The Ohio State University Consent to Participate in Research

Study Title:	Cardiometabolic benefits of potatoes mediated along the gut-vessel axis in adults with metabolic syndrome
Principal Investigator:	Richard S. Bruno
Sponsor:	Alliance for Potato Research and Education

- **This is a consent form for research participation.** It contains important information about this study and what to expect if you decide to participate. Please consider the information carefully. Feel free to discuss the study with your friends and family and to ask questions before making your decision of whether or not to participate.
- **Your participation is voluntary.** You may refuse to participate in this study. If you decide to take part in the study, you may leave the study at any time. No matter what decision you make, there will be no penalty to you and you will not lose any of your usual benefits. Your decision will not affect your future relationship with The Ohio State University. If you are a student or employee at Ohio State, your decision will not affect your grades or employment status.
- **You may or may not benefit as a result of participating in this study.** Also, as explained below, your participation may result in unintended or harmful effects for you that may be minor or may be serious depending on the nature of the research.
- **You will be provided with any new information that develops during the study that may affect your decision whether or not to continue to participate.** If you decide to participate, you will be asked to sign this form and will receive a copy of the form. You are being asked to consider participating in this study for the reasons explained below.

1. Why is this study being done?

Cardiovascular disease (CVD) is a major public health concern in the United States, where it accounts for 1 in 4 deaths every year. The inability of your blood vessels to properly enlarge and shrink, known as vascular endothelial dysfunction (VED), is an early event leading to CVD and can be caused by postprandial hyperglycemia (PPH) or short-term increases in blood sugar that occur after you have eaten. Although we do not know how this occurs, research shows that temporary increases in blood sugar impair the blood vessel's ability to properly enlarge and shrink. CVD is also characterized by metabolic endotoxemia. Metabolic endotoxemia is a term given to describe the presence of a gastrointestinal-derived bacterial product (endotoxin) in the blood that occurs due to "leaky gut" or impaired gut health that is common in metabolic syndrome. Metabolic syndrome is a group of risk factors, such as elevated blood pressure, elevated blood sugar, and abdominal fat, that increases a person's risk for CVD.

Studies in animals and humans have shown that consumption of resistant starch (a type of carbohydrate found in potatoes among other foods) can help to improve vascular and gut health. However, the impact of potatoes themselves on vascular and gut health is not known, as only other food forms containing resistant starch have been tested. This indicates a need to examine potato consumption as a dietary strategy to reduce vascular endothelial dysfunction and metabolic endotoxemia to improve vascular and gut health. By successfully completing this study, we anticipate showing that chronic consumption of potatoes is an effective strategy to reduce vascular endothelial dysfunction and metabolic endotoxemia, and thus improve vascular and gut health.

2. How many people will take part in this study?

Our goal is to recruit 30 men and women with metabolic syndrome (18-50 years old). To meet this goal, we plan to screen up to 200 individuals.

3. What will happen if I take part in this study?

Screening
Before participating in this study, you will need to visit our study center located in Campbell Hall on the Ohio State University campus for an initial blood screening to make sure you have fasting blood chemistries (glucose, triglyceride, high density lipoprotein (HDL)) that are consistent with our study criteria. During this time, an experienced technician will measure your blood pressure and collect a small blood sample (1 tablespoon) from your arm. Within a week, we will have determined your blood results, which we will provide to you. If your blood results are consistent with our study criteria, you will be eligible to continue with the study procedures. If not, you will not be able to participate in our study.

Study Overview
For this study, everyone will complete four weeks of a prescribed diet: two weeks with the addition of a potato daily and two weeks with the addition of a bagel daily. The order in which you receive the diets will be assigned by chance. If you are interested in learning about the final results of the study, we would be happy to email you a copy of the published study findings.

If you participate in this study, you will be scheduled at your convenience to visit our study center a total of 12 times after the initial screening meeting which includes picking up meals, having your height and weight measured, completing two ~3-hour metabolic testing sessions, and dropping off urine and stool samples. Throughout the study, we ask that you avoid consuming foods/drinks other than the ones we give to you. We will provide you with all foods for each two-week period. The amount of food given will be tailored to your caloric needs so that you maintain the same weight throughout the study. The meals will be cooked and ready to eat; a microwave may be used to reheat food if desired. See below for the meal plan that will be followed. This is a four-day meal plan that will repeat for each two-week intervention period (i.e. Meal Pattern A on Day 1, B on Day 2, C on Day 3, D on Day 4, repeated 4 times per two-week intervention period). An asterisk (*) denotes where meal patterns differ between the two interventions.

Meal Pattern A:	**Meal Pattern B:**	**Meal Pattern C:**	**Meal Pattern D:**
Breakfast			
Boiled eggs	Grapenuts cereal	Whole wheat waffles	Scrambled eggs
Blueberries	Soy milk	Peanut butter	Diced green bell pepper
Oat milk	Mandarin oranges	Tropical fruit cup	Diced onion
Raisins	English muffin	Fruit & nut bar	Shredded cheese
English muffin	Butter spread		Whole wheat tortilla
Butter spread	Honey		Fruit & nut bar
			Turkey bacon
Lunch:			
Turkey breast	Spinach	Spaghetti	Rotini pasta
Wheat bread	Sunflower oil	Chicken meatballs	Ground beef
Baby carrots	Whole wheat bread	Marinara sauce	Marinara sauce
Fruit & nut bar	Tuna		
Cheese slice	Mayonnaise		
	Diced pears		
Dinner:			
Grilled chicken	Taco shells	Turkey burger	Tilapia filets
Wheat bun	Shredded chicken	Wheat bun	Brown rice
Sun Chips	Grapes	BBQ crisps	Spinach
Riced cauliflower	Shredded cheese	Grapefruit	Sunflower oil
Broccoli	Grape tomatoes	**Au gratin potatoes or bagel***	Diced pineapple
Red apple	**Potato wedges or bagel***		**Mashed potatoes or bagel***
Baked potato or bagel*			
Snacks			
Peanut butter	Celery	Craisins	Granola
Rice cakes	Peanut butter	Cashews	Clementines
	Granola		Oat milk

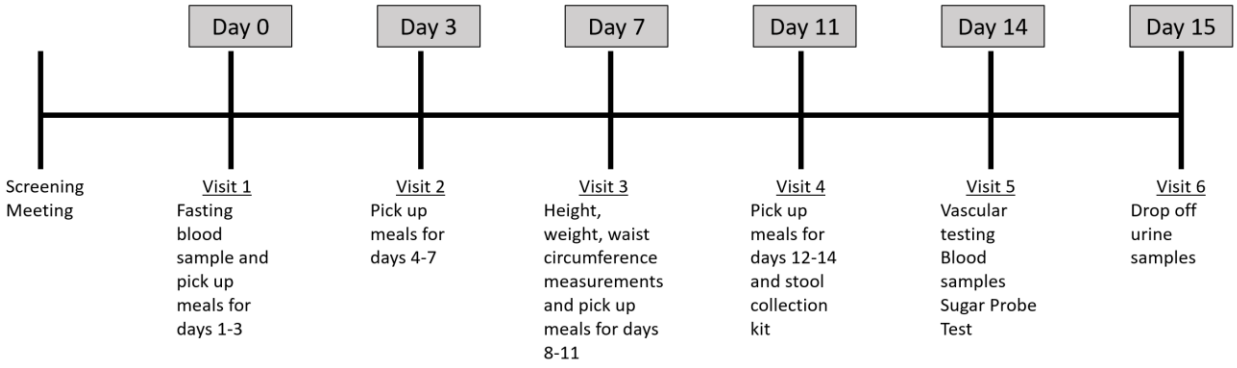
If you have an allergy to one of the foods on the menu (e.g. eggs, peanut butter), we ask that you do not participate in the study due to concerns of cross-contamination, as all study foods will be prepared in the same location.

If you have an aversion to a food item listed on the menu, it may be substituted with a similar item from another meal pattern day. For example, if you do not like celery (on Meal Pattern B), it may be replaced with a vegetable from Meal Patterns A, C, or D (e.g. broccoli, carrots, green bell pepper). If you have an aversion to several (3 or more) foods on the menu, it is recommended that you reconsider your participation in the study, as the menu has been carefully formulated to meet the Dietary Guidelines for Americans and is standardized across participants.

Additionally, the menus will be customized to your personal calorie level needed for weight maintenance. It is recommended (but not required) that you eat all that is provided to you so as to maintain the same weight throughout the study.

In addition to the foods listed above, we will give you a water bottle that you can refill with water, and seasonings to add to your food if desired. We will also give you a form to record any accidental intake of additional foods/drinks.

We also ask that you do not exercise for more than 7 hours per week throughout the entire study. For each visit to our study center, you will need to be fasted for 10-12 hours (no food or drink, only water) and not have exercised or had alcohol or caffeine within the last 24 hours to ensure reliable blood values and blood vessel measurements. Please refer to the picture below for a visual overview of the study.



This study consists of two 2-week interventions of consuming diets that follow the Dietary Guidelines for Americans, with the addition of a potato or a bagel every day. During each 2-week period, you will visit the study center once prior to the beginning of the intervention (Visit 1), three times in the middle of the intervention (Visits 2-4), and twice at the end of the intervention (Visit 5 and 6). The study visit at the beginning of the study will consist of a fasting blood draw. Visits 2 and 4 will consist of picking up meals for the proceeding 3 days. Visit 3 will consist of picking up meals for the proceeding 3 days plus having measurements of your height, weight, and waist circumference taken. At the end of the study (Visit 5), you will come to the study center to consume a sugar beverage, followed by vascular testing and blood sample collection. We will ask you to collect one stool sample at home which you will return to us when you arrive for Visit 5. We will provide you with the necessary materials and collection kits to perform this safely and hygienically. The collection kit will contain a plastic container that can

be placed underneath the toilet seat where you can collect your stool sample. We will also provide you with gloves and a waste bag to assist in the collection and prevent any possible contamination. During Visit 5 and for 24 hours following, you will also collect urine samples. These will be returned to the study center the next day.

Study Visit 1. We ask that you do not exercise for 24 hours prior to your study visit and do not consume any food or drink, except water, for 10-12 hours prior to your study visit. Prior to the intervention phase, we will measure your blood levels of glucose, triglyceride, and high-density lipoprotein, along with the extent of impaired gut health. To do so, we will collect a 15 mL blood sample (~1 tablespoon). We will provide you with meals for the following 3 days and ask that you abstain from eating additional foods or drinks other than those provided.

Study Visit 2. You will return to the study center to pick up your meals for days 4-7.

Study Visit 3. Halfway through the 2-week intervention period (day 7) we will have you come to the study center. We ask that you do not exercise for 24 hours prior to your study visit. Please do not eat or drink anything other than water for 10-12 hours prior. During this visit, we will take your height, weight, and waist circumference. You will also pick up your meals for days 8-10.

Study Visit 4. You will pick up your meals for days 11-14 and a stool collection kit to be used once at home.

Study Visit 5. Please refrain from exercise or ingesting caffeine or alcohol for 24 hours prior to this appointment and abstain from food and beverages (other than water) for 12 hours. You will come to the study center to complete a metabolic testing session lasting ~3 hours. When you first arrive, you will return your stool sample. We will measure your height, weight, and waist circumference. A trained phlebotomist will insert a sterile catheter into the vein of your arm to collect all blood samples during the session. Once the catheter is in place, a fasting blood sample (15 mL or ~1 tablespoon) will be taken. We will also measure your blood vessel function using ultrasound. Next, you will consume a beverage containing glucose, sucralose, erythritol, lactulose, and mannitol (artificial sweeteners). This will taste like a sweet, water-based drink (e.g. Kool-Aid). After you drink the test beverage, you will have to remain in a lying down position throughout the duration of the metabolic testing session, although you will be able to use the restroom between measurements. We will use a procedure to collect ultrasound images of the artery located in your neck from two different angles. This will allow us to evaluate the thickness of the wall of your artery and determine if you are at high risk for developing heart disease. We will take blood samples and collect images of your brachial artery (on your arm, just above your elbow) every 30 minutes for two hours (at 30, 60, 90, and 120 minutes after ingestion of the sugar beverage). We will also measure your blood vessel function at these same time points. After each blood sample is obtained, the catheter will be flushed with sterile saline to prevent the formation of clots and to minimize the likelihood of having to insert a needle again. You will collect urine samples while you are at the study center and for 24 hours following. During Study Visit 5, we will be collecting about 75 mL or 0.33 cups of blood. This amount of blood is necessary to collect to ensure adequate sample volumes for accurate and reliable analysis. Throughout the span of the study, which consists of a screening blood sample plus study visits 1

and 5, we will be collecting a total amount of 210 mL (about 0.88 cups) of blood. You should not donate blood during the course of this study or for 8 weeks after completing the study.

Study Visit 6. You will return to the study center the next day to drop off your urine samples.

Blood, Urine, and Stool Sample Storage Agreement

All blood samples collected for this study will be analyzed for glucose, insulin, HDL, triglyceride, endotoxin, gut hormones (cholecystokinin) and markers of inflammation. Urine samples will be analyzed for sucralose and erythritol. Stool samples will be analyzed for short chain fatty acids (produced in the gut after consuming resistant starch) and microbiota (naturally abundant bacteria in the gut) composition. Any remaining samples will be stored up to 5 years at our study center. We ask that you allow us to store your samples for future analysis specifically related to this study. Storage of samples is completely optional and you may complete the study without agreeing to the storage of samples.

Do you agree to allow us to store any remaining blood, urine, and stool samples for additional future measurements? Please circle your response and provide your initials below:

YES NO _____(Participant's Initials) _____Date

4. How long will I be in the study?

You are required to visit the study center at least 6 times per intervention, for a total of 12 times. Prior to joining the study, you will complete a screening visit, which will take about 1 hour. Your first visit following the screening visit will consist of baseline measurements of blood chemistries, height, weight, and waist circumference, which will take about 1 hour. Study visits 2, 3, and 4 will each take about 10 to 15 minutes. Visit 5 will require about 3 hours at the study center. Finally, following the 24-hour urine collection period, you will need to visit the study center or coordinate with study personnel to meet at a public and mutual location to drop off your samples within 24 hours of collecting them. We anticipate this will take about 10 minutes. The above procedures will be completed two times, once per intervention (potato, bagel). Overall, we anticipate that you will commit about 12 hours over the course of about 6-12 weeks to complete the study, depending on your availability.

5. Can I stop being in the study?

You may leave the study at any time. If you decide to stop participating in the study, there will be no penalty to you, and you will not lose any benefits to which you are otherwise entitled. Your decision will not affect your future relationship with The Ohio State University. If you are a student or employee at Ohio State, your decision will not affect your grades or employment status. If you wish to have your samples destroyed, contact the investigator by phone or email.

6. What risks, side effects or discomforts can I expect from being in the study?

The primary inconvenience for you is that you must visit our study center 12 times over the course of the entire study. You will not be able to exercise, consume alcohol or caffeine for 24 hours prior to visits 1, 3, and 5 and you will need to limit your exercise to less than 7 hours per week throughout the study. Additionally, you may consume only the food and beverage products provided to you throughout each two-week intervention period.

Blood Collection. During the blood drawing aspect of this investigation, only experienced technicians will be responsible for inserting all catheters and needles as well as collecting blood samples. All blood drawing materials will be sterile and sanitary techniques will be used. You may experience a small initial pain from insertion of the needle and bruising may occasionally occur after the procedures are completed. In addition, you may experience lightheadedness or feel faint which is common when people donate blood. At study visit 5, we will be collecting about 75 mL or 0.33 cups of blood. We do not foresee any additional significant risks with collecting this amount of blood, other than the possible risks stated previously. During study visit 5, you will need to keep the catheter inserted for 3 hours, which may lead to some discomfort.

Blood Vessel Ultrasound Imaging. A procedure called flow-mediated dilation will be used to assess the health and ability of your blood vessel to expand. This information will tells us about whether the diet you have been eating has beneficial effects on how well blood flows through your arteries. This procedure is performed by a trained individual using an ultrasound system while your heart is monitored using an electrocardiogram (ECG) that is similar to what is present in many doctor's offices. The procedure is non-invasive, and you must be lying down throughout the procedure. During the ultrasound imaging procedure, you may experience some mild discomfort (e.g. tingling in your fingers) while wearing the blood pressure cuff on your arm, and while the cuff is inflated. The discomfort will go away after the blood pressure cuff is deflated. Using ultrasound, the brachial artery (blood vessel in your upper arm) will be located and the ultrasound probe (a device that sends and receives sound waves in order to create an image) will be held in place to collect images of your blood vessel. Images of your blood vessel will be obtained at two different times during each test. First, we will image your blood vessel for about 30 seconds without the blood pressure cuff inflated. Then, we will inflate the blood pressure cuff for 5 minutes and then rapidly release the blood pressure cuff to cause a surge in blood flow. During that surge, the blood vessel will be imaged a second time for about 3 minutes to see how well it expands while the blood is flowing strongly. The software of the ultrasound system then calculates how much your blood vessel expanded during the surge of blood flow relative to the size of your blood vessel during the period when the cuff was not inflated. The software also calculates how fast your blood is flowing. Using the same ultrasound system, but without the blood pressure cuff, we will also evaluate the health of the artery in your neck. Images of the blood vessel in your neck will be obtained while you are resting comfortably. There are no risks with this procedure, but you may be uncomfortable because we will be asking you to remain still for approximately 3 minutes so that we can collect images of your artery at a high quality.

Sugar Test Beverage. The sugar test beverage contains a mix of glucose plus non-digestible sugars that are safe for human consumption. Although we expect no adverse effects, you may experience slight gastrointestinal discomfort after consuming the beverage.

Urine and Stool Sample Collection. During study visit 5 we will ask you to collect your urine for 24 hours. We will also ask you to provide a stool sample taken once on day 12 or 13. We will provide you with urine collection containers and show you how to use the stool collection kits to safely and hygienically collect a stool sample. If you do not feel comfortable collecting your own urine or stool, we ask that you do not participate in this study.

Confidentiality. To maintain your confidentiality, a number (i.e. code) will be assigned to you. This "code" will only be available to research personnel and any records containing your name will be stored in a locked filing cabinet within a lockable office or on a password protected computer in the principal investigator's laboratory or office. Research personnel under the supervision of the principal investigator and the principal investigator will be the only individuals that have access to this information.

7. What benefits can I expect from being in the study?

Although consumption of potatoes is expected to have a positive effect, there is no guarantee the results will directly benefit you. You will be provided with your screening blood testing results as categorical information, because the results are for research purposes and cannot be used to provide a clinical diagnosis of disease. In addition, we will provide information regarding your blood pressure, height, weight, and body mass index. If you are interested in learning more about your results during the study, we would be happy to email you a copy of the final study findings that are compiled in an anonymous manner once we have published our findings. Overall, the results obtained from this study are expected to enhance our knowledge of how chronic ingestion of potatoes affects postprandial glycemia, metabolic endotoxemia and cardiovascular and gastrointestinal health, and whether potatoes can be used as potential dietary strategy to reduce postprandial glycemia, metabolic endotoxemia and improve cardiovascular and gastrointestinal health. This knowledge is of great importance to increase our understanding of the potential health benefits of consuming potatoes in improving cardiovascular and gut health.

8. What other choices do I have if I do not take part in the study?

You may choose not to participate without penalty or loss of benefits to which you are otherwise entitled.

9. Will my study-related information be kept confidential?

Efforts will be made to keep your study-related information confidential. However, there may be circumstances where this information must be released. For example, personal information regarding study participation may be disclosed if required by state law.

Also, your records may be reviewed by the following groups (as applicable to the research):

- Office for Human Research Protections or other federal, state, or international regulatory agencies;

- U.S. Food and Drug Administration;
- The Ohio State University Institutional Review Board or Office of Responsible Research Practices;
- The sponsor supporting the study, their agents or study monitors; and
- Your insurance company (if charges are billed to insurance).

If this study is related to your medical care, your study-related information may be placed in your permanent hospital, clinic, or physician's office records. Authorized Ohio State University staff not involved in the study may be aware that you are participating in a research study and have access to your information. A description of this clinical trial will be available on http://www.ClinicalTrials.gov, as required by U.S. law. This website will not include information that can identify you. At most, the website will include a summary of the results. You can search the website at any time.

You may also be asked to sign a separate Health Insurance Portability and Accountability Act (HIPAA) research authorization form if the study involves the use of your protected health information.

10. What are the costs of taking part in this study?

There will be no costs for participating in this study except those needed for transportation to and from the OSU campus.

11. Will I be paid for taking part in this study?

If you complete the study in its entirety and provide all requested blood, stool, and urine samples, and complete the two 2-week interventions and associated tests, you may receive up to $300 (as a check) at the completion of the study. The check will be given at your final study visit. Parking for each visit will be paid for by a parking pass. For each of the intervention periods following the informed consent and screening meeting, you will be paid in the following manner:

Intervention Period 1:

- *Visit 1:* $10 will be provided for visiting our study center and providing a fasting blood sample
- *Visit 2:* $10 will be provided for visiting our study center to pick up meals
- *Visit 3:* $10 will be provided for visiting our study center and having measurements of height, weight, and waist circumference taken
- *Visit 4:* $10 will be provided for visiting our study center to pick up meals
- *Visit 5:* $50 will be provided for a 3-hour metabolic testing session including providing blood samples, a stool sample, and image collection of the brachial artery
- *Visit 6:* $10 will be provided for dropping off 24-hour urine sample collection

Intervention Period 2:
Visits 1-6 repeated as indicated above

Study Bonus:
If you complete the entire study and provide all of the requested materials, you will be provided a $100 bonus, which will bring your total compensation to $300. This will be given to you in the form of a check. If you withdraw or are dismissed from our study, you will be compensated for the completed aspects as indicated above. Please note that by law, all payments are considered taxable income.

12. What happens if I am injured because I took part in this study?

If you suffer an injury from participating in this study, you should notify the researcher or other study personnel immediately, who will determine if you should obtain medical treatment at The Ohio State University Medical Center.

The cost for this treatment will be billed to you or your medical or hospital insurance. The Ohio State University has no funds set aside for the payment of health care expenses for this study.

13. What are my rights if I take part in this study?

If you choose to participate in the study, you may discontinue participation at any time without penalty or loss of benefits. By signing this form, you do not give up any personal legal rights you may have as a participant in this study.

You will be provided with any new information that develops during the course of the research that may affect your decision whether or not to continue participation in the study.

You may refuse to participate in this study without penalty or loss of benefits to which you are otherwise entitled.

An Institutional Review Board responsible for human subjects research at The Ohio State University reviewed this research project and found it to be acceptable, according to applicable state and federal regulations and University policies designed to protect the rights and welfare of participants in research.

14. Who can answer my questions about the study?

For questions, concerns, or complaints about the study you may contact Dr. Richard Bruno (Principal Investigator; 614-292-5522; bruno.27@osu.edu) or Ms. Emily Shaw (Research Assistant; (573)673-7269; shaw.876@buckeyemail.osu.edu)**.**

For questions about your rights as a participant in this study or to discuss other study-related concerns or complaints with someone who is not part of the research team, you may contact Ms. Sandra Meadows in the Office of Responsible Research Practices at 1-800-678-6251.

Signing the consent form

I have read (or someone has read to me) this form and I am aware that I am being asked to participate in a research study. I have had the opportunity to ask questions and have had them answered to my satisfaction. I voluntarily agree to participate in this study.

I am not giving up any legal rights by signing this form. I will be given a copy of this form**.**

Printed name of subject	**Signature of subject**
	AM/PM
	Date and time
Printed name of person authorized to consent for subject (when applicable)	**Signature of person authorized to consent for subject (when applicable)**
	AM/PM
Relationship to the subject	**Date and time**

Investigator/Research Staff

I have explained the research to the participant or his/her representative before requesting the signature(s) above. There are no blanks in this document. A copy of this form has been given to the participant or his/her representative.

Printed name of person obtaining consent	**Signature of person obtaining consent**
	AM/PM
	Date and time

Witness(es) - *May be left blank if not required by the IRB*

Printed name of witness	**Signature of witness**
	AM/PM
	Date and time
Printed name of witness	**Signature of witness**
	AM/PM
	Date and time