UNIVERSITY OF CALIFORNIA, IRVINE
CONSENT TO ACT AS A HUMAN RESEARCH SUBJECT

Characterization of Familial Myopathy, Paget Disease of Bone
(Main Study Consent Form)

You are being asked to participate in a research study. Participation in this study is **completely voluntary**. Please read the information below and ask questions about anything that you do not understand before deciding if you want to participate. The researcher listed below will be available to answer your questions.

RESEARCH TEAM AND SPONSORS

Lead Researcher:
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Study Locations:
GCRC, UCI Medical Center, Orange, CA and GCRC, Irvine, CA
Center for Molecular and Mitochondrial Medicine and Genetics (C-MAMMAG) at UCI

Study Sponsor: NIH

NAME OF SUBJECT: _____ DATE _____

PURPOSE OF STUDY:

You have been asked to volunteer for a medical research study to explore the genetic causes of muscle disease. Dr. Kimonis is particularly interested in muscle disorders that occur in combination with diseases of bone that appear to be passed on from generation to generation. You have been identified by your primary care physician as a possible candidate for this research or you have learned about this research from a related website and have contacted Dr. Kimonis as a possible candidate for the study.

Families with a combination of muscle disease with Paget disease of bone, a chronic skeletal disorder which may result in enlarged or deformed bones in one or more regions of the skeleton, have been studied in the laboratory and the gene that is responsible for the disease has been identified. Studying families with muscle and bone disease and/or dementia will help in understanding why the changes in the gene cause the muscle and bone problems. While there is no guarantee that your participation will be of benefit to you or others, this study has the potential of helping develop new treatment options in the future.

DNA is part of the genetic information carried on the chromosomes. Chromosomes contain the entire information needed for a cell to perform its function in the body and are found in every cell. A gene is a part of a chromosome that contains the information necessary for the cell to make a specific protein. The study team is looking for a change in a gene that contains the information for a specific protein which may cause this disorder.

As a research participant, you will be requested to provide information about yourself, your children, siblings, parents, grandparents, spouses, and possibly other members of your family. This information may include age, ethnic background, health status and the biological relationship between individuals. Depending on the nature of your medical condition, your requested participation might range from obtaining cheek swabs to mildly invasive techniques such as providing a blood or urine sample, to moderately invasive procedures such as providing a skin or/and muscle biopsy. The relationship between your problem and the proposed study and the degree of involvement requested of you will be explained so that you can make an informed decision as to whether or not to participate.

Many of the procedures in which you will be invited to participate are standard procedures routinely used for the clinical evaluation and diagnosis of muscle and bone diseases. The research study will not interfere with the care for your disease provided by your primary care physician or specialist. Although the procedures performed are routine they will only be done for the purposes of this research study.

The study team is also interested in monitoring disease progression through a natural history project. Non-invasive methods will be evaluated for the benefits of monitoring disease progression and results of future treatment. In order to accomplish this, you are requested to take part in procedures such as muscle strength measurements, rating scales for the muscle weakness, Magnetic Resonance Imaging (MRI), echocardiogram testing, lung function studies and studies to detect Paget disease of bone.

Participants who will be requested to participate in the skin or/and muscle biopsy portion of the study will be asked to sign a separate consent form.

Spouses may be asked to participate in this study and will be asked to sign a separate consent form.

SUBJECTS:

You are eligible to participate in this study if you are an adult (over the age of 18), and you or a member of your family has both a muscle disease and a disease of bone. This study will include people with a variety of diseases of muscle and bone. Individuals in your family both male and female, with myopathy and Paget or other disease of bone have an approximately 1 in 2 chance of passing on the disorder to their children.

This study will include approximately 500 subjects and will involve approximately 1-2 hours of your time. Your involvement in this study is limited to this visit however your samples could be studied for approximately 10 years which is the anticipated duration of the study.

For the natural history project, approximately 75 subjects (50 individuals with VCP mutations and 25 unaffected individuals) are expected to participate in more extensive studies including muscle strength measurements, MRI (magnetic resonance imaging) and echocardiograms studies. Your study participation may span to two days. You will be invited to participate in this testing at two yearly intervals (if we receive funding)
This study uses standard clinical procedures, but they are being done for research purposes. None of these procedures are experimental with the exception of Biodex dynamometry a method of measuring muscle strength and DOSI a method of measuring the concentrations of blood, water, and lipids (fats, for example) in your tissues. Below is a table that lists the procedures you are being asked to complete.

Table 1 (schedule subject to change if needed)	
Day 1	
Measure/ Procedure	
Medical History (30 min)	
Medication Use/Updates (5-10 minutes)	
Blood: CPK (10 min)	
Alkaline phosphatase	
Urine deoxy/pyridinolines	
MRI/MRS Measurements (one hour with prep)	
Muscle volumetric analysis	
Intramuscular Lipid (%)	
Muscle T2	
IBM rating Scale (15 min)	
Quality of Life scale (20 min)	
6 minute walk test (20 min with prep time)	
Biodex dynamometry testing (30 min)	
Echocardiogram and Electrocardiogram (30 min)	
Electromyography/Nerve Conduction Velocity (60 min)	
Motor Unit Number Estimation (60 min)	
Diffuse Optical Spectroscopy (DOS) (30 min) TOTAL TIME DAY 1= APPROX. 77 HOURS	
DAY 2	
Neuropsychological testing (1 hr) **Functional Measures**	
Muscle strength-MRC (20-30 min)	
Hand held Dynamometry (30 min)	
Skin biopsy (10 min)	
Muscle biopsy (20 min)	
Pulmonary Function Studies (Spirometry, MEP, MIP) (15 min)	
DEXA scan (20 min)	
Bone Scan (30 min + 3 hrs wait)	
XRAYs (20 min)	
TOTAL TIME DAY 2= APPROX. 3-7 HOURS	

PROCEDURES:
The procedures listed below represent an array of possible tests in which you might be asked to participate. These procedures will be conducted under a research protocol and will be performed at no cost to you. You are not obliged to agree to participate in all the above studies.

Some of the samples which will be requested for this research might already have been collected for diagnostic evaluations in other clinics by your primary care physician. If these previous materials such as muscle or bone are adequate for the studies to be conducted, and it is your desire to make the materials available, then your previously collected biological materials and medical data might be used for this study. After you sign the consent form the following procedures will be performed. The schedule of these tests may be subject to change.

You will be asked questions about your medical history. Please provide your consent and initial what you have indicated:

Chart review: The study team asks your permission to review your medical records from previous and current physicians. If you do not have medical records you will be asked to sign a Release of Medical Information form by Dr. Kimonis, which will allow your records to be reviewed. Data will be analyzed from your medical records.

YES____ NO____ Initial and date _____

VCP mutation Quality of Life Questionnaire: This 15-20 minute survey asks questions about your diet, exercise, disease symptoms and your quality of life. This survey is for adults who may be experiencing or are anticipating symptoms of IBMPFD, a disease which is cause by the VCP gene mutation. There may be some emotional discomfort or embarrassment while completing the questionnaire.

YES____ NO____ Initial and date _____

Physical and Neurological Examination: This examination will only be performed for those subjects who will be seen by Dr. Kimonis at University of California, Irvine (UCI). A general physical exam and neurological exam will be performed by Dr. Kimonis. This will include examination of the amount of muscle present, the muscle strength, and how the hands and feet feel sensation. The muscle stretch reflexes, walking and balance will also be tested. Your spine, arms, legs and skull will also be examined by looking at them and feeling them and any findings recorded (*20-30 minutes).*

YES____ NO____ Initial and date _____

Collection of a Venous Blood Sample: Your blood will be collected, one time only, by inserting a needle into a vein in your arm. Approximately two tablespoons of blood will be collected and used to obtain DNA (deoxyribose nucleotides), creatinine phosphokinase (CPK), which is a muscle chemical that is higher in some individuals with muscle disease, and alkaline phosphatase which is a bone enzyme that is higher in individuals with Paget disease of bone (This takes no more than a few minutes).

YES____ NO____ Initial and date _____

The study team asks that you to please inform Dr. Kimonis if you have had a muscle injury or an intra-muscular injection in the week before the blood draw because this may affect test results.

Some of the blood will be used to keep a perpetual sample of DNA, by collecting cells from the blood that makes white blood cells and serum in order to be able to do further studies in the future.

YES____ NO____ Initial and date _____

Urine Analysis: Approximately 4 tablespoons of urine will be collected to test for pyridinoline and deoxypyridinoline and other similar tests. These are chemicals that can sometimes be higher in people who have Paget disease of bone.

YES____ NO____ Initial and date _____

If you are referred by your primary care physician and will not be coming to UCI, a kit will be forwarded to you or your doctor for the blood and urine samples. The blood will be collected either by your doctor or your local laboratory. A return FEDEX package will be included for the samples to be returned to the laboratory of Dr. Kimonis. There will be no cost to you for the blood sampling or the delivery service. All laboratory charges will be paid by Dr. Kimonis.

For those individuals who are able to come to UCI Medical Center, these samples will be collected by Dr. Kimonis or a member of the GCRC team.

Collection of Buccal Cells: Either a saliva sample or cheek swab may be obtained by lightly brushing the inside of your cheek for approximately 30 seconds with a small brush and placing the brush in a tube. This is typically obtained if you are unable to provide a sample of blood. This sample and part of the blood sample is used for collection of DNA. Instructions and a kit will be sent by mail or FEDEX to you if you are providing buccal cells instead of a blood sample.

YES____ NO____ Initial and date _____

Muscle or Bone Sample**:** If a sample of muscle or bone is obtained by your physicians from you for clinical purposes, the study team request permission to obtain some of the leftover tissue sample for further genetic studies to help understand the disease in your family. A copy of the signed consent form will be shared to your doctor or laboratory where the sample is held for release of the muscle or bone sample to Dr. Kimonis. A FEDEX account number or appropriate packaging will be provided to the pathology laboratory.

YES____ NO____ Initial and date _____

A separate consent form is required for the skin and muscle biopsy studies. These studies will take no more than 30 minutes.

Muscle strength measurements:

Inclusion Body Myositis (IBM) Rating scale: The IBM scale is a 10 point functional rating scale that assesses activities of daily living. The IBM Rating scale will be obtained at annual intervals over the phone and at the time of the visits. Studies in inclusion body myositis revealed that this scale achieved good correlations with the Manual Muscle testing, dynamometry and quality of life studies therefore this simple test may possibly be used for future monitoring of progression of the muscle disease. (Duration approximately 15 minutes).

YES____ NO____ Initial and date _____

The Manual Muscle testing (MMT) using the MRC (Medical Research Council) scale is used to evaluate for muscle weakness particularly in the arms, legs, shoulder, and pelvic girdle and will be scored using the MRC, a validated scale for assessing muscle weakness. (Duration approximately 30 minutes).

YES____ NO____ Initial and date _____

Dynamometer measurements: Dynamometry testing uses instruments called dynamometers which more accurately measure muscle strength and force generated during muscular contractions. This test will be used to assess how muscle weakness progresses throughout your body. Specific exercises to be used will include moving your hips, knees, ankles, shoulders, wrists and fingers against resistance. (Duration approximately 30 minutes)

YES____ NO____ Initial and date _____

The 6 minute walk test: The 6 minute walk test is a useful measure of functional capacity targeted at people with at least moderately severe impairment. It will test the distance in a 6 minute period by the subject walking briskly. (Duration 20 minutes)

YES____ NO____ Initial and date _____

Magnetic Resonance Imaging (MRI) test: An MRI is used to visualize the structure and function of the body with detailed images. MRI does not employ radiation, drugs or other agents and is not associated with any side effects. The MRI procedure uses a powerful magnetic field to generate detailed anatomical images. The presence of any metal inside your body such as metallic clips used for vascular repairs and/or implanted devices such as cardiac pacemakers will exclude you from participation in this study. A scan of both legs and shoulders will be done to measure the muscle volume, and of the head to study the brain's lobes. Data from the MRI will also assist in determining the best site for the muscle biopsy. You will be asked to lie down in an MRI machine while the machine emits radio frequency pulses across a magnetic field to extract images of your body's tissue. The MRI will be combined with an MRS (Magnetic resonance spectroscopy) which will permit us to study the chemicals in your body. There is no exposure to radiation. Duration of the testing with preparation time is approximately one hour.

YES____ NO____ Initial and date _____

Echocardiogram: You may be asked to participate in an echocardiogram. An echocardiogram is a cardiac ultrasound that uses sound waves to create two dimensional images of the heart in order to assess how well the heart is functioning and the structure of the heart. A gel that makes conduction easier will be applied to your chest while an instrument that emits sound waves is moved across your chest. An echo contrast agent called Definity (Perflutren Lipid Microsphere) will be injected through an IV. This contrast agent allows the researchers to get a crystal clear image of the left ventricular function and ejection fraction. Side effects of the contrast agent may include mild low back pain and flushing, which go away within minutes.

YES____ NO____ Initial and date _____

Pulmonary Function Studies: These studies include the measure of lung volumes and how air flows, as well as, the Maximum Inspiratory (during breathing in) and Expiratory Pressures (during breathing out).using a machine called a spirometer. (Duration approximately 15 minutes)

YES____ NO____ Initial and date _____

Dual energy X-ray absorptiometry (DEXA scan): The DEXA scan is a painless X-ray procedure that uses a very small amount of X ray energy to determine body composition, including lean body mass. For the test, a patient lies down on an examining table, and the scanner rapidly directs x-ray energy from two different sources towards the body part being examined. The amount of radiation you will receive from each scan is very small, and is about one-quarter of one mrem. If there is any risk from this exposure, it is too small to be measured and is low compared to other everyday risks. For comparison, natural background radiation to which everyone is exposed is approximately 1 mrem per day. This test will take approximately 15-20 minutes.

Women of child bearing potential will have a pregnancy test prior to the procedure. Women who are pregnant will not have the DEXA scan but can participate in the other procedures not requiring radiation.

YES____ NO____ Initial and date _____

Bone Scans: To assess your risk and/or progression of Paget Disease of Bone, you may be asked to participate in a Bone Scan Test. During the Bone Scan test you will be injected with tracers through a vein in the arm. After a couple of hours, you will be asked to drink water to remove any unabsorbed tracer materials. You will be asked to lie on a table while a special camera passes over your body to scan your bones. Bone scans are used for the detection and monitoring of disorders affecting the bones, including Paget's disease. The Bone scan will expose you to radiation. The amount of radiation used for the bone scan at one clinic visit is equivalent to 61 weeks exposure to background radiation from natural sources (sun, soil, food, and water). This test will take approximately 30 minutes.

YES____ NO____ Initial and date _____

Electromyography (EMG): This test will be utilized to test a muscle's electrical activity. It is used as part of a neurological workup to test how a muscle responds to signals from the nerves responsible for muscle movement, called motor nerves. You will be put into a position in which the muscle being tested is at rest, either lying down or sitting. During EMG, small pins or needles are inserted into muscles to measure electrical activity. You may have a small amount of discomfort during EMG testing because of pin insertion. You may feel some soreness or notice some bruising in the muscles tested for a few days after an EMG. There may also be some minor bleeding around the needle insertion points for a few hours after the test.

Nerve Conduction Velocity (NCV): An EMG also includes a test of how fast the motor nerve conducts impulses. This is called a Nerve Conduction Velocity (NCV) test. With nerve conduction studies, small electrodes will be taped to your skin or placed around your fingers. You may experience a mild and brief tingling or shock, which may be a bit unpleasant. The EMG and NCV will take approximately 60 minutes.

YES____ NO____ Initial and date _____

You are requested not to drink beverages like coffee, tea, or cola, or take any medication that has a sedating effect for at least 24 hours before the test.

If the EMG is suggestive of neuropathic testing, a follow up test called MUNE will be performed. MUNE is performed using surface sticky disc electrodes that are attached to the skin overlying a muscle in your hand and leg. Gentle electrical shocks are administered via another set of sticky disc electrodes attached to the skin overlying a nerve. You will receive a series of brief electrical shocks. The goal is to gradually increase the strength or intensity of the electrical shock to see how the nerve responds. With one exception, all shocks are of much lower intensity than those used in routine nerve conduction studies (see above). A few shocks will be of the same intensity as used in routine nerve conduction studies. Typically 3-4 muscles are tested using MUNE. The selection of which side to study is made as follows: the affected side is studied if only one side is affected; if both sides are affected, the less affected side is studied.

YES____ NO____ Initial and date _____

Diffuse Optical Spectroscopy (DOS):
Diffuse Optical Spectroscopy will measure the concentrations of blood, water, and lipids (fats, for example) in your tissues. This device essentially measures the color of tissues in order to determine tissue physiology (its physical and chemical processes). The technique is fast and painless and was developed at the University of California, Irvine. The Diffuse Optical Spectroscopy instrument is actively involved in research studies, but is not yet a part of routine clinical practice. The result of this study will aid similar research projects that seek to improve our understanding of how tissues work and how alterations in metabolism affect long-term health.

The DOS measurement consists of placing a probe onto the surface of your body (calf, bicep, or head). This probe will be secured by either gentle hand pressure or fastened to your skin using clinically-approved wraps such as Corbin/wrap bandages or medical adhesive tape and medical glues. Several dots will be made on your skin outlining the probe with a surgical felt tip marker. This is so we would be able to put the probe again on the same spot in case we needed to interrupt the measurement. The probe looks like a bar code scanner in a supermarket and it shines infrared light on your skin. There is no radiation involved with this light. In some cases where light signals are low, the optical detector will be placed directly onto your skin (but contained within an electronically shielded casing, and placed inside another plastic casing).

Subjects will be asked to perform a force grip test. After securing the optical probes, you will be asked to squeeze the hand grip as hard as you can for a few seconds. The maximum contraction force will be measured by the computer. A 5 minute rest period follows. After the rest period, you will be asked to squeeze the hand grip again, but at only 70% of the maximum value recorded earlier. You should try to maintain this contraction force as steady as possible for no more than 30 seconds. You will be able to see how hard you are squeezing by looking at the computer screen. You will then be asked to release the hand grip, and rest for 2-5 minutes. This procedure may be repeated 2-4 additional times, although you will not have to repeat the maximum contraction portion of the study again. The overall time of the exercise challenge is not expected to take more than approximately 30 minutes total.

You will be asked to perform single leg heel raises. The study team will ask you to stand, hold something for balance, and remove one foot off of the ground that will not be exercised. You will then be asked to lift the heel of the foot resting on the ground over and over until fatigue (Essentially you will be standing on one foot and going up and down on your tiptoes with the other foot).

You will be asked to lay still while a blood pressure cuff is put on your arm. After 5 minutes of rest, the cuff will be inflated and the pressure will be kept on your arm for 3 minutes. The cuff will then be instantly released and you will rest for 5 more minutes. This cycle may be performed a total of three times, depending on how you feel, and DOS measurements will be taken throughout.

Other measurements may be performed during this study. These measurements include:

- An ultrasound on your muscle (to measure the fat layer thickness)
- A pulse oximeter to measure your heart rate and arterial oxygen fraction.
- A skin fold caliper to measure your fat layer thickness.
- A measurement tape to measure the diameter of your arm or leg.
- A digital thermometer or similar temperature sensor on your arm, leg, or torso.

If you are interested, and if instrument availability allows, you may be asked back for repeat DOS measurements on another day. Repeat DOS measurements will be the same as your initial DOS measurement session, including the additional procedures listed above.

YES____ NO____ Initial and date _____

X-rays: An X-ray is a painless medical test that involves exposing a part of the body to a small dose of ionizing radiation to produce pictures of the inside of the body. The procedure typically takes 10 to 15min. X-rays usually have no side effects. No radiation remains in a patient's body after an X-ray examination. The amount of radiation used for the X-rays at one clinic visit is equivalent to one week exposure to background radiation from natural sources (sun, soil, food, and water).

Plain X-rays of the particular part of the skeleton (for example spine, skull or long bones) will be performed only if the bone scan is positive in order to detect detailed changes of Paget's's disease of bone. This test will take approximately 20 minutes.

YES____ NO____ Initial and date _____

Neuropsychological test: You will be asked to complete several neuropsychological tests, which will take approximately one hour. The tests are as follows:

Dementia Screening. The Mini-Mental State Examination (MMSE) is a brief 30-point questionnaire test that is used to screen for the presence of dementia.

Frontal/Executive Function. The Stroop Interference subtest has a short administration time (5 minutes). During this test you will be asked to look at words on a screen and identify their color. The Digit Span subtests from the Wechsler Memory Scale will be used to assess short term memory. In this test, you are asked to repeat back numbers in the correct order. The Letter Fluency Test will be administered to test spontaneous production of words beginning with a given letter within a limited amount of time. In the Category Fluency test, the subject generates as many words as they can within a given category within a minute. The Boston Naming Test will also be used to assess naming of line-drawings.

Behavioral Symptoms: Neuropsychiatric Inventory (NPI). The NPI is a survey of symptoms (e.g., sleep, appetite, irritability) that may be seen in the absence of cognitive abnormalities in Frontotemporal Dementia.

Assessment of Depression: This screening is available over the Internet or from us by telephone. If depression were present we would ask the subject to seek evaluation and treatment before continuing participation. In the second step, after passing screening the subject would take the 21-item Beck Depression Inventory for behavioral symptoms. This is a questionnaire composed of items relating to symptoms of depression such as hopelessness and irritability, cognitions such as guilt or feelings of being punished, as well as physical symptoms such as fatigue, weight loss, and lack of interest in sex.

The above studies will also be included in our Natural History portion of the study. Subjects will be invited to have these studies performed at two yearly intervals in order to monitor the progression of the disease. We hope to enroll approximately 75 subjects for our natural history studies. The purpose of the natural history portion of the study is to be able to evaluate the results of any future planned treatments in an objective scientific manner. You will be requested to sign this consent form again at future visits.

STORAGE OF RESEARCH SAMPLES:

The collected DNA samples will be stored for approximately 10 years or the duration of this study if this is shorter. Dr. Kimonis will store the samples in the laboratory at MAMMAG. A sample may also be obtained and stored with a unique ID number. The list linking the unique number and your identity will remain confidential and will be stored at a separate location. Only the investigator and the laboratory researchers on the study team will have access to this list to know which sample is linked to a patient identifier (personally identifying information). This list will be kept confidential in a secure location. No researcher will have access to the subject identifiers unless they are members of the study team who will have access to identifiable data. When the study is completed, the DNA samples will be destroyed. If at any time you would like to have your sample destroyed or your unique identifier removed from your sample allowing Dr. Kimonis to maintain the sample anonymously, please let Dr. Kimonis know. Your sample will be discarded or stripped of the unique number at your request.

You can choose to have your blood stored for future research or discarded.

I agree to have my samples stored for future research:

_____Yes _____No Initial and date _____

Dr. Kimonis may share your sample with other researchers who have an interest in the genetic causes and treatment of your disease, but the samples will not contain any identifiable information about you, such as your name or medical record number. The sample will be shared only with individuals who have an active research interest in your disorder. If at any time you would like to have your sample destroyed or your unique number removed from your sample allowing Dr. Kimonis to maintain the sample anonymously, please let Dr. Kimonis know. Your sample will be discarded or stripped of the unique number at your request. You can choose to have your blood stored for future use or discarded.

I agree to let Dr. Kimonis share my sample with other researchers interested in this disorder.

_____ Yes _____No Initial and date _____

It is important to remember that results from genetic tests performed for research purposes may take months and sometimes years to complete. If you wish to inquire into the progress of this research, you are welcome to do so at any time.

Data collected will be entered and stored in REDCap. REDCap is a secure, web-based application for building and managing online databases. Using REDCap's stream-lined process for rapidly developing databases, you may create and design databases using 1) the online method from your web browser using the Online Form Editor; and/or 2) the offline method by constructing a "data dictionary" template file in Microsoft Excel, which can be later uploaded into REDCap. REDCap provides automated export procedures for seamless data downloads to Excel and common statistical packages (SPSS, SAS, Stata, R), as well as a built-in project calendar, a scheduling module, ad hoc reporting tools, and advanced features, such as branching logic, file uploading, and calculated fields.

RECEIVING RESULTS FROM GENETIC TESTING:
Because this work will be conducted in a research laboratory, results from the DNA testing cannot be directly released to you.

If you wish to have these results a cheek scraping sample or a fresh sample of blood will have to be arranged by your treating physician and sent to a CLIA approved laboratory who can confirm the results. A CLIA laboratory is a lab that is authorized to release results to patients for tests for clinical and diagnostic purposes. This takes approximately one month. Results from the CLIA lab will be provided to the physician who is designated by the patient to receive such results. This may be a neurologist, a geneticist or genetic counselor. Dr. Kimonis can assist in arranging for the test to be performed in a CLIA certified laboratory. You will be responsible for the cost of the CLIA certified test.

RISKS AND DISCOMFORTS:
The possible risks and/or discomforts associated with the procedures described in this study are minimal or/and moderate. These are as follows:

Minimal risk for collection of a venous blood sample: At the time of collection, there will be some discomfort from the needle insertion, and there is some possibility of bruising, swelling, bleeding, and infection at the site of the needle insertion, also rarely of fainting. When possible we will draw blood at the time of a clinically indicated procedure so that you will not need to have blood drawn only for research purposes.

There is no discomfort from the cheek swabs just a tickling sensation.

There may be minimal discomfort from the physical examination or any other examination procedure if you have preexisting Paget disease of bone or muscle disease associated with preexisting pain.

Magnetic resonance imaging/spectroscopy (MRI/MRS): There are no known risks to this test. However, the long-term effects of exposure to the radio waves used by MRI/MRS procedures have not been determined. The MRI/MRS procedure is noisy and you may experience a brief period of claustrophobia (fear of being enclosed in a small space). If this happens you may wish to discontinue your participation in the research study. Parts of this study may be tiring and stressful. Lying still for the imaging study may be uncomfortable. You may take a break during the imaging procedure if you need to.

There may be some fatigue and discomfort from the muscle strength testing measurements. If this occurs there is no pressure to continue with the strength testing.

There will be a cold experience when the gel is applied to the chest for the echocardiogram. In addition, an echo contrast agent called Definity (Perflutren Lipid Microsphere), which is considered a standard clinical procedure, but is being done for research purposes will be injected through an IV. This contrast agent allows the researchers to get a crystal clear image of the leftventricular function and ejection fraction. Side effects of the contrast agent may include mild low back pain and flushing, which gives you a warm feeling in your body, which go away within minutes. You may also be asked to change positions and slowly inhale, exhale, or not breathe for a short period of time during the exam. The risks associated with inserting the IV include pain from the needle and redness at the location of IV. If you have an allergic reaction to the contrast, you might feel itching on your skin.

There may be a small amount of discomfort during EMG testing because of pin insertion. The needles are different than needles used for injection of medications. They are small and solid, not hollow like hypodermic needles. Because no medication is injected, discomfort is much less than with shots. You may feel some soreness or notice some bruising in the muscles tested for a few days after an EMG. There may also be some minor bleeding around the needle insertion points for a few hours after the test.

NCV: You may experience a brief and mild shock which may be a bit unpleasant. Most people find it only slightly annoying. Some patients may have minor aches and pains from the testing.

MUNE is an entirely non-invasive technique. The only risk associated with MUNE is a repeated, temporary, mild discomfort that occurs with electrical stimulation of nerves, similar to “hitting the funny bone.”

There is no pain or risk associated with using a handheld dynamometer. However, you may experience some tiredness from pushing or pulling against the dynamometer.

Strength Test: Your muscles may experience soreness and fatigue due to the exercises performed.

There is a chance that participation in this study could cause psychological distress. Some people involved in genetic studies have felt anxious about the possibility of carrying an altered gene that places them at risk or that may be passed on to children. If these feelings arise at any time during the study, you may contact us and we will arrange for you to speak with a genetic counselor.

You should also be aware that there might be social and economic disadvantages, which can be associated with the gathering of genetic information.

Genetic information divulged to the wrong source, could affect you and your family (if an insurance company or employer acquired this genetic information) or socially.

There could potentially be a breach of confidentiality. All information about you will be kept confidential and only with your permission under certain circumstances will be made available to others. Identifiable information will not be included in the database.

The results of the genetic tests performed for research purposes will not be placed in your medical record. In this manner it will be unlikely that an insurance company or employer would ever learn of such results. You should be aware that we may detect instances of non-paternity, and such information may interfere with our analysis. This non-paternity information will be kept in the strictest confidence and will not be divulged to anyone.

There is a reasonable possibility that no findings will result from this research effort. Any significant findings that do result may take months or years to complete. If you wish to inquire into the progress of our research, you are welcome to do so at any time.

DEXA Scan: The DEXA scan emits a very low level of radiation similar to an X-ray. X-rays expose the individual to radiation and have the potential of causing harm to the unborn child.

Neuropsychological tests: Repeated evaluations of mood and mental status may be slightly frustrating or produce fatigue and boredom.

There is no risk associated with the use of the DOSI according to current data (as this device is investigational.

The following tests for Paget disease will only be performed in individuals who carry the gene mutation:

Bone scan: Bone scans expose the individual to radiation but are the best way to detect Paget disease of bone Other than the discomfort of an injection and exposure to a trace of radiation, there are no other expected risks of the procedure.

X-Rays: Only specific parts of the body will be X-rayed as detected by the bone scan. If the bone scan is normal skeletal X-rays will not be performed.

UNKNOWN RISKS TO WOMEN OF CHILD BEARING POTENTIAL AND PREGNANT WOMEN
If you believe that you are pregnant or have a chance of becoming pregnant you should not participate in this study. A blood OR urine pregnancy test will be performed prior to the start of study procedures. If you are pregnant, you will not be allowed to participate in the study. If you do participate in this study, you must use a medically recognized form of birth control for one month before entering the study, while participating in the study, and for at least one cycle after stopping the study. If you become pregnant during the study, you will be immediately withdrawn from the study and followed through the outcome of your pregnancy. The side effects of this study on newborns are also not known, therefore if you are currently breastfeeding you cannot participate in this study.

BENEFITS:
You may not benefit directly from participation in this study. However, in the future, the information obtained from this study may help researchers understand the genetic causes of the disease. This may eventually lead to new forms of diagnosis and treatment in the future.

ALTERNATIVES:
This study is not being performed to improve your health or well-being. You have the option of not participating in this study.

COMPENSATION, COSTS AND REIMBURSEMENT:
There will be no charge to you or your insurance company for the blood, urine or other research testing. There is no cost to you for participating in this research study. Dr. Kimonis' study will pay for the cost of your testing, travel, meals and accommodation for this study. You will also be paid $200 for your participation in this study. A check will be mailed to your home after completion of each 2 day visit of the study. You will be reimbursed for reasonable out of pocket expenses. A receipt will be required for reimbursement purposes.

COMPENSATION FOR INJURY:
If you are injured as a result of your participation in this study, University of California will provide reasonable and necessary medical care to treat the injury at no cost to you or your insurer/third party payer. The University of California does not routinely provide any other form of compensation for injury. It is important that you report any suspected study-related injury to the research team listed at the top of this form immediately.

OTHER CONSIDERATIONS:
Use of Specimens
Any specimens (e.g., tissue, blood, urine) obtained for the purposes of this study will become the property of the University of California, Irvine (UCI). Once you provide the specimens you will not have access to them. The specimens will be used for research and as such use may result in inventions or discoveries that could become the basis for new products or diagnostic or therapeutic agents. In some instances, these inventions and discoveries may be of potential commercial value and may be patented and licensed by the University. You will not receive any money or other benefits derived from any commercial or other products that may be developed from use of the specimens.

Investigator Financial Conflict of Interest
Dr. Bruce Tromberg has a financial interest in Volighten Scientific, a company with interests related to this study. Dr. Tromberg owns equity interests in Volighten Scientific, which is in addition to his salary from the University of California, Irvine. He is also one of the inventors of the DOS technology being utilized in this study.

The nature of these financial interests and the design of the study have been reviewed by the UCI Conflict of Interest Oversight Committee, and this committee has determined that the investigator's financial interests will not compromise the quality or reliability of the study. Furthermore, the UCI Institutional Review Board has determined that the investigator's financial interests will not adversely affect your safety and welfare.

CONFIDENTIALITY:
Subject Identifiable Data
All identifiable information that will be collected about you will be removed and replaced with a code. A list linking the code and your identifiable information will be kept separate from the research data.

Data Storage
All research data will be maintained in a secure location at UCI. Only authorized individuals will have access to it. Data collected will be entered and stored in REDCap. REDCap is a secure, web-based application for building and managing online databases.

Data Access
The research team, authorized UCI personnel, the study sponsor (National Institute of Health) and regulatory entities such as the Office of Human Research Protections (OHRP), may have access to your study records to protect your safety and welfare. Any information derived from this research project that personally identifies you will not be voluntarily released or disclosed by these entities without your separate consent, except as specifically required by law. Research records provided to authorized, non-UCI entities will not contain identifiable information about you. Publications and/or presentations that result from this study will not include identifiable information about you.

Data Retention
The researchers intend to keep the research data until the completion of the study which is approximately 10 years.

NEW FINDINGS:
If, during the course of this study, significant new information becomes available that may relate to your willingness to continue to participate, this information will be provided to you by the researchers listed at the top of the form.

IF YOU HAVE QUESTIONS:
If you have any comments, concerns, or questions regarding the conduct of this research please contact the research team listed at the top of this form.

If you are unable to reach a member of the research team listed at the top of the form and have general questions, or you have concerns or complaints about the research study, research team, or questions about your rights as a research subject, please contact UCI's Office of Research by phone, (949) 824-6068 or (949) 824-2125, by e-mail at IRB@rgs.uci.edu or in person at 5171 California Ave., Suite 150, Irvine, CA 92697-7600.

VOLUNTARY PARTICIPATION STATEMENT:
You should not sign this form unless you have read the attached "Experimental Subject's Bill of Rights" and have been given a copy of it and this consent form to keep. Participation in this study is voluntary. You may refuse to answer any question or discontinue your involvement at any time without penalty or loss of benefits to which you might otherwise be entitled. Your decision will not affect your future relationship with UCI or your quality of care at the UCI Medical Center. Your signature below indicates that you have read the information in this consent form and have had a chance to ask any questions that you have about the study.

I agree to participate in the study.

_____ _____
Subject Signature Date

_____
Printed Name of Subject

_____ _____
Researcher Signature Date

_____
Printed Name of Researcher

_____ _____
Witness Signature Date

_____
Printed Name of Witness

UNIVERSITY OF CALIFORNIA, IRVINE
Experimental Subject's Bill of Rights

The rights listed below are the right of every individual asked to participate in a research study. You have the right:

1. To be told about the nature and purpose of the study.

2. To be told about the procedures to be followed in the research study, and whether any of the drugs, devices, or procedures is different from what would be used in standard practice.

3. To receive a description of any side effects, discomforts, or risks that you can reasonably expect to occur during the study.

4. To be told of any benefits that you may reasonably expect from the participation in the study, if applicable.

5. To receive a description of any alternative procedures, drugs, or devices that might be helpful, and their risks and benefits compared to the proposed procedures, drugs or devices.

6. To be told of what sort of medical treatment, if any, will be available if any complications should arise.

7. To be given a chance to ask any questions concerning the research study both before agreeing to participate and at any time during the course of the study.

8. To refuse to participate in the research study. Participation is voluntary. You may refuse to answer any question or discontinue your involvement at any time without penalty or loss of benefits to which you might otherwise be entitled. Your decision will not affect your right to receive the care you would receive if you were not in the experiment.

9. To receive a copy of the signed and dated written consent form and a copy of this form.

10. To be given the opportunity to freely decide whether or not to consent to the research study without any force, coercion, or undue influence.

If you have any concerns or questions regarding the research study you should contact the research team listed at the top of the consent form.

If you are unable to reach a member of the research team and have general questions, or you have concerns or complaints about the research study, research team, or questions about your rights as a research subject, please contact the UCI's Human Research Protections Unit in the Office of Research by calling (949) 824-6068 or (949) 824-2125 Monday – Friday, 8 am – 5 pm; or by e-mail at IRB@rgs.uci.edu; or by writing us at 5171 California Ave., Suite 150, Irvine, CA 92697-7600.