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\\RESEARCH
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FMRIB Developer
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\\RESEARCH\FMRIB Developer\Tom Okell\PCASL\_standard\_protocols\localiser\_3plane \*

TA: 0:14 PM: REF Voxel size: 0.5×0.5×7.0 mmPAT: Off Rel. SNR: 1.00 : fl

**Properties**

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	On
Load images to graphic segments	On
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	On
Wait for user to start	Off
Start measurements	Single measurement

**Routine**

Slice group	1
Slices	1
Dist. factor	20 %
Position	L0.0 A30.6 F4.8 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
Slice group	2
Slices	1
Dist. factor	20 %
Position	L0.0 A20.6 F4.8 mm
Orientation	Transversal
Phase enc. dir.	A >> P
Slice group	3
Slices	1
Dist. factor	20 %
Position	L0.0 A20.6 F4.8 mm
Orientation	Coronal
Phase enc. dir.	R >> L
AutoAlign	---
Phase oversampling	0 %
FoV read	250 mm
FoV phase	100.0 %
Slice thickness	7.0 mm
TR	8.6 ms
TE	4.00 ms
Averages	2
Concatenations	3
Filter	Normalize, Elliptical filter
Coil elements	HE1-4;NE1,2

**Contrast - Common**

TR	8.6 ms
TE	4.00 ms
TD	0 ms
MTC	Off
Magn. preparation	None
Flip angle	20 deg
Fat suppr.	None
Water suppr.	None
SWI	Off

**Contrast - Dynamic**

Averages	2
Averaging mode	Short term
Reconstruction	Magnitude
Measurements	1

**Contrast - Dynamic**

Multiple series	Each measurement
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**Resolution - Common**

FoV read	250 mm
FoV phase	100.0 %
Slice thickness	7.0 mm
Base resolution	256
Phase resolution	91 %
Phase partial Fourier	Off
Interpolation	On

**Resolution - iPAT**

PAT mode	None
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**Resolution - Filter Image**

Image Filter	Off
Distortion Corr.	Off
Prescan Normalize	Off
Normalize	On
B1 filter	Off

**Resolution - Filter Rawdata**

Raw filter	Off
Elliptical filter	On

**Geometry - Common**

Slice group	1
Slices	1
Dist. factor	20 %
Position	L0.0 A30.6 F4.8 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
Slice group	2
Slices	1
Dist. factor	20 %
Position	L0.0 A20.6 F4.8 mm
Orientation	Transversal
Phase enc. dir.	A >> P
Slice group	3
Slices	1
Dist. factor	20 %
Position	L0.0 A20.6 F4.8 mm
Orientation	Coronal
Phase enc. dir.	R >> L
FoV read	250 mm
FoV phase	100.0 %
Slice thickness	7.0 mm
TR	8.6 ms
Multi-slice mode	Sequential
Series	Interleaved
Concatenations	3

**Geometry - AutoAlign**

Slice group	1
Position	L0.0 A30.6 F4.8 mm
Orientation	Sagittal
Phase enc. dir.	A >> P
Slice group	2
Position	L0.0 A20.6 F4.8 mm
Orientation	Transversal

**Geometry - AutoAlign**

Phase enc. dir.	A >> P
Slice group	3
Position	L0.0 A20.6 F4.8 mm
Orientation	Coronal
Phase enc. dir.	R >> L
AutoAlign	---
Initial Position	L0.0 A30.6 F4.8
L	0.0 mm
A	30.6 mm
F	4.8 mm
Initial Rotation	0.00 deg
Initial Orientation	Sagittal

**Geometry - Saturation**

Saturation mode	Standard
Fat suppr.	None
Water suppr.	None
Special sat.	None

**Geometry - Tim Planning Suite**

Set-n-Go Protocol	Off
Table position	H
Table position	0 mm
Inline Composing	Off

**System - Miscellaneous**

Positioning mode	REF
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Adaptive Combine
Save uncombined	Off
Matrix Optimization	Off
AutoAlign	---
Coil Select Mode	On - AutoCoilSelect

**System - Adjustments**

B0 Shim mode	Tune up
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

**System - Adjust Volume**

Position	Isocenter
Orientation	Transversal
Rotation	0.00 deg
A >> P	263 mm
R >> L	350 mm
F >> H	350 mm
Reset	Off

**System - pTx Volumes**

B1 Shim mode	TrueForm
Excitation	Slice-sel.

**System - Tx/Rx**

Frequency 1H	123.255216 MHz
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**System - Tx/Rx**

Correction factor	1
Gain	High
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

**Physio - Signal1**

1st Signal/Mode	None
TR	8.6 ms
Concatenations	3
Segments	1

**Physio - Cardiac**

Tagging	None
Magn. preparation	None
Fat suppr.	None
Dark blood	Off
FoV read	250 mm
FoV phase	100.0 %
Phase resolution	91 %

**Physio - PACE**

Resp. control	Off
Concatenations	3

**Inline - Common**

Subtract	Off
Measurements	1
StdDev	Off
Liver registration	Off
Save original images	On

**Inline - MIP**

MIP-Sag	Off
MIP-Cor	Off
MIP-Tra	Off
MIP-Time	Off
Save original images	On

**Inline - Soft Tissue**

Wash - In	Off
Wash - Out	Off
TTP	Off
PEI	Off
MIP - time	Off
Measurements	1

**Inline - Composing**

Inline Composing	Off
Distortion Corr.	Off

**Sequence - Part 1**

Introduction	On
Dimension	2D
Phase stabilisation	Off
Asymmetric echo	Allowed
Contrasts	1
Flow comp.	No
Multi-slice mode	Sequential
Bandwidth	320 Hz/Px

**Sequence - Part 2**

Segments	1
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**Sequence - Part 2**

Acoustic noise reduction	None
RF pulse type	Normal
Gradient mode	Normal
Excitation	Slice-sel.
RF spoiling	On

**Sequence - Assistant**

Mode	Off
Allowed delay	0 s

\\RESEARCH\FMRIB Developer\Tom Okell\PCASL\_standard\_protocols\T1\_mprage\_ns\_sag\_p2\_iso\_1mm\_192 \*

TA: 6:17 PM: REF Voxel size: 1.0×1.0×1.0 mmPAT: 2 Rel. SNR: 1.00 : tfl

### Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	Off
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	On
Start measurements	Single measurement

### Routine

Slab group	1
Slabs	1
Dist. factor	50 %
Position	Isocenter
Orientation	Sagittal
Phase enc. dir.	A >> P
AutoAlign	Head > Brain
Phase oversampling	0 %
Slice oversampling	0.0 %
Slices per slab	192
FoV read	256 mm
FoV phase	100.0 %
Slice thickness	1.00 mm
TR	2250.0 ms
TE	4.11 ms
Averages	1
Concatenations	1
Filter	Prescan Normalize
Coil elements	HE1-4;NE1,2

### Contrast - Common

TR	2250.0 ms
TE	4.11 ms
Magn. preparation	Non-sel. IR
TI	925 ms
Flip angle	9 deg
Fat suppr.	None
Water suppr.	None

### Contrast - Dynamic

Averages	1
Averaging mode	Long term
Reconstruction	Magnitude
Measurements	1
Multiple series	Off

### Resolution - Common

FoV read	256 mm
FoV phase	100.0 %
Slice thickness	1.00 mm
Base resolution	256
Phase resolution	100 %
Slice resolution	100 %
Phase partial Fourier	Off
Slice partial Fourier	Off

### Resolution - Common

Interpolation	Off
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### Resolution - iPAT

PAT mode	GRAPPA
Accel. factor PE	2
Ref. lines PE	80
Accel. factor 3D	1
Reference scan mode	Integrated

### Resolution - Filter Image

Image Filter	Off
Distortion Corr.	Off
Prescan Normalize	On
Unfiltered images	Off
Normalize	Off
B1 filter	Off

### Resolution - Filter Rawdata

Raw filter	Off
Elliptical filter	Off

### Geometry - Common

Slab group	1
Slabs	1
Dist. factor	50 %
Position	Isocenter
Orientation	Sagittal
Phase enc. dir.	A >> P
Slice oversampling	0.0 %
Slices per slab	192
FoV read	256 mm
FoV phase	100.0 %
Slice thickness	1.00 mm
TR	2250.0 ms
Multi-slice mode	Single shot
Series	Ascending
Concatenations	1

### Geometry - AutoAlign

Slab group	1
Position	Isocenter
Orientation	Sagittal
Phase enc. dir.	A >> P
AutoAlign	Head > Brain
Initial Position	Isocenter
L	0.0 mm
P	0.0 mm
H	0.0 mm
Initial Rotation	0.00 deg
Initial Orientation	Transversal

### Geometry - Navigator

### Geometry - Tim Planning Suite

Set-n-Go Protocol	Off
Table position	H
Table position	0 mm
Inline Composing	Off

**System - Miscellaneous**

Positioning mode	REF
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Adaptive Combine
Save uncombined	Off
Matrix Optimization	Off
AutoAlign	Head > Brain
Coil Select Mode	On - Coil Memory

**System - Adjustments**

B0 Shim mode	Standard
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

**System - Adjust Volume**

Position	Isocenter
Orientation	Sagittal
Rotation	0.00 deg
A >> P	256 mm
F >> H	256 mm
R >> L	192 mm
Reset	Off

**System - pTx Volumes**

B1 Shim mode	TrueForm
Excitation	Non-sel.

**System - Tx/Rx**

Frequency 1H	123.255216 MHz
Correction factor	1
Gain	Low
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

**Physio - Signal1**

1st Signal/Mode	None
TR	2250.0 ms
Concatenations	1

**Physio - Cardiac**

Magn. preparation	Non-sel. IR
TI	925 ms
Fat suppr.	None
Dark blood	Off
FoV read	256 mm
FoV phase	100.0 %
Phase resolution	100 %

**Physio - PACE**

Resp. control	Off
Concatenations	1

**Inline - Common**

Subtract	Off
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**Inline - Common**

Measurements	1
StdDev	Off
Save original images	On

**Inline - MIP**

MIP-Sag	Off
MIP-Cor	Off
MIP-Tra	Off
MIP-Time	Off
Save original images	On

**Inline - Composing**

Inline Composing	Off
Distortion Corr.	Off

**Sequence - Part 1**

Introduction	On
Dimension	3D
Elliptical scanning	Off
Reordering	Linear
Asymmetric echo	Off
Flow comp.	No
Multi-slice mode	Single shot
Echo spacing	9.3 ms
Bandwidth	150 Hz/Px

**Sequence - Part 2**

RF pulse type	Normal
Gradient mode	Fast*
Excitation	Non-sel.
RF spoiling	On
Incr. Gradient spoiling	Off
Turbo factor	192

**Sequence - Assistant**

Mode	Off
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\\RESEARCH\FMRIB Developer\Tom Okell\PCASL\_standard\_protocols\TOF\_3D\_neck \*

TA: 0:42 PM: REF Voxel size: 0.3×0.3×1.3 mmPAT: 3 Rel. SNR: 1.00 : fl\_r

**Properties**

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	On
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	Off
Start measurements	Single measurement

**Routine**

Slab group	1
Slabs	1
Dist. factor	-50.00 %
Position	R1.8 A29.4 F69.6 mm
Orientation	Transversal
Phase enc. dir.	R >> L
AutoAlign	---
Phase oversampling	0 %
Slice oversampling	20.0 %
Slices per slab	40
FoV read	200 mm
FoV phase	76.9 %
Slice thickness	1.30 mm
TR	21.0 ms
TE	3.43 ms
Averages	1
Concatenations	1
Filter	Normalize
Coil elements	HE1-4;NE1,2

**Contrast - Common**

TR	21.0 ms
TE	3.43 ms
MTC	Off
Flip angle	30 deg
Fat suppr.	None
Water suppr.	None

**Contrast - Dynamic**

Averages	1
Averaging mode	Short term
Reconstruction	Magnitude
Measurements	1

**Resolution - Common**

FoV read	200 mm
FoV phase	76.9 %
Slice thickness	1.30 mm
Base resolution	320
Phase resolution	95 %
Slice resolution	50 %
Phase partial Fourier	6/8
Slice partial Fourier	7/8
Interpolation	On

**Resolution - iPAT**

PAT mode	GRAPPA
Accel. factor PE	3
Ref. lines PE	32
Accel. factor 3D	1
Reference scan mode	Integrated

**Resolution - Filter Image**

Image Filter	Off
Distortion Corr.	Off
Prescan Normalize	Off
Normalize	On
B1 filter	Off

**Resolution - Filter Rawdata**

Raw filter	Off
Elliptical filter	Off
POCS	Off

**Geometry - Common**

Slab group	1
Slabs	1
Dist. factor	-50.00 %
Position	R1.8 A29.4 F69.6 mm
Orientation	Transversal
Phase enc. dir.	R >> L
Slice oversampling	20.0 %
Slices per slab	40
FoV read	200 mm
FoV phase	76.9 %
Slice thickness	1.30 mm
TR	21.0 ms
Multi-slice mode	Sequential
Series	Descending
Concatenations	1

**Geometry - AutoAlign**

Slab group	1
Position	R1.8 A29.4 F69.6 mm
Orientation	Transversal
Phase enc. dir.	R >> L
AutoAlign	---
Initial Position	R1.8 A29.4 F69.6
R	1.8 mm
A	29.4 mm
F	69.6 mm
Initial Rotation	90.00 deg
Initial Orientation	Transversal

**Geometry - Saturation**

Fat suppr.	None
Water suppr.	None
Special sat.	Tracking H
Gap	10 mm
Thickness	40 mm

**Geometry - Tim Planning Suite**

Set-n-Go Protocol	Off
Table position	H
Table position	0 mm
Inline Composing	Off

**System - Miscellaneous**

Positioning mode	REF
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Sum of Squares
Save uncombined	Off
Matrix Optimization	Off
AutoAlign	---
Coil Select Mode	Off - AutoCoilSelect

**System - Adjustments**

B0 Shim mode	Tune up
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

**System - Adjust Volume**

Position	Isocenter
Orientation	Transversal
Rotation	0.00 deg
A >> P	263 mm
R >> L	350 mm
F >> H	350 mm
Reset	Off

**System - pTx Volumes**

B1 Shim mode	TrueForm
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**System - Tx/Rx**

Frequency 1H	123.255216 MHz
Correction factor	1
Gain	Low
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

**Physio - Signal1**

1st Signal/Mode	None
TR	21.0 ms
Concatenations	1

**Physio - Cardiac**

Fat suppr.	None
Dark blood	Off
FoV read	200 mm
FoV phase	76.9 %
Phase resolution	95 %

**Angio - Common**

TONE ramp	70 %
Flow direction	F >> H
Flip angle	30 deg
MTC	Off
Measurements	1
3D centric reordering	On

**Angio - Inline**

Subtract	Off
Measurements	1
StdDev	Off
Save original images	On

**Angio - MIP**

MIP-Sag	On
MIP-Cor	On
MIP-Tra	On
MIP-Time	Off
Save original images	On

**Angio - Composing**

Inline Composing	Off
Distortion Corr.	Off

**Sequence - Part 1**

Introduction	On
Dimension	3D
Elliptical scanning	Off
Asymmetric echo	Allowed
Contrasts	1
Flow comp.	Yes
Multi-slice mode	Sequential
Bandwidth	186 Hz/Px

**Sequence - Part 2**

Gradient mode	Fast
RF spoiling	On

**Sequence - Assistant**

Mode	Off
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\\RESEARCH\FMRIB Developer\Tom Okell\PCASL\_standard\_protocols\to\_ep2d\_PCASL \*

TA: 6:39 PM: REF Voxel size: 3.4×3.4×4.5 mmPAT: Off Rel. SNR: 1.00 : epfid

**Properties**

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	Off
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	Off
Start measurements	Single measurement

**Routine**

Slice group	1
Slices	24
Dist. factor	10 %
Position	L0.0 A23.6 H23.0 mm
Orientation	Transversal
Phase enc. dir.	A >> P
AutoAlign	---
Phase oversampling	0 %
FoV read	220 mm
FoV phase	100.0 %
Slice thickness	4.5 mm
TR	4100 ms
TE	14.0 ms
Averages	1
Concatenations	1
Filter	Prescan Normalize
Coil elements	HE1-4;NE1,2

**Contrast - Common**

TR	4100 ms
TE	14.0 ms
Flip angle	90 deg
Fat suppr.	Fat sat.
Fat sat. mode	Strong

**Contrast - Dynamic**

Averages	1
Averaging mode	Long term
Reconstruction	Magnitude
Measurements	97
Delay in TR	0 ms
Multiple series	Off

**Contrast - ASL**

Perfusion mode	PICORE Q2T
Quality check	Off
Bolus Duration	700 ms
Inversion Time	1800.0 ms
Inversion Array Size	1
Flow limit	100.0 cm/s

**Resolution - Common**

FoV read	220 mm
FoV phase	100.0 %
Slice thickness	4.5 mm
Base resolution	64

**Resolution - Common**

Phase resolution	100 %
Phase partial Fourier	6/8
Interpolation	Off

**Resolution - iPAT**

PAT mode	None
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**Resolution - Filter Image**

Distortion Corr.	Off
Prescan Normalize	On
Unfiltered images	On

**Resolution - Filter Rawdata**

Raw filter	Off
Elliptical filter	Off
Hamming	Off

**Geometry - Common**

Slice group	1
Slices	24
Dist. factor	10 %
Position	L0.0 A23.6 H23.0 mm
Orientation	Transversal
Phase enc. dir.	A >> P
FoV read	220 mm
FoV phase	100.0 %
Slice thickness	4.5 mm
TR	4100 ms
Multi-slice mode	Interleaved
Series	Ascending
Concatenations	1

**Geometry - AutoAlign**

Slice group	1
Position	L0.0 A23.6 H23.0 mm
Orientation	Transversal
Phase enc. dir.	A >> P
AutoAlign	---
Initial Position	L0.0 A23.6 H23.0
L	0.0 mm
A	23.6 mm
H	23.0 mm
Initial Rotation	0.00 deg
Initial Orientation	Transversal

**Geometry - Saturation**

Sat. region	1
Thickness	134 mm
Position	L0.0 P0.0 H27.0 mm
Orientation	Transversal
Sat. region	2
Thickness	5 mm
Position	L0.0 P0.0 F69.0 mm
Orientation	Transversal
Fat sat. mode	Strong
Special sat.	None

**Geometry - Tim Planning Suite**

Set-n-Go Protocol	Off
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**Geometry - Tim Planning Suite**

Table position	H
Table position	0 mm
Inline Composing	Off

**System - Miscellaneous**

Positioning mode	REF
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Sum of Squares
Matrix Optimization	Off
AutoAlign	---
Coil Select Mode	Default

**System - Adjustments**

B0 Shim mode	Standard
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

**System - Adjust Volume**

Position	L0.0 A23.6 H23.0 mm
Orientation	Transversal
Rotation	0.00 deg
A >> P	220 mm
R >> L	220 mm
F >> H	119 mm
Reset	Off

**System - pTx Volumes**

B1 Shim mode	TrueForm
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**System - Tx/Rx**

Frequency 1H	123.255216 MHz
Correction factor	1
Gain	High
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

**Physio - Signal1**

1st Signal/Mode	None
TR	4100 ms
Concatenations	1

**Perf**

Measurements	97
Motion correction	Off
Spatial filter	Off

**Sequence - Part 1**

Introduction	On
Multi-slice mode	Interleaved
Free echo spacing	Off
Echo spacing	0.56 ms
Bandwidth	2004 Hz/Px

**Sequence - Part 2**

EPI factor	64
RF pulse type	Normal
Gradient mode	Fast

**Sequence - Special**

Perform VEPCASL	On
Use Variable TR?	Off
VEPCASL Tag Mode	Tag/Cntrl All
BGS Mode	Pre-sats + DI
Tag RF Flip Angle	20 degs
Tag RF Duration	600 us
Tag RF Separation	1000 us
Mean Tag Gradient	0.8 mT/m
Tag Gradient Amplitude	6.0 mT/m
Tag Duration	1400 ms
Maximum T1 Opt	500 ms
PLD 0	250 ms
PLD 1	500 ms
PLD 2	750 ms
PLD 3	1000 ms
PLD 4	1250 ms
PLD 5	1500 ms
PLD 6	0 ms
PLD 7	0 ms
PLD 8	0 ms
PLD 9	0 ms
PLD 10	0 ms
PLD 11	0 ms
PLD 12	0 ms
PLD 13	0 ms
PLD 14	0 ms
PLD 15	0 ms
PLD 16	0 ms
PLD 17	0 ms
PLD 18	0 ms
PLD 19	0 ms
Trans Grad Angle	0.0 degs
Vessel locations 0	-25.0 mm
Vessel locations 1	25.0 mm
Vessel locations 2	25.0 mm
Vessel locations 3	25.0 mm
Vessel locations 4	-25.0 mm
Vessel locations 5	-25.0 mm
Vessel locations 6	25.0 mm
Vessel locations 7	-25.0 mm

\\RESEARCH\FMRIB Developer\Tom Okell\PCASL\_standard\_protocols\to\_ep2d\_PCASL\_PA \*

TA: 0:14 PM: REF Voxel size: 3.4×3.4×4.5 mmPAT: Off Rel. SNR: 1.00 : epfid

**Properties**

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	Off
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	Off
Start measurements	Single measurement

**Routine**

Slice group	1
Slices	24
Dist. factor	10 %
Position	L0.0 A23.6 H23.0 mm
Orientation	Transversal
Phase enc. dir.	P >> A
AutoAlign	---
Phase oversampling	0 %
FoV read	220 mm
FoV phase	100.0 %
Slice thickness	4.5 mm
TR	4100 ms
TE	14.0 ms
Averages	1
Concatenations	1
Filter	Prescan Normalize
Coil elements	HE1-4;NE1,2

**Contrast - Common**

TR	4100 ms
TE	14.0 ms
Flip angle	90 deg
Fat suppr.	Fat sat.
Fat sat. mode	Strong

**Contrast - Dynamic**

Averages	1
Averaging mode	Long term
Reconstruction	Magnitude
Measurements	2
Delay in TR	0 ms
Multiple series	Off

**Contrast - ASL**

Perfusion mode	PICORE Q2T
Quality check	Off
Bolus Duration	700 ms
Inversion Time	1800.0 ms
Inversion Array Size	1
Flow limit	100.0 cm/s

**Resolution - Common**

FoV read	220 mm
FoV phase	100.0 %
Slice thickness	4.5 mm
Base resolution	64

**Resolution - Common**

Phase resolution	100 %
Phase partial Fourier	6/8
Interpolation	Off

**Resolution - iPAT**

PAT mode	None
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**Resolution - Filter Image**

Distortion Corr.	Off
Prescan Normalize	On
Unfiltered images	On

**Resolution - Filter Rawdata**

Raw filter	Off
Elliptical filter	Off
Hamming	Off

**Geometry - Common**

Slice group	1
Slices	24
Dist. factor	10 %
Position	L0.0 A23.6 H23.0 mm
Orientation	Transversal
Phase enc. dir.	P >> A
FoV read	220 mm
FoV phase	100.0 %
Slice thickness	4.5 mm
TR	4100 ms
Multi-slice mode	Interleaved
Series	Ascending
Concatenations	1

**Geometry - AutoAlign**

Slice group	1
Position	L0.0 A23.6 H23.0 mm
Orientation	Transversal
Phase enc. dir.	P >> A
AutoAlign	---
Initial Position	L0.0 A23.6 H23.0
L	0.0 mm
A	23.6 mm
H	23.0 mm
Initial Rotation	180.00 deg
Initial Orientation	Transversal

**Geometry - Saturation**

Sat. region	1
Thickness	134 mm
Position	L0.0 P0.0 H27.0 mm
Orientation	Transversal
Sat. region	2
Thickness	5 mm
Position	L0.0 P0.0 F69.0 mm
Orientation	Transversal
Fat sat. mode	Strong
Special sat.	None

**Geometry - Tim Planning Suite**

Set-n-Go Protocol	Off
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**Geometry - Tim Planning Suite**

Table position	H
Table position	0 mm
Inline Composing	Off

**System - Miscellaneous**

Positioning mode	REF
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Sum of Squares
Matrix Optimization	Off
AutoAlign	---
Coil Select Mode	Default

**System - Adjustments**

B0 Shim mode	Standard
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

**System - Adjust Volume**

Position	L0.0 A23.6 H23.0 mm
Orientation	Transversal
Rotation	180.00 deg
A >> P	220 mm
R >> L	220 mm
F >> H	119 mm
Reset	Off

**System - pTx Volumes**

B1 Shim mode	TrueForm
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**System - Tx/Rx**

Frequency 1H	123.255216 MHz
Correction factor	1
Gain	High
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

**Physio - Signal1**

1st Signal/Mode	None
TR	4100 ms
Concatenations	1

**Perf**

Measurements	2
Motion correction	Off
Spatial filter	Off

**Sequence - Part 1**

Introduction	On
Multi-slice mode	Interleaved
Free echo spacing	Off
Echo spacing	0.56 ms
Bandwidth	2004 Hz/Px

**Sequence - Part 2**

EPI factor	64
RF pulse type	Normal
Gradient mode	Fast

**Sequence - Special**

Perform VEPCASL	On
Use Variable TR?	Off
VEPCASL Tag Mode	Tag/Cntrl All
BGS Mode	Pre-sats + DI
Tag RF Flip Angle	20 degs
Tag RF Duration	600 us
Tag RF Separation	1000 us
Mean Tag Gradient	0.8 mT/m
Tag Gradient Amplitude	6.0 mT/m
Tag Duration	1400 ms
Maximum T1 Opt	500 ms
PLD 0	250 ms
PLD 1	500 ms
PLD 2	750 ms
PLD 3	1000 ms
PLD 4	1250 ms
PLD 5	1500 ms
PLD 6	0 ms
PLD 7	0 ms
PLD 8	0 ms
PLD 9	0 ms
PLD 10	0 ms
PLD 11	0 ms
PLD 12	0 ms
PLD 13	0 ms
PLD 14	0 ms
PLD 15	0 ms
PLD 16	0 ms
PLD 17	0 ms
PLD 18	0 ms
PLD 19	0 ms
Trans Grad Angle	0.0 degs
Vessel locations 0	-25.0 mm
Vessel locations 1	25.0 mm
Vessel locations 2	25.0 mm
Vessel locations 3	25.0 mm
Vessel locations 4	-25.0 mm
Vessel locations 5	-25.0 mm
Vessel locations 6	25.0 mm
Vessel locations 7	-25.0 mm

\\RESEARCH\FMRIB Developer\Tom Oke\PCASL\_standard\_protocols\to\_ep2d\_PCASL\_varTR \*

TA: 5:34 PM: FIX Voxel size: 3.4×3.4×4.5 mmPAT: Off Rel. SNR: 1.00 : epfid

**Properties**

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	Off
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	Off
Start measurements	Single measurement

**Routine**

Slice group	1
Slices	24
Dist. factor	10 %
Position	L0.0 A23.6 H23.0 mm
Orientation	Transversal
Phase enc. dir.	A >> P
AutoAlign	---
Phase oversampling	0 %
FoV read	220 mm
FoV phase	100.0 %
Slice thickness	4.5 mm
TR	4100 ms
TE	14.0 ms
Averages	1
Concatenations	1
Filter	Prescan Normalize
Coil elements	HE1-4;NE1,2

**Contrast - Common**

TR	4100 ms
TE	14.0 ms
Flip angle	90 deg
Fat suppr.	Fat sat.
Fat sat. mode	Strong

**Contrast - Dynamic**

Averages	1
Averaging mode	Long term
Reconstruction	Magnitude
Measurements	97
Delay in TR	0 ms
Multiple series	Off

**Contrast - ASL**

Perfusion mode	PICORE Q2T
Quality check	Off
Bolus Duration	700 ms
Inversion Time	1800.0 ms
Inversion Array Size	1
Flow limit	100.0 cm/s

**Resolution - Common**

FoV read	220 mm
FoV phase	100.0 %
Slice thickness	4.5 mm
Base resolution	64

**Resolution - Common**

Phase resolution	100 %
Phase partial Fourier	6/8
Interpolation	Off

**Resolution - iPAT**

PAT mode	None
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**Resolution - Filter Image**

Distortion Corr.	Off
Prescan Normalize	On
Unfiltered images	On

**Resolution - Filter Rawdata**

Raw filter	Off
Elliptical filter	Off
Hamming	Off

**Geometry - Common**

Slice group	1
Slices	24
Dist. factor	10 %
Position	L0.0 A23.6 H23.0 mm
Orientation	Transversal
Phase enc. dir.	A >> P
FoV read	220 mm
FoV phase	100.0 %
Slice thickness	4.5 mm
TR	4100 ms
Multi-slice mode	Interleaved
Series	Ascending
Concatenations	1

**Geometry - AutoAlign**

Slice group	1
Position	L0.0 A23.6 H23.0 mm
Orientation	Transversal
Phase enc. dir.	A >> P
AutoAlign	---
Initial Position	L0.0 A23.6 H23.0
L	0.0 mm
A	23.6 mm
H	23.0 mm
Initial Rotation	0.00 deg
Initial Orientation	Transversal

**Geometry - Saturation**

Sat. region	1
Thickness	134 mm
Position	L0.0 P0.0 H27.0 mm
Orientation	Transversal
Sat. region	2
Thickness	5 mm
Position	L0.0 P0.0 F69.0 mm
Orientation	Transversal
Fat sat. mode	Strong
Special sat.	None

**Geometry - Tim Planning Suite**

Set-n-Go Protocol	Off
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**Geometry - Tim Planning Suite**

Table position	H
Table position	0 mm
Inline Composing	Off

**System - Miscellaneous**

Positioning mode	FIX
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Sum of Squares
Matrix Optimization	Off
AutoAlign	---
Coil Select Mode	Default

**System - Adjustments**

B0 Shim mode	Standard
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

**System - Adjust Volume**

Position	L0.0 A23.6 H23.0 mm
Orientation	Transversal
Rotation	0.00 deg
A >> P	220 mm
R >> L	220 mm
F >> H	119 mm
Reset	Off

**System - pTx Volumes**

B1 Shim mode	TrueForm
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**System - Tx/Rx**

Frequency 1H	123.255216 MHz
Correction factor	1
Gain	High
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

**Physio - Signal1**

1st Signal/Mode	None
TR	4100 ms
Concatenations	1

**Perf**

Measurements	97
Motion correction	Off
Spatial filter	Off

**Sequence - Part 1**

Introduction	On
Multi-slice mode	Interleaved
Free echo spacing	Off
Echo spacing	0.56 ms
Bandwidth	2004 Hz/Px

**Sequence - Part 2**

EPI factor	64
RF pulse type	Normal
Gradient mode	Fast

**Sequence - Special**

Perform VEPCASL	On
Use Variable TR?	On
VEPCASL Tag Mode	Tag/Cntrl All
BGS Mode	Pre-sats + DI
Tag RF Flip Angle	20 degs
Tag RF Duration	600 us
Tag RF Separation	1000 us
Mean Tag Gradient	0.8 mT/m
Tag Gradient Amplitude	6.0 mT/m
Tag Duration	1400 ms
Maximum T1 Opt	500 ms
PLD 0	250 ms
PLD 1	500 ms
PLD 2	750 ms
PLD 3	1000 ms
PLD 4	1250 ms
PLD 5	1500 ms
PLD 6	0 ms
PLD 7	0 ms
PLD 8	0 ms
PLD 9	0 ms
PLD 10	0 ms
PLD 11	0 ms
PLD 12	0 ms
PLD 13	0 ms
PLD 14	0 ms
PLD 15	0 ms
PLD 16	0 ms
PLD 17	0 ms
PLD 18	0 ms
PLD 19	0 ms
Trans Grad Angle	0.0 degs
Vessel locations 0	-25.0 mm
Vessel locations 1	25.0 mm
Vessel locations 2	25.0 mm
Vessel locations 3	25.0 mm
Vessel locations 4	-25.0 mm
Vessel locations 5	-25.0 mm
Vessel locations 6	25.0 mm
Vessel locations 7	-25.0 mm

\\RESEARCH\FMRIB Developer\Tom Okell\PCASL\_standard\_protocols\jw\_tgse\_PCASL\_M0 \*

TA: 0:14 PM: REF Voxel size: 3.6×3.6×5.0 mmRel. SNR: 1.00 : tgse

**Properties**

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	Off
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	Off
Start measurements	Single measurement

**Routine**

Slab group	1
Slabs	1
Dist. factor	50 %
Position	L0.0 P0.0 H30.0 mm
Orientation	Transversal
Phase enc. dir.	A >> P
AutoAlign	---
Phase oversampling	0 %
Slice oversampling	0.0 %
Slices per slab	20
FoV read	230 mm
FoV phase	100.0 %
Slice thickness	5.00 mm
TR	6810 ms
TE	36.54 ms
Averages	1
Concatenations	1
Filter	None
Coil elements	HE1-4;NE1,2

**Contrast - Common**

TR	6810 ms
TE	36.54 ms
Flip angle	120 deg
Fat suppr.	Fat sat.
Fat sat. mode	Strong

**Contrast - Dynamic**

Averages	1
Averaging mode	Long term
Reconstruction	Magnitude
Measurements	1
Delay in TR	0 ms
Multiple series	Off

**Contrast - ASL**

Perfusion mode	FAIR QII
Bolus Duration	700 ms
Inversion Time	1800.0 ms
Averaging mode	CONSTANT
Inversion Array Size	1

**Resolution - Common**

FoV read	230 mm
FoV phase	100.0 %
Slice thickness	5.00 mm

**Resolution - Common**

Base resolution	64
Phase resolution	98 %
Slice partial Fourier	Off
Interpolation	Off

**Resolution - Filter Image**

Distortion Corr.	Off
Prescan Normalize	Off

**Resolution - Filter Rawdata**

Raw filter	Off
Elliptical filter	Off
Hamming	Off

**Geometry - Common**

Slab group	1
Slabs	1
Dist. factor	50 %
Position	L0.0 P0.0 H30.0 mm
Orientation	Transversal
Phase enc. dir.	A >> P
Slice oversampling	0.0 %
Slices per slab	20
FoV read	230 mm
FoV phase	100.0 %
Slice thickness	5.00 mm
TR	6810 ms
Multi-slice mode	Interleaved
Series	Ascending
Concatenations	1

**Geometry - AutoAlign**

Slab group	1
Position	L0.0 P0.0 H30.0 mm
Orientation	Transversal
Phase enc. dir.	A >> P
AutoAlign	---
Initial Position	L0.0 P0.0 H30.0
L	0.0 mm
P	0.0 mm
H	30.0 mm
Initial Rotation	0.00 deg
Initial Orientation	Transversal

**Geometry - Saturation**

Sat. region	1
Thickness	190 mm
Position	L0.0 P0.0 H25.0 mm
Orientation	Transversal
Sat. region	2
Thickness	5 mm
Position	L0.0 P0.0 F70.0 mm
Orientation	Transversal
Sat. region	3
Thickness	190 mm
Position	L0.0 P0.0 H25.0 mm
Orientation	Transversal
Fat sat. mode	Strong
Special sat.	None

**Geometry - Tim Planning Suite**

Set-n-Go Protocol	Off
Table position	H
Table position	0 mm
Inline Composing	Off

**System - Miscellaneous**

Positioning mode	REF
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Sum of Squares
Matrix Optimization	Off
AutoAlign	---
Coil Select Mode	Default

**System - Adjustments**

B0 Shim mode	Standard
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

**System - Adjust Volume**

Position	L0.0 P0.0 H30.0 mm
Orientation	Transversal
Rotation	0.00 deg
A >> P	230 mm
R >> L	230 mm
F >> H	100 mm
Reset	Off

**System - pTx Volumes**

B1 Shim mode	TrueForm
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**System - Tx/Rx**

Frequency 1H	123.255216 MHz
Correction factor	1
Gain	Low
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

**Physio - Signal1**

1st Signal/Mode	None
TR	6810 ms
Concatenations	1
Segments	1

**Sequence - Part 1**

Introduction	Off
Dimension	3D
Reordering	Centric
Multi-slice mode	Interleaved
Echo spacing	0.5 ms
Bandwidth	2298 Hz/Px

**Sequence - Part 2**

EPI factor	63
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**Sequence - Part 2**

Segments	1
RF pulse type	Normal
Gradient mode	Fast
RF spoiling	On
Turbo factor	20

**Sequence - Special**

PCASL?	On
Var TR?	Off
WET OVS?	On
Time-encoding?	Sequential
VEPCASL Tag Mode	Tag/Cntrl All
BGS Mode	Pre-sats only
Maximum T1 Opt	700 ms
Tag RF Flip Angle	20 degs
Tag RF Duration	500 us
Tag RF Separation	1000 us
Mean Tag Gradient	0.80 mT/m
Tag Grad Amplitude	6.0 mT/m
Tag 0	0 ms
Tag 1	0 ms
Tag 2	0 ms
Tag 3	0 ms
Tag 4	0 ms
Tag 5	0 ms
Tag 6	0 ms
Tag 7	0 ms
Tag 8	0 ms
Tag 9	0 ms
Tag 10	0 ms
Tag 11	0 ms
Tag 12	0 ms
Tag 13	0 ms
Tag 14	0 ms
Tag 15	0 ms
Tag 16	0 ms
Tag 17	0 ms
Tag 18	0 ms
Tag 19	0 ms
PLD 0	6000 ms
PLD 1	0 ms
PLD 2	0 ms
PLD 3	0 ms
PLD 4	0 ms
PLD 5	0 ms
PLD 6	0 ms
PLD 7	0 ms
PLD 8	0 ms
PLD 9	0 ms
PLD 10	0 ms
PLD 11	0 ms
PLD 12	0 ms
PLD 13	0 ms
PLD 14	0 ms
PLD 15	0 ms
PLD 16	0 ms
PLD 17	0 ms
PLD 18	0 ms
PLD 19	0 ms
Trans Grad Angle	0.0 degs
Vessel locations 0	-25.0 mm
Vessel locations 1	25.0 mm
Vessel locations 2	25.0 mm
Vessel locations 3	25.0 mm



**Sequence - Special**

Vessel locations 4	-25.0 mm
Vessel locations 5	-25.0 mm
Vessel locations 6	25.0 mm
Vessel locations 7	-25.0 mm
Number of M0	0
Number of Prep	0
Number of OVS	4
Refoc Thick	200 mm
FFT Scaling	1

\\RESEARCH\FMRIB Developer\Tom Oke\\PCASL\_standard\_protocols\jw\_tgse\_PCASL\_singleShot\_6PLDs\_8Averages \*

TA: 4:55 PM: REF Voxel size: 3.6×3.6×5.0 mmRel. SNR: 1.00 : tgse

### Properties

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	Off
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	Off
Start measurements	Single measurement

### Routine

Slab group	1
Slabs	1
Dist. factor	50 %
Position	L0.0 P0.0 H30.0 mm
Orientation	Transversal
Phase enc. dir.	A >> P
AutoAlign	---
Phase oversampling	0 %
Slice oversampling	0.0 %
Slices per slab	20
FoV read	230 mm
FoV phase	100.0 %
Slice thickness	5.00 mm
TR	3710 ms
TE	36.54 ms
Averages	1
Concatenations	1
Filter	None
Coil elements	HE1-4;NE1,2

### Contrast - Common

TR	3710 ms
TE	36.54 ms
Flip angle	120 deg
Fat suppr.	Fat sat.
Fat sat. mode	Strong

### Contrast - Dynamic

Averages	1
Averaging mode	Long term
Reconstruction	Magnitude
Measurements	48
Delay in TR	0 ms
Multiple series	Off

### Contrast - ASL

Perfusion mode	FAIR QII
Bolus Duration	700 ms
Inversion Time	1800.0 ms
Averaging mode	CONSTANT
Inversion Array Size	1

### Resolution - Common

FoV read	230 mm
FoV phase	100.0 %

### Resolution - Common

Slice thickness	5.00 mm
Base resolution	64
Phase resolution	98 %
Slice partial Fourier	Off
Interpolation	Off

### Resolution - Filter Image

Distortion Corr.	Off
Prescan Normalize	Off

### Resolution - Filter Rawdata

Raw filter	Off
Elliptical filter	Off
Hamming	Off

### Geometry - Common

Slab group	1
Slabs	1
Dist. factor	50 %
Position	L0.0 P0.0 H30.0 mm
Orientation	Transversal
Phase enc. dir.	A >> P
Slice oversampling	0.0 %
Slices per slab	20
FoV read	230 mm
FoV phase	100.0 %
Slice thickness	5.00 mm
TR	3710 ms
Multi-slice mode	Interleaved
Series	Ascending
Concatenations	1

### Geometry - AutoAlign

Slab group	1
Position	L0.0 P0.0 H30.0 mm
Orientation	Transversal
Phase enc. dir.	A >> P
AutoAlign	---
Initial Position	L0.0 P0.0 H30.0
L	0.0 mm
P	0.0 mm
H	30.0 mm
Initial Rotation	0.00 deg
Initial Orientation	Transversal

### Geometry - Saturation

Sat. region	1
Thickness	190 mm
Position	L0.0 P0.0 H25.0 mm
Orientation	Transversal
Sat. region	2
Thickness	5 mm
Position	L0.0 P0.0 F70.0 mm
Orientation	Transversal
Sat. region	3
Thickness	190 mm
Position	L0.0 P0.0 H25.0 mm
Orientation	Transversal
Fat sat. mode	Strong

**Geometry - Saturation**

Special sat.	None
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**Geometry - Tim Planning Suite**

Set-n-Go Protocol	Off
Table position	H
Table position	0 mm
Inline Composing	Off

**System - Miscellaneous**

Positioning mode	REF
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Sum of Squares
Matrix Optimization	Off
AutoAlign	---
Coil Select Mode	Default

**System - Adjustments**

B0 Shim mode	Standard
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

**System - Adjust Volume**

Position	L0.0 P0.0 H30.0 mm
Orientation	Transversal
Rotation	0.00 deg
A >> P	230 mm
R >> L	230 mm
F >> H	100 mm
Reset	Off

**System - pTx Volumes**

B1 Shim mode	TrueForm
--------------	----------

**System - Tx/Rx**

Frequency 1H	123.255216 MHz
Correction factor	1
Gain	Low
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

**Physio - Signal1**

1st Signal/Mode	None
TR	3710 ms
Concatenations	1
Segments	1

**Sequence - Part 1**

Introduction	Off
Dimension	3D
Reordering	Centric
Multi-slice mode	Interleaved
Echo spacing	0.5 ms
Bandwidth	2298 Hz/Px

**Sequence - Part 2**

EPI factor	63
Segments	1
RF pulse type	Normal
Gradient mode	Fast
RF spoiling	On
Turbo factor	20

**Sequence - Special**

PCASL?	On
Var TR?	On
WET OVS?	On
Time-encoding?	Sequential
VEPCASL Tag Mode	Tag/Cntrl All
BGS Mode	Pre-sats + Flex DI
Maximum T1 Opt	700 ms
Tag RF Flip Angle	20 degs
Tag RF Duration	500 us
Tag RF Separation	1000 us
Mean Tag Gradient	0.80 mT/m
Tag Grad Amplitude	6.0 mT/m
Tag 0	1400 ms
Tag 1	0 ms
Tag 2	0 ms
Tag 3	0 ms
Tag 4	0 ms
Tag 5	0 ms
Tag 6	0 ms
Tag 7	0 ms
Tag 8	0 ms
Tag 9	0 ms
Tag 10	0 ms
Tag 11	0 ms
Tag 12	0 ms
Tag 13	0 ms
Tag 14	0 ms
Tag 15	0 ms
Tag 16	0 ms
Tag 17	0 ms
Tag 18	0 ms
Tag 19	0 ms
PLD 0	250 ms
PLD 1	500 ms
PLD 2	750 ms
PLD 3	1000 ms
PLD 4	1250 ms
PLD 5	1500 ms
PLD 6	0 ms
PLD 7	0 ms
PLD 8	0 ms
PLD 9	0 ms
PLD 10	0 ms
PLD 11	0 ms
PLD 12	0 ms
PLD 13	0 ms
PLD 14	0 ms
PLD 15	0 ms
PLD 16	0 ms
PLD 17	0 ms
PLD 18	0 ms
PLD 19	0 ms
Trans Grad Angle	0.0 degs
Vessel locations 0	-25.0 mm
Vessel locations 1	25.0 mm
Vessel locations 2	25.0 mm

**Sequence - Special**

Vessel locations 3	25.0 mm
Vessel locations 4	-25.0 mm
Vessel locations 5	-25.0 mm
Vessel locations 6	25.0 mm
Vessel locations 7	-25.0 mm
Number of M0	0
Number of Prep	0
Number of OVS	4
Refoc Thick	200 mm
FFT Scaling	10

\\RESEARCH\FMRIB Developer\Tom Okell\PCASL\_standard\_protocols\fl\_pc\_2D\_venc100 \*

TA: 2:56 PM: REF Voxel size: 0.5×0.5×5.0 mmPAT: 2 Rel. SNR: 1.00 : pc

**Properties**

Prio recon	Off
Load images to viewer	On
Inline movie	Off
Auto store images	On
Load images to stamp segments	Off
Load images to graphic segments	Off
Auto open inline display	Off
Auto close inline display	Off
Start measurement without further preparation	Off
Wait for user to start	On
Start measurements	Single measurement

**Routine**

Slice group	1
Slices	1
Dist. factor	20 %
Position	L0.0 A20.0 F35.5 mm
Orientation	Transversal
Phase enc. dir.	R >> L
AutoAlign	---
Phase oversampling	0 %
FoV read	210 mm
FoV phase	75.0 %
Slice thickness	5.0 mm
TR	52.85 ms
TE	4.59 ms
Averages	1
Concatenations	1
Filter	Elliptical filter
Coil elements	HE1-4;NE1,2

**Contrast - Common**

TR	52.85 ms
TE	4.59 ms
Flip angle	10 deg

**Contrast - Dynamic**

Averages	1
Averaging mode	Short term
Reconstruction	Magnitude
Measurements	1
Multiple series	Each measurement

**Resolution - Common**

FoV read	210 mm
FoV phase	75.0 %
Slice thickness	5.0 mm
Base resolution	192
Phase resolution	100 %
Phase partial Fourier	Off
Interpolation	On

**Resolution - iPAT**

PAT mode	GRAPPA
Accel. factor PE	2
Ref. lines PE	24
Reference scan mode	Integrated

**Resolution - Filter Image**

Image Filter	Off
Distortion Corr.	Off
Prescan Normalize	Off
Normalize	Off
B1 filter	Off

**Resolution - Filter Rawdata**

Raw filter	Off
Elliptical filter	On

**Geometry - Common**

Slice group	1
Slices	1
Dist. factor	20 %
Position	L0.0 A20.0 F35.5 mm
Orientation	Transversal
Phase enc. dir.	R >> L
FoV read	210 mm
FoV phase	75.0 %
Slice thickness	5.0 mm
TR	52.85 ms
Multi-slice mode	Sequential
Series	Interleaved
Concatenations	1

**Geometry - AutoAlign**

Slice group	1
Position	L0.0 A20.0 F35.5 mm
Orientation	Transversal
Phase enc. dir.	R >> L
AutoAlign	---
Initial Position	L0.0 A20.0 F35.5
L	0.0 mm
A	20.0 mm
F	35.5 mm
Initial Rotation	90.00 deg
Initial Orientation	Transversal

**Geometry - Saturation**

Special sat.	None
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**Geometry - Tim Planning Suite**

Set-n-Go Protocol	Off
Table position	H
Table position	0 mm
Inline Composing	Off

**System - Miscellaneous**

Positioning mode	REF
Table position	H
Table position	0 mm
MSMA	S - C - T
Sagittal	R >> L
Coronal	A >> P
Transversal	F >> H
Coil Combine Mode	Adaptive Combine
Matrix Optimization	Off
AutoAlign	---
Coil Select Mode	Default

**System - Adjustments**

B0 Shim mode	Tune up
B1 Shim mode	TrueForm
Adjust with body coil	Off
Confirm freq. adjustment	Off
Assume Dominant Fat	Off
Assume Silicone	Off
Adjustment Tolerance	Auto

**System - Adjust Volume**

Position	Isocenter
Orientation	Transversal
Rotation	0.00 deg
A >> P	263 mm
R >> L	350 mm
F >> H	350 mm
Reset	Off

**System - pTx Volumes**

B1 Shim mode	TrueForm
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**System - Tx/Rx**

Frequency 1H	123.255216 MHz
Correction factor	1
Gain	High
Img. Scale Cor.	1.000
Reset	Off
? Ref. amplitude 1H	0.000 V

**Physio - Signal1**

1st Signal/Mode	Pulse/Trigger
Average cycle	6220 ± 5662 ms
Average cycle	No Signal ms
Captured cycle	-not set-
Acquisition window	512 ms
Trigger pulse	1
Trigger delay	5 ms
TR	52.85 ms
Concatenations	1
Segments	3
Phases	9

**Angio - Common**

Flow mode	Single dir.
Encodings	1
Velocity enc.	100 cm/s
Direction	Through plane
Rephased images	On
Magnitude images	On
Magnitude sum	Off
Phase images	On

**Angio - Inline**

Subtract	Off
Measurements	1
StdDev	Off
Save original images	On

**Angio - MIP**

MIP-Sag	Off
MIP-Cor	Off
MIP-Tra	Off
MIP-Time	Off
Save original images	On

**Angio - Composing**

Inline Composing	Off
Distortion Corr.	Off

**Sequence - Part 1**

Introduction	On
Dimension	2D
Asymmetric echo	Weak
Contrasts	1
Flow comp.	No
Multi-slice mode	Sequential
Bandwidth	299 Hz/Px

**Sequence - Part 2**

Segments	3
RF pulse type	Normal
Gradient mode	Fast
RF spoiling	On

**Sequence - Assistant**

Mode	Off
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