Medical University of South Carolina
CONSENT TO BE A RESEARCH SUBJECT

TITLE OF RESEARCH: Evaluating the effects of transcranial focused ultrasound (tFUS) on fronto-striatal resting state functional connectivity in healthy individuals

SUMMARY

You are being asked to volunteer for a research study. Research studies are voluntary and include only people who choose to take part. Your participation is entirely voluntary. This is a research study to find out whether delivering sound into your brain can change the way your brain functions.

If you agree to participate, you will undergo one experimental visit. The visit includes a brief review of your height, weight, past medical history focusing on chronic (and current) medical problems, seizure history, medications, psychiatric disorders, and substance use. If you are eligible, you will then undergo a brain scan (magnetic resonance imaging (MRI) during this visit as well. During the MRI brain scan, you will receive real or placebo (fake) brain stimulation using a technology called transcranial focused ultrasound (tFUS). The visit should take 2 hours.

The greatest risks of this study include headache and discomfort from the device fixed on your head with velcro for one hour. There also may be risks of claustrophobia and/or anxiety within the MRI machine. The rest of the study details are described below.

The knowledge gained may help us better understand how an investigational form of brain stimulation works and how it can be used to treat brain disorders in the future. investigational means that the device is still being tested in research studies and is not approved by the U.S. Food and Drug Administration. If you are interested in learning more about this study, please continue reading below.

A. PURPOSE OF THE RESEARCH

Recently, scientists have discovered that transcranial focused ultrasound (tFUS) can stimulate the human brain. tFUS is like general ultrasound used in imaging, except that it is pulsed, rather than continuous. tFUS is an investigational medical technology platform performed within the magnetic resonance imaging (MRI) scanner that can modulate the brain. We want to see if we can use tFUS on a deep brain region (the nucleus accumbens) to temporarily change brain circuits in order to develop future treatments for addiction.

The study is being done at the Medical University of South Carolina (MUSC) 30 Bee Street Neuroimaging Center. Approximately 10 people will take part in this study. The investigator in charge of this study at MUSC is Bashar Badran, PhD.

B. PROCEDURES

If you agree to be in this study, the following will happen:

1. Pregnancy Test - If you are an individual of childbearing potential, you will be asked to take a urine pregnancy test, because the risks of transcranial focused ultrasound (tFUS) to a fetus are currently unknown. This test will be provided to you at no cost. Should the test present a positive result, you will no longer be eligible to participate in the study.
2. Brain Pictures (Brain Scan) - The study team will take pictures of your brain to measure how your brain responds while you are resting, and how your brain responds to tFUS. This will be done inside an Magnetic Resonance Imaging (MRI) machine. This will be done at the Medical University of South Carolina (MUSC) center for biomedical imaging. You will be placed inside an MRI lying down on a narrow bed, which will then be placed in a tube that is about 6 feet long and open at each end. You will lay there quietly for about 1 hours during which you will hear a loud noise. The study team will connect a tFUS system to your head, and will administer tFUS during some of the brain scans. the tFUS device is explained in detail in the following section.
3. Transcranial focused ultrasound (tFUS) – tFUS involves the delivery of sound waves to your brain using a special ultrasound loudspeaker (i.e., a transducer). The ultrasound being used in this study is just like the ultrasound used to image parts of the body, except that it is being pulsed rather than being delivered constantly. Because ultrasound does not travel well in the air, a water bag or gel will be placed between your head and the ultrasound device. In some cases, a water-based gel will be used to improve the contact between the loudspeaker and your head. You will experience no sensation from the ultrasound itself, and you may or may not be aware when the ultrasound is turned on. The researchers may attach the ultrasound device to your head with an elastic band or an adjustable frame so that it stays in the correct location. If this becomes uncomfortable for you, please advise the operator who will either readjust it, or end the exam as needed. There is a 50% chance (like flipping a coin) that you will receive either the real tFUS or the sham (placebo) tFUS. You will be asked at the end of the brain scan whether you thought you received real or placebo tFUS.

   The tFUS will be administered using the BX Pulsar 1001 device an investigational form of brain stimulation works and how it can be used to treat

brain disorders in the future. Investigational means that the device is still being tested in research studies and is not approved by the U.S. Food and Drug Administration.

Voluntary Withdrawal:
Participation in this study is voluntary. You are free to withdraw your consent and discontinue participation in the study at any time throughout the study without negative consequences to your relationship with the Medical University of South Carolina (MUSC).

Involuntary Withdrawal:
You may be withdrawn from the study without your consent if the researchers believe it is in your best interest or if you fail to follow study procedures.

Withdrawal from study will not affect any routine care you would normally receive at MUSC.

C. DURATION

This study involves only one visit, which lasts approximately 1-hour.

D. RISKS AND DISCOMFORTS

There are risks to the participation in this study.

1. Transcranial Focused Ultrasound (tFUS):

The study is being done to the nucleus accumbens because changing the activity in this region may have promise in treating addiction and pain disorders in the future. We have conducted similar studies to this in different deep brain regions and it has been well tolerated and safe.

- You might experience some minor cold or discomfort if gel is applied to your skin in the location where the ultrasound loudspeaker is placed.
- You might feel minor discomfort as your skin is cleaned from the gel.
- headache and discomfort from the device fixed on your head with velcro for one hour

Unknown Risks: Although tFUS considered safe, tFUS is still an investigational

procedure that has not been approved by the food and drug administration (FDA). The Principal Investigator will let you know if they learn anything that might make you change your mind about participating in the study.

2. Magnetic Resonance Imaging (MRI) Brain Scan:
MRI tests are non-invasive and painless. There are no known risks or side effects associated with conventional MRI procedures except to those people who have electrically, magnetically or mechanically activated implants (such as cardiac pacemakers) or to those who have clips on blood vessels in their brain. There are no known additional risks for using tFUS in the MRI scanner. However, an MRI may cause you to feel claustrophobic (uncomfortable in a small space) or anxious from the noises made by the machine.

This MRI scan will be used to answer research questions, not to examine your brain medically. This MRI scan is not a substitute for one a doctor would order. It may not show problems that would be picked up by a medical MRI scan. Nevertheless, a clinical neurologist or neuroradiologist will read your scan. If we find an abnormality, we will let you know, and will advise you to follow this up with your doctors. If you wish a copy of your MRI scan, we can provide it to you on a compact disc (CD). The MRI scans will be stored on research computers for 7 years and then they will be destroyed. It is not possible to access them after you complete the study so please get a copy of your MRI on a CD if you think you might want it in the future.

We are performing imaging solely for the research purposes described above. It is not a clinical scan intended for diagnostic or therapeutic purposes. If you want your scan to be reviewed by a physician so that the physician can look for medical issues, you can request a copy of your scan. We will provide an electronic copy at no charge.

4. Loss of Confidentiality: There is a risk of loss of confidentiality of your information that is used in this study.

E. MEDICAL RECORDS AND CERTIFICATE OF CONFIDENTIALITY

Information about your study participation will not be in your medical record. This means that neither your research participation nor any of your research results will be included in any Medical University of South Carolina (MUSC) medical record.

F. BENEFITS

We do not anticipate this study to provide any benefits to you, but knowledge gained will be used to better develop nonpharmacological treatments for treating brain and body ailments.

G. COSTS

There will be no cost to you as a result of participation in this study.

H. PAYMENT TO PARTICIPANTS

In return for your time and effort, you will be paid $100.00. Payments that you receive from Medical University of South Carolina (MUSC) for participating in this research study are considered taxable income per IRS regulations. If you do not complete the entire study visit, payments will be prorated for the time that you participated.

Payment for your study visits will be made to you using cash or a pre-paid debit card, called a ClinCard. It works like a bank debit card and you may use the card to purchase goods or services everywhere Debit MasterCard is accepted. You will be given a ClinCard at the beginning of the study. Each time you receive payment for participation in this study, the money will be added to the card, as outlined in the payment schedule above. Details of the debit card system are explained on an additional sheet.

If the total amount of payment you receive from MUSC reaches or exceeds $600.00 in a calendar year, you will be issued a Form 1099.

I. ALTERNATIVES

Your alternative is to not participate in this study.

J. DATA SHARING

Underlying primary data (ie: imaging results) for publications will be made broadly available to other researchers through an appropriate data repository. Any data that is shared via these means will be deidentified and no private health or identifying information will be included.

K. DISCLOSURE OF RESULTS

Data collected and results will not be disclosed to participants in the study, however will be released for public dissemination in published manuscripts and conference presentations.

L. AUTHORIZATION TO USE AND DISCLOSE (RELEASE) MEDICAL INFORMATION

As part of this research study, your study doctor and his/her research team will keep records of your participation in this study.

The health information Medical University of South Carolina (MUSC) may use or disclose (release) for this research study includes information in your medical record, results of physical exams, medical history, lab tests or certain health information indicating or relating to your condition.

Your study doctor and his/her research team will use and disclose (release) your health information to conduct this study. The health information listed above may be used by and/or disclosed (released) to the following, as applicable:

- The sponsor of the study including its agents such as data repositories or contract research organizations monitoring the study;
- Other institutions and investigators participating in the study;
- Data Safety Monitoring Boards;
- Accrediting agencies;
- Clinical staff not involved in the study who may become involved if it is relevant;
- Parents of minor children if less than 16 years old. Parents of children 16 years old or older require authorization from the child; or
- Health insurer or payer in order to secure payment for covered treatment;
- Federal and state agencies and MUSC committees having authority over the study such as:

    - The Institutional Review Board (IRB) overseeing this study; Committees with quality improvement responsibilities; Office of Human Research Protections; Food and Drug Administration; National Institutes of Health or Other governmental offices, such as a public health agency or as required by law.

Those persons who receive your health information may not be required by Federal privacy laws (such as the Privacy Rule) to protect it and may share your information with others without your permission, if permitted by laws governing them. You do not have to sign this consent form. If you choose not to sign, it will not affect your treatment, payment or enrollment in any health plan or affect your eligibility for benefits. However, you will not be allowed to be a participant in this research study.

You will be given a copy of this consent form. Your authorization will expire at the conclusion of this study or, if you are participating in a study designed for the

development of a drug or device, your authorization will remain in effect until the drug or device is approved by the Food and Drug Administration (FDA) or until the company's application to study the drug/device is withdrawn. You have the right to withdraw your agreement at any time. You can do this by giving written notice to your study doctor. If you withdraw your agreement, you will not be allowed to continue participation in this research study. However, the information that has already been collected will still be used and released as described above. You have the right to review your health information that is created during your participation in this study. After the study is completed, you may request this information.

Your health information will be used or disclosed when required by law. Your health information may be shared with a public health authority that is authorized by law to collect or receive such information for the purpose of preventing or controlling disease, injury or disability and for conducting public health surveillance, investigations or interventions. No publication or public presentation about the research study will reveal your identity without another signed authorization from you.

If you have questions or concerns about this Authorization or your privacy rights, please contact MUSC's Privacy Officer at (843) 792-8740.

M. SIGNIFICANT NEW FINDINGS

If there are significant new findings during the course of the study, you will be notified.

N. CLINICAL TRIALS.GOV

A description of this clinical trial will be available on http://www.ClinicalTrials.gov, as required by U.S. Law. This Web site will not include information that can identify you. At most, the Web site will include a summary of the results. You can search this Web site at any time.

O. STUDENT PARTICIPATION

Your participation or discontinuance will not constitute an element of your academic performance, nor will it be a part of your academic record at this Institution.

P. EMPLOYEE PARTICIPATION

Your participation or discontinuance will not constitute an element of your job performance or evaluation, nor will it be a part of your personnel record at this Institution.

Results of this research will be used for the purposes described in this study. This information may be published, but you will not be identified. Information that is obtained concerning this research that can be identified with you will remain confidential to the extent possible within State and Federal law. The sponsor and the Food and Drug Administration (FDA) will receive copies of the research records. The investigators associated with this study, employees of the sponsor, the FDA, and the Medical University of South Carolina (MUSC) Institutional Review Board for Human Research will have access to identifying information. All records in South Carolina are subject to subpoena by a court of law.

In the event of a study related injury, you should notify a study team member or one of the medical staff on the inpatient unit immediately. They will call your study doctor who will make arrangements for your treatment. If the study sponsor does not pay for your treatment, the Medical University Hospital and the physicians who render treatment to you will bill your insurance company. If your insurance company denies coverage or insurance is not available, you will be responsible for payment for all services rendered to you.

Your participation in this study is voluntary. You may refuse to take part in or stop taking part in this study at any time. You should call the investigator in charge of this study if you decide to do this. The data collected on you to this point remains part of the study database and may not be removed. Your decision not to take part in the study will not affect your current or future medical care or any benefits to which you are entitled.

The investigators and/or the sponsor may stop your participation in this study at any time if they decide it is in your best interest. They may also do this if you do not follow the investigator's instructions.

Q. FUTURE CONTACT

The researcher in charge of this study might like to contact you in the future about other research opportunities. Please initial by your choice below:

____Yes, I agree to be contacted

____No, I do not agree to be contacted

Volunteers Statement

I have been given a chance to ask questions about this research study. These questions have been answered to my satisfaction. If I have any more questions about my participation in this study or study related injury, I may contact **Bashar Badran (843-792-6076)**. I may contact the Medical University of SC Patient and Family Care Liaison (843) 792-5555 concerning medical treatment.

If I have any questions, problems, or concerns, desire further information or wish to offer input, I may contact the Medical University of SC Institutional Review Board for Human Research IRB Manager or the Office of Research Integrity Director at (843) 792-4148. This includes any questions about my rights as a research subject in this study.

I agree to participate in this study. I have been given an electronic or paper copy of this form for my own records.

Please sign below for paper consents or scroll to the bottom of the screen to provide an electronic signature.

_____ _____

Signature of Person Obtaining Consent Date *Name of Participant

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Signature of Participant Date