tell me how you are feeling?” or, ”Are you doing alright?” This will help the study team mitigate the risk of discomfort while the venous catheter is in place. Any potential small gastrointestinal discomfort from raw corn starch cannot be mitigated by changing the dosage or taking on a full stomach or by taking it over a period of time. It is crucial to the integrity of the study that participants arrive in a fasted state to the study visit and consume all 75g of starch at one time. However, to reiterate, consumption of raw corn starch in quantities like 60 g present a small potential risk for gastrointestinal discomfort like bloating or gas. (For reference that is the quantity of starch in a 150 g potato ~ 1 medium sized potato. It is also roughly 90 g of corn ~ 0.67 cup of kernels.) These symptoms typically resolve on their own within a short period and do not usually require medical attention. The likelihood of this minor discomfort is minimal as similar quantities of carbohydrates are frequently consumed by the average individual. The risks of being in this study are like those in normal life.

As to the consumption of 75 g of maltodextrin, there are no potential side effects. 75 grams of a simple carbohydrate, like maltodextrin, can be consumed by an average American. In fact, it is often consumed. That is 300 calories of simple carbohydrates. Comparing to commercially available food, that is similar to two 12-oz cans of sodapop, or two 6-oz cups of flavored yogurt, or 3 oz of candy gummies. We do not expect any discomfort or side effects from consumption of 75 g of maltodextrin.

If a participant expresses unexpectedly high discomfort, the study staff will ask them if they wish to discontinue the study. If so, their desire will be honored, and they will stop all procedures and be immediately withdrawn from the study. If a participant experiences discomfort, the study personnel will seek to mitigate that discomfort to all reasonable ends as determined by the study

personnel. The study personnel may ask them if they wish to fully lie down, though they are already in a reclining chair. They may be offered an isolated space in Room 144 or 124 for privacy. Study personnel may ask the participant if they wish to call someone on their behalf. If they wish, the participant may be allowed to remain at the CRC until the end of that study visit around 1pm, at which time, study personnel will ask if they can be of further assistance. If the participant's request for assistance is reasonable and does not impose liabilities upon the personnel member, their request will be granted. If the participant does not need further assistance but still feels ill, they will be encouraged to seek medical attention from their primary healthcare provider.

The CRC has an AED and First Aid Kit and the student lead researcher is trained in First Aid and CPR. However, any adverse events beyond the scope of practice of the study staff should be treated by medical professionals. The study staff does not include any medical professionals (with the notable exception of the phlebotomist who is only trained in phlebotomy); therefore, no clinical resources are available if an adverse event occurs. As a reminder, all blood draws are taken by a trained phlebotomist in the CRC which is a clinical research environment.

Risk/Benefit Ratio Assessment

12.3 Include an assessment of known risks and potential benefits, addressing each of the following:

- Rationale for the necessity of exposing participants to risks
- A summary of the ways that risks to participants are minimized in the study design
- Justification as to why the value of the information to be gained outweighs the risks of participation in the study

The proposed study does not cause harm to the subjects except for the potential discomfort of repeated blood draws. Risk has been minimized by having a trained phlebotomist and having a single venous catheter stick rather than 7 small sticks. Additionally, there is at least a week washout period between study visits. Therefore, the probability of possible harm is minimal.

On the other hand, the study hopes to confirm dietary carbohydrate quality as a food-based agent for weight loss. This study investigates the effect of dietary carbohydrates on appetitive response and satiety signals. This is, in turn, directly related to possible therapies for many metabolic disorders that affect society, such as obesity and type II diabetes (which is the seventh leading cause of death in the United States) and cardiovascular disease.

The research team deems the potential benefits to far outweigh the potential risk to participants.

13. Data Analysis

Internal/External Validity

13.1 Describe measures that have been taken to avoid study bias (consider the threats to internal/external validity).

Treatments are blinded to the individual participants and to the study personnel.

Data Analysis Techniques

13.2 Specify the analytic techniques the researcher will use to answer the study questions. Indicate the statistical procedures (e.g. specific descriptive or inferential tests) that will be used and why the procedures are appropriate.
NOTE: The IRB does not need the actual formulas to be used, just a description of them. If applicable, specify the proposed analytic approaches for qualitative data.

The appetitive rating questionnaire is a visual analog scale (VAS) and will measure satiety parameters throughout the study. The VAS is derived from Flint et al. (2000) and has been used in previous clinical studies by our lab with success. Plasma will be separated by centrifugation at 2000-3000 g for 10-15 min at 4°C within 30 min of collection and stored at -80°C until assayed. Plasma GLP-1 analysis will be done using an ELISA-based kit (Millipore) and plasma glucose will be done through IU Health.

During screening in particular, fasting blood glucose and Hemoglobin A1C will be tested by blood draw and sent to IU Health for analysis. (Analysis going outside of the University are coded and do not contain direct identifiers.)

14. Data Safety and Monitoring

14.1 Does the research involve greater than minimal risk (i.e., the harms or discomforts described are beyond those ordinarily encountered in daily life or during the performance of routine physical or psychological tests)?	**Y**	**N**	**Comments**
	☐	x	If yes, describe a data and safety monitoring plan below.

14.2 Describe the plan to oversee and monitor data collected to ensure participant safety and data integrity.

If the plan is outlined in a separate document, upload it to the documents page of the application SmartForm.

If not, describe it below and include the following:

- The information that will be evaluated (e.g., incidence and severity of actual harm compared to that expected)
- Who will perform the monitoring (e.g., investigator, sponsor, or independent monitoring committee/board)
- Timing of monitoring (e.g., at specific points in time, after a specific number of participants have been enrolled/treated) and
- Decisions to be made as a result of the monitoring process (e.g., provisions to stop the study early for unanticipated problems)

During the screening, enrollment, and study visits each participant will be met individually in a separate chair 6 feet apart in the Clinical Research Center. Data information and analysis will not be conducted until after the end of the visit and will only be accessible to staff working on the project.

See Section 12.2. for detailed information on monitoring during sample collection and for provisions to stop the study early for unanticipated problems.

The lead student researcher, Erica de Jong, and Dr. Hamaker will be responsible for data and safety monitoring during all supplementation periods. Drs. Hamaker and Cantu-Jungles, as PI and Co-PI respectively, will hold overall responsibility. There will be daily communication between the three investigators.

15. Bibliography

1. Chegeni, M., Hayes, A. M. R., Gonzalez, T. D., Manderfeld, M. M., Lim, J., Menon, R. S., Holschuh, N. M., Hedges, M. E., & Hamaker, B. R. (2022). Activation of gastrointestinal ileal brake response with dietary slowly digestible carbohydrates, with no observed effect on subjective appetite, in an acute randomized, double- blind, crossover trial. European Journal of Nutrition, 61(4), 1965–1980. https://doi.org/10.1007/s00394-021- 02770-2
2. Dhand, N. K., & Khatkar, M. S. (2014). Statulator: An online statistical calculator. Sample Size Calculator for Comparing Two Paired Means. http://statulator.com/SampleSize/ss2PM.html
3. El Hindawy, M. M. M. (2018). Maltooligosaccharide Chemosensation by Intestinal Enteroendocrine L-Cells Regulates the Endogenous Release of Gut Hormones and Contributes to Weight Management in Vivo. ProQuest Dissertations & Theses.
4. Flint, A., Raben, A., Blundell, J. E., & Astrup, A. (2000). Reproducibility, power and validity of visual analogue scales in assessment of appetite sensations in single test meal studies. *International Journal of Obesity*, *24*(1), 38–48. https://doi.org/10.1038/sj.ijo.0801083
5. Hasek, L.Y., Phillips, R.J., Zhang, G., Kinzig, K.P., Kim, C.Y., Powley, T.L. and Hamaker, B.R., 2018. Dietary slowly digestible starch triggers the gut–brain axis in obese rats with accompanied reduced food intake. Molecular Nutrition & Food Research, 62(5), p.1700117.
6. Lim, J., Ferruzzi, M. G., & Hamaker, B. R. (2021). Dietary starch is weight reducing when distally digested in the small intestine. Carbohydrate Polymers, 273, Article 118599. https://doi.org/10.1016/j.carbpol.2021.118599
7. Sebastian, R. S., Hoy, M. K., Murayi, T., Goldman, J. D., & Moshfegh, A. J. (2024, April 1). Lunch consumption by U.S. adults. FSRG Dietary Data Briefs - NCBI Bookshelf. https://www.ncbi.nlm.nih.gov/books/NBK604047//
8. Wachters-Hagedoorn, R. E., Priebe, M. G., Heimweg, J. A. J., Heiner, A. M., Englyst, K. N., Holst, Jens. J., Stellaard, F., & Vonk, R. J. (2006). Rate of Intestinal Glucose Absorption Is Correlated with Plasma Glucose-Dependent Insulinotropic Polypeptide Concentrations in Healthy Men. *The Journal of Nutrition*, *136*(6), 1511–1516. https://doi.org/10.1093/jn/136.6.1511
9.