Lever en spier glycogeen herstel

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We hypothesize that high carbohydrate intake with sucrose will fully replenish liver and/or muscle glycogen repletion within 12 hours after exhaustive exercise in healthy well-trained endurance athletes

Ethische beoordeling	Goedgekeurd WMO
Status	Werving gestopt
Type aandoening	Overige aandoening
Onderzoekstype	Interventie onderzoek

Samenvatting

ID

NL-OMON24661

Bron
Nationaal Trial Register

Aandoening

- Overige aandoening

Aandoening

None

Betreft onderzoek met
Mensen

Ondersteuning

Primaire sponsor: Maastricht University Medical Centre+ & Kenniscentrum Suiker & Voeding
Overige ondersteuning: Maastricht University Medical Centre+ & Kenniscentrum Suiker & Voeding

Onderzoeksproduct en/of interventie

- Overige

Toelichting

Uitkomstmaten

Primaire uitkomstmaten

Liver and muscle glycogen concentrations and content

Toelichting onderzoek

Achtergrond van het onderzoek

Ample carbohydrate availability is essential to optimize prolonged moderate- to high-intensity exercise performance. These carbohydrates can be stored within the human body (in the form of glycogen) in the muscle and liver. After prolonged (>2.5 h) and moderate- to high-intensity endurance type exercise these glycogen stores will be depleted, thereby reducing the capacity to optimally perform during subsequent exercise. Therefore, it is of great importance to replenish these carbohydrate stores as quickly as possible when optimal performance is required within short periods of (recovery) time. This is mainly of importance for athletes that have to perform maximally within 24 hours after a previous exercise bout, such as athletes during the Tour de France. Previous research has shown that, with large carbohydrate ingestion after exercise, muscle glycogen stores can be replenished within 24 hours. With regards to liver glycogen, it is suggested that this may also be replenished within 24 hours. However, this has never been directly assessed. Recently we have demonstrated that when well-trained athletes ingest sucrose (instead of glucose), that their liver glycogen repletion is doubled. This would suggest that after intense endurance type exercise, liver glycogen stores can be fully replenished within 12 hours. We hypothesize that high carbohydrate intake with sucrose will fully replenish liver and/or muscle glycogen repletion within 12 hours after exhaustive exercise in healthy well-trained endurance athletes.

Doel van het onderzoek

We hypothesize that high carbohydrate intake with sucrose will fully replenish liver and/or muscle glycogen repletion within 12 hours after exhaustive exercise in healthy well-trained endurance athletes

Onderzoeksopzet

MRI and biopsy measurements will be performed before and after exercise, and at 6 and 12 h in the post-exercise recovery period. Blood samples will be collected frequently during the test day.

Onderzoeksproduct en/of interventie

All subjects will participate in a cross-over design and will come to the laboratory on 3 different occasions, of which 2 post-exercise recovery trials and 1 nutrition trial (to increase liver glycogen content in the morning). In all 3 trials, after arrival in a fasted state, an MRI scan will be performed to assess muscle and liver glycogen concentrations and muscle and liver volume (to assess total glycogen storage). Afterwards, during the 2 post-exercise recovery trials, participants will perform a glycogen depletion (exercise) protocol to lower their glycogen concentrations followed by another MRI scan. Subsequently, participants will remain in the laboratory for an additional 12 h to assess recovery. On one occasion they will remain fasted (water can be ingested ad libitum), and on the other occasion they will receive 1.2 g/kg/h of sucrose for the first 6 h and afterwards 2 carbohydrate-rich carbohydrate meals in the following 6 hours. On both test days, at 6 and 12 h another MRI scan will be performed to assess glycogen concentrations in the muscle and liver. Muscle biopsies will be collected after every MRI scan to assess and compare muscle glycogen concentrations with the MRI results. Blood samples will be collected to assess plasma glucose, lactate, insulin, free fatty acids, and glycerol concentrations. During the nutritional trial, participants will receive a carbohydrate-rich breakfast (3 g/kg body mass of carbohydrate) after the MRI scan session in the morning. Subsequently, participants will rest for 3 hours during which blood samples will be collected to assess plasma glucose, lactate, insulin, free fatty acids, and glycerol concentrations. After 3 hours of rest another MRI scan session will be performed to assess muscle and liver glycogen concentrations and muscle and liver volume (to assess total glycogen storage).

Contactpersonen

Publiek

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Wetenschappelijk

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Deelname eisen

Leeftijd
Volwassenen (18-64 jaar)

Volwassenen (18-64 jaar)

Belangrijkste voorwaarden om deel te mogen nemen (Inclusiecriteria)

• Males, aged between 18 and 40 y • BMI between 18.5 and 25 kg/m2 • Well-trained endurance athletes (cyclists, runners, triathletes), with a VO2max > 50 ml/kg/min.

Belangrijkste redenen om niet deel te kunnen nemen (Exclusiecriteria)

• Female • VO2max < 50 ml/kg/min • Celiac disease • Smoking • Diabetes • Cancer • Cardiovascular Disease • Donated blood within the last 2 months • Diagnosed GI tract diseases • Arthritic conditions • A history of neuromuscular problems • Vegetarian and/or vegan

Onderzoeksopzet

Opzet

Type:	Interventie onderzoek
Onderzoeksmodel:	Cross-over
Toewijzing:	Gerandomiseerd
Blindering:	Enkelblind
Controle:	N.v.t. / onbekend
Doel:	Anders

Deelname

Nederland

Status:	Werving gestopt
(Verwachte) startdatum:	12-09-2021
Aantal proefpersonen:	15
Type:	Werkelijke startdatum

Voornemen beschikbaar stellen Individuele Patiënten Data (IPD)

Wordt de data na het onderzoek gedeeld: Nog niet bepaald

Ethische beoordeling

Goedgekeurd WMO

Datum:	19-02-2021
Soort:	Eerste indiening
Toetsingscommissie:	METC Academisch Ziekenhuis Maastricht / Universiteit Maastricht Postbus 5800 6202 AZ Maastricht 043 387 6009 secretariaat.metc@mumc.nl

Registraties

Opgevolgd door onderstaande (mogelijk meer actuele) registratie

ID: 49691
Bron: ToetsingOnline
Titel:

Andere (mogelijk minder actuele) registraties in dit register

Geen registraties gevonden.

In overige registers

Register	ID
NTR-new	NL9282
CCMO	NL74550.068.20
OMON	NL-OMON49691

Resultaten