

Scientific project

Detection of myocardial inflammation after strenuous exercise in cyclists: a pilot study

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ETAPE DU TOUR DE FRANCE 2021

Nice, July 3-5 2021

JESSA
Z I E K E N H U I S



UNIVERSITÉ CÔTE D'AZUR 



Last years...



Frederiek Nolf
[Topsport Vlaanderen](#)
Tour of Qatar 2009



Rob Goris
[Verandas Willems-](#)
[Accent](#)
2012



Daan Mynghee
[Roubaix Métropole](#)
[européenne de Lille](#)
International criterium
2016



Michael Goolaerts
[Crelan-Verandas Willems](#)
Paris-Roubaix 2017



Robbert de Greef
[Roompot-](#)
[Nederlandse Loterij](#)
Omloop Braakman
2019

Last years...



Olivier Kaisen
2014



Niels Albert
2014



Klaas Lodewyck
2015



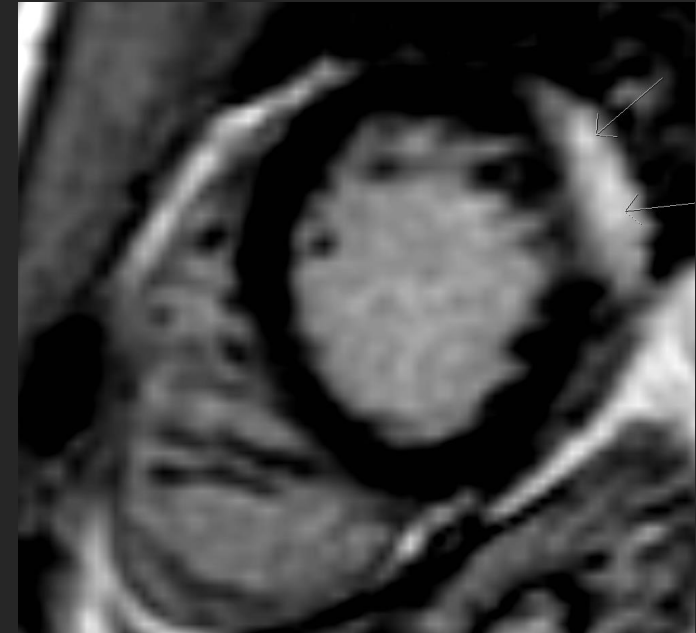
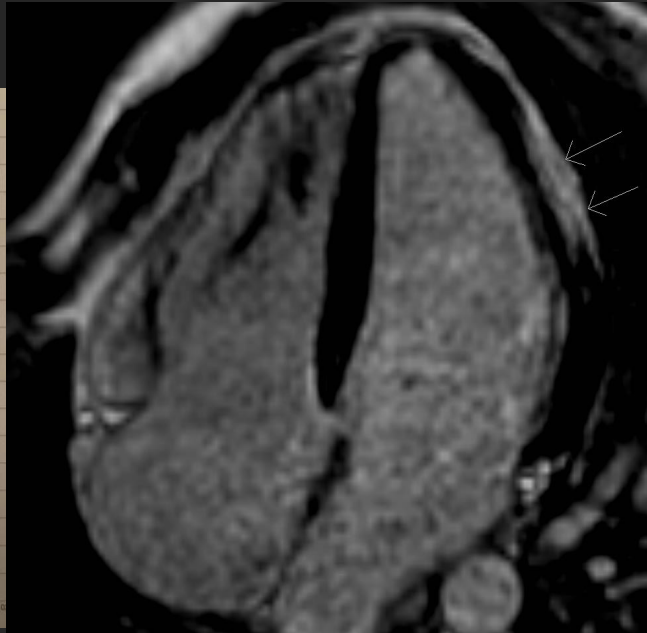
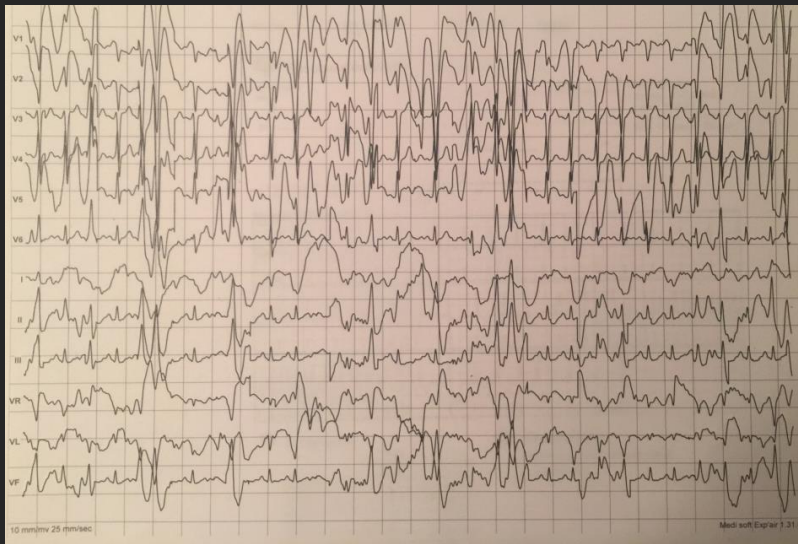
Gianni Meersman
2016



Johan Vansummeren
2016

Myocardial fibrosis in athletes? Origin?

1. Virus: COVID-19, adenovirus, influenza, ...
2. Extensive exercise? ?



*** La Gerche A et al. EHI 2012;33:998, ** Breuckmann F Radiology 2009;251:50, *** Wilson et al. J Appl Physiol 1985, Sanchis-Gomar F et al. Int J Cardiol 2016;222:171, **** Zorzi A Circ Arrhythm Electrophysiol 2016; 9:e004229, ***** Schnell F et al. Br J Sports Med 2015;0:1**

Research team:

Principal investigator:

Dr. Olivier Ghekiere, radiologist, Jessa Hospital, Hasselt, Belgium

Local investigators:

Prof. B. Op 't Eijnde, physiologist Hasselt University

Dr. Lieven Herbots, Jessa Hospital, Hasselt and Dr. Sophie Demanez, CCO Liège, cardiologists

Prof. Dr. Bernard Padovani, radiologist CHU Nice, France

Co- investigators:

Dr. Benjamin Peters, radiologist Jessa Hospital; Dr. Baptiste Vande Berg assistant radiologie UZ Leuven; Prof. Dr. Jan Bogaert, radiologist UZ Leuven; Dr. Dorothee Ducreux radioloog CHU Nice, France, Dr. Alain Nchimi, radiologist CHL Luxembourg; Prof. Dr. Emile Ferrari cardiologist CHU Nice; Prof. Dr. Hein Heidbuchel, cardiologist, UZ Antwerpen; Prof. Dr. Rik Willems, Dr. Ruben De Bosscher and Prof. Dr. Guido Claessen, cardiologists UZ Leuven; Physiysicus Tom Dresselaers, dienst radiologie UZ Leuven



Prof. Rik Willems
Dr. Guido Claessen
Prof. Piet Claus
Prof. Jan Bogaert
Prof. Steven Dymarkovski
Prof. Peter Hessel
Dr. Kaatje Goetschalckx
Dr. Tom Dresselaers
Dr. Ruben De Bosscher
Dr. Thibault Petit
Mr. Christoph Dausin
Mrs. Sofie Van Soest



Prof. Hein Heidbuchel
Prof. Caroline Van de Heyning
Prof. Bernard Paelinck
Dr. Jessica Ratajczak
Dr. Isabel Witvrouwen



Dr. Lieven Herbots
Dr. Olivier Ghekiere
Dr. Kristof Lefebvre
Mrs. Daisy Thijs
Mr. Peter Van de Voorde



Prof. Andre La Gerche
Dr. Maria Brosnan
Dr. Ben Costello
Dr. Darragh Flannery
Mrs. Kristel Janssens
Mr. Fergus Sully



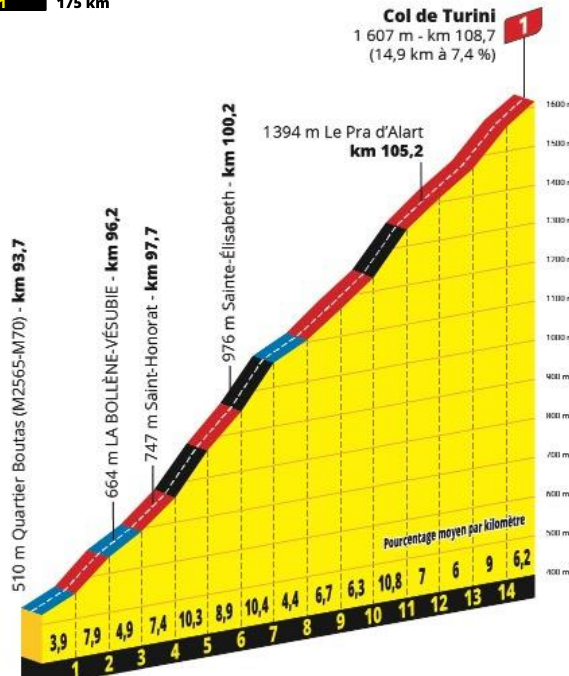
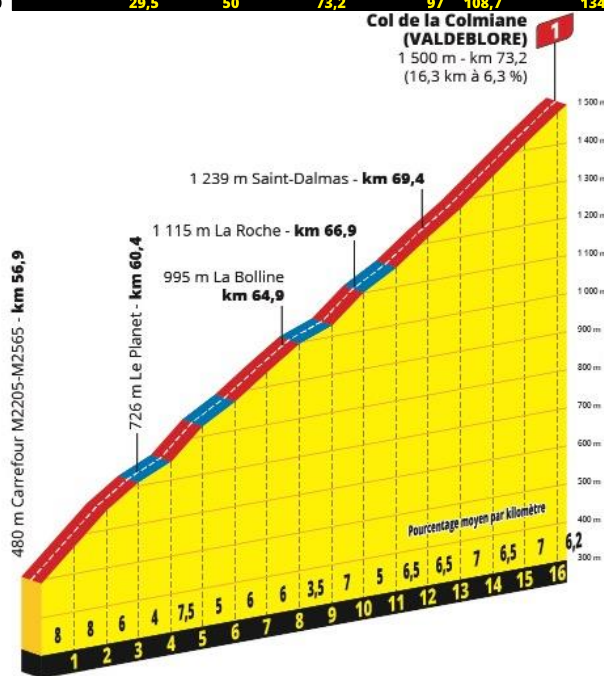
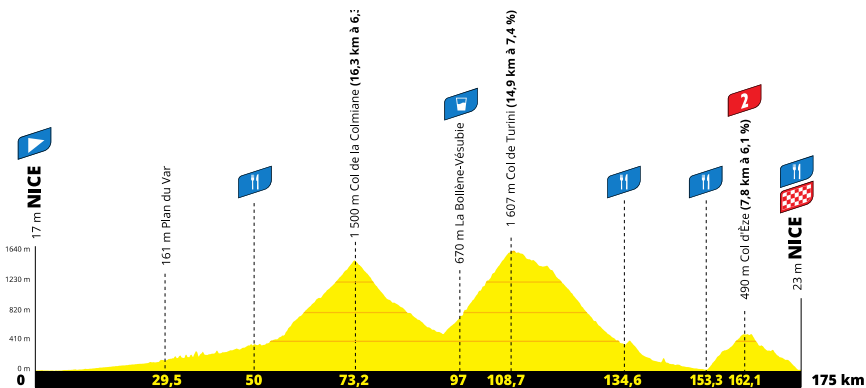
Prof. Prash Sanders
Dr. Adrian Elliott

Objective of the study:

To evaluate myocardial inflammation in cyclists after high intense and sustained exercise

L'ETAPE DU TOUR DE FRANCE (EDT) 2021 Nice :

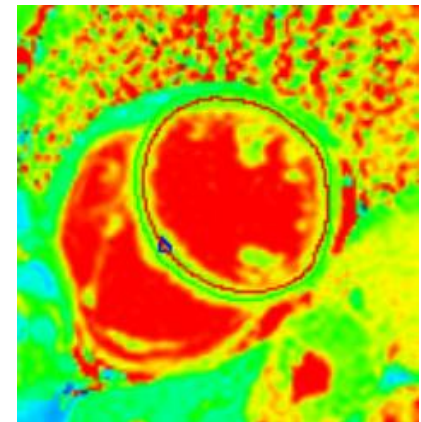
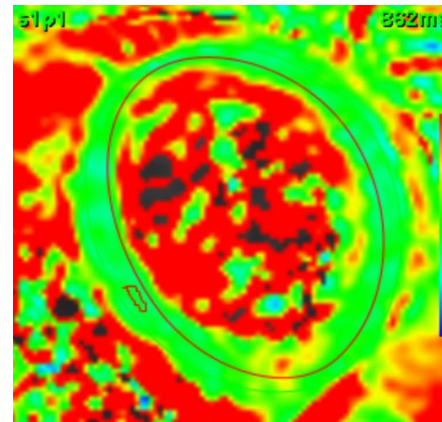
- 175 km
- > 3600 altimeters



Objective of the study:

- To evaluate myocardial inflammation in cyclists after high intense and sustained exercise:

- Ultrasonography
- MRI T1 en T2 mapping
- Bloodsample
- Holter



Participants

- 18-20 participants
- 50% medical doctors (3 radiologists, 3 cardiologists, 1 nuclear medicine and 1 orthopedist)

Program

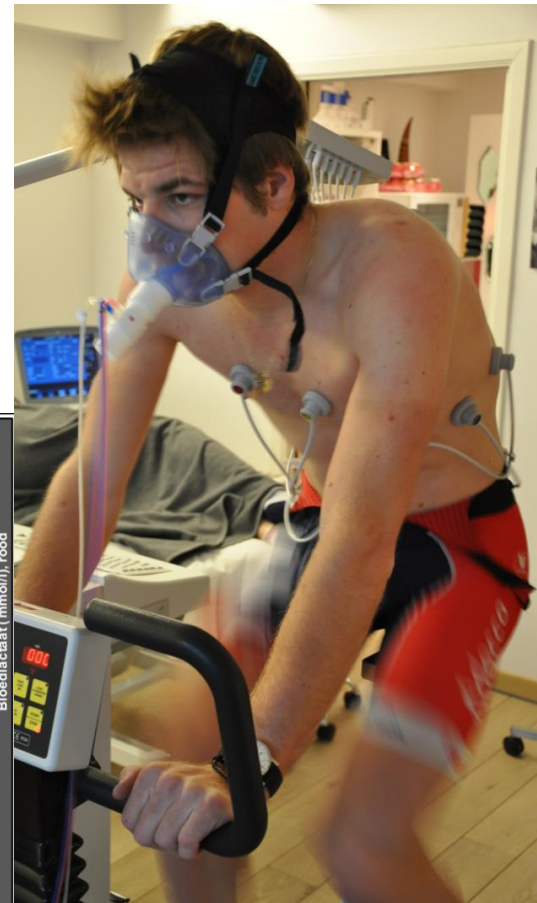
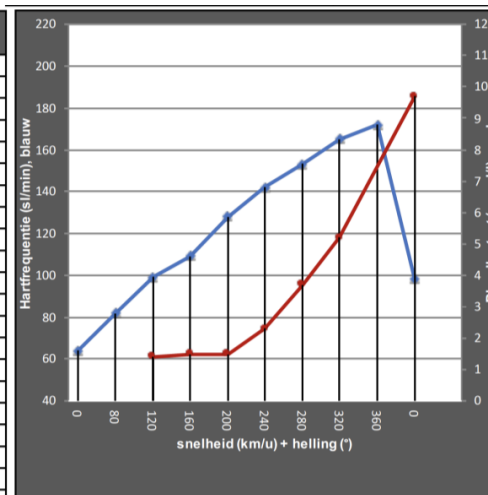
- Saturday 26/6 Hasselt University:
 - Exercise VO2max test
 - Echocardiography
- Saturday July 3 CHU Nice
 - Cardiac MRI
 - Patch Rooti for ECG registration tijdens fietsrit
- Sunday July 4 Nice
 - 7h- XXX h... EDT cycling race
 - 3-6h post race (18h- 24h):
 - Bloodsample
 - Echocardiography
 - Cardiac MRI
- Monday July 5 (7h30-9h30)
 - Cardiac MRI 24h post exercise

- **Saturday 26/6 Hasselt University:**

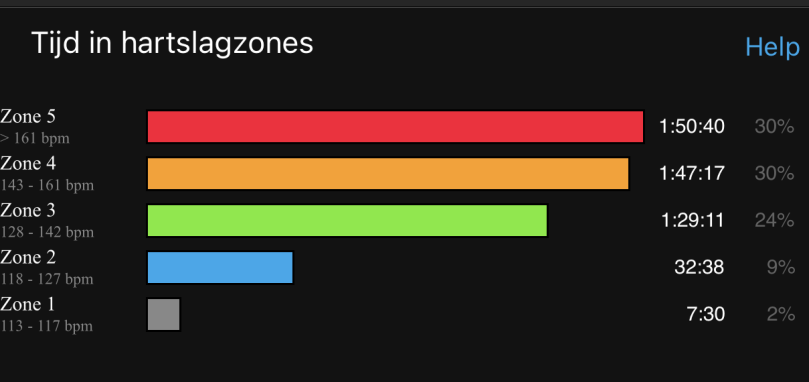
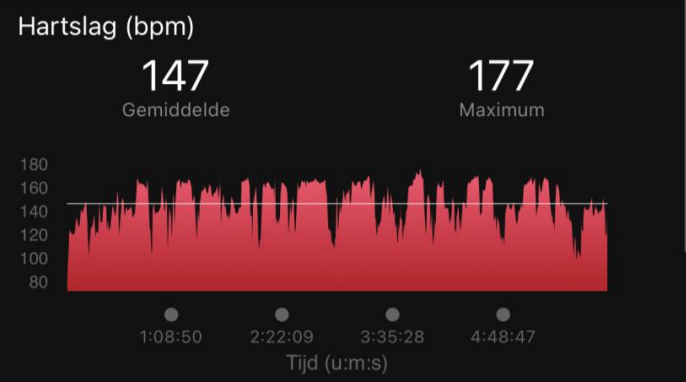
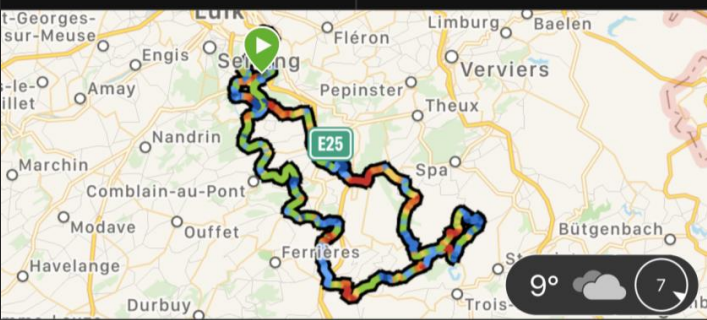
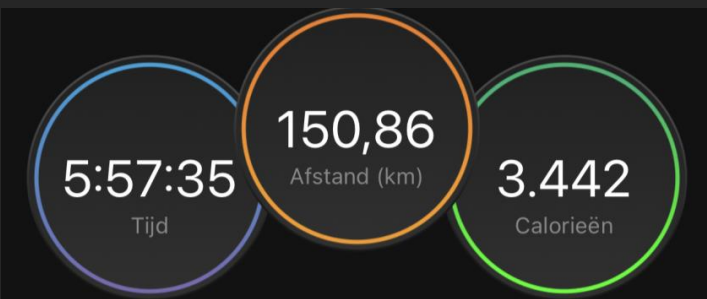
- Exercise VO₂max test to set aerobic/anaerobic thresholds: exercise at least 2 hours in HIT/zone 5
- Clinical investigation and questionnaire
- Echocardiography



Tijd (min)	Snelheid (km/u)	hartslag (sl/min)	Lactaat (mmol/l)	RER	VO ₂ (ml/kg/min)
1	0	64			
4	80	82			
7	120	99	1,4		
10	160	109	1,5		
13	200	128	1,5		
16	240	142	2,3		
19	280	153	3,7		
22	320	165	5,2		
25	360	172		1,17	57
2' Post	0	98	9,7		



Clinical example: anaerobic gas exchange threshold 161 bpm 11/2020



Cadans (rpm)

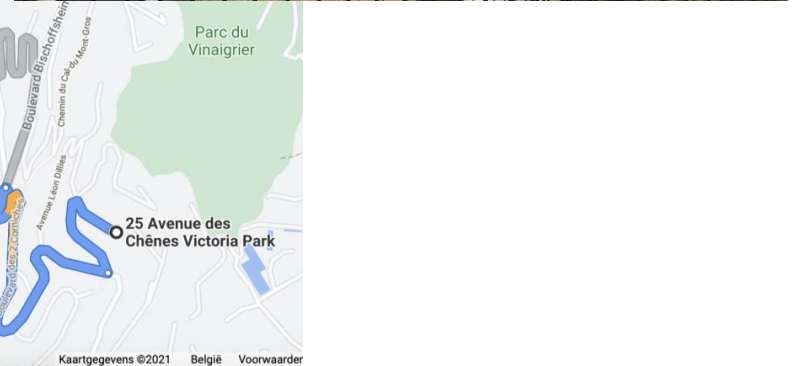
- **Saturday July 3 2021: University Hospital Nice**
 - Cardiac MRI
 - Echocardiography, if not performed on 26/6
- **Saturday evening July 3 or Sunday morning 2021:**
Patch Rooti for ECG registration during cycling ride



Villa Nice – CHU Nice

The screenshot shows a navigation app interface with the following elements:

- Search Bar:** "25 Avenue des Chênes Victoria Park, 06" and "Pasteur 2, 27 Boulevard Pasteur, 06000".
- Destination:** "Bestemming toevoegen".
- Options:** "Nu vertrekken" and "Route verzenden naar je telefoon".
- Route Options:**
 - via Boulevard des 2 Corniches:** 9 min., 3,8 km. Snelste route, normale verkeersdruk. ⚠️ Deze route bevat wegen voor beperkt verkeer of privéwegen.
 - via Boulevard des 2 Corniches en Boulevard Louis Braille:** 10 min., 3,8 km.
 - via Boulevard Jean-Baptiste Véra:** 11 min., 4,3 km.
- Map:** Shows the city of Nice with a blue route starting at Pasteur 2 and ending at 25 Avenue des Chênes Victoria Park. Landmarks include Musée Matisse, Monastère de Cimiez, Gare de Nice-Pont-Michel, and various supermarkets like Lidl and ALDI.
- Bottom Bar:** "Pasteur 2 verkennen" with icons for Restaurants, Hotels, Tankstations, Parkeren, and Meer.



- **Sunday morning July 4 (7h-XXX): EDT cycling ride**

- Support vehicle(s) as probably the official EDT2021 will be canceled due to COVID-19
- 18-20 participants (at least 16 finishers!!)
- ECG registration during the ride, and 3 to 6h post-exercise (Patch Rooti)



NICE

HAUT PAYS

- **Sunday evening 4/7/21 CHU Nice 18h-24h, 3-6h post-exercise:**

- Blood sample for troponin
- Cardiac MRI
- Echocardiography

- **Monday 4/7 (7h30-9h30) CHU Nice 24h post exercise:**

- Cardiac MRI



Ethical committees

- UHasselt and Jessa: presented on March 3: positif, some remarks to be answered (eg. costs of participants reimbursed by sponsorship?)
- CHU Nice --> in the next weeks

Study protocol and informed consent

DETECTION OF MYOCARDIAL INFLAMMATION IN CYCLISTS AFTER

STRENUOUS EXERCISE PART 2: A PILOT STUDY

Version 16-03-2021

Background:

The presence of isolated subepicardial/midmyocardial myocardial fibrosis on cardiac Magnetic Resonance Imaging (MRI) in asymptomatic athletes is associated with life-threatening arrhythmic events and sudden death. Although the late gadolinium enhancement pattern suggests myocarditis as the most likely underlying cause, no history of clinical myocarditis was reported in these athletes (1,2).

Meanwhile, it remains unclear if strenuous and sustained physical exercise can cause myocardial inflammation with development of myocyte necrosis and possibly myocardial fibrosis in athletes (3). Prolonged strenuous exercise has been associated with functional and biochemical evidence of myocardial damage with exercise-induced reductions in ventricular strain, and increases in cardiac troponins (cTn), mechanistically distinct from cTn release in acute myocardial infarction (4). Factors for higher exercise-induced increases of cTn in athletes include longer exercise duration (5) and heavy exercise intensity (110% gas exchange threshold during 90 min) (6), and higher heart rate during exercise (7).

A MRI study in 2010 revealed no post-exercise myocardial inflammation or fibrosis in marathon runners unless high troponin levels. However, the diagnosis of myocardial inflammation was based on original Lake Louise criteria in this study (8). Coexisting

Patientinformatie en toestemmingsformulier

OPSPOREN VAN MYOCARDINFLAMMATIE BIJ FIETSERS NA EXTENSIEVE INSPANNING: EEN PILOOTSTUDIE DEEL 1

Datum deze versie: 16-03-2021

Projecttitel: Opsporen van myocardinflammatie bij fietsers na extensieve inspanning: een pilootstudie deel 1

Studiegroep: recreatieve fietsers

Opdrachtgever: Jessaziekenhuis Hasselt, Salvatorstraat 20, 3500 Hasselt

Contactgegevens: studies.radiologie@jessazh.be of +32 (0)11/335555

Hoofdonderzoeker: Dr. Olivier Ghekiere, radioloog Jessa ziekenhuis Hasselt

Lokale onderzoekers: Prof. B. Op't Eijnde, inspanningsfysioloog UHasselt; Dr. Lieven Herbots, cardioloog Jessa ziekenhuis Hasselt en Dr. Sophie Demanez, cardioloog CCO Liège

Medeonderzoekers:

Dr. Benjamin Peters, radioloog Jessa ziekenhuis Hasselt; Dr. Baptiste Vande Berg, assistent radioloog UZ Leuven; Prof. Dr. Jan Bogaert, radioloog UZ Leuven; Dr. Dorothee Ducreux, radioloog CHU Nice, France; Prof. Dr. Bernard Padovani, radioloog CHU Nice, France; Dr. Alain Nchimi, radioloog CHL Luxembourg; Prof. Dr. Emile Ferrari, cardioloog CHU Nice, France; Prof. Dr. Hein Heidbuchel, cardioloog UZ Antwerpen, Prof. Dr. Rik Willems, cardioloog UZ Leuven; Dr. Ruben De Bosscher, assistent cardiologie UZ Leuven; Prof. Dr. Guido Claessen, cardioloog UZ Leuven; Tom Dresselaers, Fysicus UZ Leuven

Verwerkingsverantwoordelijke: Jessa ziekenhuis Hasselt

Studiecoördinator: studies.radiologie@jessazh.be

Data protection officer:

De functionaris voor gegevensbescherming van het onderzoekcentrum, staat ter uwer beschikking. Hierbij vindt u zijn/haar contactgegevens: Els Houbrechts (via email: dpo@jessazh.be of via telefoon: 011/33 50 09).

Ombudsdienst Jessaziekenhuis:

Als u vragen hebt met betrekking tot uw rechten als deelnemer aan de studie, kan u contact opnemen met de ombudsdienst in uw ziekenhuis op het telefoonnummer 011/33.54.90. Indien nodig kan de ombudsdienst u in contact brengen met het Ethisch Comité.

Organization

- Support
 - “Peter”: Philippe Gilber and/or Sven Nys
 - At least 16 finishers for this study: need for motivation and accompaniment of participants (eg nutrition, long exercise)

- project of +/- 15-20K €

- Sponsoring to cover costs:
 - COVID19 measures
 - medical examinations
 - logistics, jersey + residence participants Nice (< ethical committee)
 - sportsnutrition
 - support vehicle (provision of participants)

Sponsors

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