In vitro quality assessment of myogenic stem cells in multiple patient groups with confirmed skeletal muscle atrophy to study their potential for autologous stem cell therapy

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Ethical review	Approved WMO
Status	Recruiting
Health condition type	Other condition
Study type	Observational invasive

Summary

ID

NL-OMON56403

Source
ToetsingOnline

Brief title
ATROMAB

Condition

- Other condition
- Muscle disorders

Synonym
muscle atrophy; muscle wasting

Health condition

cachexie

Research involving
Human

Sponsors and support

Primary sponsor: Medisch Universitair Ziekenhuis Maastricht
Source(s) of monetary or material Support: Interreg

Intervention

Keyword: atrophy, mesoangioblasts, muscle, stem cells

Outcome measures

Primary outcome

• Immunophenotype characterization of mesoangioblasts (i.e. number of the correct cells isolated from a muscle biopsy) by Alkaline phosphatase staining to determine stemness (>50%); and cell sorting via magnetic-activated cell sorting (MACS) and/or fluorescent-activated cell sorting (FACS) depending on surface antigens (>50%) • Proliferation rate of mesoangioblasts in vitro (population doubling level: >2 every 3-4 days) • Muscle regenerative capacity of mesoangioblasts in terms of the formation of multinucleated mature myotubes (>25% of total nuclei).

Secondary outcome

- The metabolic health of the mesoangioblasts, based on mitochondrial parameters (mitochondrial activity, mitochondrial DNA copy number, ATP production). This should not be below 50%, compared to age-matched controls.
- The homing potential of the mesoangioblasts in these patients by characterizing inflammatory parameters. Muscle damage reflected by inflammation is essential for the migration and engraftment of mesoangioblasts in the affected muscles. (Inflammation) markers are determined in blood via an ELISA

assay (descriptive).

- Identify a potential difference between mesoangioblasts and satellite cells

as a response to cachexia and sarcopenia.

o Number of satellite cells present in muscle tissue via (immuno)histochemistry

(descriptive)

o Muscle regenerative capacity of satellite cells in terms of the formation of

multinucleated mature myotubes (descriptive).

o Proliferation rate of satellite cells in vitro (descriptive)

Study description

Background summary

No effective treatment is available for the loss of muscle tissue in non-genetic muscle diseases such as (cancer) cachexia and sarcopenia. Such a treatment would improve the quality of life, therapy success, and independency of these patients. Myogenic stem cells have the potential to regenerate skeletal muscle.

Study objective

The study aims to isolate and culture mesoangioblasts from muscle biopsies of two patient groups suffering from skeletal muscle atrophy to assess their potential for autologous muscle stem cell therapy. To relate this potential to the underlying condition, we will collect information of the patients by questionnaires, muscle strength measurements and blood parameters.

Study design

A mono-center observation study.

Study burden and risks

Muscle biopsies will be collected using the a thin-needle biopsy instrument, which is a fast and routinely used procedure in diagnostic centers to harvest a small (~30 mg) muscle fragment with the patient burden being limited to the time of the procedure (anecdotes multiple patients). Muscle biopsies can be

painful in some cases and infections and bleeding afterward are possible, but rare. Blood will be collected (20cc), according to standard hospital procedures, having a low burden/risk for the participants.

Contacts

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Trial sites

Listed location countries

Netherlands

Eligibility criteria

Age
Adults (18-64 years)
Elderly (65 years and older)

Inclusion criteria

Patient group: cachexia - Diagnosed with non-small cell lung cancer (NSCLC), stage 3-4 - Diagnosed with cachexia (>5% unintentional body weight loss in past six months) - Age 50-60 and 60-70 - Written informed consent Patient group: muscle impaired elderly - Scheduled for knee-, back- or hip surgery - Age 60-70 and 70-80y - Written informed consent Controls - Scheduled for knee-, back- or hip surgery - Age 50-60, 60-70 and 70-80 - Written informed consent

Exclusion criteria

- No informed consent
- Suffering from a muscular dystrophy or other disease known to affect muscle morphology or function
- Have a weekly alcohol intake of >= 35 units (men) or >= 24 units (women)
- Ongoing participation in other intervention clinical trials
- Major surgery within 4 weeks of the visit
- Patients unable and/or unwilling to comply with treatment and study instructions
- Any other factor that in the opinion of the investigator excludes the patient from the study

Study design

Design

Study type:	Observational invasive
Intervention model:	Other
Allocation:	Non-randomized controlled trial
Masking:	Open (masking not used)
Control:	Active
Primary purpose:	Treatment

Recruitment

NL

Recruitment status:	Recruiting
Start date (anticipated):	07-12-2023
Enrollment:	80
Type:	Actual

Ethics review

Approved WMO

Date:	26-07-2023
Application type:	First submission

Review commission:	METC academisch ziekenhuis Maastricht/Universiteit Maastricht, METC azM/UM (Maastricht)
Approved WMO Date:	30-10-2023
Application type:	Amendment
Review commission:	METC academisch ziekenhuis Maastricht/Universiteit Maastricht, METC azM/UM (Maastricht)

Study registrations

Followed up by the following (possibly more current) registration

No registrations found.

Other (possibly less up-to-date) registrations in this register

No registrations found.

In other registers

Register	ID
CCMO	NL81090.068.22