



Universitair Medisch Centrum
Utrecht

High Precision Instrumentation and Imaging

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University Medical Center Utrecht*

*Chief Scientific Officer
Center for Translational Molecular Medicine*

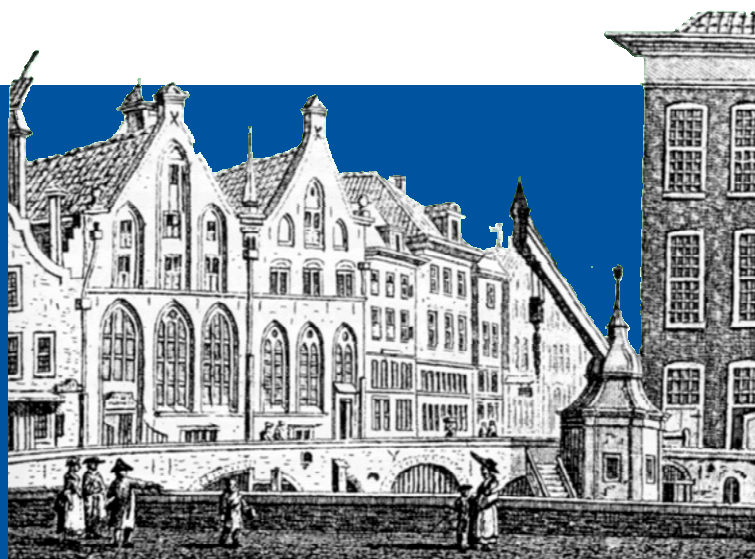
The Netherlands



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University of Utrecht
1636

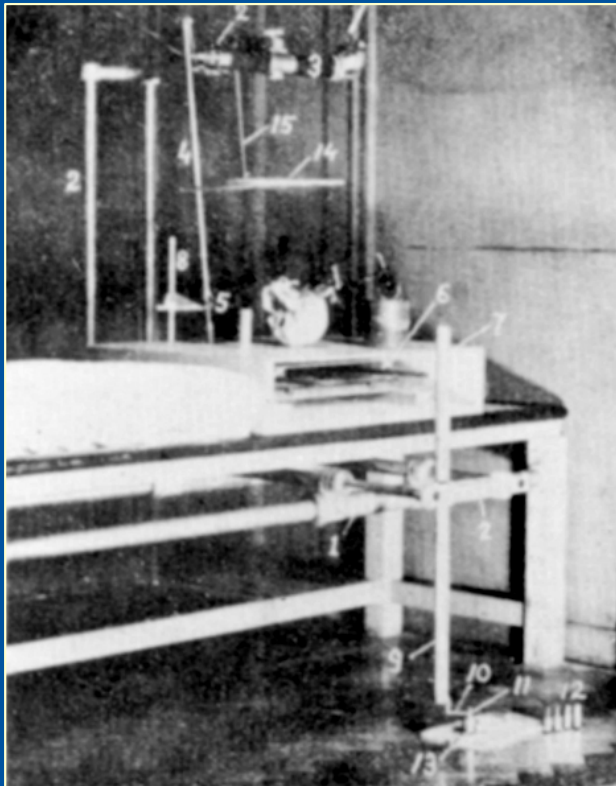
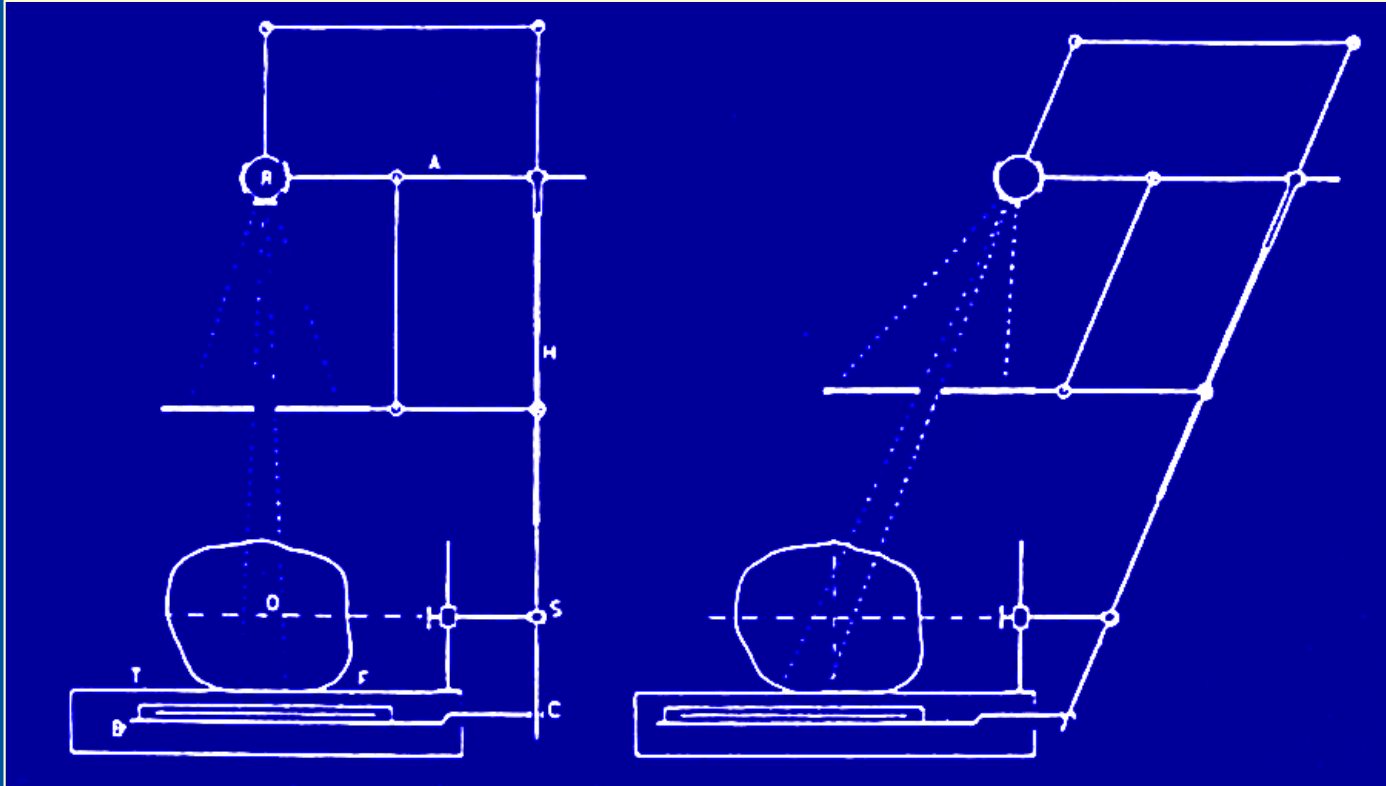


Academic Medical Center
1817



University Medical Center
2000

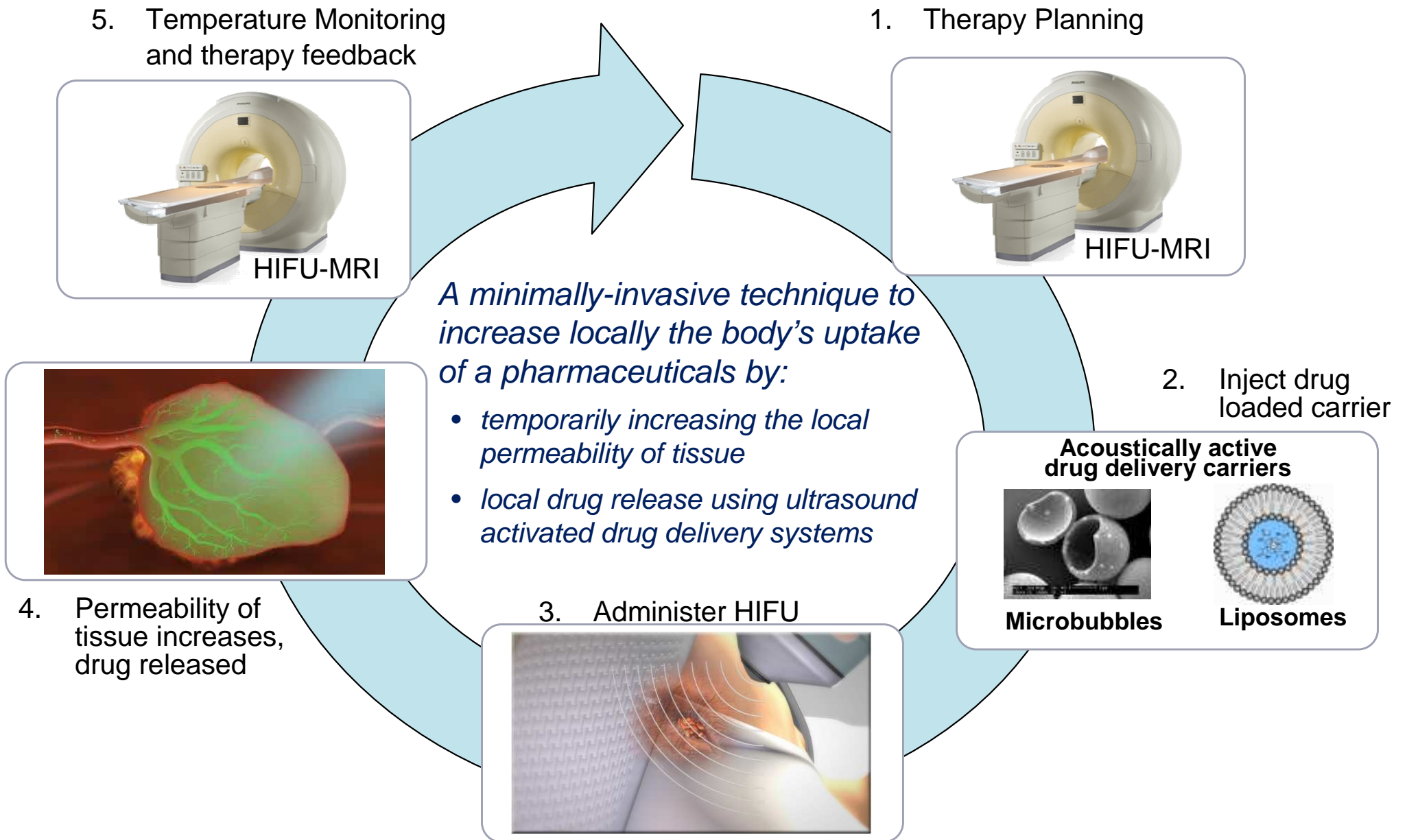
Medical Imaging Utrecht



1921: Discovery tomography by Bernard Ziedses des Plantes
(1^e-year medical student)

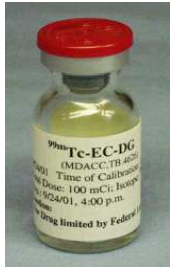
Ultrasound-Mediated Tissue Ablation and Drug Delivery **VOLTA**

Towards minimally-invasive, personalized therapy

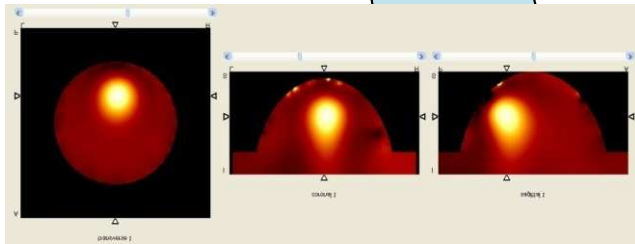


Optical Breast Imaging (NIR)

Molecular Imaging using (targeted) fluorescence probes



Target selection: HER-2, EGFR, CAIX, ...)



Fluorescence

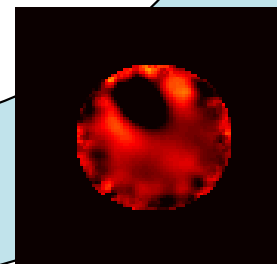
Breast Imaging



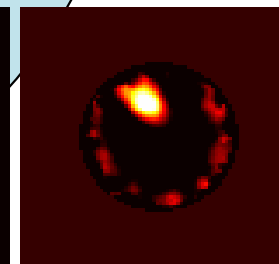
3D Optical Tomography



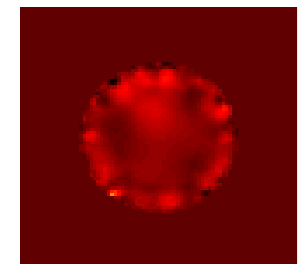
Early detection and specification of breast lesions by (NIR) optical Tomography:



Blood



Water

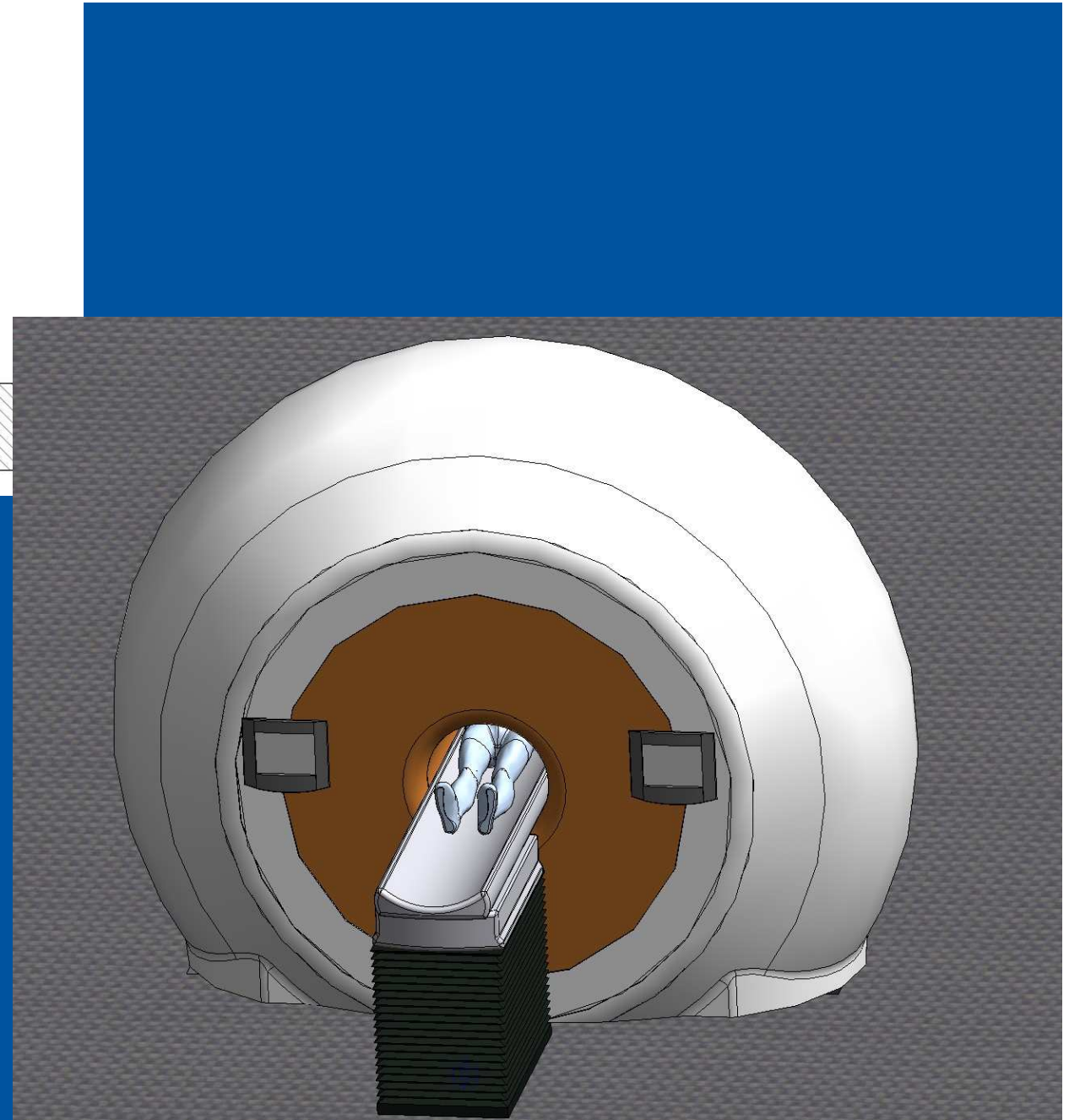
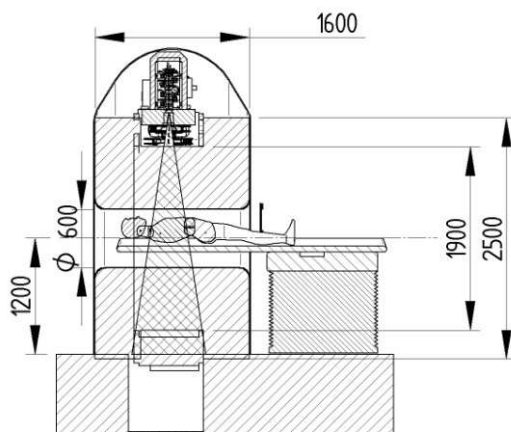
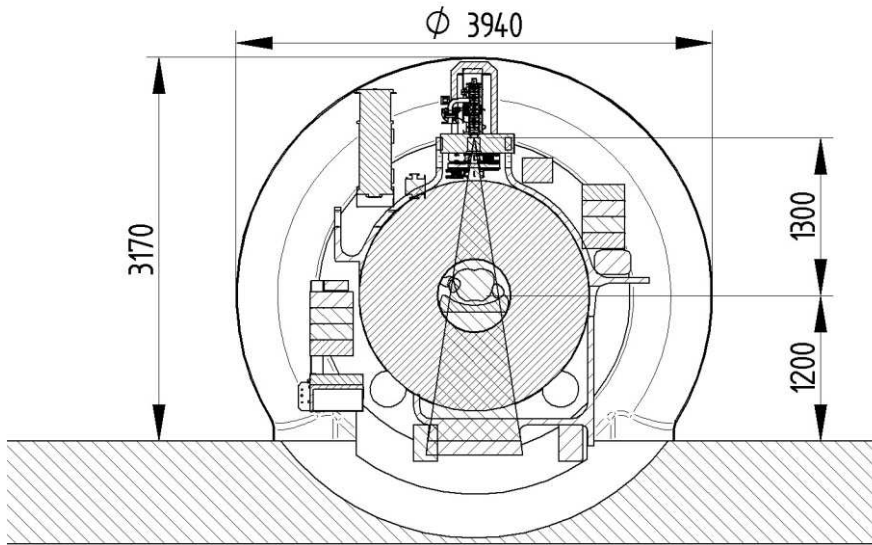


Lipid

Image guided Radiotherapy: MRI accelerator combination



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Jan Lagendijk

Image guided radio-embolisation Holmium microspheres



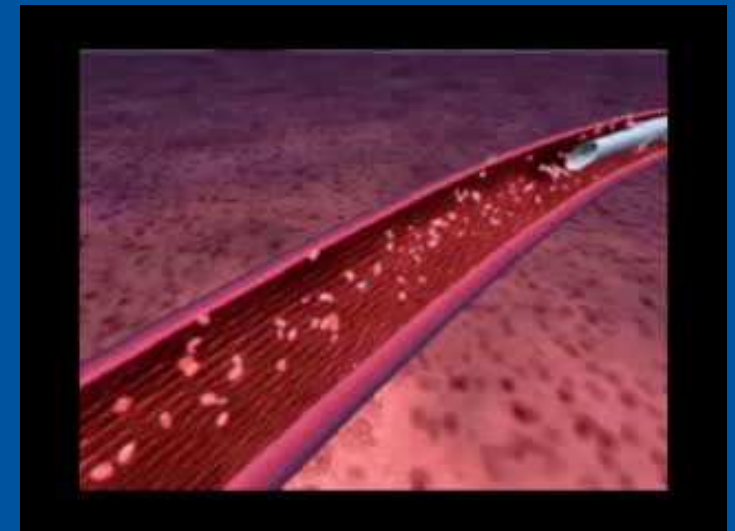
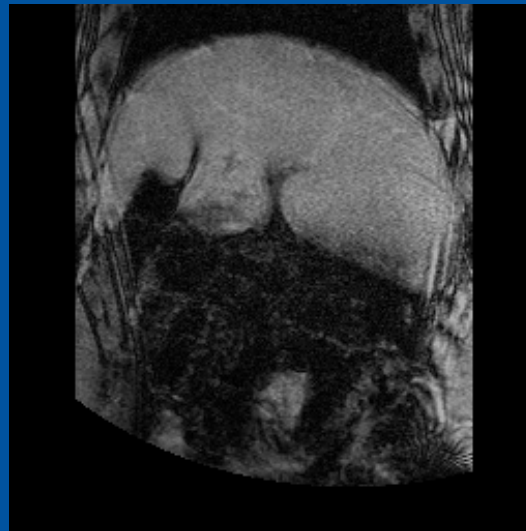
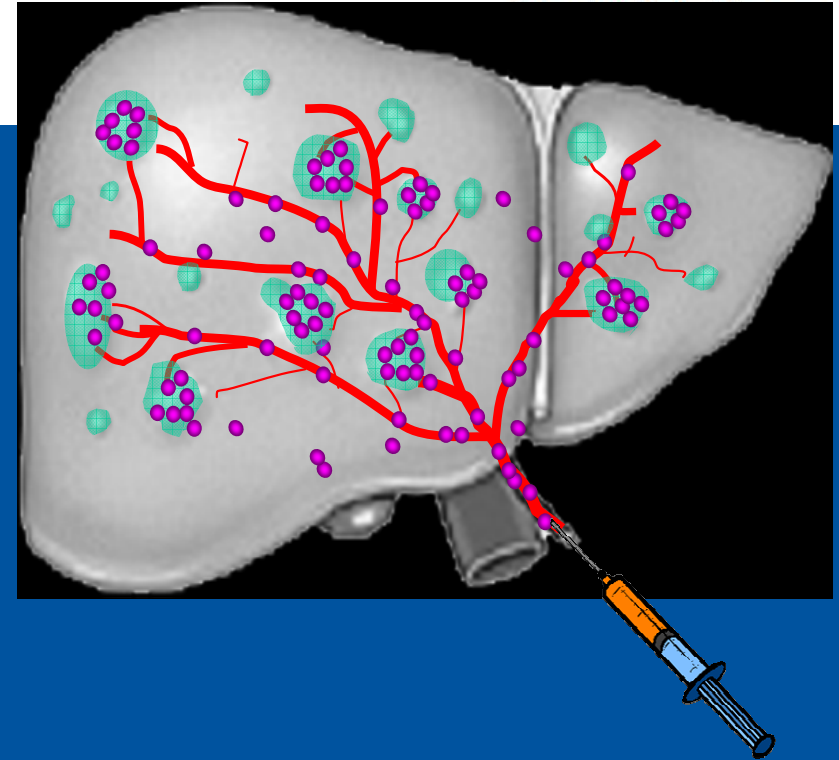
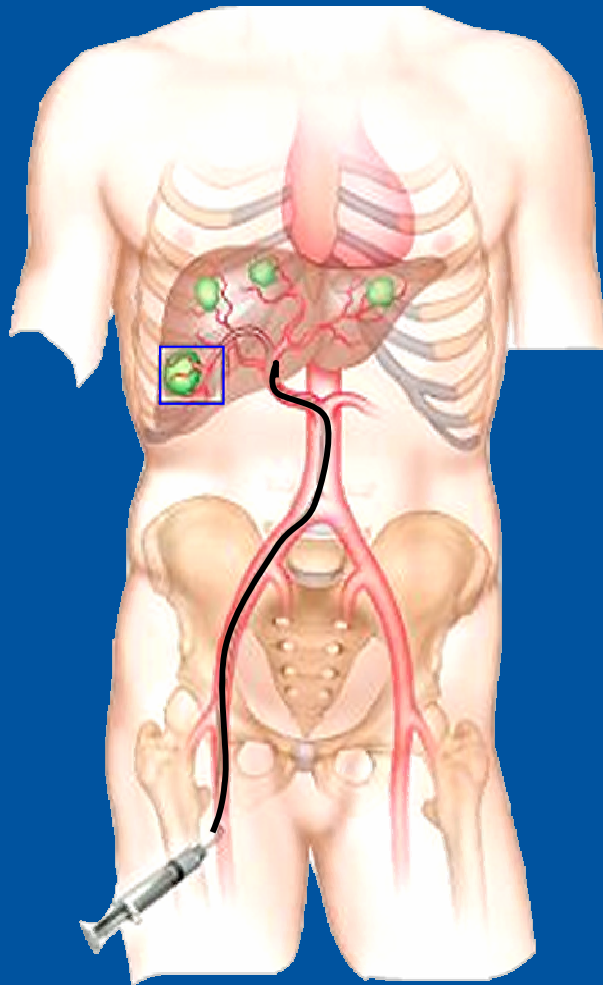
Holmium-166

$T_{1/2} = 1.1$ days

1.84 MeV β -max

8 mm tissue range

γ -imaging



Whole body 7T system



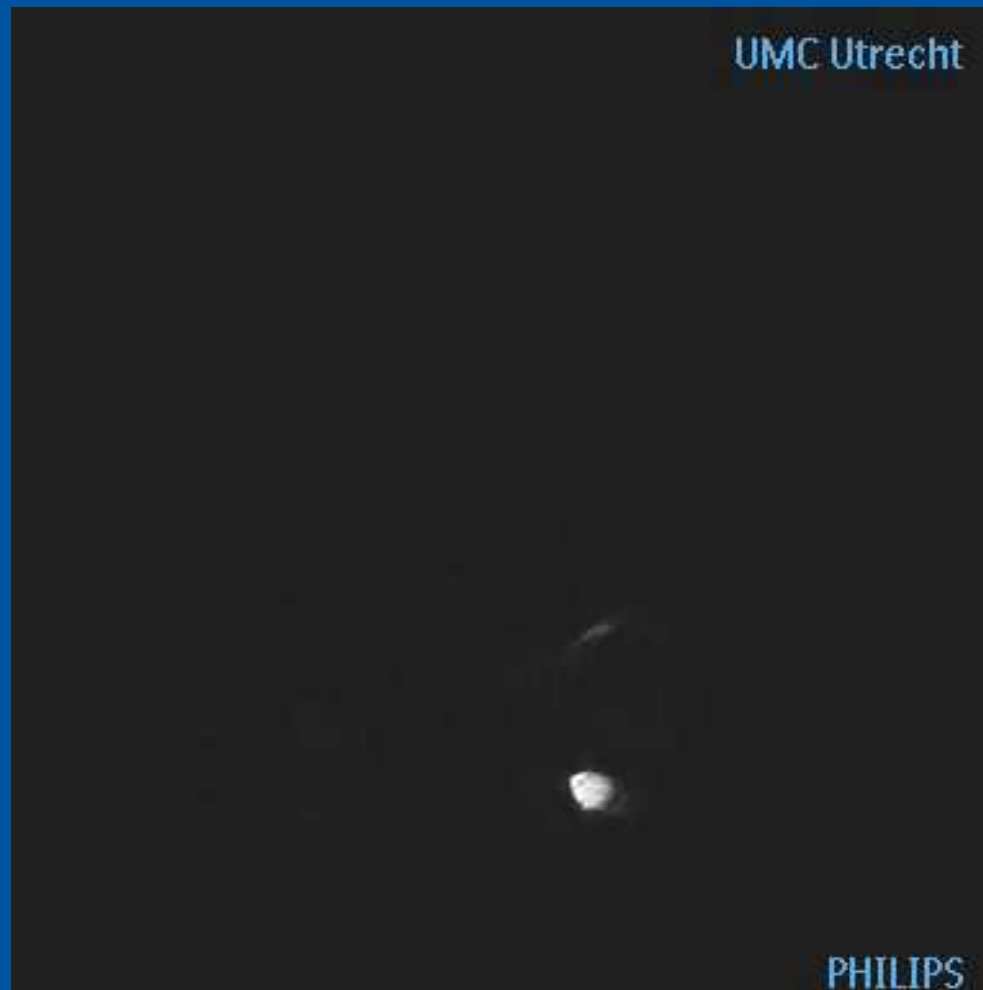
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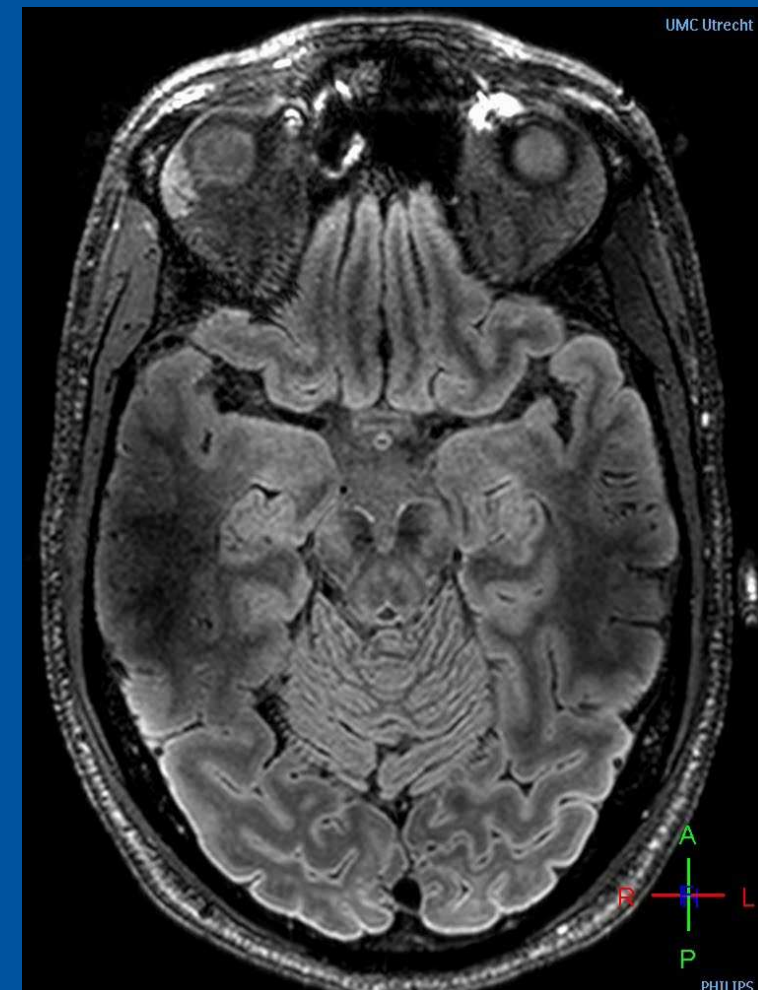
December 4th, 2007

High resolution & different contrast

Image contrast: T1 weighted & FLAIR



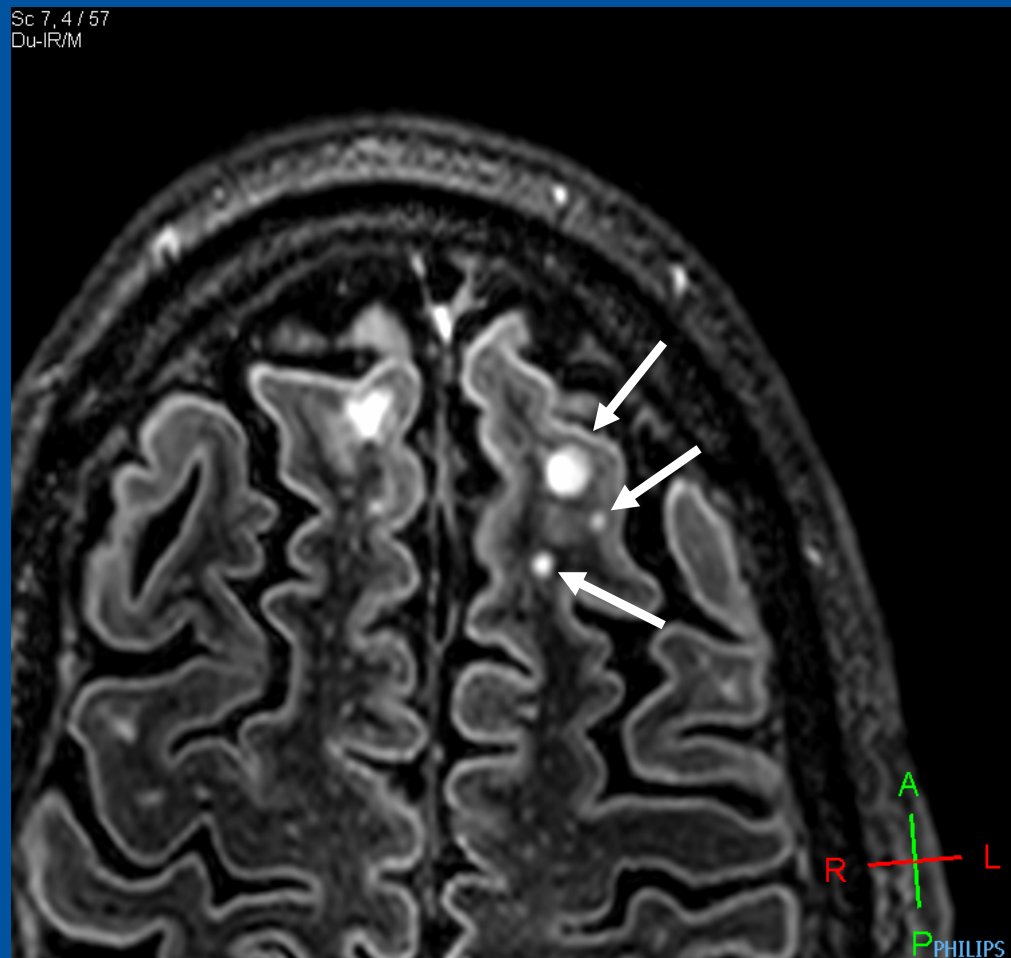
3D TFE T1 0.8x0.8x0.8 mm³



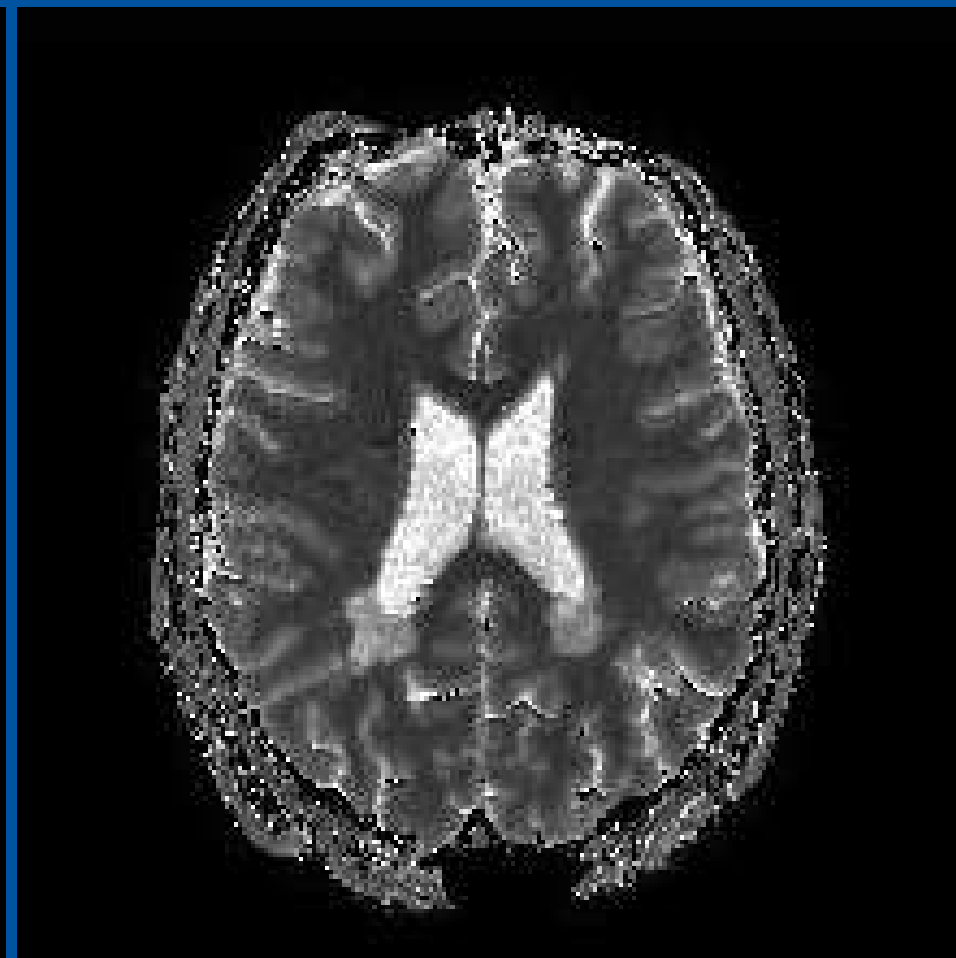
3D FLAIR 0.8x0.8x0.8 mm³

Case: MS patient

Detection of cortical and sub-cortical lesions



Magnetization Prepared DIR



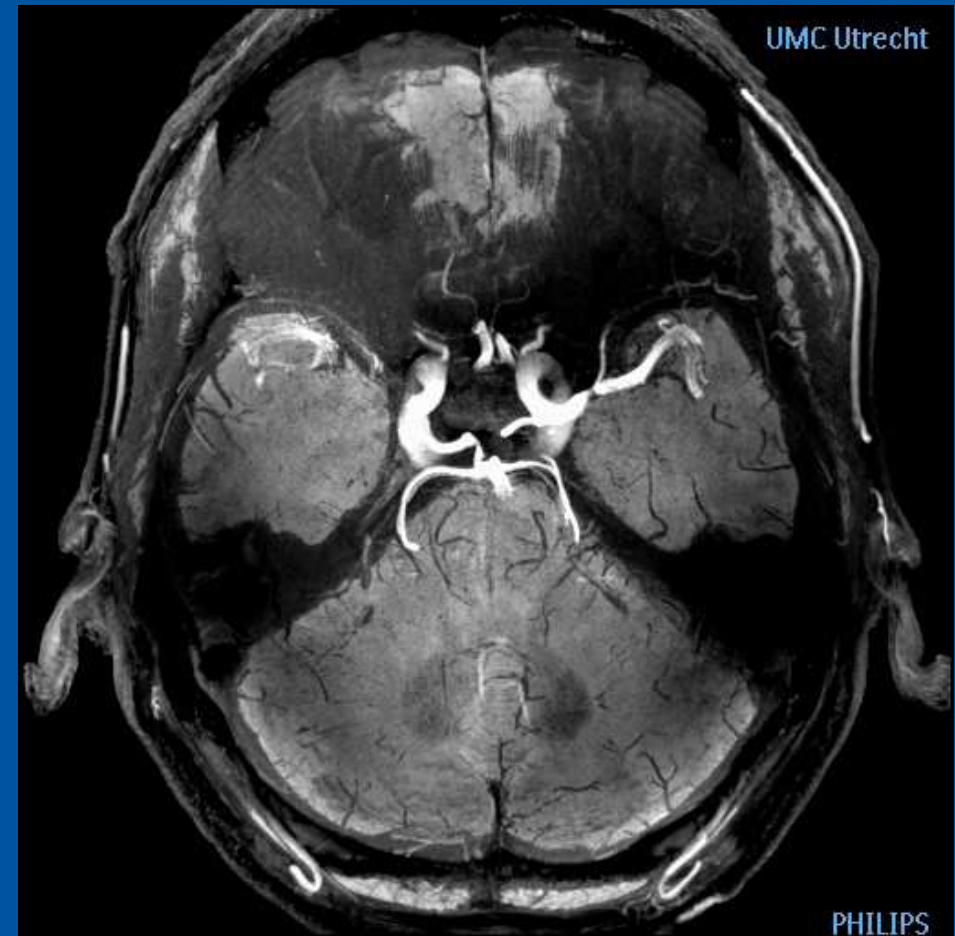
Quantified T1

Combining contrast

Image contrast: arteries & veins

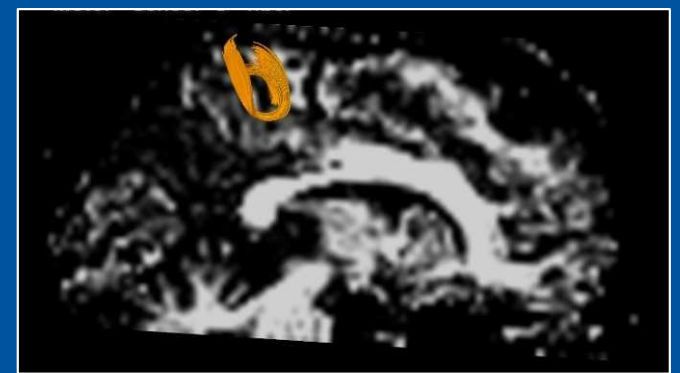
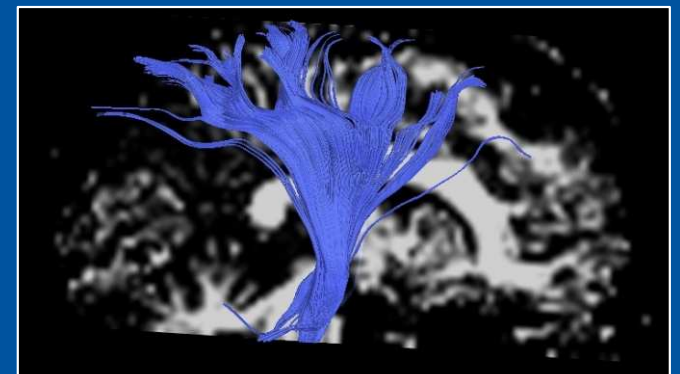
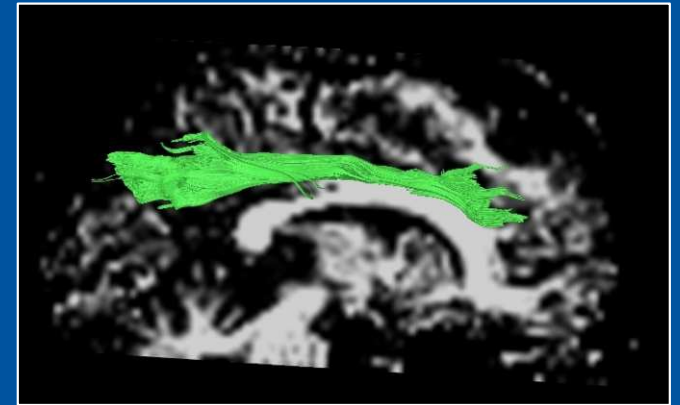
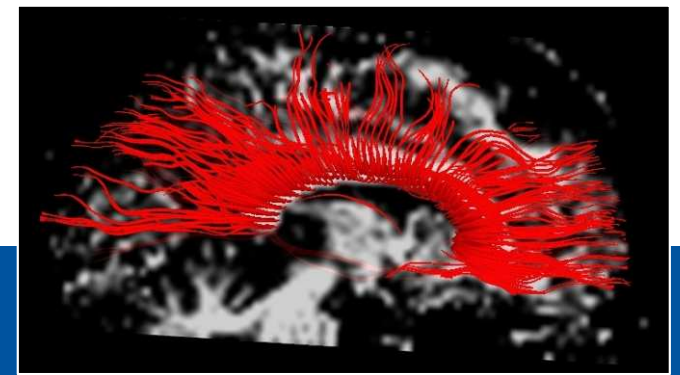
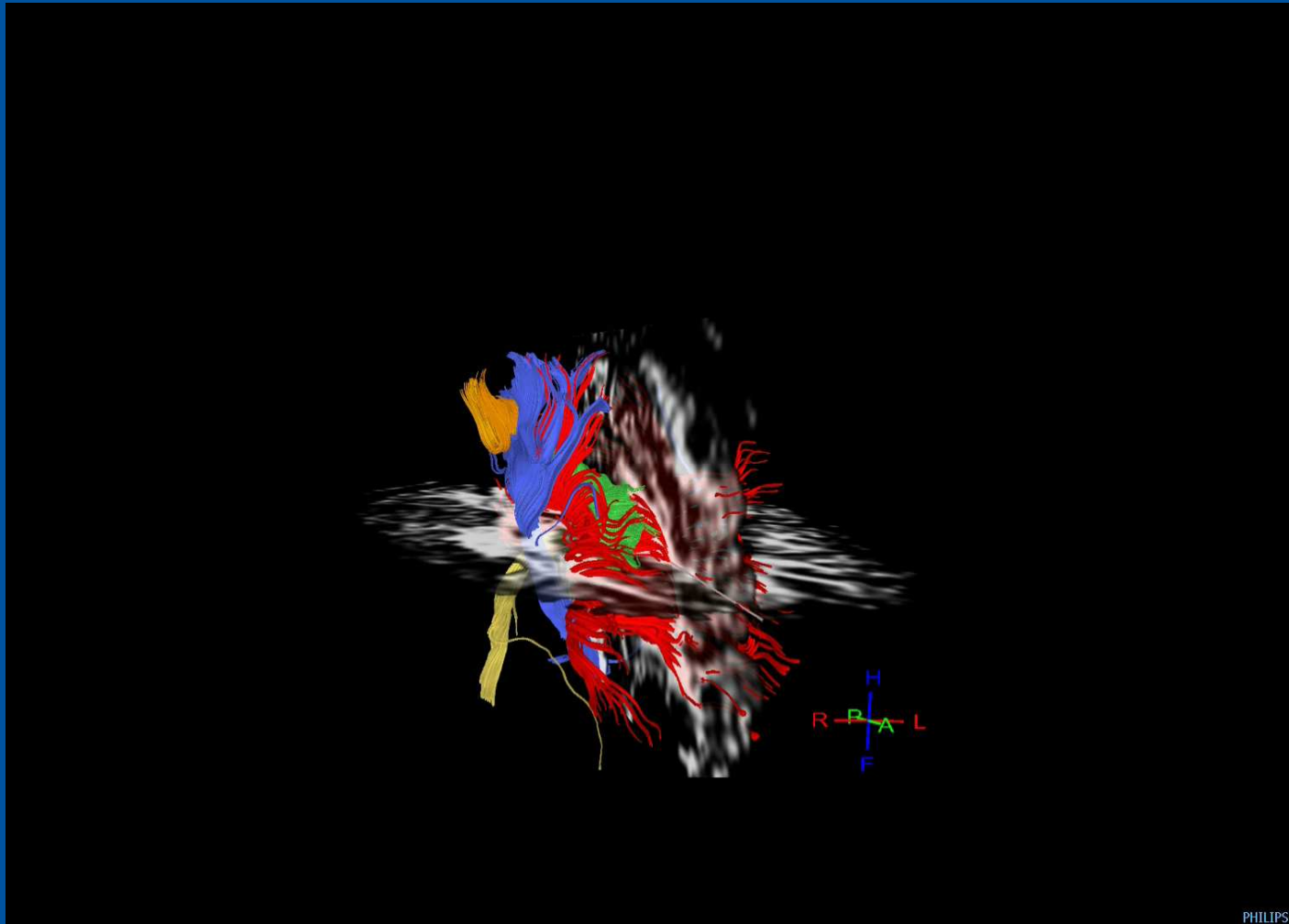


Inflow Angio (separate scans 2x10 min)

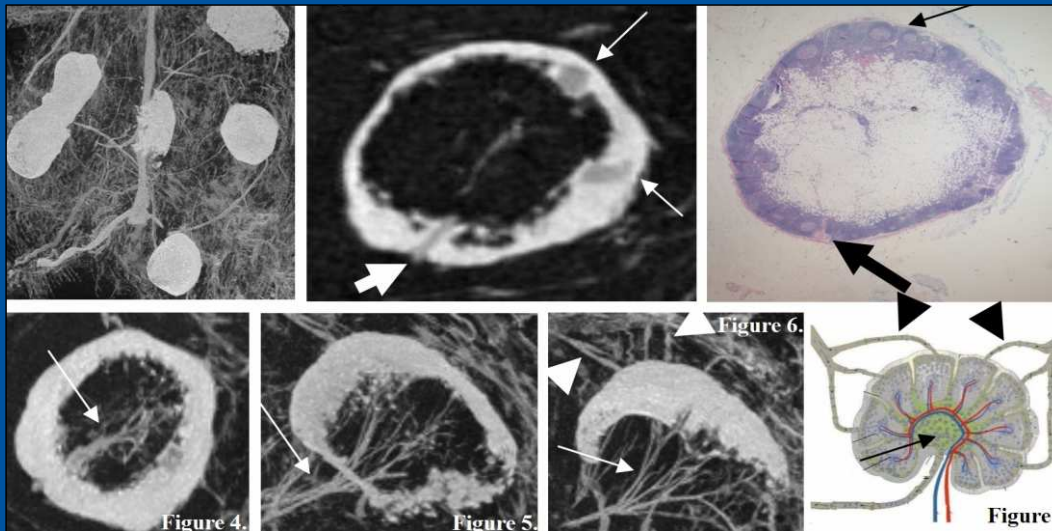


Inflow Angio (dual echo 9 min)

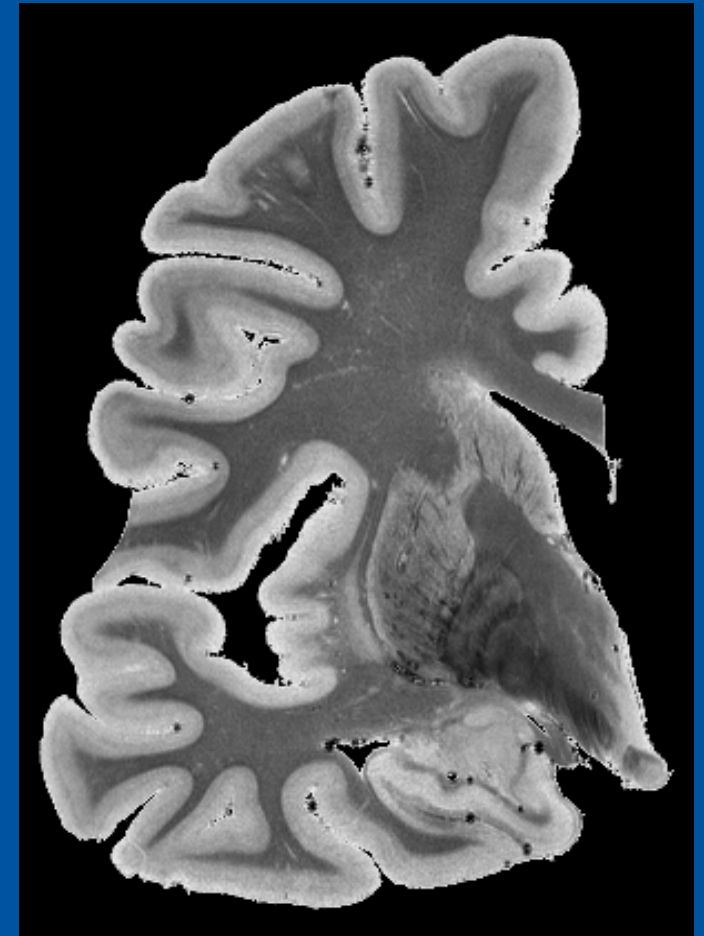
Fiber tracking



High resolution lymph nodes



180 x 180 x 180 μm^3

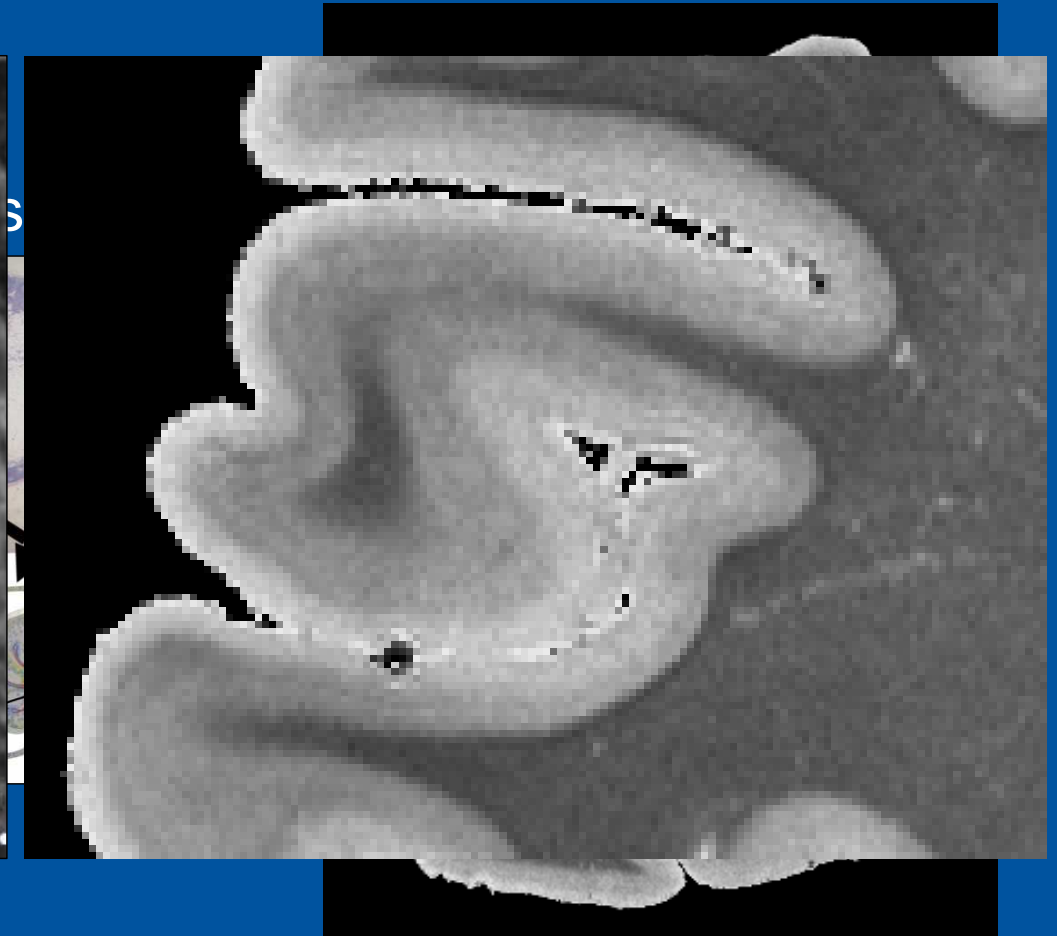
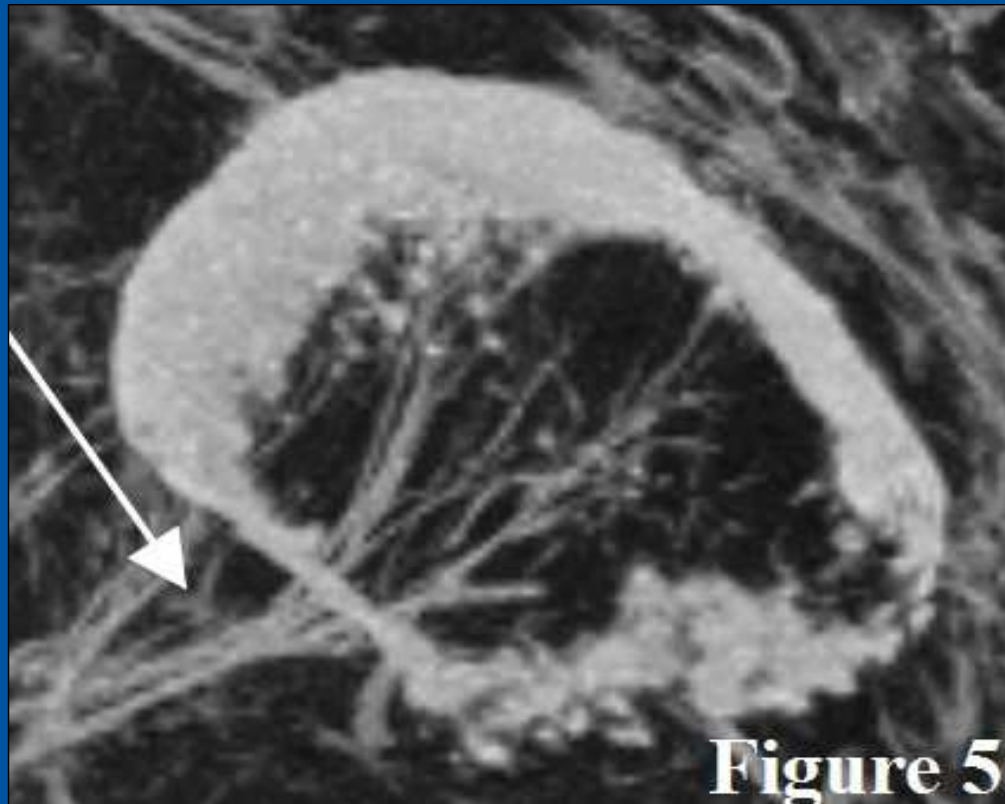


T2* map brain
210 x 210 x 400 μm^3

MR Pathology



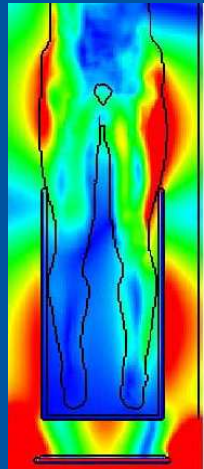
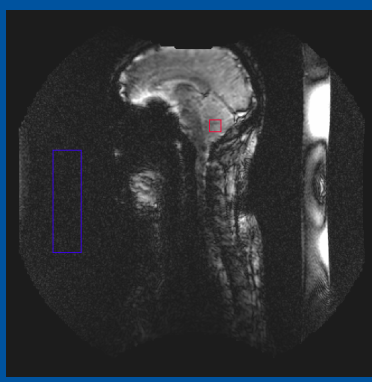
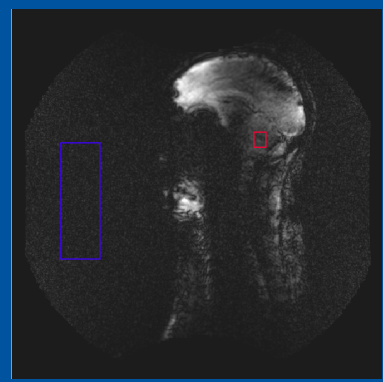
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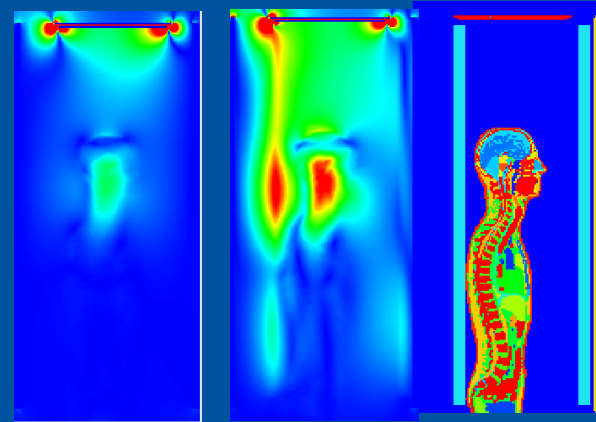
T2* map brain
210 x 210 x 400 μm^3



Ultra High Field MRI Technology Development



screening RF



Guiding RF



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UMC Utrecht - Radiology

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Ruud de Boer
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Brian Welch et al.

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Ohio State University

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