

# Rheumatoid arthritis and the muscle

<b>Submission date</b> 03/10/2019	<b>Recruitment status</b> No longer recruiting	<input checked="" type="checkbox"/> Prospectively registered <input checked="" type="checkbox"/> Protocol
<b>Registration date</b> 18/10/2019	<b>Overall study status</b> Completed	<input type="checkbox"/> Statistical analysis plan <input checked="" type="checkbox"/> Results
<b>Last Edited</b> 21/10/2025	<b>Condition category</b> Musculoskeletal Diseases	<input type="checkbox"/> Individual participant data

## Plain English summary of protocol

### Background and study aims

Rheumatoid arthritis is a long-term condition that causes pain, swelling and stiffness in the joints. This trial studies the role of the drug Tofacitinib in the reversal of the skeletal muscle loss, sarcopenia, that occurs in Rheumatoid Arthritis patients. It has the potential to contribute work of significant improvement in our understanding of sarcopenia, and provide targeted future therapy that's beyond the reversal of joint inflammation.

### Who can participate?

Patients with active Rheumatoid Arthritis treated with tofacitinib

### What does the study involve?

Participants would undergo various investigations of muscle structure and function before and during treatment. This will take place over a period of 6 months. Potential participants will be identified and recruited at routine outpatient clinics at the Freeman Hospital.

### What are the possible benefits and risks of participating?

#### Benefits

There may be no direct benefit from taking part. However, participants will be contributing to improving our understanding of muscle loss and developing future therapy that's beyond joint inflammation, which will benefit other sufferers of RA or other similar diseases

#### Risks

Having blood tests may cause minor pain and a small bruise where the needle is inserted.

Exposure to ionising radiation during DEXA scan: We are all at risk of developing cancer during our lifetime. About 40 out of every 100 people will develop cancer at some point in their life.

Taking part in this study will increase the risk of developing cancer by a tiny amount: 0.00015%. Put in another way, of 100,000 people, about 40,000 would normally be expected to develop a cancer during their lifetime. If they all took part in our study, 1 or 2 additional people may develop cancer. The risk is the same as six days' worth of background radiation (the radiation that you are exposed to during your normal daily activities)

Muscle biopsy risks: As the local anaesthetic wears off after the muscle biopsy, up to one-third of patients experience mild-moderate, pain or discomfort. You may use normal painkillers (e.g. paracetamol) to treat this and it usually settles within several weeks. There are also other less

common complications. Significant bruising or bleeding happens to about 1 person in 100. Damage to local nerves, which may cause a patch of numbness, happens to about 1 person in 1000

Where is the study run from?

Newcastle University and the Freeman Hospital (UK)

When is the study starting and how long is it expected to run for?

October 2019 to March 2023

Who is funding the study?

Pfizer (UK)

Who is the main contact?

1. Prof John D. Isaacs, john.isaacs@ncl.ac.uk

2. Dr Josh Bennett, J.Bennett19@newcastle.ac.uk

## Contact information

### Type(s)

Scientific

### Contact name

Prof John D. Isaacs

### ORCID ID

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### Type(s)

Public

### Contact name

Dr Josh Bennett

### ORCID ID

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## **Additional identifiers**

### **Protocol serial number**

funder ref W1238777

## **Study information**

### **Scientific Title**

An observational, single-arm study of skeletal muscle metabolism in patients with rheumatoid arthritis receiving Tofacitinib

### **Acronym**

RAMUS

### **Study objectives**

JAK inhibitors (tofacitinib) reverse sarcopenia in patients with rheumatoid arthritis

### **Ethics approval required**

Old ethics approval format

### **Ethics approval(s)**

Approved 11/09/2019, NHS HRA South East Scotland REC 1 (NHS Lothian, Waverley Gate, 2 - 4 Waterloo Place, Edinburgh, EH1 3EG, UK; +44 (0)131 465 5473; Sandra.Wyllie@nhslothian.scot.nhs.uk), ref: 19/SS/0100

### **Study design**

Observational single-arm study

### **Primary study design**

Observational

### **Study type(s)**

Treatment

### **Health condition(s) or problem(s) studied**

Sarcopenia and Rheumatoid Arthritis

### **Interventions**

Current intervention as of 05/02/2021:

Observational single-arm study of skeletal muscle metabolism in patients with rheumatoid arthritis receiving tofacitinib

Potential participants will be identified in routine out-patient rheumatology clinics by the usual care team. These are individuals with active rheumatoid arthritis for whom the decision has been made to prescribe tofacitinib. If they express interest in participating in the study, they will be

approached by a member of the research team who will describe what is involved, and provide them with a Patient Information Sheet. Sufficient time will be given for them to think about the study, discuss it with family and friends, and ask questions. Once they confirm that they would like to participate, they will be asked to sign a consent form. They will be informed that they may change their mind and withdraw from the study at any point, a decision that will not affect their routine care.

They will then be asked to participate in between 6 and 9 study visits. These will take place at the Clinical Research in the Royal Victoria Infirmary and at the Newcastle Magnetic Resonance Centre. The duration of each visit will vary, with most lasting up to 2 hours. However, visits 2, 4 and 5 will last longer because of the need to carry out more complex procedures such as extra blood tests, obtaining muscle samples and radiological imaging. It is likely that the study team will decide to carry out some of the procedures for these visits on a different day to the main study visit. For this reason, the total number of study visits will be between 6 and 9.

In the above-mentioned visits, participants' medical and drug history will be noted. They will undergo a physical examination. They will be asked to provide a urine sample. Blood samples will be taken by the research nurse. They will also be asked to fill out questionnaires that address their general well being. Muscle strength will be tested by assessing their handgrip and timed-raise from chair.

Muscle samples will be obtained in visits 2 and 5 after obtaining consent. This is a day case procedure that will take place in the Clinical Research Facility in the Royal Victoria Hospital and is performed by the research doctor. The relevant area will be cleaned thoroughly, then numbed using local anaesthetics. A small cut will be made. Muscle sample will then be taken by a special type of forceps. The wound is then covered by special medical tape and doesn't require any stitches. Paracetamol and codeine will be advised to pain relief in the days following the procedure. Participants will be advised to keep the area dry and clean.

The imaging techniques that will be used in this study are: magnetic resonance imaging (MRI), magnetic resonance spectroscopy (MRS) and DEXA scan. These are scheduled to be done on visits 2, 3 and 5 in Newcastle Imaging Centre and CRF respectively. No dye will be used in these studies. MRI and MRS use magnetic fields to produce images of the body. Participants will be asked to lie on their backs on a flat bed then moved into the scanner feet first. The scan will last about 45 minutes.

DEXA scans use a small and safe dose of radiation energy. Imaging is done while the participants are lying on their backs. The scanner arm then passes over the body to collect images. The scan usually takes between 10-30 minutes.

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Previous intervention:

Observational single-arm study of skeletal muscle metabolism in patients with rheumatoid arthritis receiving Tofacitinib

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### **Intervention Type**

Drug

### **Phase**

Not Applicable

### **Drug/device/biological/vaccine name(s)**

Tofacitinib

### **Primary outcome(s)**

Change in muscle bulk measured by accelerated MRI of lower limbs

### **Key secondary outcome(s)**

Current secondary outcome measures as of 05/02/2021:

1. Muscle function/strength at baseline, and 1 and 6 months after commencing tofacitinib assessed by hand grip and timed raise from chair

2. Muscle biochemistry assessed by magnetic resonance spectroscopy of skeletal muscle: content of ATP, phosphocreatine and inorganic phosphate at baseline, 1 month and 6 months, assessed by magnetic resonance spectroscopy.
3. Serum biochemistry: Serum creatinine, serum creatine phosphokinase, serum aspartate transaminase, serum aldolase, serum myoglobin and serum cystatin C at baseline, 1 month and 6 months.
4. Relationship between changes in serum biochemistry (serum creatinine, serum creatine phosphokinase) to biochemical, structural, functional and histological/molecular changes in muscle
5. Relationship between changes noted in muscle and reduction in systemic inflammation
6. Body composition using DEXA at baseline, 1 month and 6 months

#### Previous secondary outcome measures

1. Muscle function/strength at baseline, and 1 and 6 months after commencing Tofacitinib assessed by hand grip and timed- raised from chair
2. Muscle biochemistry assessed by magnetic resonance spectroscopy of skeletal muscle: content of ATP, phosphocreatine and inorganic phosphate at baseline, 1 month and 6 months, assessed by magnetic resonance spectroscopy.
3. Serum biochemistry: Serum creatinine, serum creatine phosphokinase, serum aspartate transaminase, serum Aldolase, serum Myoglobin and serum Cystatin C at baseline, 1 month and 6 months.
4. Relationship between changes in serum biochemistry (serum creatinine, serum creatine phosphokinase) to biochemical, structural, functional and histological/molecular changes in muscle
5. Relationship between changes noted in muscle and reduction in systemic inflammation

#### Completion date

31/03/2023

## Eligibility

#### Key inclusion criteria

1. 2010 ACR/ EULAR classification criteria for a diagnosis of rheumatoid arthritis
2. At least 6 months disease duration
3. Inadequate response to intensive therapy with synthetic disease-modifying anti-rheumatic drugs (DMARDs) alone, or inadequate response to at least one biologic DMARD, thereby qualifying for treatment with tofacitinib according to local guidelines.
4. Aged >18 years
5. Willing and able to provide written informed consent.
6. ACR Functional Class I-III
7. Willing to undergo muscle biopsy on 2 occasions.
8. Willing to undergo MRI and MRS and Dexa scan on 3 occasions
9. Active systemic disease, as exemplified by a C-reactive protein of at least 10 mg/l

#### Participant type(s)

Patient

#### Healthy volunteers allowed

No

#### Age group

Adult

**Lower age limit**

18 years

**Sex**

All

**Total final enrolment**

15

**Key exclusion criteria**

1. Serum creatinine that is above the upper limit of normal at baseline.
2. Patients receiving glucocorticoids
3. Patients will be excluded if they have any contraindications to tofacitinib which include:
  - 3.1 Pregnancy and lactation
  - 3.2 Women of childbearing potential (WOCP) who are not prepared to use effective contraception during treatment with tofacitinib and for at least 4 weeks after the last dose.
  - 3.3 Severe hepatic impairment (Child Pugh C)
  - 3.4 Active TB, serious infections such as sepsis or opportunistic infections as detailed in the SmPC
  - 3.5 Chronic infections (HIV, hepatitis B, hepatitis C)
4. Participants will be excluded if they have any contraindications to muscle biopsies. These include:
  - 4.1 Participants on anticoagulant therapy. These include vitamin K antagonists, thrombin inhibitors, and heparin and low molecular weight heparin preparations.
  - 4.2 Participants on antiplatelet therapy. \*Participants on aspirin for primary prevention will be included in this study. However, aspirin will be held for 7 days prior to the muscle biopsies and recommenced 48 hours after.
  - 4.3 Participants who are known to have bleeding disorders. These include, but are not limited to, haemophilia, Factor II, V, VII, X, or XII deficiencies and Von Willebrand's disease
  - 4.4 Previous reactions to local anesthetics
  - 4.5 Platelets count < 100 x 10<sup>9</sup>/l
5. Participants will be excluded if they have any contraindications to MRI. These include:
  - 5.1 Limb metal pins, plates, rods or screws that were placed less than 6 weeks from scanning day
  - 5.2 Heart pacemaker or replacement valves
  - 5.3 Neuro-stimulator or programmable intra-cerebral shunt, cerebral aneurysm clips
  - 5.4 Metallic foreign body in their eye
  - 5.5 Internal hearing devices, ocular prosthesis
  - 5.6 Weight >190 kg
  - 5.7 Claustrophobia

**Date of first enrolment**

08/02/2021

**Date of final enrolment**

10/08/2022

**Locations**

**Countries of recruitment**

United Kingdom

England

**Study participating centre**

**The Newcastle Upon Tyne Hospitals NHS Foundation Trust**

Freeman Hospital

Freeman Road

High Heaton

Newcastle upon Tyne

United Kingdom

NE7 7DN

**Study participating centre**

**Newcastle University**

Kings Gate

Newcastle upon Tyne

United Kingdom

NE1 7RU

## **Sponsor information**

**Organisation**

Newcastle upon Tyne Hospitals NHS Foundation Trust

**ROR**

<https://ror.org/05p40t847>

## **Funder(s)**

**Funder type**

Industry

**Funder Name**

Pfizer UK

**Alternative Name(s)**

Pfizer Ltd, Pfizer Limited

**Funding Body Type**

Private sector organisation

## Funding Body Subtype

For-profit companies (industry)

## Location

United Kingdom

# Results and Publications

## Individual participant data (IPD) sharing plan

The current data sharing plans for this study are unknown and will be available at a later date

## IPD sharing plan summary

Data sharing statement to be made available at a later date

## Study outputs

Output type	Details	Date created	Date added	Peer reviewed?	Patient-facing?
<a href="#">Results article</a>		15/10/2025	21/10/2025	Yes	No
<a href="#">Protocol article</a>		01/03/2023	07/03/2023	Yes	No
<a href="#">HRA research summary</a>			26/07/2023	No	No
<a href="#">Participant information sheet</a>	version V1.1	25/09/2019	08/11/2019	No	Yes
<a href="#">Participant information sheet</a>	version 1.5	10/05/2021	18/08/2021	No	Yes
<a href="#">Protocol file</a>	version V1.0	12/07/2019	08/11/2019	No	No
<a href="#">Protocol file</a>	version 1.5	22/07/2021	18/08/2021	No	No