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Beyond perfusion: measuring water transport across brain barriers with arterial spin labeling MRI

Petitclerc, L.

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Beyond Perfusion:

Measuring Water Transport Across Brain Barriers with Arterial Spin Labeling MRI

Léonie Petitclerc

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Promotores

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Prof. dr. O.C. Meijer

Dr. L.M. Parkes, MPhys, MSc, PhD, *University of Manchester*

Dr. E.A.H. Warnert, *Erasmus MC*

Pour René

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Abbreviations

aBV = Arterial blood volume
ASL = Arterial spin labeling
ATT = Arterial transit time
BBB = Blood-brain barrier
BCSFB = Blood-CSF barrier
BGS = Background suppression
CASL = Continuous ASL
CBF = Cerebral blood flow
CBV = Cerebral blood volume
CE-CT = Contrast-enhanced computed tomography
CNS = Central nervous system
CP = Choroid plexus
CSF = Cerebrospinal fluid
CSF-PVC = PVC with CSF signal ≠ 0
DCE-MRI = Dynamic contrast-enhanced MRI
DPCT = Dynamic perfusion computed tomography
DSC-MRI = Dynamic susceptibility contrast MRI
eTE = Effective echo time
Gd = Gadolinium
GM = Gray matter
GM_{prob} = Probability, or partial volume, of GM in a given voxel
GRASE = Gradient and spin echo
ISF = Interstitial fluid
$K_{bl->CSF}$ = Exchange rate from blood to CSF
$K_{bl->GM}$ = Exchange rate from blood to GM
K_{trans} = Volume transfer constant from blood to brain
LD = Labeling duration
MT = Magnetization transfer
Non-CSF-PVC = PVC with CSF signal = 0
PASL = Pulsed ASL
PCASL = Pseudo-continuous arterial spin labeling
PET = Positron emission tomography
PLD = Post-labeling delay
PV = Partial volume
PVC = Partial volume correction
PVS = Perivascular space(s)
RF = Radiofrequency

SAS = Subarachnoid space
SNR = Signal-to-noise ratio
T_{2prep} = T_2 preparation module
$T_{bl->CSF}$ = Exchange time from blood to CSF
TE = Echo time
TPM = Tissue Probability Map
TR = Repetition time
TRUST = T_2 relaxation under spin tagging
VSASL = Velocity-selective ASL
WM = White matter