

Orgaanbeoordeling van de toekomst

Wetenschapsdag NVN / Nierstichting / nieren.nl 2023



Cyril Moers, transplantatiechirurg



umcg Transplantation
Comprehensive Transplant Center

Orgaantransplantatie – Een droom!



Donatie en Transplantatie



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Orgaantransplantatie – Realiteit!



Donatie en Transplantatie



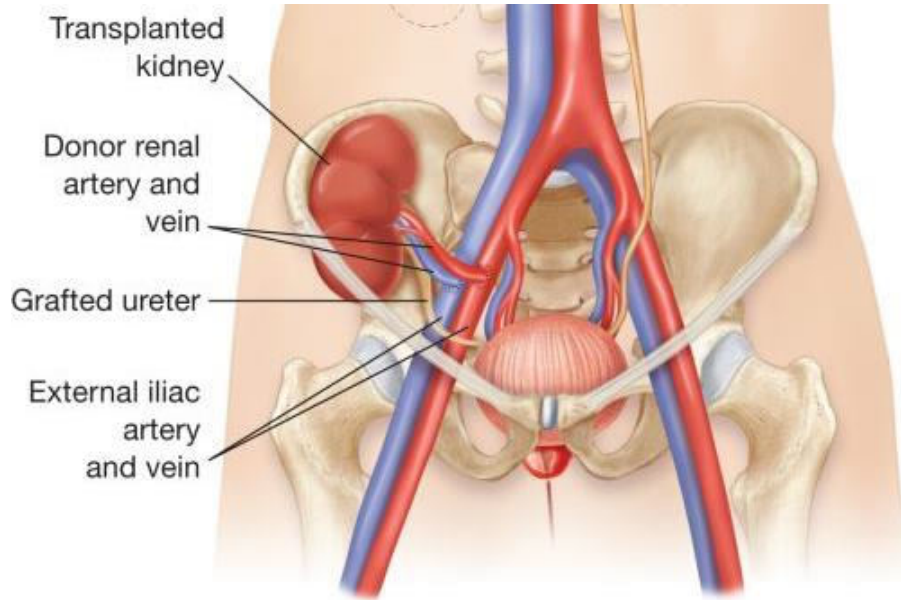
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Vragen

- Welk van onderstaande organen wordt eigenlijk nooit getransplanteerd?
 - Pancreas
 - Dunne darm
 - Penis
 - Schildklier
 - Milt
 - Uterus
 - Maag
 - Colon
- Als je een nier transplanteert dan verwijder je eerst tenminste één van de eigen nieren van de patiënt
 - Juist
 - Onjuist



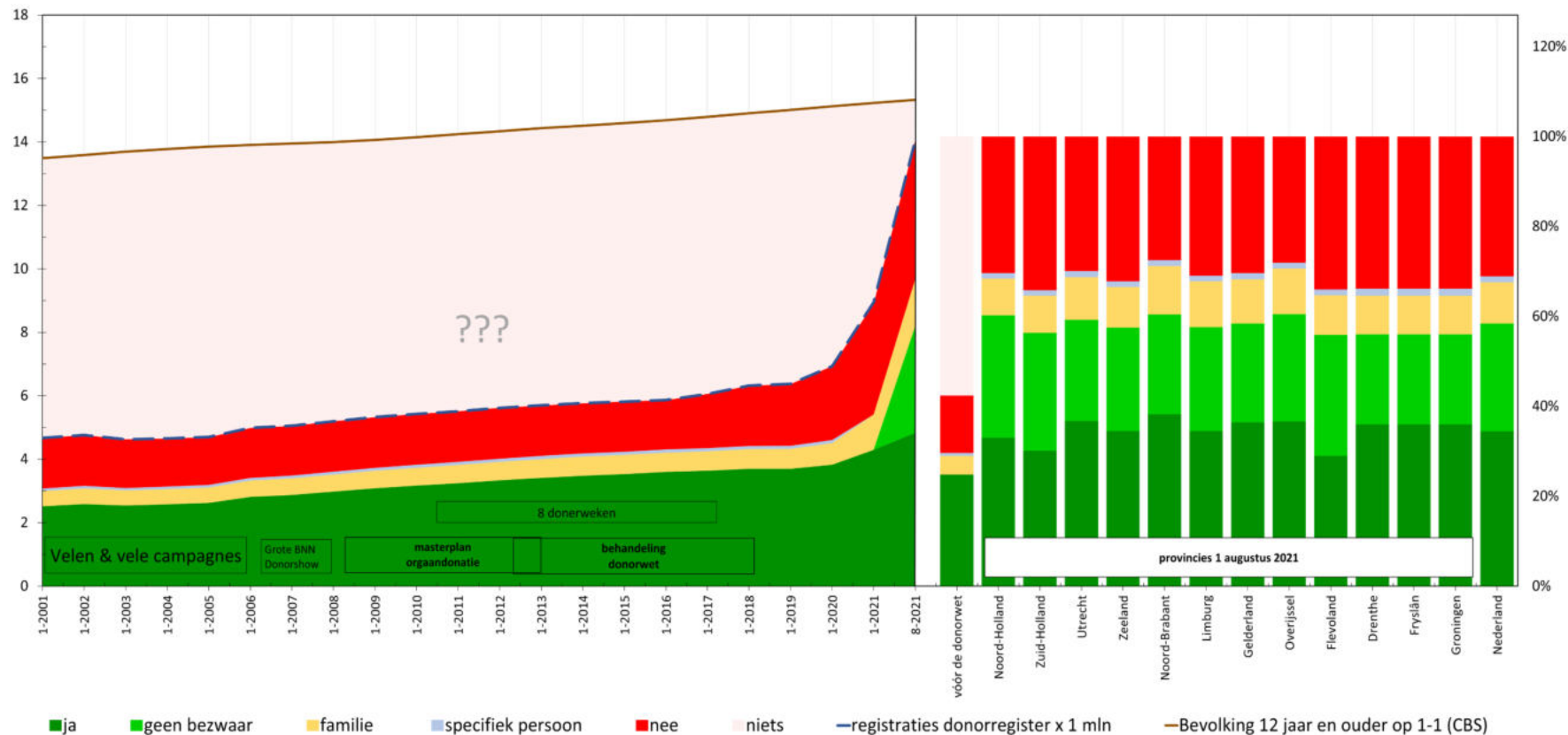
Niertransplantatie – de ontvanger



Donatie en Transplantatie



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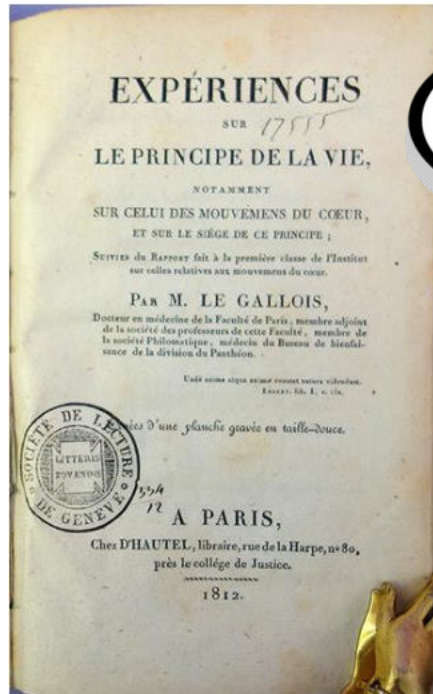


Donatie en Transplantatie



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Geschiedenis orgaanperfusie



History of Organ Perfusion*

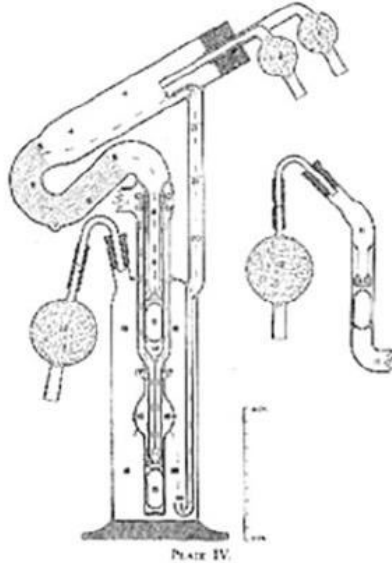
1812	Le Gallois	"If one could substitute for the heart a kind of injection... of arterial blood, either natural, or artificial... , one would succeed easily in maintaining alive indefinitely any part of the body whatsoever."
1828	Kay	first artificial circulation to restore muscle
1849	Löbell	kidney perfusion
1858	Brown-Séquard	brain perfusion
1866	de Cyon	heart and liver perfusion
1869	Ludwig and Schmidt	perfusion apparatus
1875	Luchsinger von Fry and Gruber Brodie, Hamel and Jacobj	liver perfusion pulsatile pump aeration and perfusion
1913	Carrel	culture of organs
1931	Lindbergh	coil apparatus
1935	Carrel and Lindbergh	thyroid perfusion lasting 18 days

Le Gallois – 1812



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Geschiedenis orgaanperfusie



Wat zijn we toch
sexy en innovatief!

Carrel-Lindbergh orgaanperfusie pomp in de jaren '30



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Geschiedenis orgaanperfusie

Wat zijn we toch
sowas innovatief!

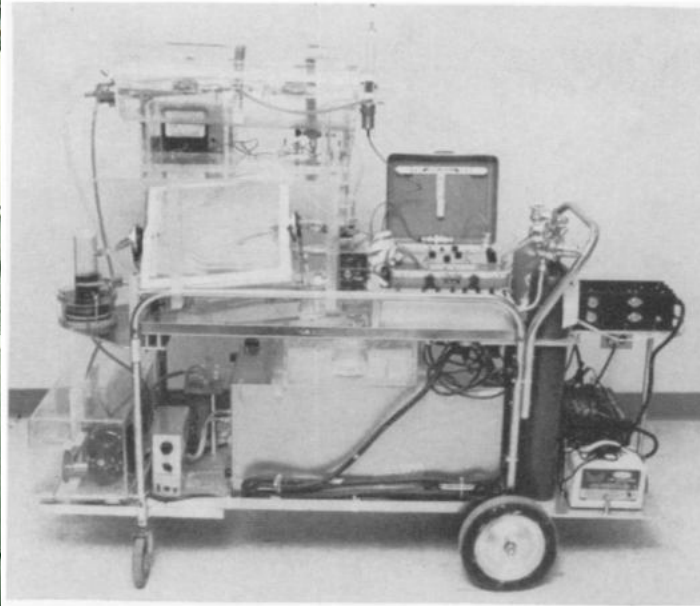


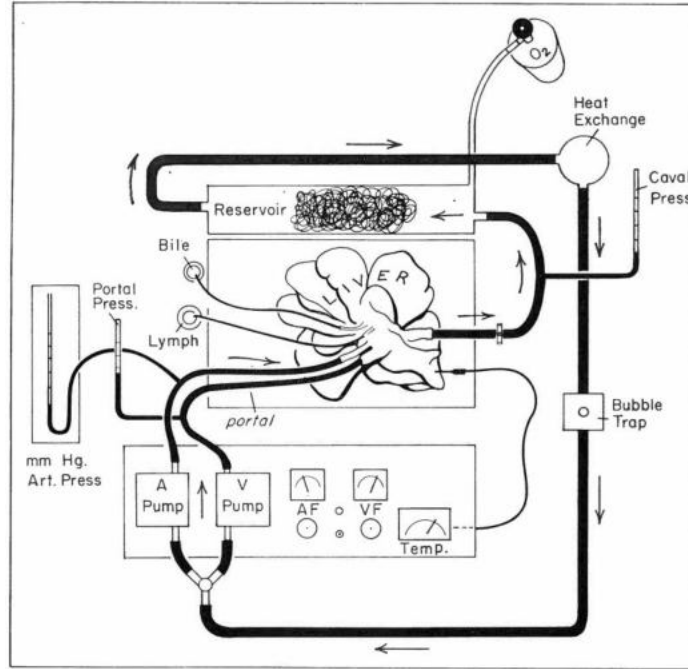
FIG. 3. Photograph of transportable renal preservation unit.

Donor nier preservatie in de jaren '60



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Geschiedenis orgaanperfusie

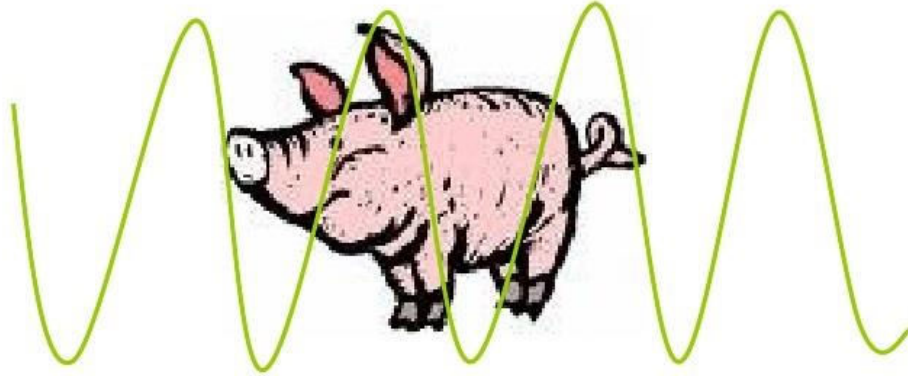


Donor lever preservatie in de jaren '60



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Geschiedenis orgaanperfusie

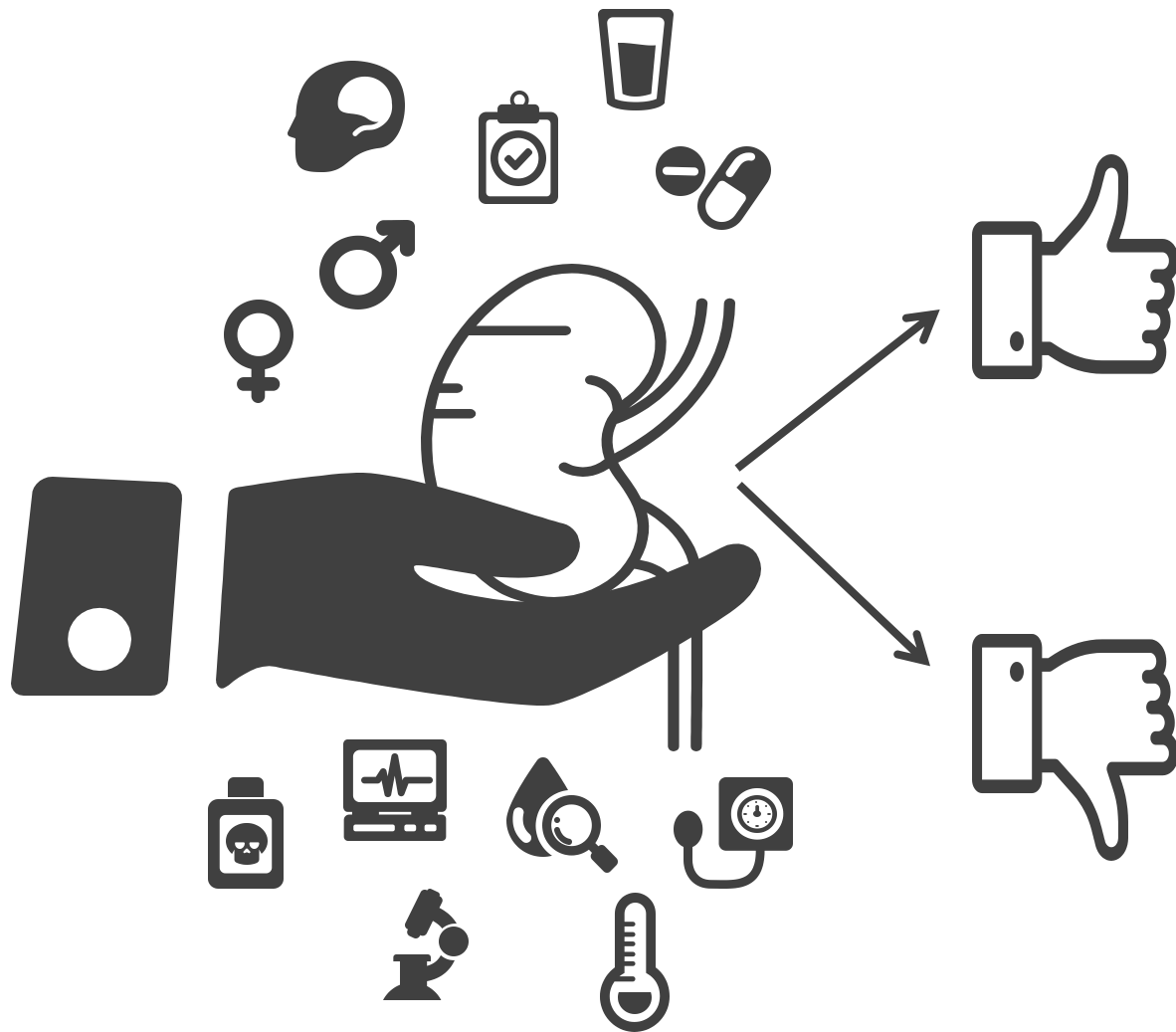


Varkenscyclus ...

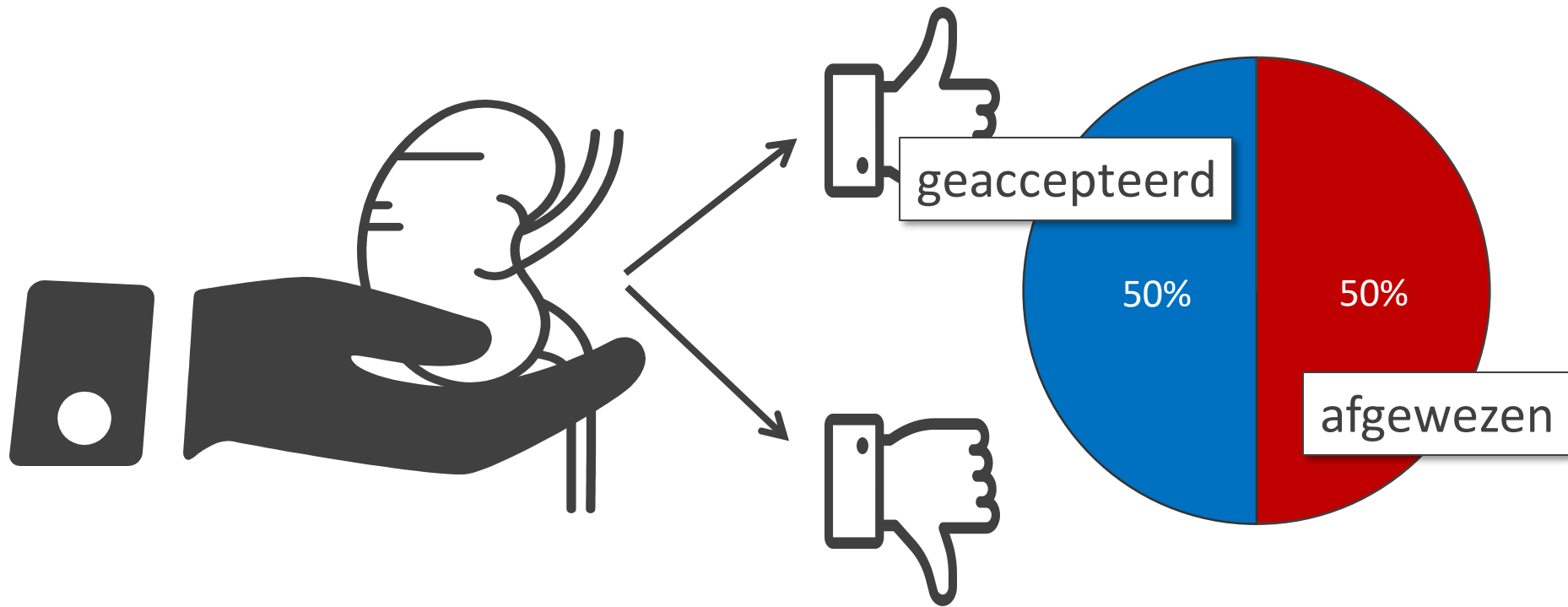


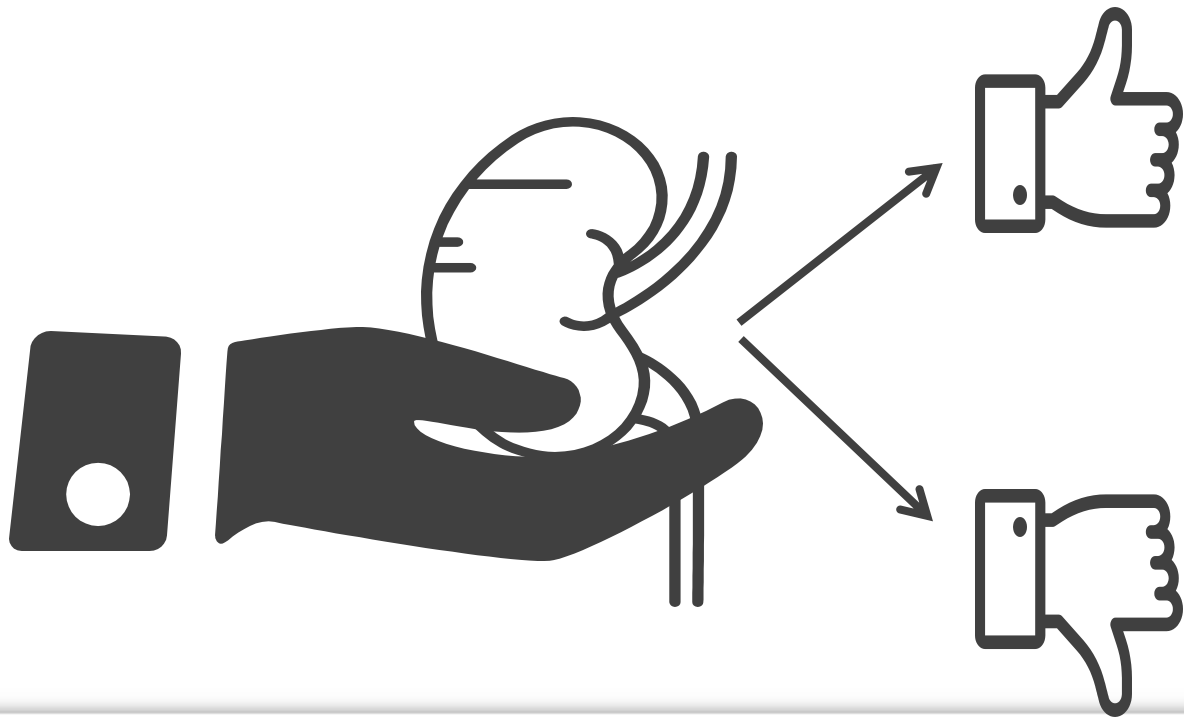
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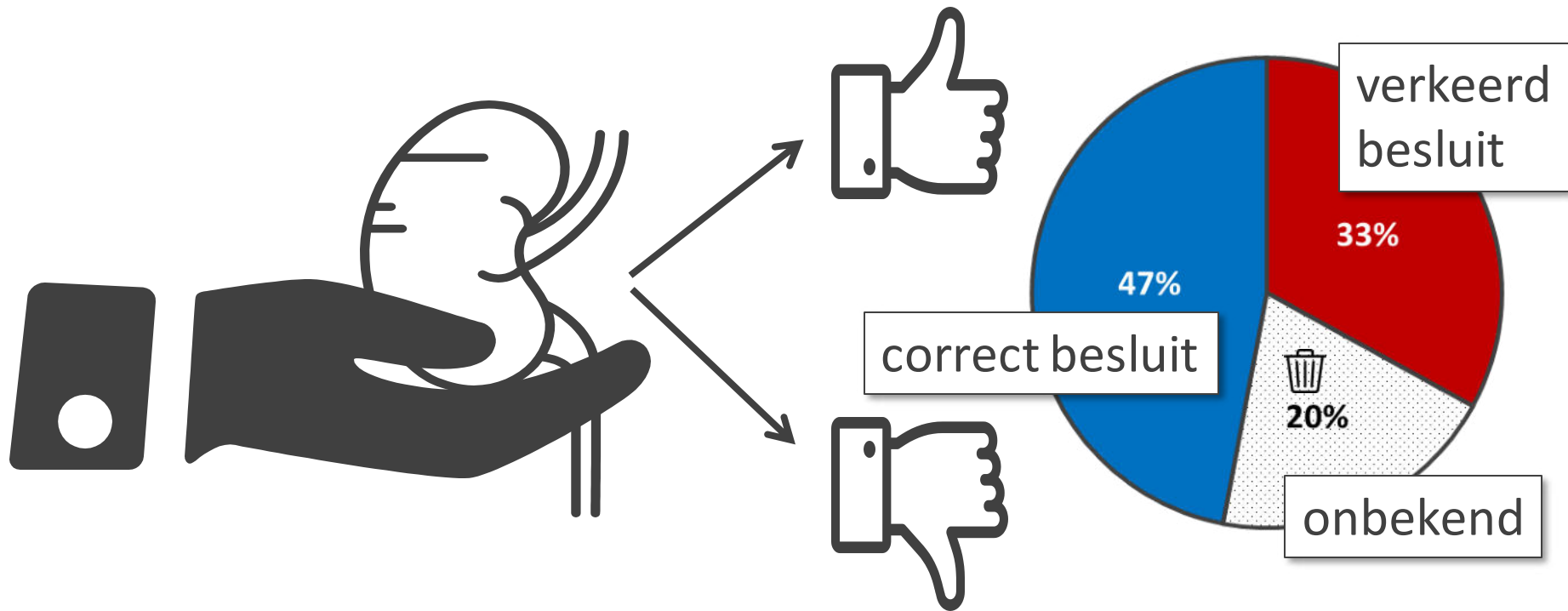
- Welk deel van de aan het UMCG aangeboden postmortale donornieren wordt afgewezen?
 - 10%
 - 30%
 - 50%
 - 70%

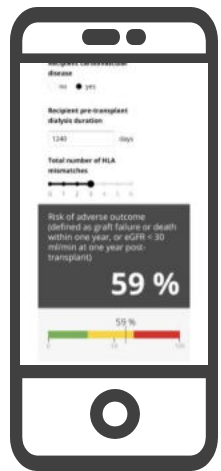




- Welk deel van de in Nederland uitgenomen postmortale donornieren wordt nergens geaccepteerd?

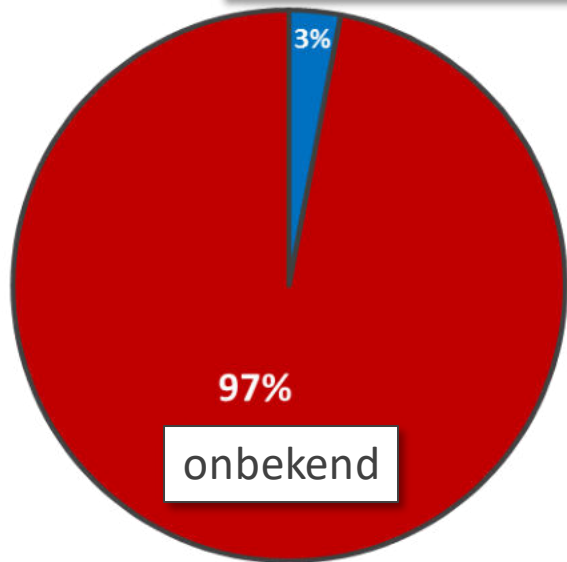
- 10%
- 20%
- 40%
- 60%





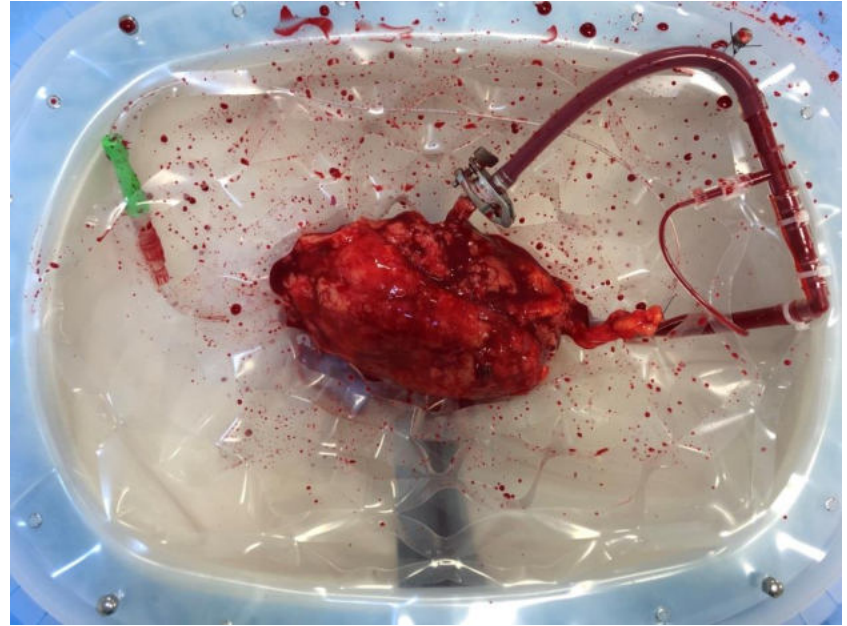
pre-image.eu/calculator
AUC = 0.63

verklaarde variantie

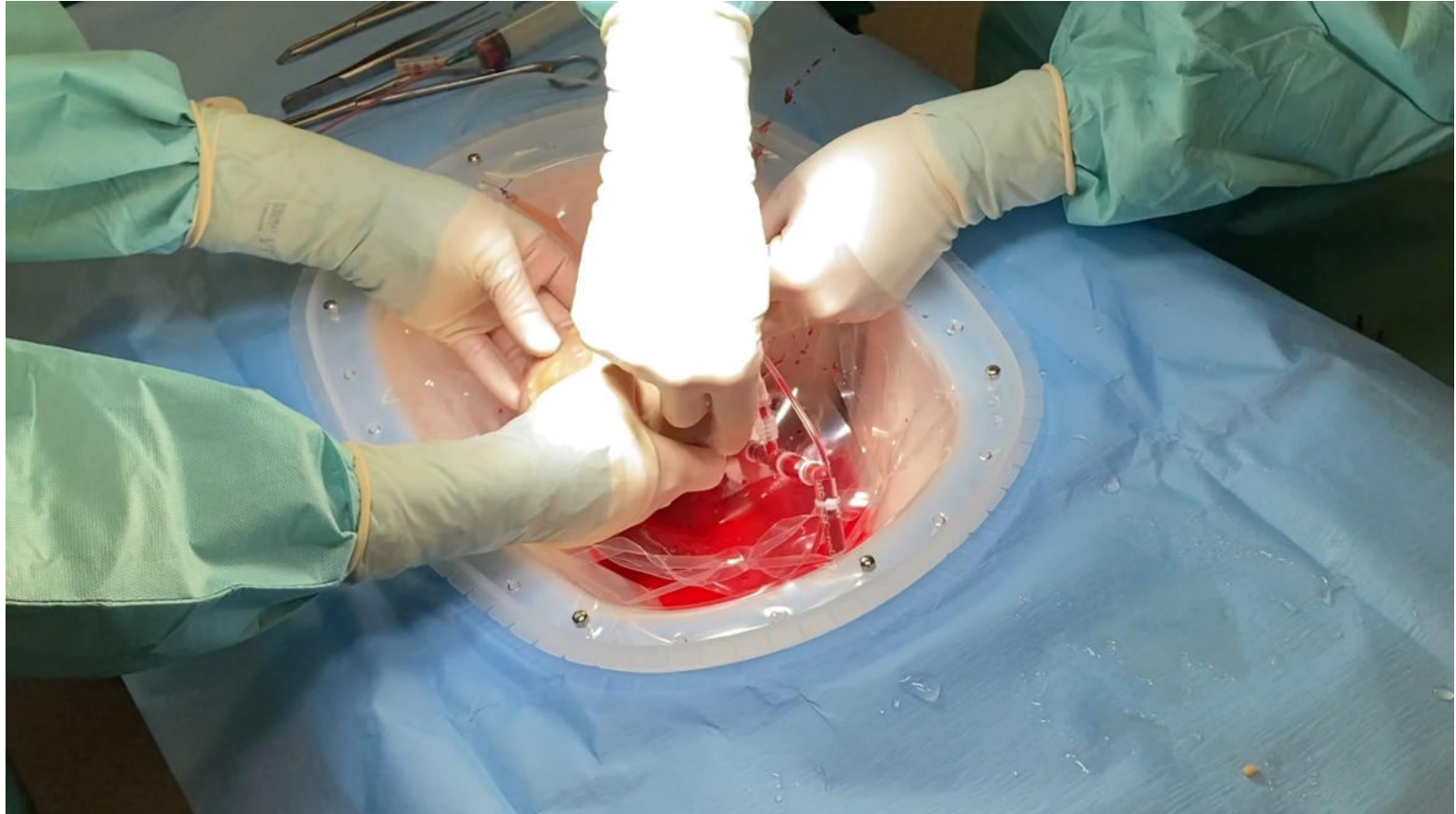


Ex vivo normotherme nierperfusie

Veelbelovend voor pre-transplantatie orgaanbeoordeling

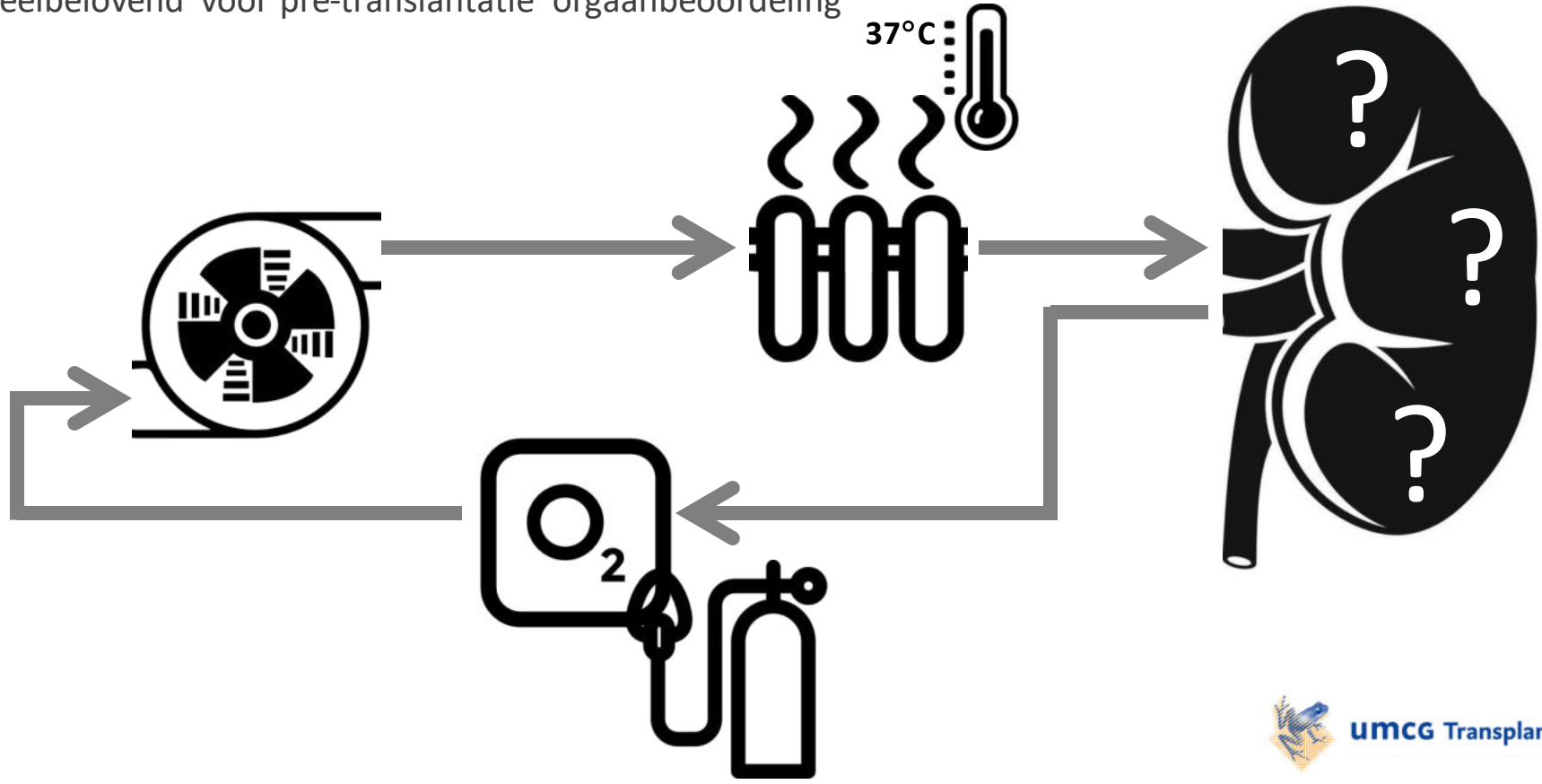


Normotherme machineperfusie



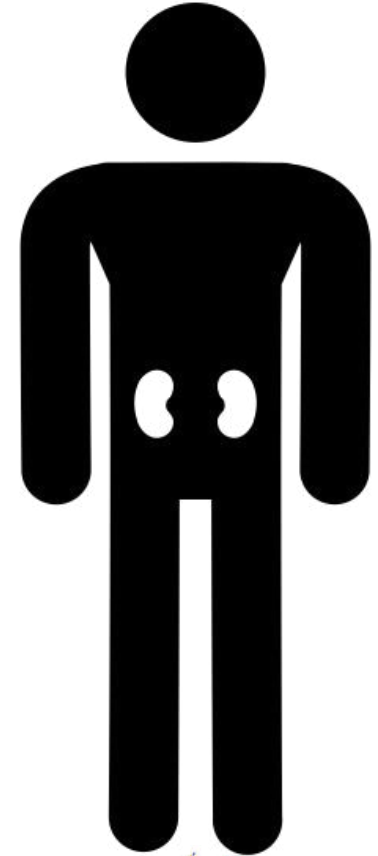
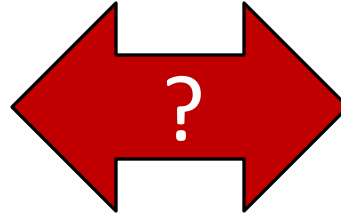
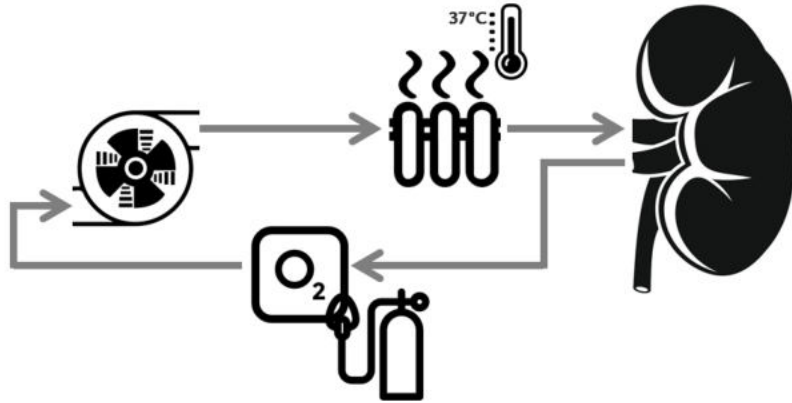
Ex vivo normothermic nierperfusie

Veelbelovend voor pre-transplantatie orgaanbeoordeling

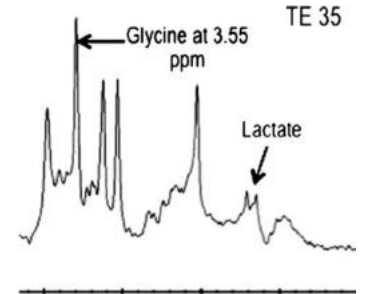
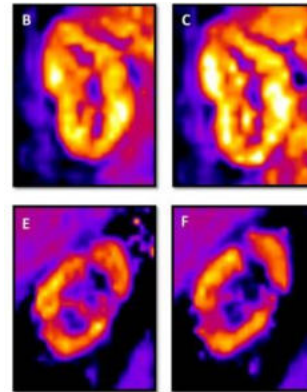
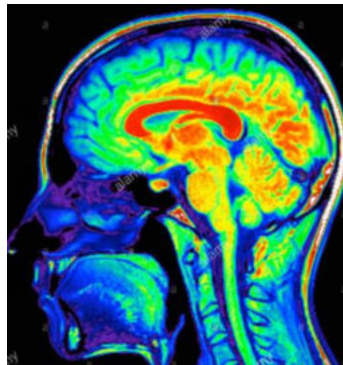
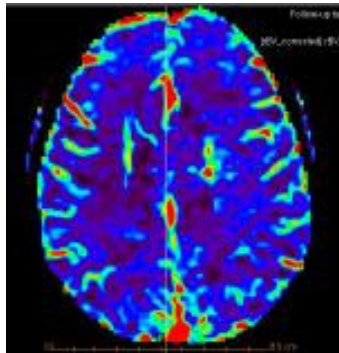
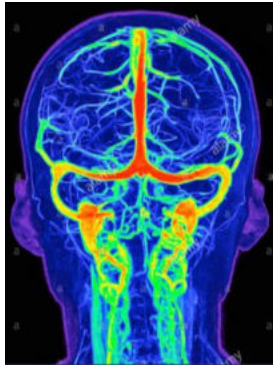


Ex vivo versus in vivo biologie

Groot gebrek aan kennis!



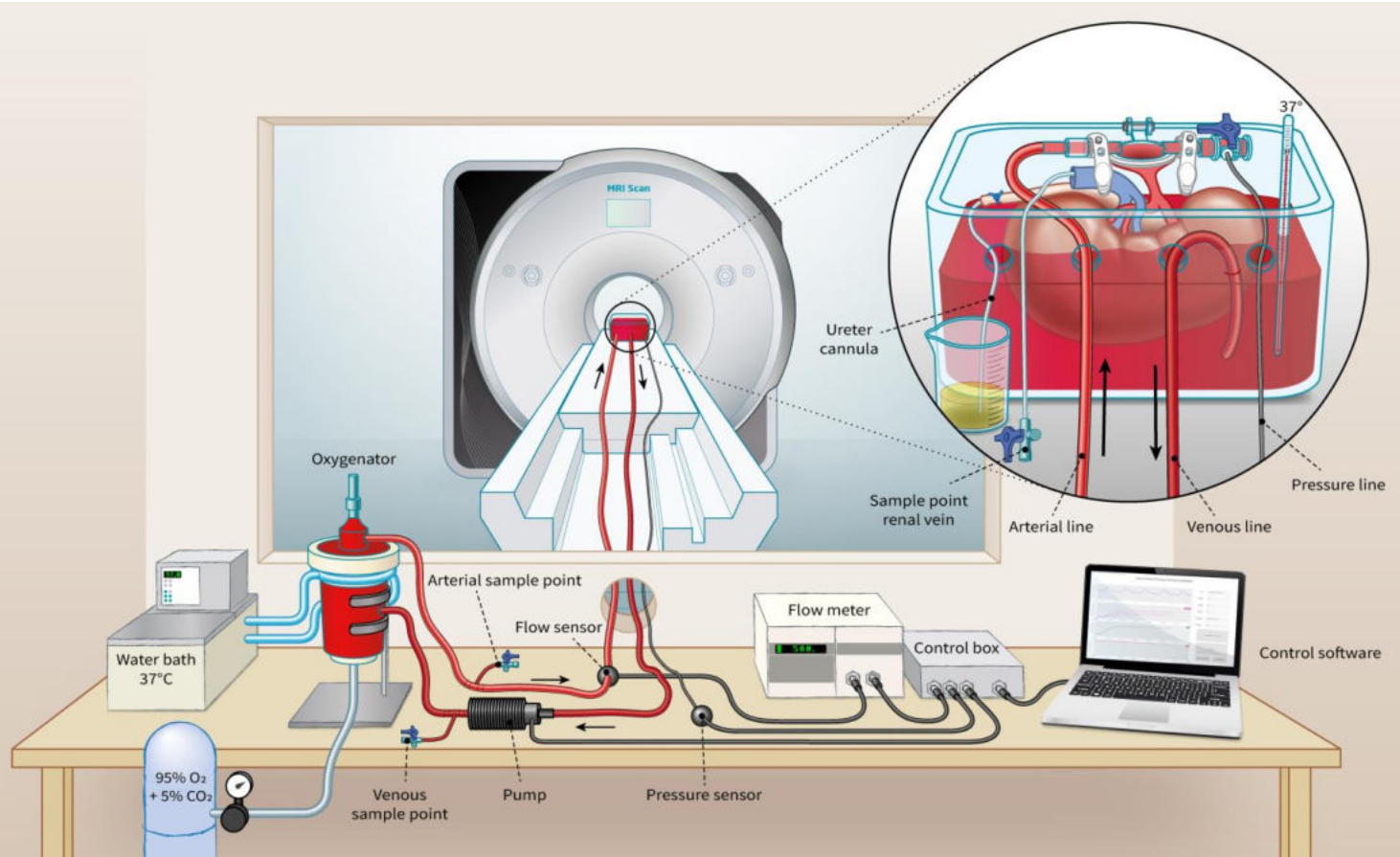
Magnetic resonance imaging (MRI)



MRI: gevaarlijkste apparaat in het ziekenhuis

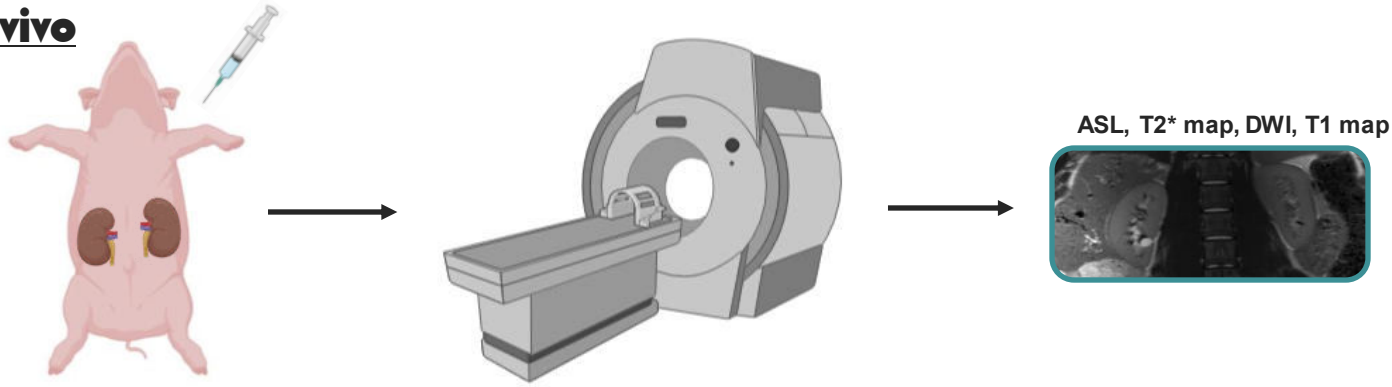


MRI ex vivo nierperfusie opstelling

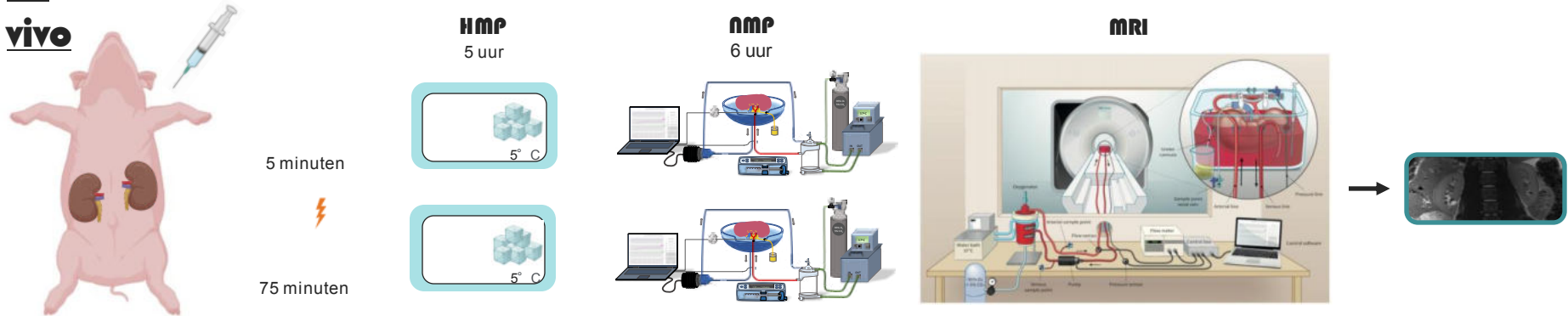


Nierperfusies in de MRI scanner

**In
vivo**



**Ex
vivo**



Nierperfusies in de MRI scanner



Nierperfusies in de MRI scanner



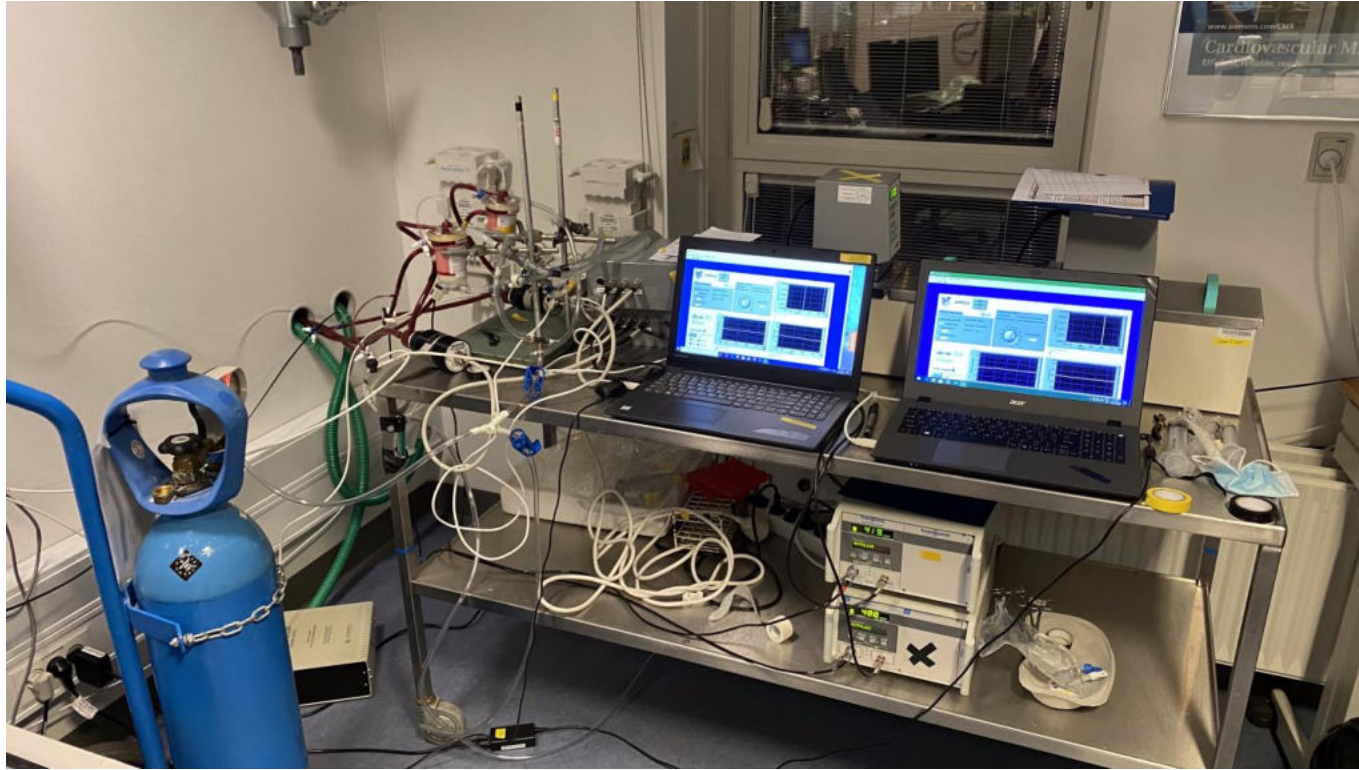
Nierperfusies in de MRI scanner



Nierperfusies in de MRI scanner



AARHUS
UNIVERSITY

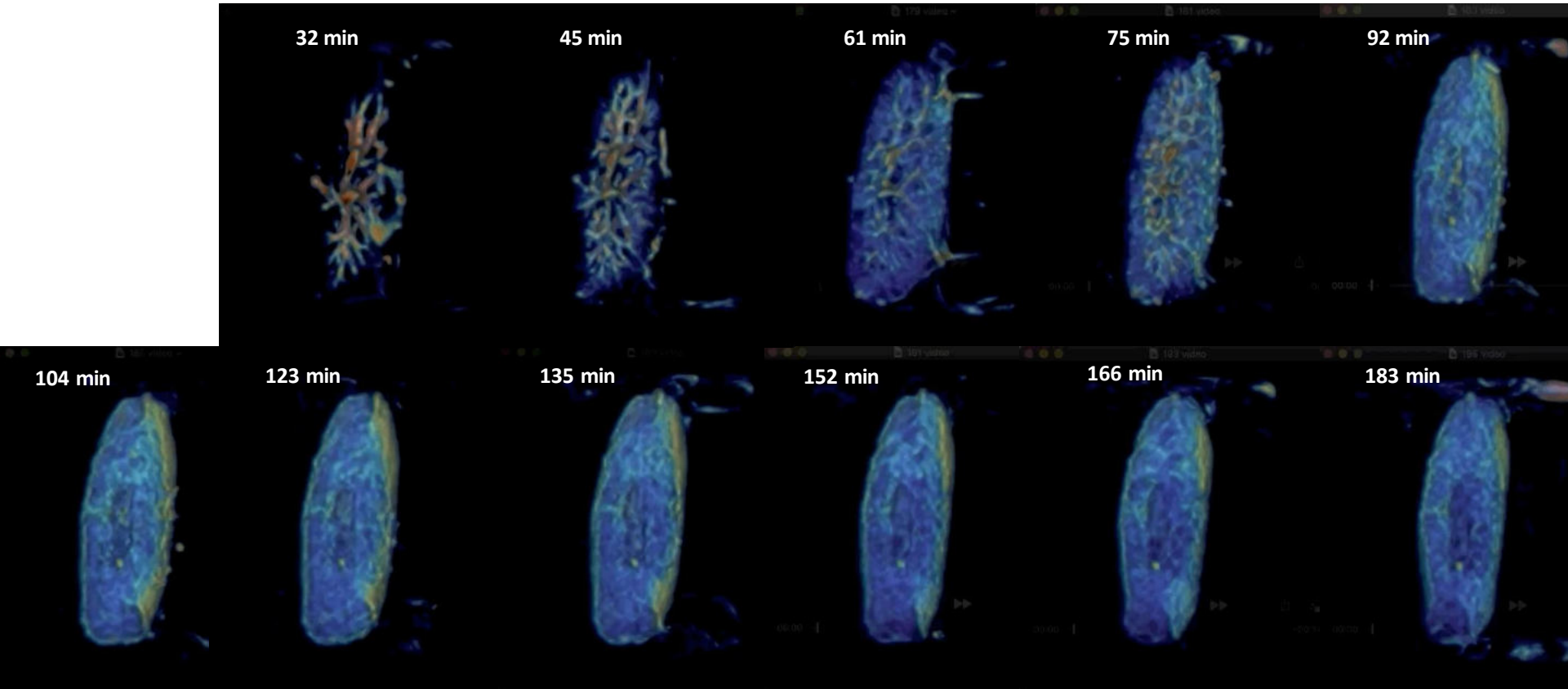


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Nierperfusies in de MRI scanner



MRI: Doorbloeding

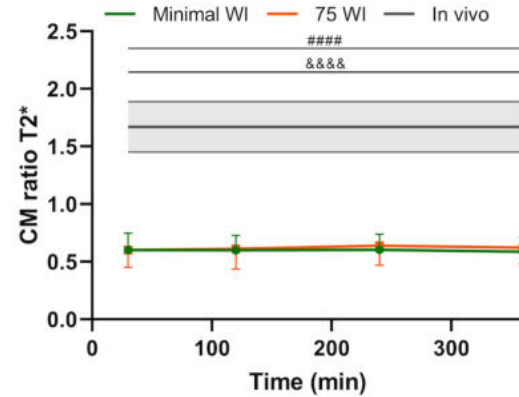
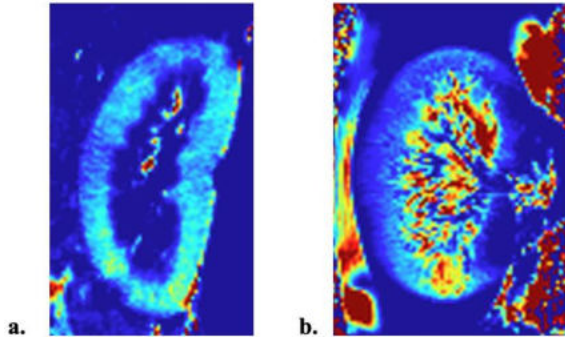


MRI: Zuurstofaanbod

T2* mapping

Ratio between oxygenated and deoxygenated hemoglobin

Tim Hamelink
Johannes Castelein
Isa van Tricht

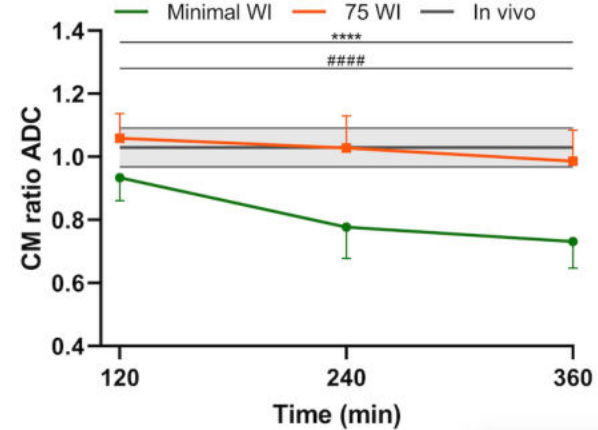
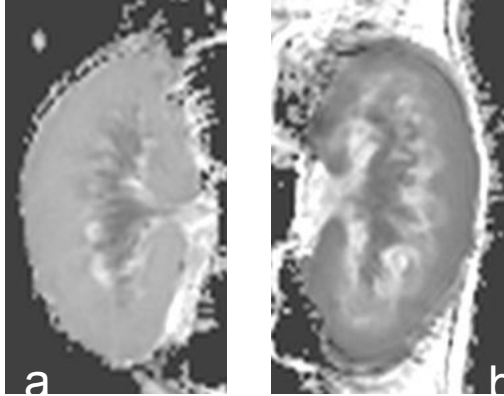


MRI: Ontsteking en littekenvorming

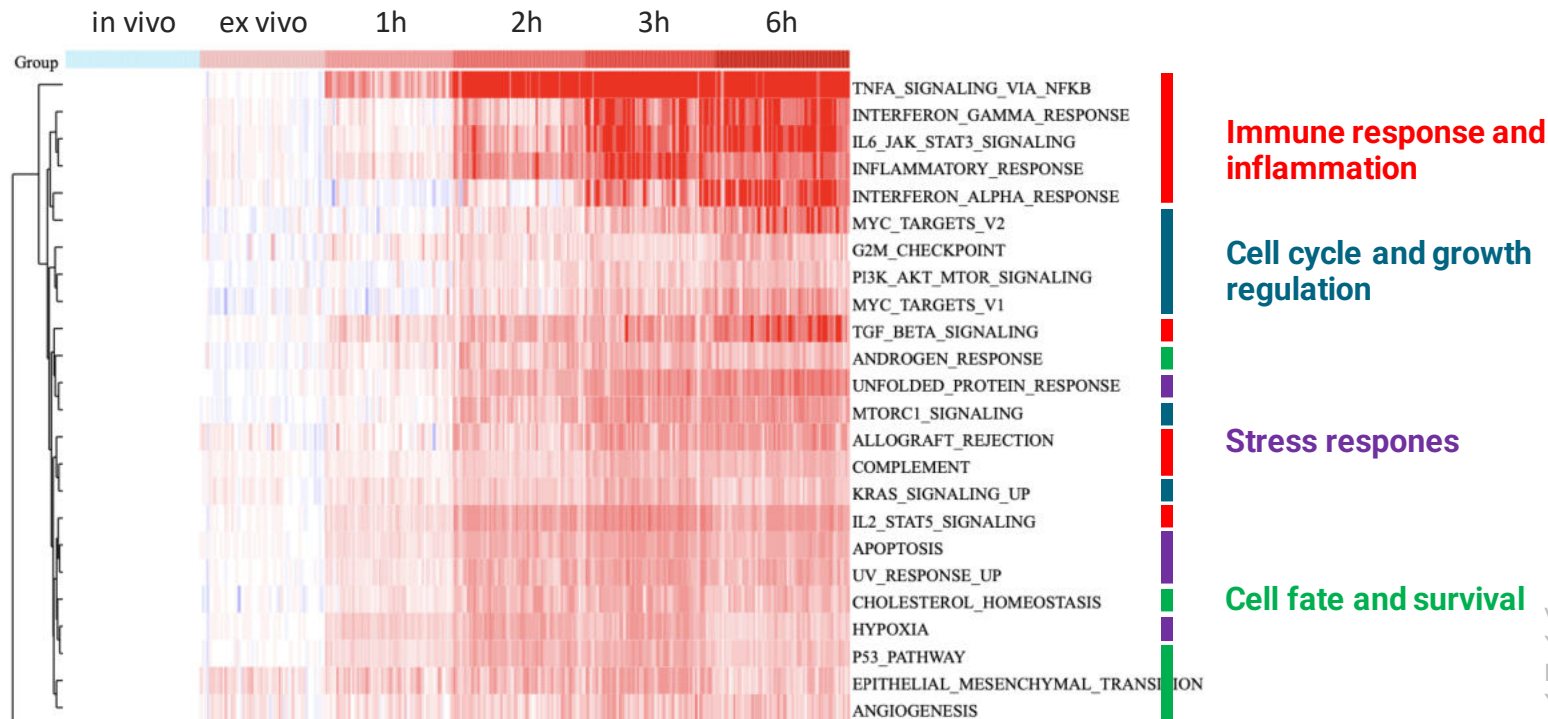
Diffusion Weighted Imaging (DWI)

Brownian movement of water molecules (fibrosis, inflammation, restriction)

Tim Hamelink
Johannes Castelein
Isa van Tricht



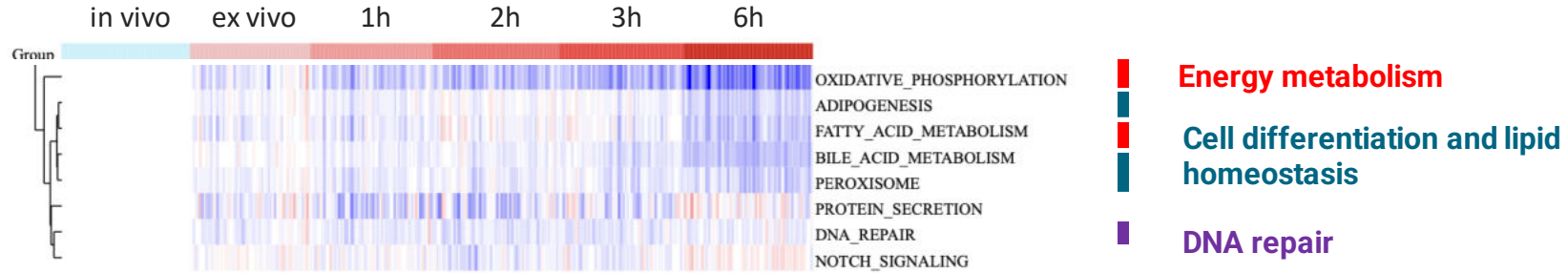
Cellulaire processen tijdens perfusie



Veerle Lantinga
You Zuo
Lin Lin
Yonglun Luo



Cellulaire processen tijdens perfusie

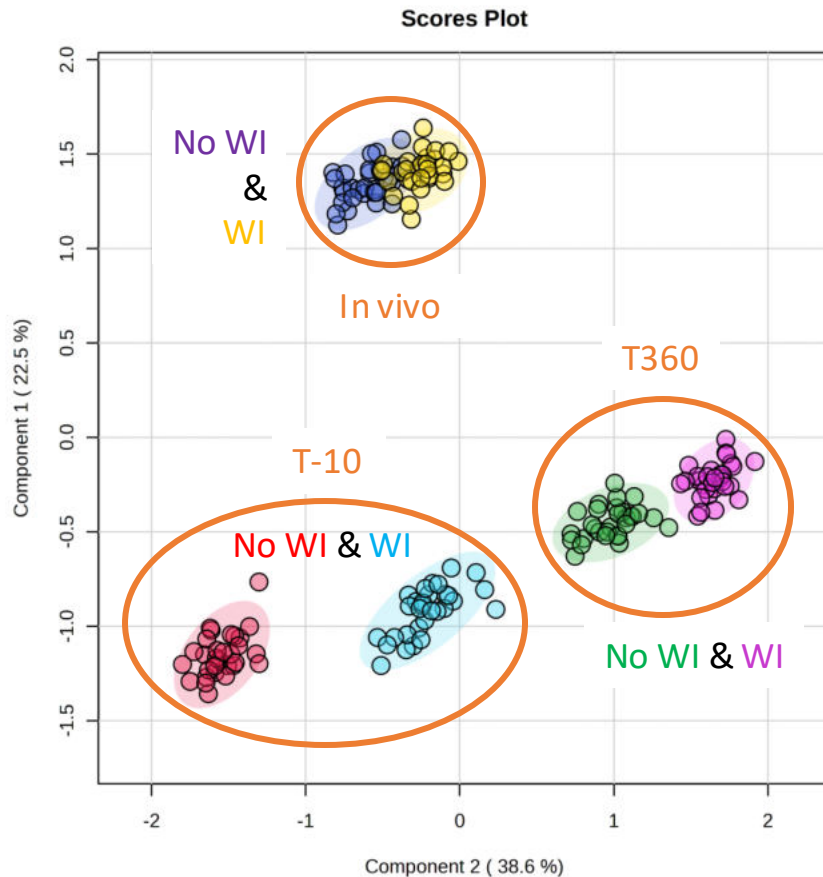


Veerle Lantinga
You Zuo
Lin Lin
Yonglun Luo



UMCG Transplantation

Cellulaire processen tijdens perfusie



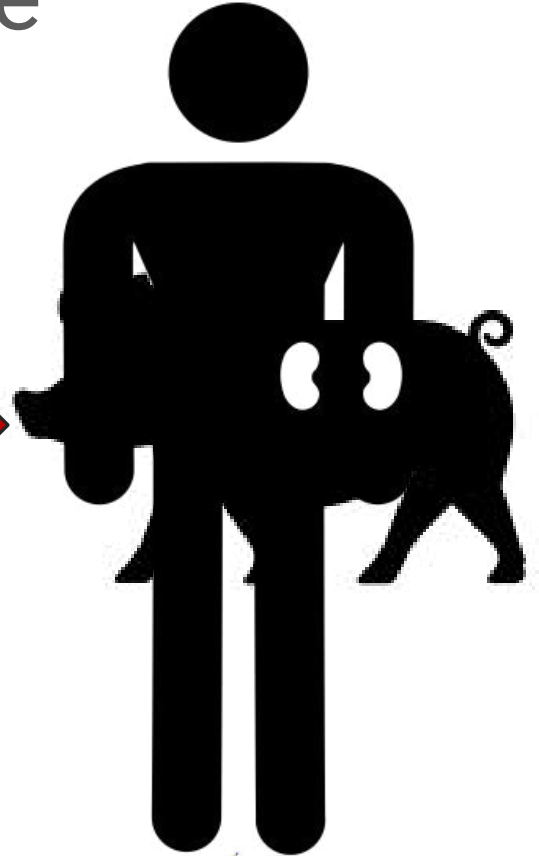
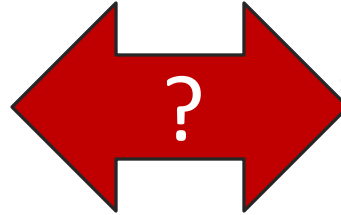
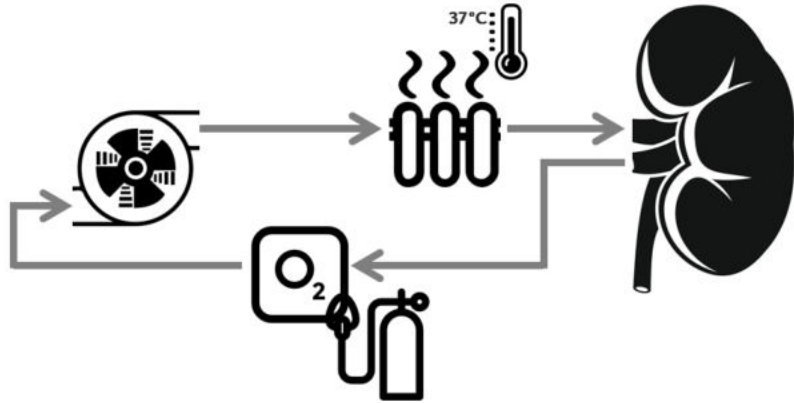
Baran Ogurlu
Leonie van Leeuwen
You Zuo



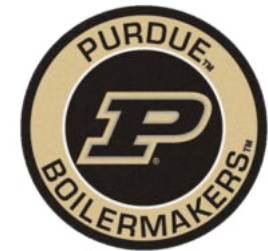
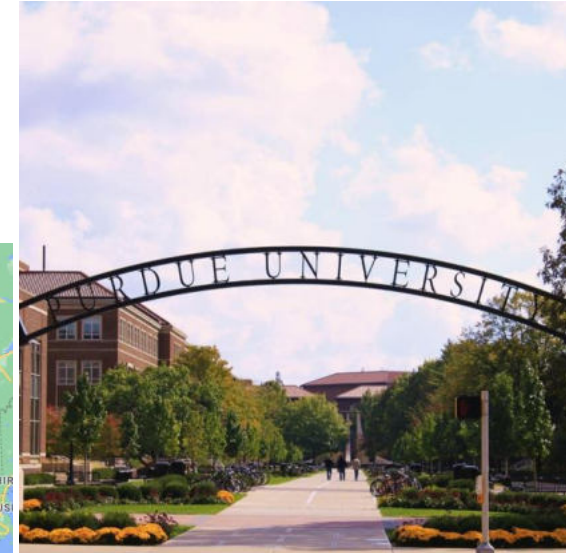
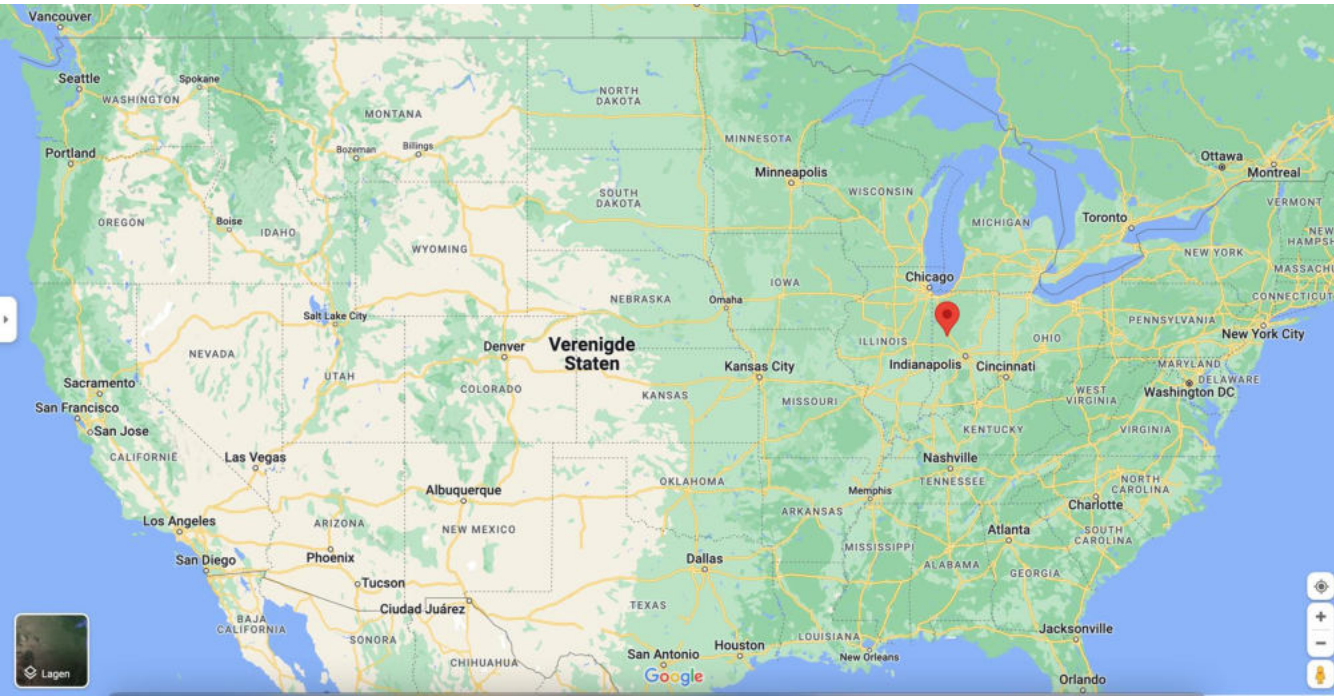
UMCG Transplantation

Ex vivo versus in vivo biologie

We begrijpen er nog maar weinig van...



Lafayette, Indiana



De MRI faciliteit

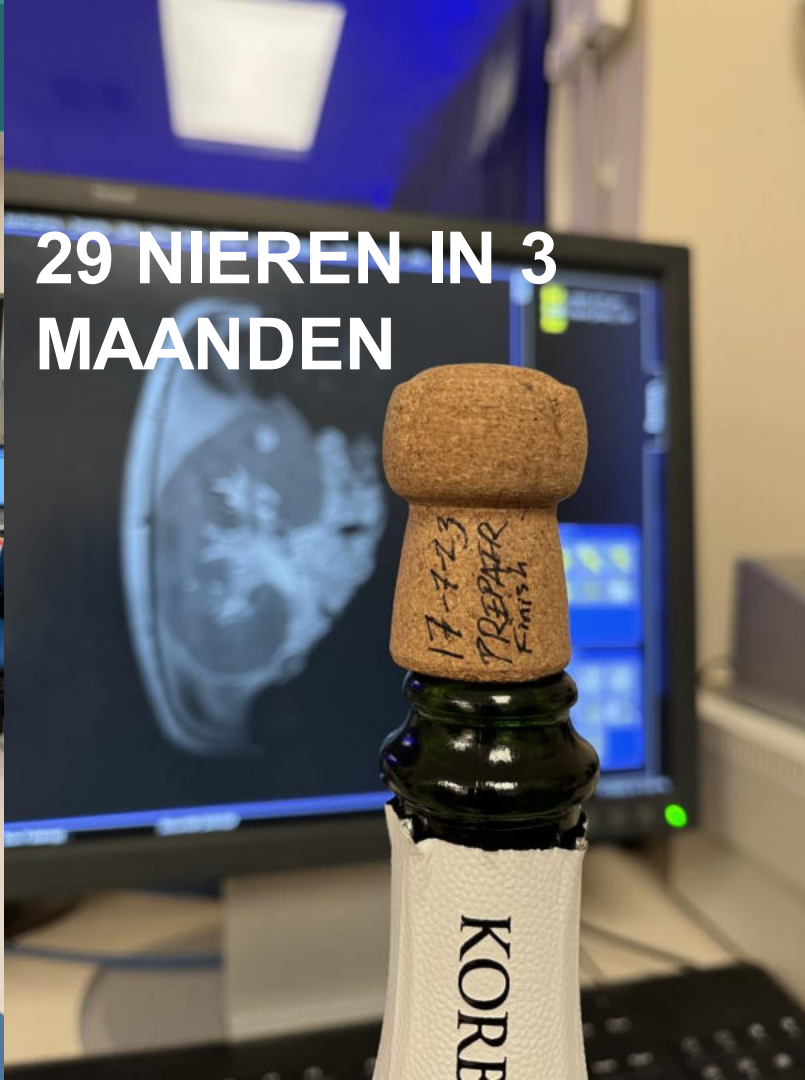
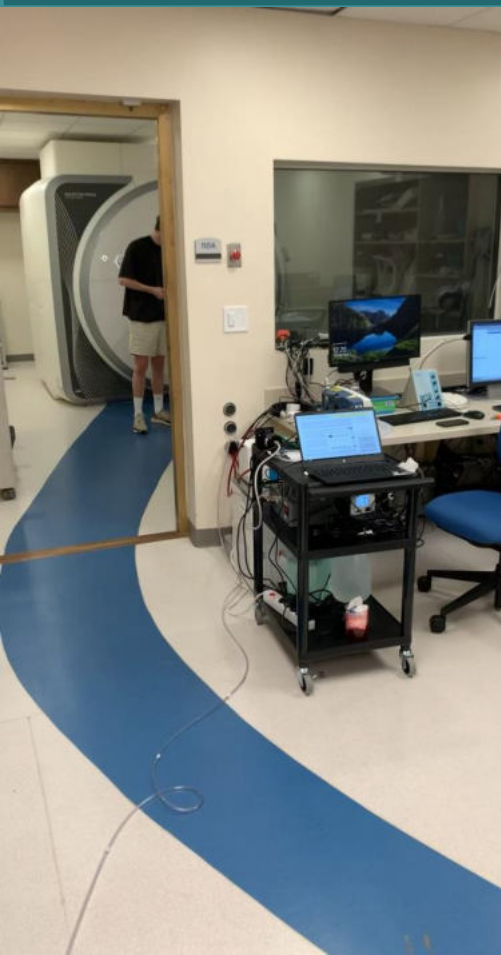
- Zelfde scanner als in Groningen en Aarhus
- Zelfde software
- Klein lokaal team
- Op zoek naar nieuwe projecten...



SAVING MORE LIVES:
INTERNATIONAL
COLLABORATION WITH
PURDUE LIFE SCIENCE
MRI FACILITY AIMS TO
INCREASE 'LIFE' OF
KIDNEYS FOR
TRANSPLANT

AUGUST 1, 2023



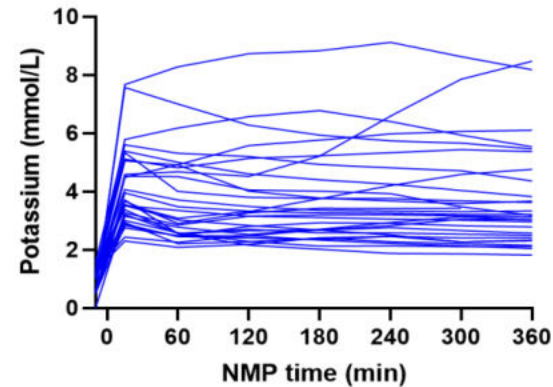
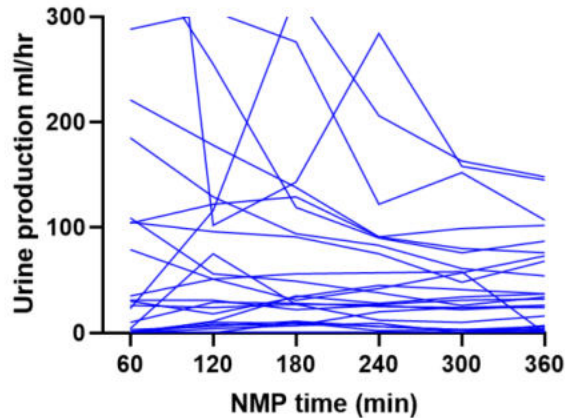
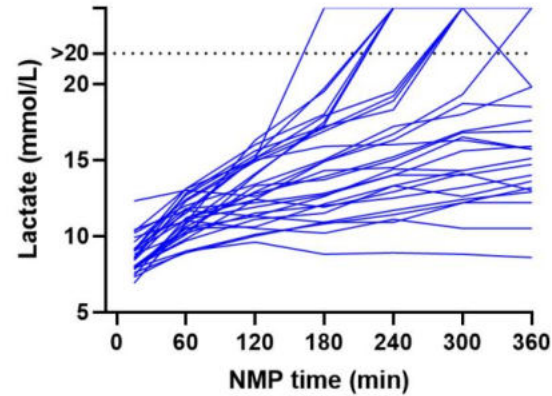
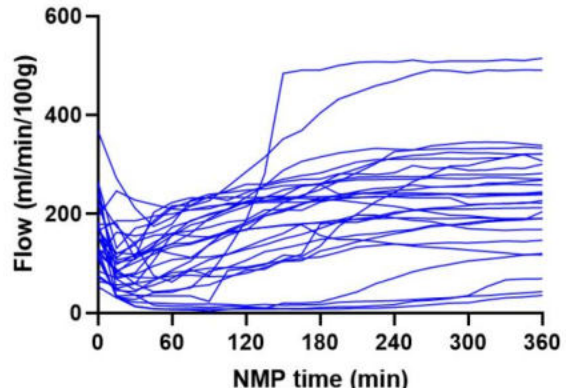


29 NIEREN IN 3
MAANDEN

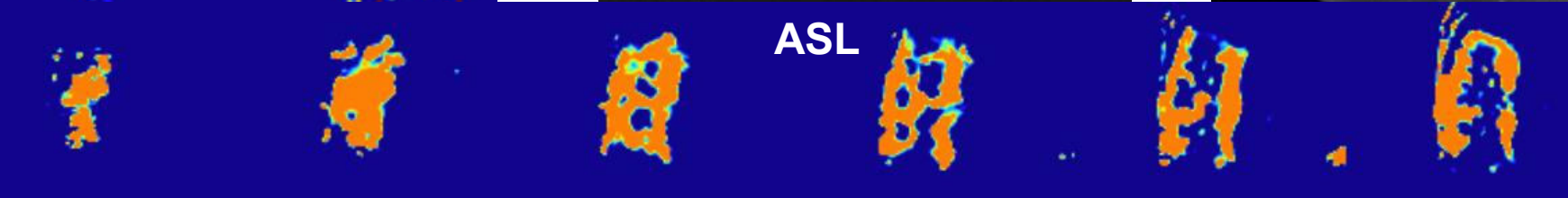
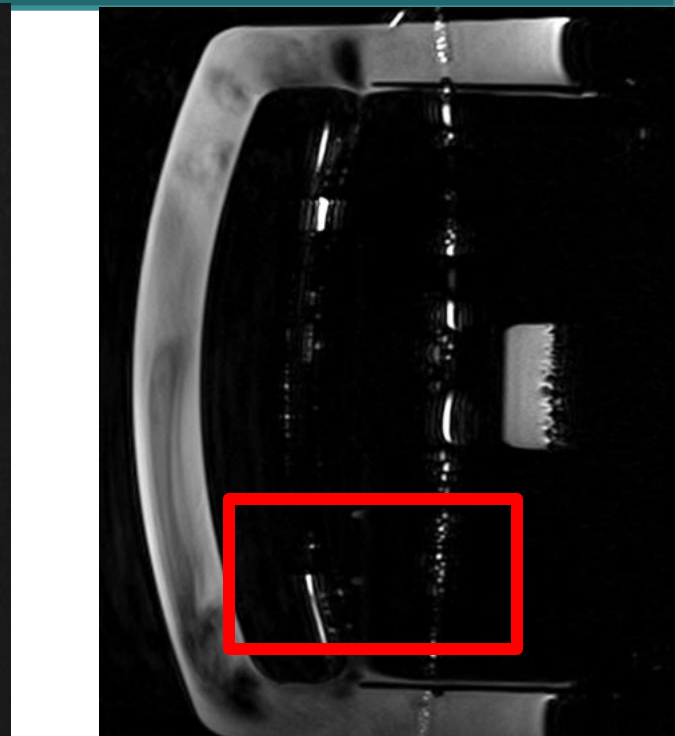
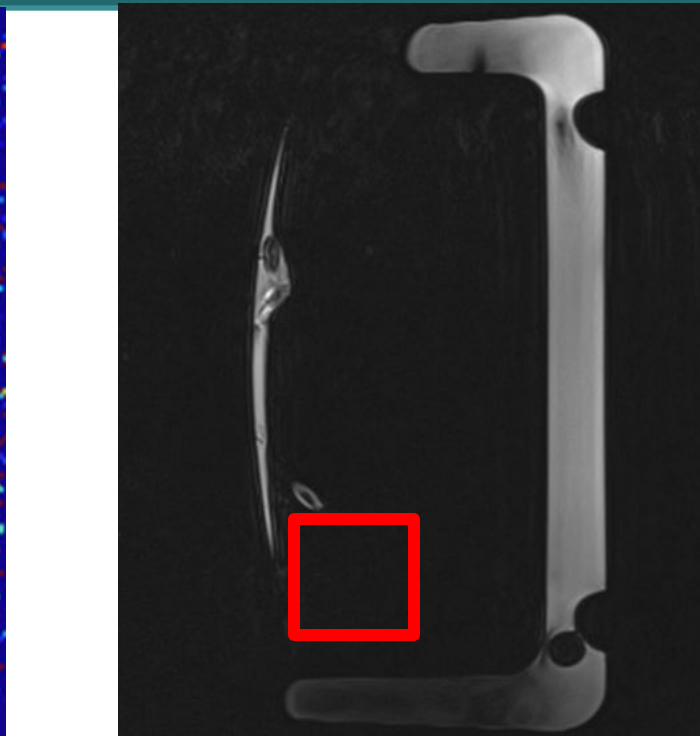
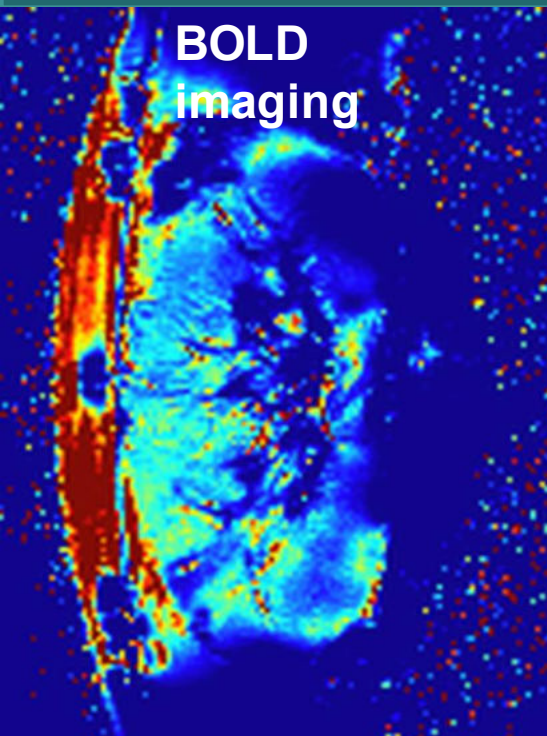


eerste resultaten

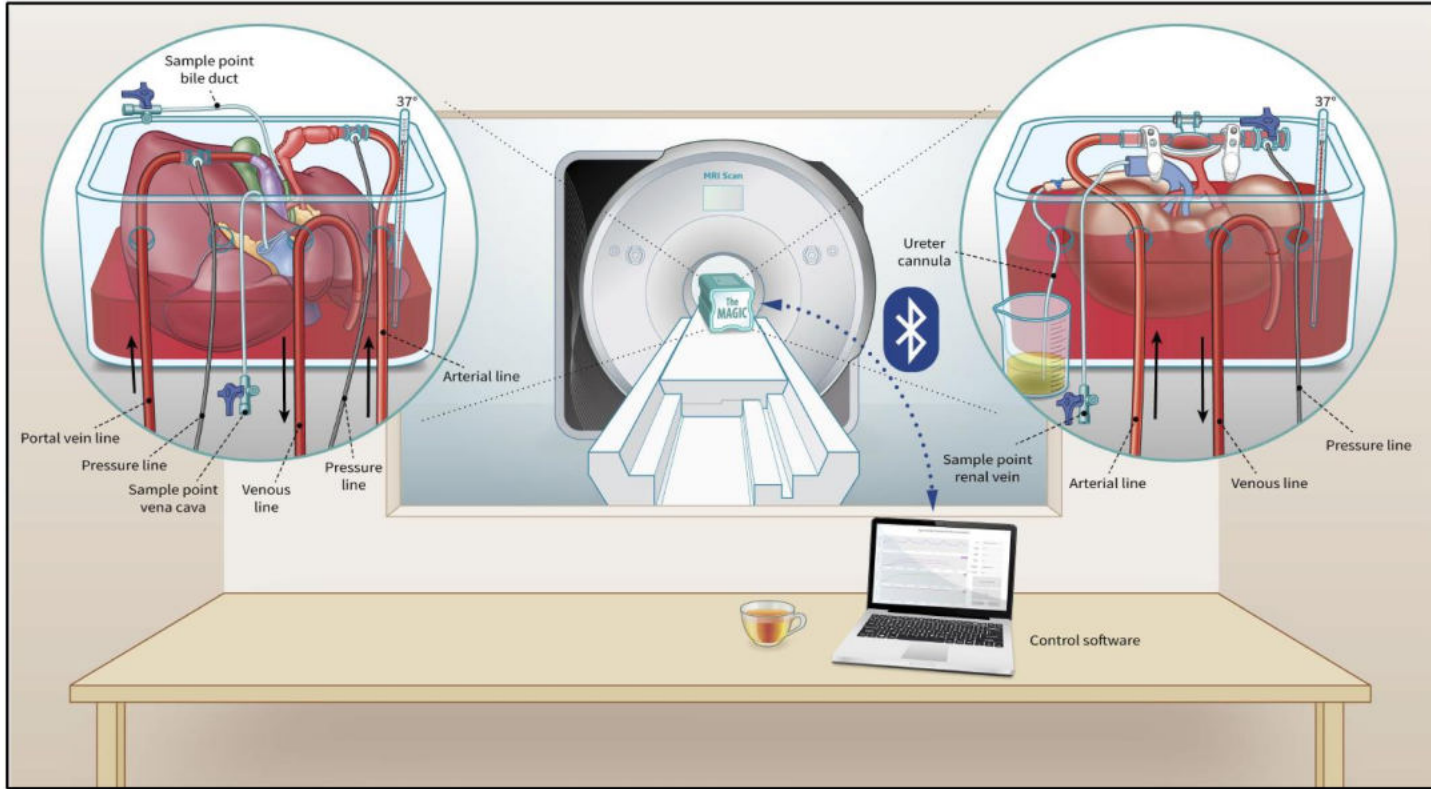
Iedere nier is anders!



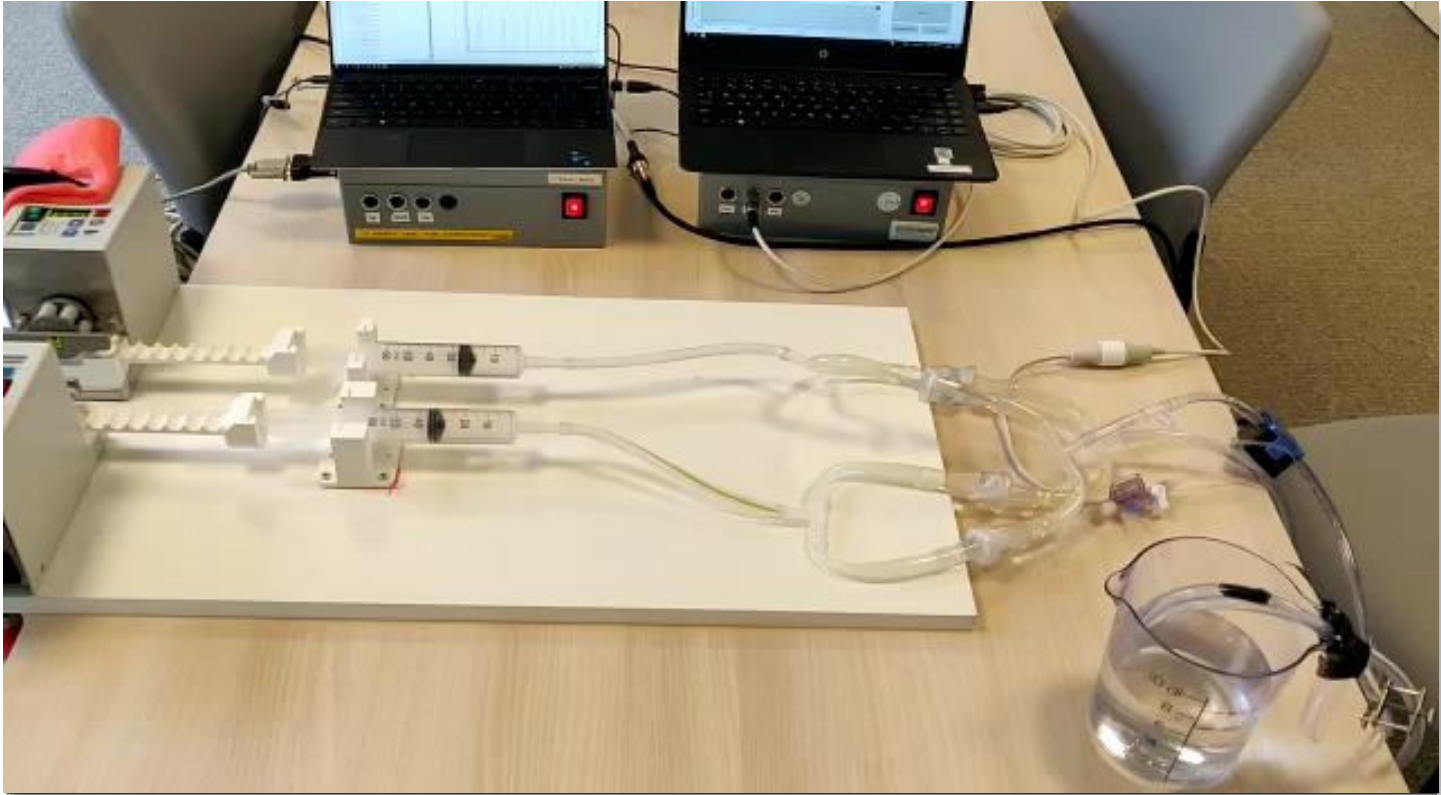
MRI data



MRI-compatibele perfusiemachine



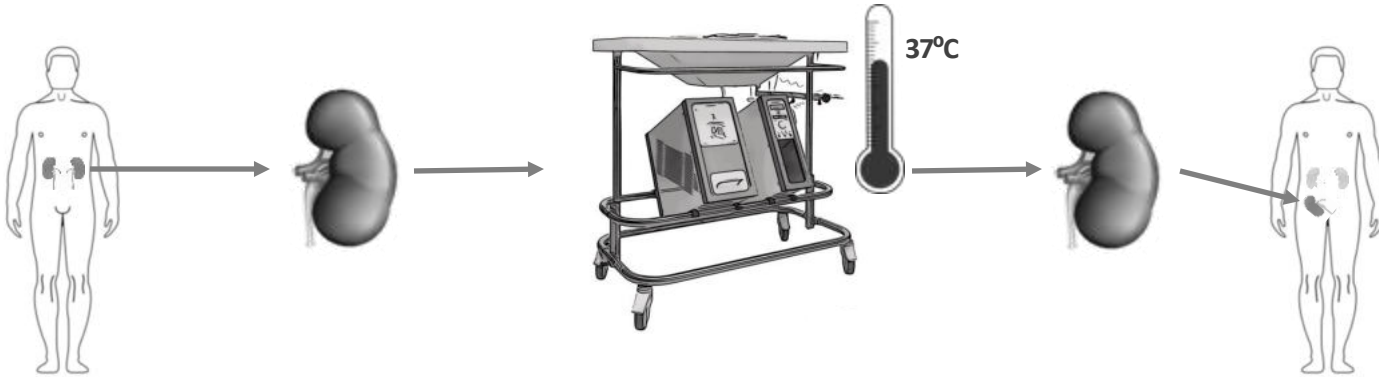
MRI-compatibele perfusiemachine



donor

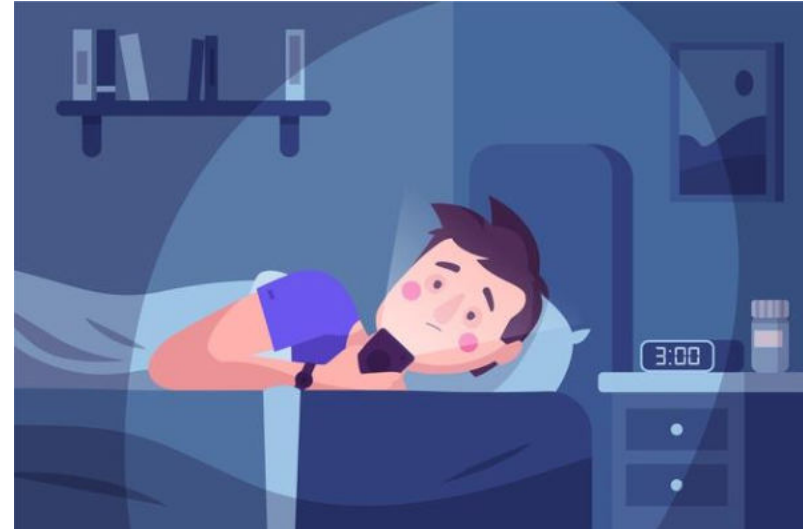
orgaanpreservatie & transport

ontvanger

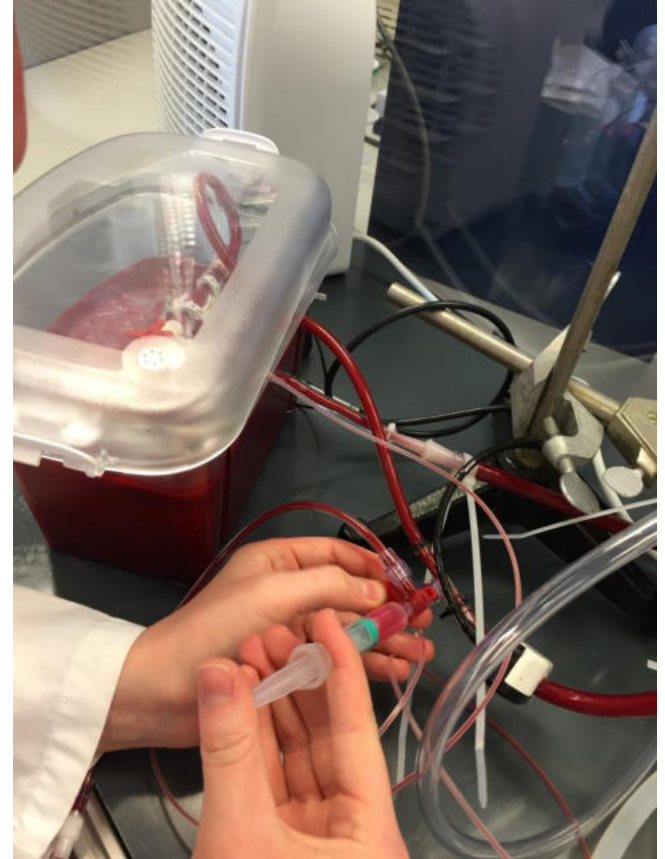
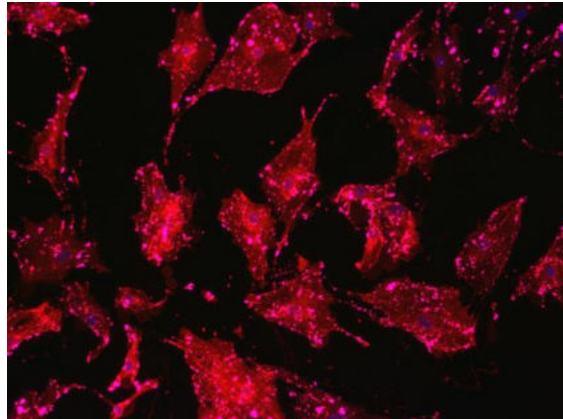
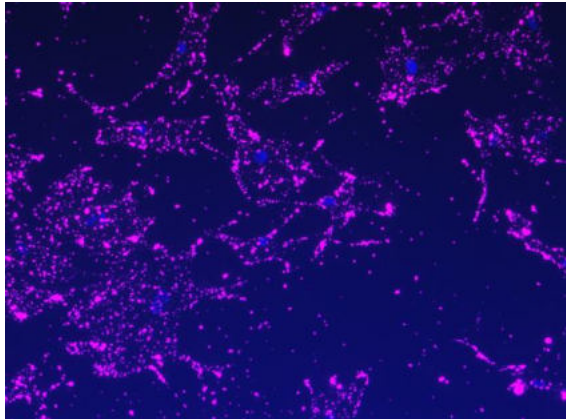
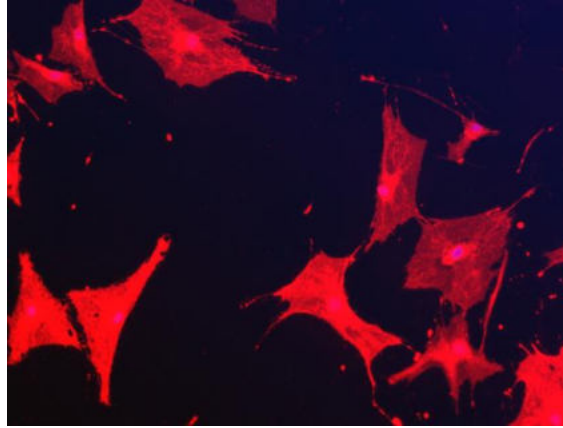
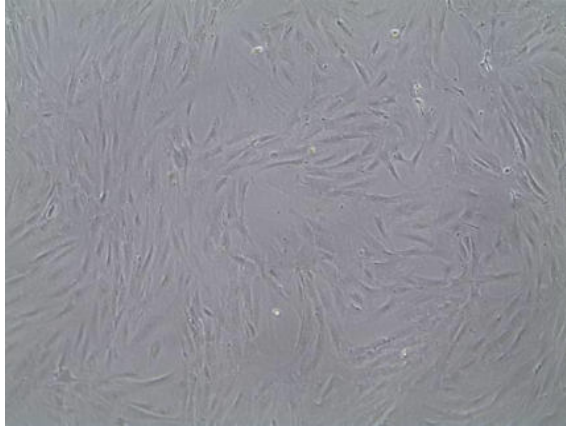


Doelen van machineperfusie

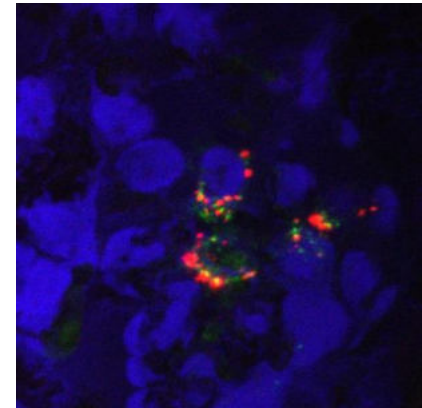
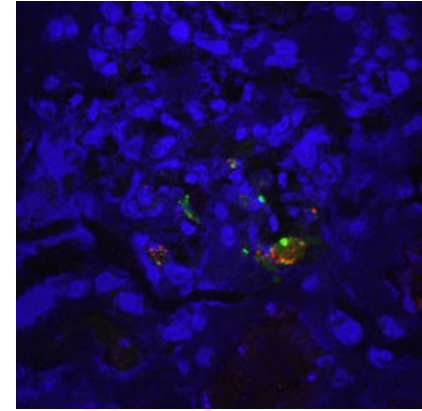
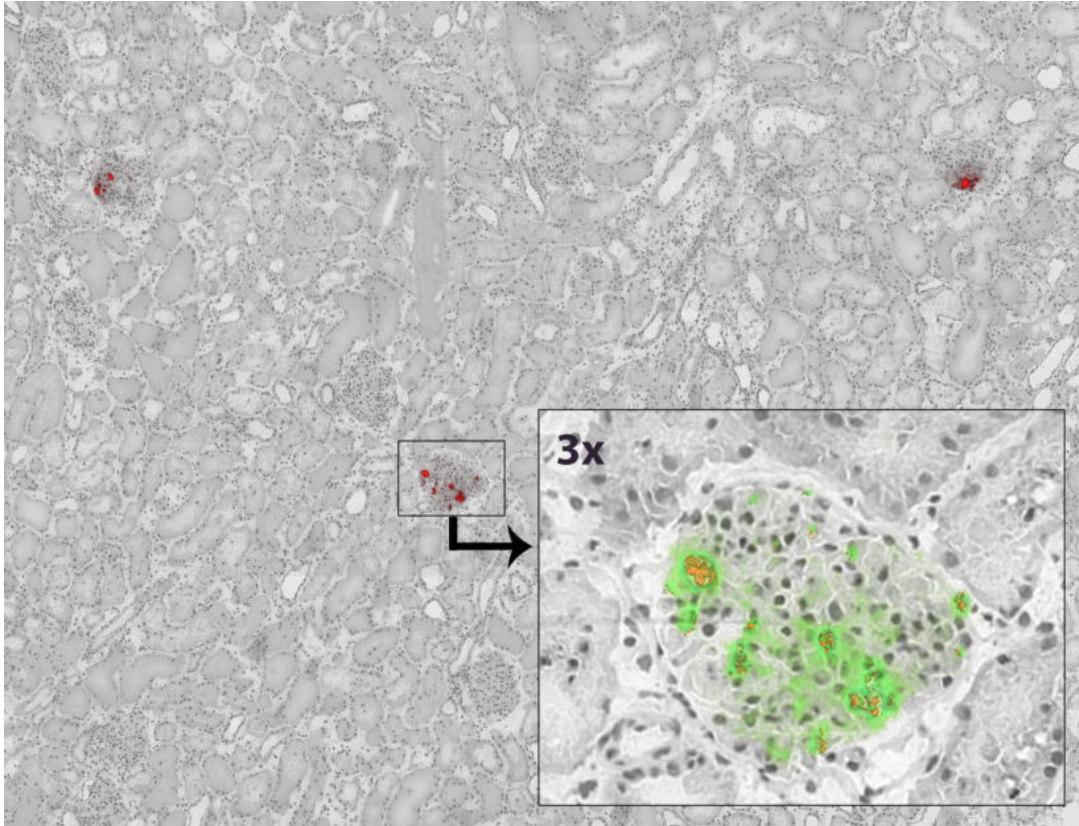
1. Betere orgaanpreservatie
2. Orgaanbeoordeling
3. Orgaanverbetering



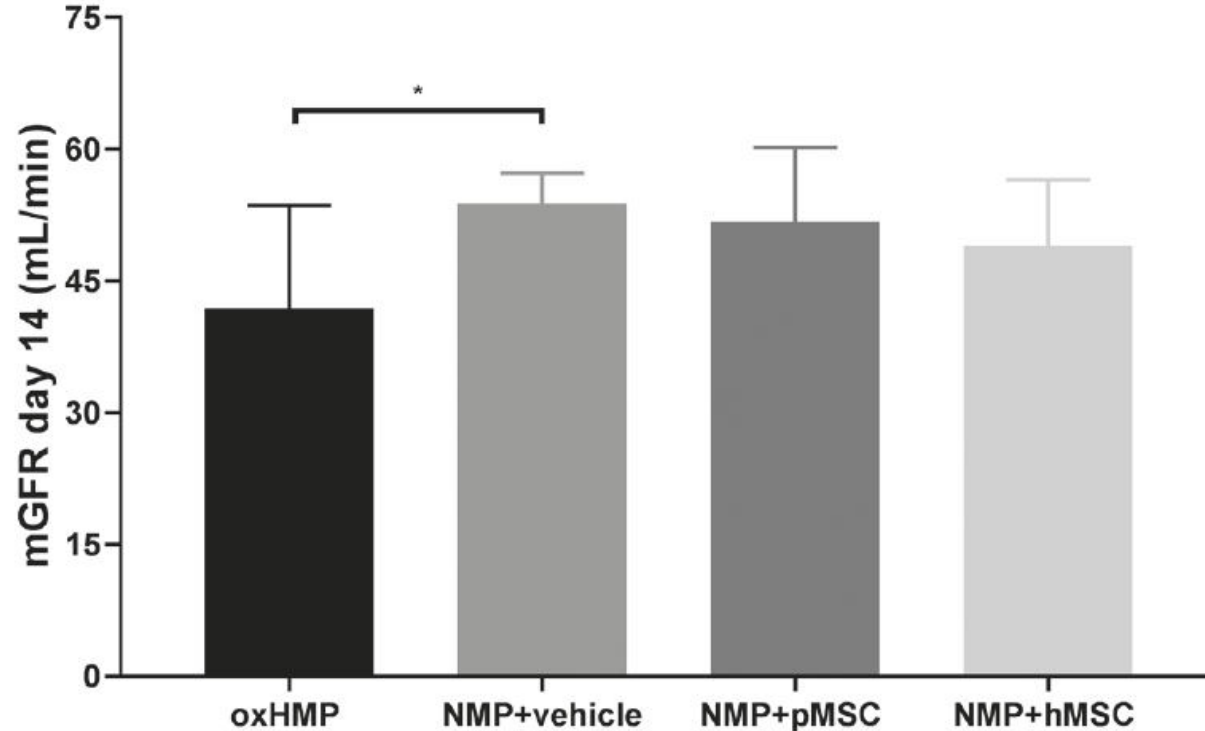
Orgaanverbetering tijdens perfusie



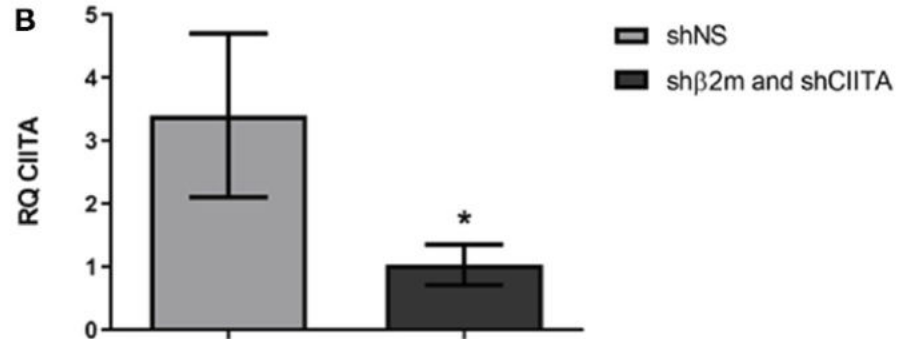
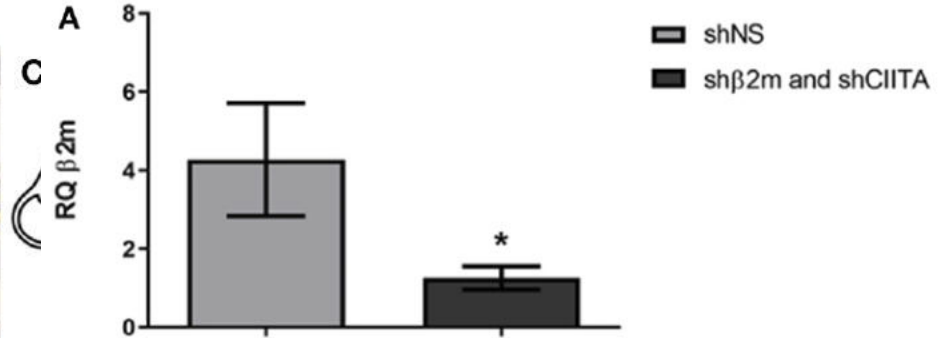
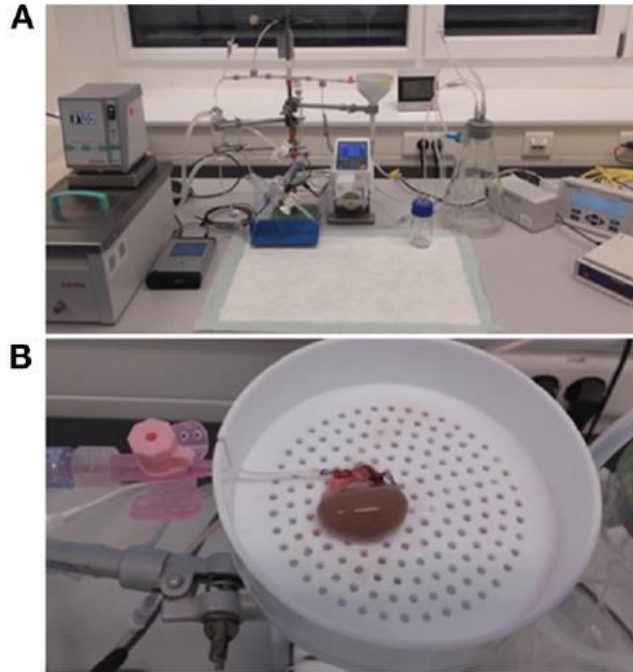
Orgaanverbetering tijdens perfusie



Orgaanverbetering tijdens perfusie



Orgaanverbetering tijdens perfusie





Waarom ik?

Waarom **nu**?

donor

orgaanpreservatie & transport

ontvanger



Doelen van machineperfusie

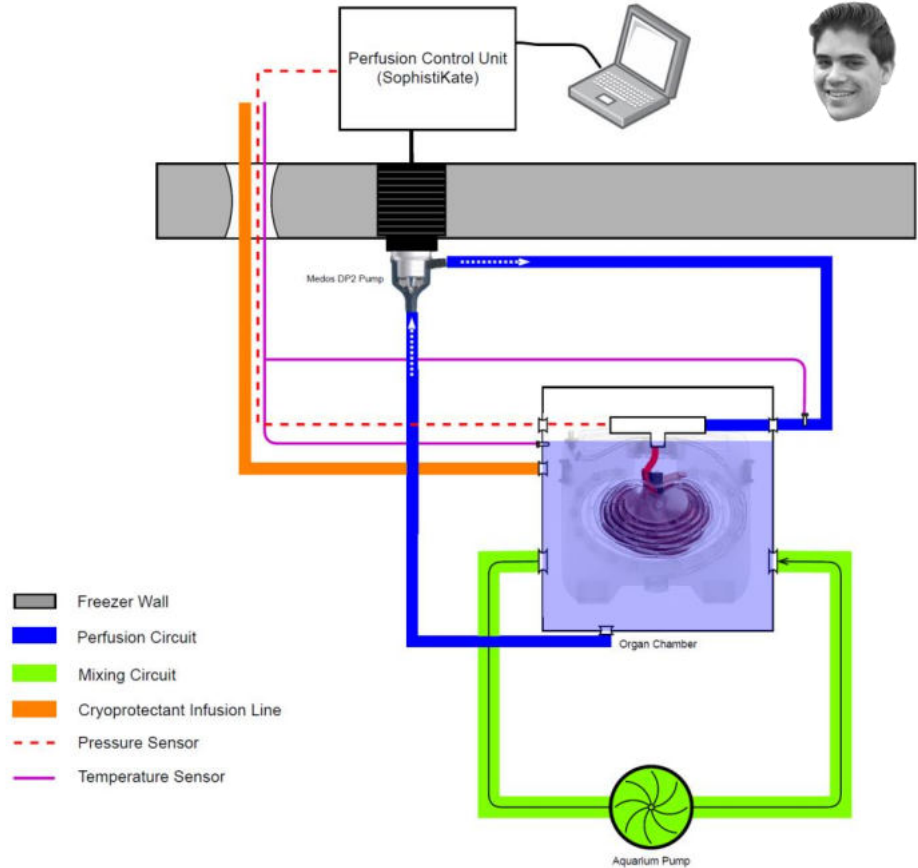
1. Betere orgaanpreservatie
2. Orgaanbeoordeling
3. Orgaanverbetering
4. Langere orgaanpreservatie
 - 24h perfusie
 - Organ banking



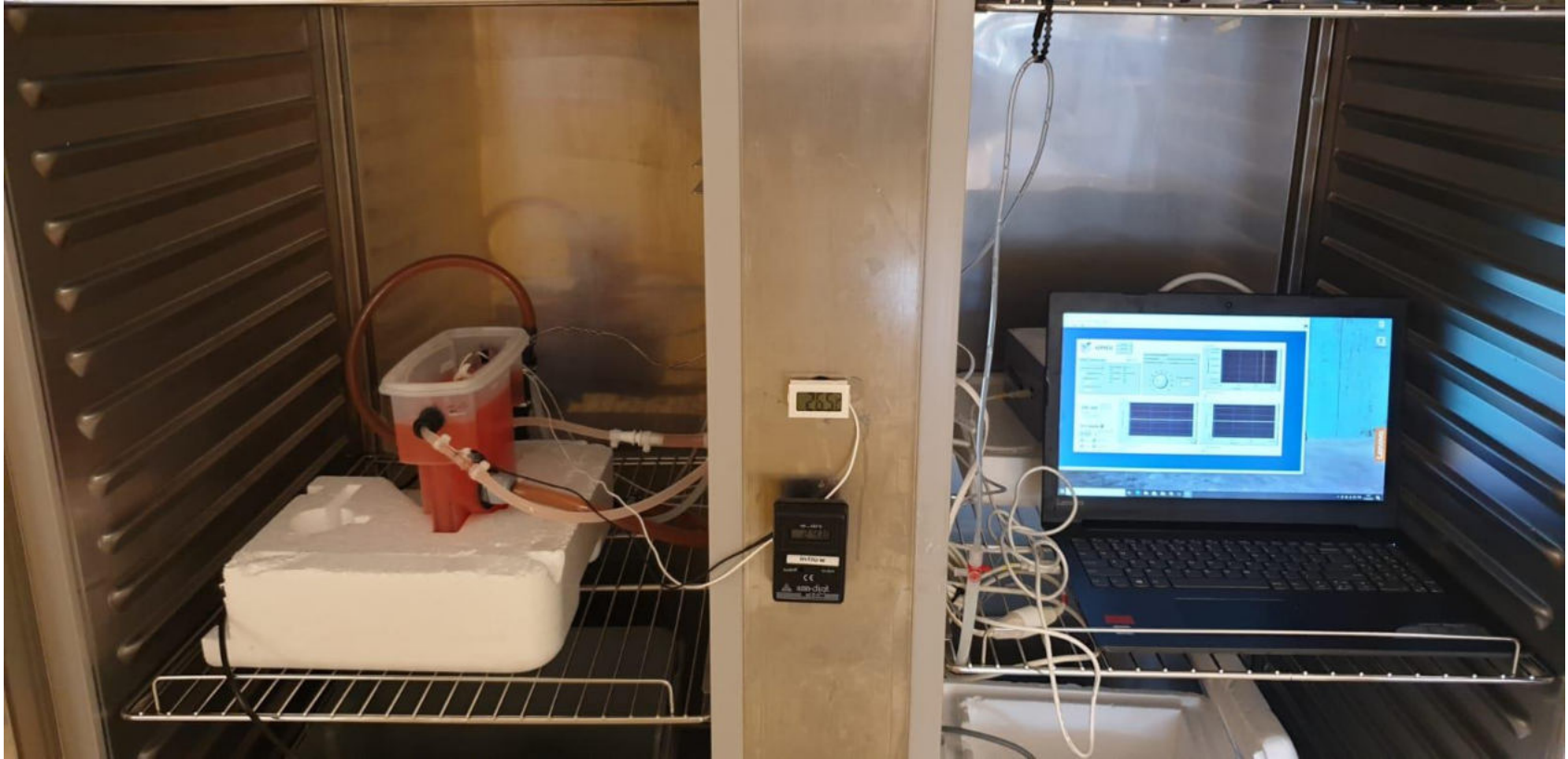


Cryoperfusie

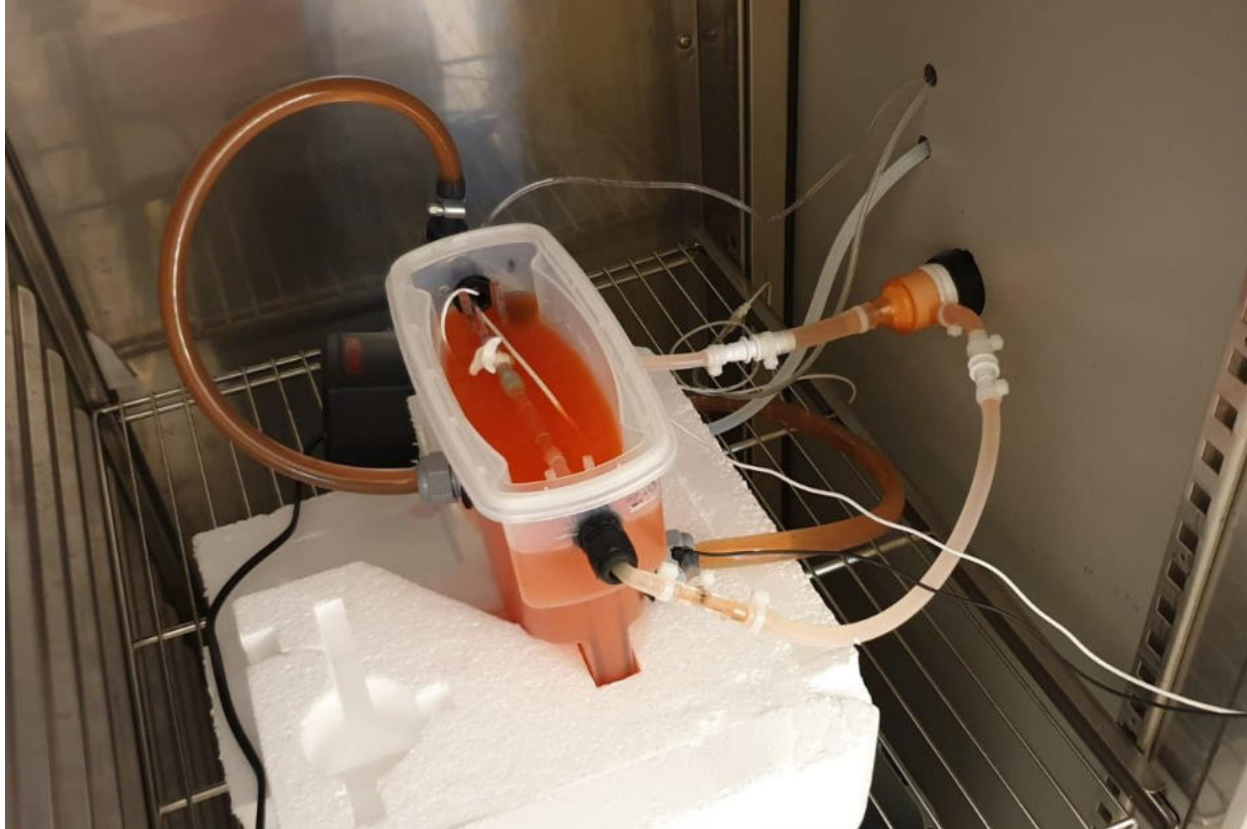
Cryoperfusie van donornieren



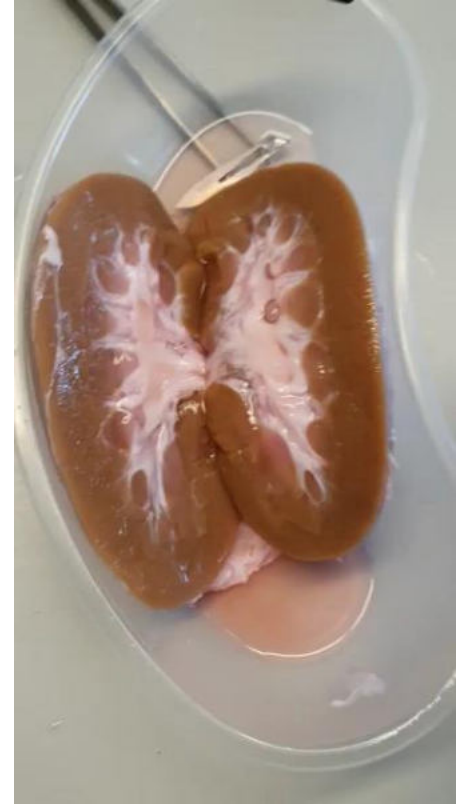
Cryoperfusie van donornieren



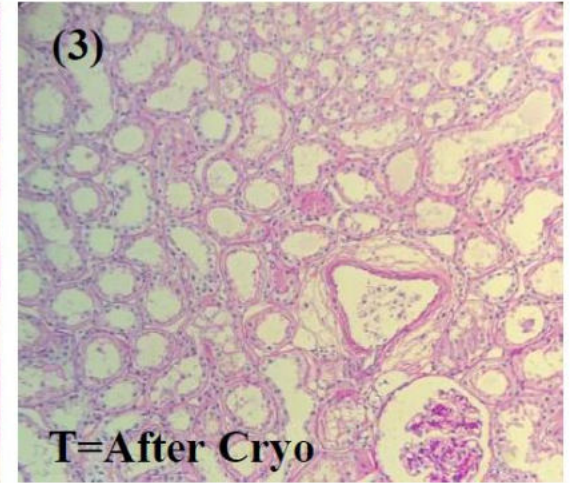
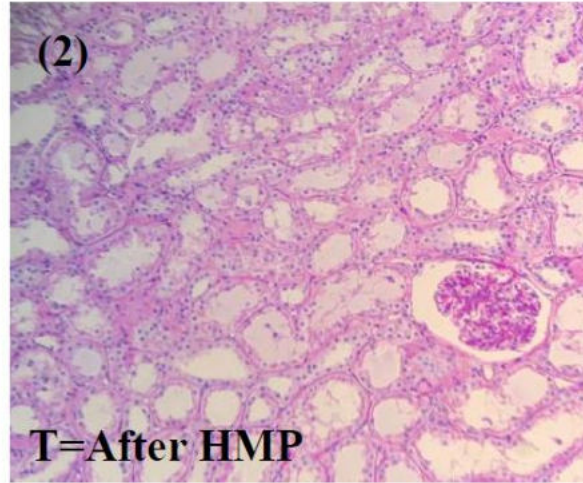
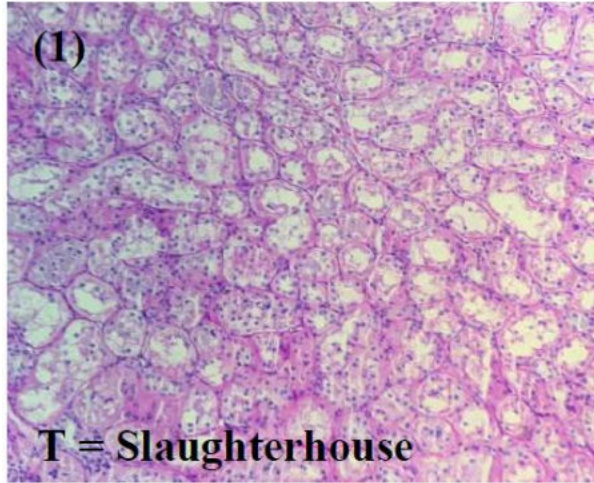
Cryoperfusie van donornieren



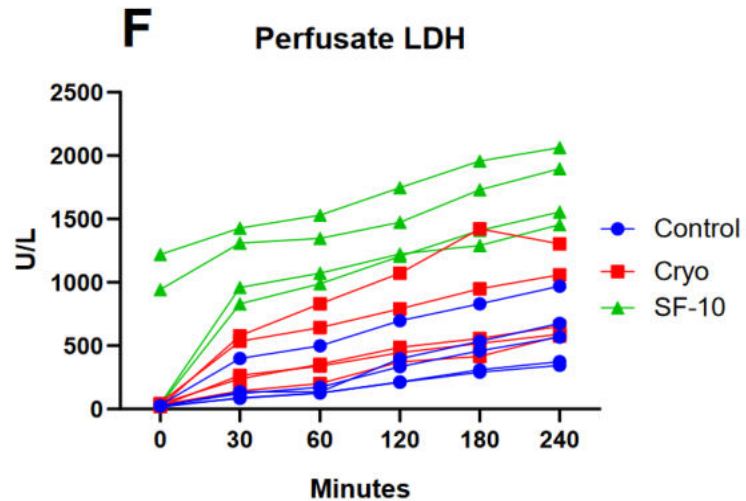
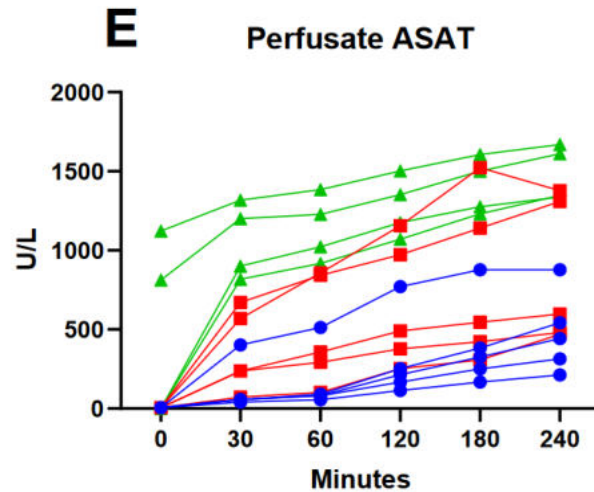
Cryoperfusie van donornieren



Cryoperfusie van donornieren



Cryoperfusie van donornieren





Van donor naar nier-ontvanger in 2065

