



## **PARTICIPANT INFORMATION SHEET**

### **1. Study title**

Uncovering the mechanisms through which krill oil increases muscle function in older adults. The Krill Ageing Muscle Mechanisms (KAMM) study

### **2. Invitation paragraph**

We invite you to participate in this research study. In order to help you to understand what the research study is about, please read the following information carefully. Be sure you understand it before you formally agree to participate. If there are any points that need further explanation, please ask a member of the research team. It is important that you understand what you are volunteering to do and are completely happy with all the information before you sign the consent form.

### **3. What is the purpose of the study?**

We have previously found that 6 months supplementation with krill oil can increase muscle size and strength in a group of older adults, but we don't know how this works. The aim of the current study is to investigate the mechanisms underlying these effects of krill oil on muscle. This is important for the development and optimization of krill oil supplements and may help direct other avenues of research in this area.

### **4. Why have I been invited to participate?**

You have been selected as a possible participant in this research study because you are healthy and aged 65 and older, with a BMI less than 30, not taking any fish oil or krill oil supplements and not participating in any resistance exercise (weights) training.

### **5. Do I have to take part?**

No, it is up to you to decide whether or not to take part. If you decide to take part, you will be given this information sheet to keep and you will be asked to sign a consent form. If you do decide to take part, you are still free to withdraw at any time and without giving a reason.

### **6. What will happen to me if I take part?**

You will be asked to visit the laboratory, at the University of Glasgow, at the beginning (2 separate days; initial and baseline) and the end of a 24-week period for various tests. During these visits you will be asked to wear shorts. The supplement you receive will be chosen by a process called randomisation, similar to tossing a coin, the supplement will be randomly assigned by computer. Whereby you will be assigned to a krill oil or control group and you are just as likely to be

in either group, ie a 50:50 chance. You will not know which supplement you receive and nor will the researchers. We will let you know at the end of the study which supplement you have been taking.

If you are assigned to the krill oil group, you will receive 4g/day of krill oil supplement capsules (4 capsules per day; 2 at breakfast and 2 at dinner), and if you are assigned to the control group, you will receive 4g/day of vegetable oil supplement capsules (4 capsules per day; 2 at breakfast and 2 at dinner). After every 8 weeks you will be asked to collect the subsequent 8 weeks supplements from the researcher. We will also call you every 4 weeks to check that everything is ok and you are happy to continue. We ask all participants to maintain their normal diet and physical activity patterns.

### **Initial visit (~1hour)**

On your first visit around 1 week before you start the supplementation programme, you will be introduced to the laboratory personnel and familiarised with the study. You will be asked to complete questionnaires about your health and physical activity habits to make sure you are suitable to join the study. We will also measure your BMI and blood pressure for the same purpose. If you meet the study participant criteria and consent to take part we will ask you to wear a device that resembles a wrist watch for 7 days to measure your physical activity habits.

### **Baseline visit (~4hours):**

Prior to this visit we will ask to you fast overnight. We will collect a blood sample after which we will provide you with a snack and then measure your walking speed and characteristics, muscle size, muscle strength, and carry out various tests to measure aspects of the nervous system which control how your muscles function. We will also ask you questions about your normal diet.

### **Intervention (24 weeks):**

We will then ask you to consume 4g/day of the provided supplements for 24 weeks. During this period we will also ask you to record any fish you eat.

### **Post-intervention visit (~4hours):**

Prior to this visit we will ask to you fast overnight. The same measurements performed during the baseline visit will be repeated after the completion of the supplementation.

### **Measurements:**

#### *Blood test*

A small needle will be inserted into a vein in the arm and a baseline blood sample collected. A total of 15ml (3 teaspoons) of blood will be taken during each visit. We will measure blood lipids, sugars and measures of inflammation in our labs at the University of Glasgow. This analysis will take place in a single batch at the end of the study.

#### *Walking speed and form:*

You will be asked to walk for 4 metres at your normal pace across a mat which times you and measures the characteristics of how you walk. Similarly, we will ask you to stand up from a chair, walk 3 metres, and return and sit back down on the chair – the time-up-and-go-test. These tests will also be filmed with special cameras which can provide further information on your walking characteristics.

### *Muscle size*

You will lie on an examination couch. We will then use a small handheld ultrasound device to measure the thickness of the thigh muscle

### *Muscle strength:*

You will sit in a chair with your legs at a 90-degree angle. A strap will be placed around the right ankle which will be connected to a force sensor. We will ask you to contract your leg as hard as you can with the leg fixed in position and record force for 10 seconds. You will perform 3 contractions, with 1 min rest between contractions. We will also ask you to perform 3 contractions as hard as you can, on each hand, with the hand grip dynamometer.

*Nervous system function:* We will ask you to perform a variety of tests to measure how the nervous system activates your muscles. You will sit in a chair with your legs at a 90-degree angle. A strap will be placed around the right ankle which will be connected to a force sensor. 1) We will ask you to contract at a variety of easy intensity levels for 10-20s with the leg fixed in position with a needle electrode (similar to an acupuncture needle) inserted into the thigh muscle to measure the electrical activity of the muscle fibres. 2) Similarly, we will ask you to contract your muscles at a variety of easy intensity levels for 10-20s with small sticky electrodes attached to the skin on top of your muscles. 3) We will ask you to contract, separately in your hand and leg muscles, at an easy intensity for 1 minute with sticky electrodes on your hand and leg muscles. During the contraction of your hand muscles we will also ask you to wear a hat which has small electrodes in it to measure the electrical activity of the brain. 4) We will ask you to gently contract the leg muscles for 10-20s at different easy intensity levels and apply a small electrical pulse to a nerve in your groin area to contract your muscle. We will then use a device that stimulates certain areas of the brain involved in muscle contraction at easy and hard intensity levels and the electrical activity in the muscles measured with the sticky electrodes.

## **7. What are the possible disadvantages and risks of taking part?**

Krill oil supplements can cause mild side effects, including: a fishy aftertaste, bad breath, heartburn, nausea or diarrhea although this is unlikely with the doses used in the current study. If you experience any unusual sensations and feel unwell or do not want to continue for any other reason during the supplementation you should stop taking the supplement immediately and let us know.

Blood sampling may cause minor bruising, an inflammation of the vein or haematoma (a small accumulation of blood under the skin). Good practice, however, minimises this risk. Some people may feel faint when they give blood.

## **8. What are the possible benefits of taking part?**

Krill oil may increase your muscle strength. We will be able to provide feedback about your muscle strength.

## **9. Will my taking part in this study be kept confidential?**

All information which is collected about you during the course of the research will be kept strictly confidential. Any information about you which leaves the University will have your name and

address removed so that you cannot be recognised from it. In addition, your records, samples and results will be identified by a number and not your name.

#### **10. What will happen to my data?**

All study data will be held in accordance with The General Data Protection Regulation (2018). The data will be stored in archiving facilities in line with the University of Glasgow retention policy of up to 10 years. After this period, further retention may be agreed or your data will be securely destroyed in accordance with the relevant standard procedures. In the event of a withdrawal from the study, the data will be retained up to that point and used for the rest of the study.

#### **11. What will happen to the results of the research study?**

The results from this study will be presented at scientific meetings and published in scientific journals. The results will also be used in the research project reports to grant funding bodies. A summary of the study findings will also be sent to you. You will not be identifiable in any of the data presented or published from this study.

#### **12. Who is organising and funding the research?**

University of Glasgow is organising this research which is funded by the Biotechnology and Biological Sciences Research Council.

#### **13. Who has reviewed the study?**

This study has been reviewed and approved by the Ethics committee of the College of Medical, Veterinary and Life Sciences at the University of Glasgow.

#### **14. Contact for Further Information**

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