

Dear Colleagues,

Here is the ASL Newsletter No. 70 for January 2017.

Please notice the invitation to the ASL Network dinner during the ISMRM below.

Kind regards,  
Klaus

### *ASL Network dinner at ISMRM 2017*

*Dear all*

*We are proud to announce that this year, and for the first time since the beginning of its existence, we will have an ASL Network dinner sponsored by **two** companies: mediri GmbH, specialising more and more on the handling of imaging data for clinical trials, and Gold Standard Phantoms Limited, a new company very much stemming from this group, introducing this year their first product, a Quantitative ASL Perfusion Reference (QASPER) Phantom, on display during the whole of the ISMRM!*

*The dinner will take place on Sunday 23 April evening after the opening ceremony from 7pm onwards. Details will follow.*

*To get a rough estimate of participants we would like to ask you to register for the dinner by sending an email to [editor\[AT\]asl-network.org](mailto:editor[AT]asl-network.org) by March 5<sup>th</sup>.*

*Looking forward to see you all in Hawaii!*

*Best wishes,*

*Xavier*

*Co-Founder, ASL Network*

*CEO, Gold Standard Phantoms Limited*



# Recent publications

## January 2017,

(Epub & Print)

Note: The '*new*-flag' is assigned to articles which haven't been in earlier newsletters (e.g. as e-publications). Additionally you will find titles printed in bold letters which indicates that they are listed for the first time in this particular newsletter. For articles listed multiple times in different sections the bold letters disappear in the later sections.

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## Animal Studies

*new*

### **Neurocardiac protection with milrinone for restoring acute cerebral hypoperfusion and delayed ischemic injury after experimental subarachnoid hemorrhage.**

Mutoh T, Mutoh T, Sasaki K, Nakamura K, Tatewaki Y, Ishikawa T, Taki Y.

Neurosci Lett. 2017 Jan 6;640:70-75. doi: 10.1016/j.neulet.2017.01.008. [Epub ahead of print]

*new*

### **Preserved Collateral Blood Flow in the Endovascular M2CAO Model Allows for Clinically Relevant Profiling of Injury Progression in Acute Ischemic Stroke.**

Little P, Kvist O, Grankvist R, Jonsson S, Damberg P, Söderman M, Arnberg F, Holmin S.

PLoS One. 2017 Jan 9;12(1):e0169541. doi: 10.1371/journal.pone.0169541.

[Free PMC Article](#)

*new*

### **Effects of Long-Duration Administration of 1% Isoflurane on Resting Cerebral Blood Flow and Default Mode Network in Macaque Monkeys.**

Li CX, Zhang X.

Brain Connect. 2017 Jan 24. doi: 10.1089/brain.2016.0445. [Epub ahead of print]

## Pharmacological / Drug Studies / Studies on the Effects of Therapies

*new (juice considered as 'drug')*

### **The effects of flavanone-rich citrus juice on cognitive function and cerebral blood flow: an acute, randomised, placebo-controlled cross-over trial in healthy, young adults.**

Lamport DJ, Pal D, Macready AL, Barbosa-Boucas S, Fletcher JM, Williams CM, Spencer JP, Butler LT.

Br J Nutr. 2016 Dec;116(12):2160-2168. doi: 10.1017/S000711451600430X.

*new*

### **Neurocardiac protection with milrinone for restoring acute cerebral hypoperfusion and delayed ischemic injury after experimental subarachnoid hemorrhage.**

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### **Randomized trial on the effects of a combined physical/cognitive training in aged MCI subjects: the Train the Brain study.**

Train the Brain Consortium..

Sci Rep. 2017 Jan 3;7:39471. doi: 10.1038/srep39471.

[Free PMC Article](#)

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**The age-dependent effects of a single-dose methylphenidate challenge on cerebral perfusion in patients with attention-deficit/hyperactivity disorder.**

Schranter A, Mutsaerts H, Bouziane C, Tamminga H, Bottelier MA, Reneman L.

Neuroimage Clin. 2016 Nov 21;13:123-129.

[Free PMC Article](#)

*new*

**Mild Thyrotoxicosis Leads to Brain Perfusion Changes: An Arterial Spin Labelling Study.**

Göbel A, Heldmann M, Sartorius A, Göttlich M, Dirk AL, Brabant G, Münte TF.

J Neuroendocrinol. 2017 Jan;29(1). doi: 10.1111/jne.12446.

**Cerebral blood flow, transit time, and apparent diffusion coefficient in moyamoya disease before and after acetazolamide.**

Federau C, Christensen S, Zun Z, Park SW, Ni W, Moseley M, Zaharchuk G.

Neuroradiology. 2017 Jan;59(1):5-12. doi: 10.1007/s00234-016-1766-y.

**Assessment of cerebral blood perfusion reserve with acetazolamide using 3D spiral ASL MRI: Preliminary experience in pediatric patients.**

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**Recurrent Glioblastoma: Combination of High Cerebral Blood Flow with MGMT Promoter Methylation Is Associated with Benefit from Low-Dose Temozolomide Rechallenge at First Recurrence.**

Kim C, Kim HS, Shim WH, Choi CG, Kim SJ, Kim JH.

Radiology. 2017 Jan;282(1):212-221. doi: 10.1148/radiol.2016152152.

## **Cerebral Blood Flow Studies**

### **CBF Regional Comparison / Regional ASL**

*new*

**MRI of Cerebellar Infarction.**

De Cocker LJ, Lövblad KO, Hendrikse J.

Eur Neurol. 2017 Jan 18;77(3-4):137-146. doi: 10.1159/000455229. [Epub ahead of print]

## Studies on Special Disease

*new*

### **Cerebral blood flow and cognitive function in HIV-infected men with sustained suppressed viremia on combination antiretroviral therapy.**

Su T, Mutsaerts HJ, Caan MW, Wit FW, Schouten J, Geurtsen GJ, Sharp DJ, Prins M, Richard E, Portegies P, Reiss P, Majoie CB; AGEhIV Cohort Study.

AIDS. 2017 Jan 24. doi: 10.1097/QAD.0000000000001414. [Epub ahead of print]

*new*

### **Structural and physiological neurovascular changes in idiopathic Parkinson's disease and its clinical phenotypes.**

Al-Bachari S, Vidyasagar R, Emsley HC, Parkes LM.

J Cereb Blood Flow Metab. 2017 Jan 1;271678X16688919. doi: 10.1177/0271678X16688919.

[Epub ahead of print]

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### **[Value of diffusion-weighted imaging, 1H-magnetic resonance spectroscopy and 3D whole-brain arterial spin labeling in the diagnosis of medulloblastoma].**

Cheng DL, Wang WS, Hu YX, Chen ML, Wen G, Cheng LN, Wu J, Yan LQ.

Nan Fang Yi Ke Da Xue Xue Bao. 2017 Jan 20;37(1):79-83. Chinese.

*new*

### **Cerebral blood flow alterations specific to auditory verbal hallucinations in schizophrenia.**

Zhuo C, Zhu J, Qin W, Qu H, Ma X, Yu C.

Br J Psychiatry. 2017 Jan 19. pii: bjp.bp.115.174961. doi: 10.1192/bjp.bp.115.174961. [Epub ahead of print]

*new*

### **The initial use of arterial spin labeling perfusion and diffusion-weighted magnetic resonance images in the diagnosis of nonconvulsive partial status epileptics.**

Shimogawa T, Morioka T, Sayama T, Haga S, Kanazawa Y, Murao K, Arakawa S, Sakata A, Iihara K.

Epilepsy Res. 2017 Jan;129:162-173. doi: 10.1016/j.eplepsyres.2016.12.008.

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Juttukonda MR, Jordan LC, Gindville MC, Davis LT, Watchmaker JM, Pruthi S, Donahue MJ.

NMR Biomed. 2017 Feb;30(2). doi: 10.1002/nbm.3681.

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Sone D, Watanabe M, Ota M, Kimura Y, Sugiyama A, Maekawa T, Okura M, Enokizono M, Imabayashi E, Sato N, Matsuda H.

Epilepsy Res. 2017 Jan;129:95-100. doi: 10.1016/j.eplesyres.2016.12.009.

*new*

**Multi-delay ASL can identify leptomenigeal collateral perfusion in endovascular therapy of ischemic stroke.**

Lou X, Yu S, Scalzo F, Starkman S, Ali LK, Kim D, Rao NM, Hinman JD, Vespa PM, Jahan R, Tateshima S, Gonzalez NR, Duckwiler GR, Saver JL, Yoo B, Salamon N, Lyu J, Ma L, Wang DJ, Liebeskind DS.

Oncotarget. 2017 Jan 10;8(2):2437-2443. doi: 10.18632/oncotarget.13898.

[Free Article](#)

*new*

**The age-dependent effects of a single-dose methylphenidate challenge on cerebral perfusion in patients with attention-deficit/hyperactivity disorder.**

Schrantee A, Mutsaerts H, Bouziane C, Tamminga H, Bottelier MA, Reneman L.

Neuroimage Clin. 2016 Nov 21;13:123-129.

[Free PMC Article](#)

*new*

**Decreased cerebral perfusion in Duchenne muscular dystrophy patients.**

Doorenweerd N, Dumas EM, Ghariq E, Schmid S, Straathof CS, Roest AA, Wokke BH, van Zwet EW, Webb AG, Hendriksen JG, van Buchem MA, Verschuuren JJ, Asllani I, Niks EH, van Osch MJ, Kan HE.

Neuromuscul Disord. 2017 Jan;27(1):29-37. doi: 10.1016/j.nmd.2016.10.005.

*new*

**Risk factors and global cognitive status related to brain arteriolosclerosis in elderly individuals.**

Ighodaro ET, Abner EL, Fardo DW, Lin AL, Katsumata Y, Schmitt FA, Kryscio RJ, Jicha GA, Neltner JH, Monsell SE, Kukull WA, Moser DK, Appiah F, Bachstetter AD, Van Eldik LJ; Alzheimer's Disease Neuroimaging Initiative (ADNI)., Nelson PT.

J Cereb Blood Flow Metab. 2017 Jan;37(1):201-216.

**Perfusion imaging of brain gliomas using arterial spin labeling: correlation with histopathological vascular density in MRI-guided biopsies.**

Ningning D, Haopeng P, Xuefei D, Wenna C, Yan R, Jingsong W, Chengjun Y, Zhenwei Y, Xiaoyuan F.  
Neuroradiology. 2017 Jan;59(1):51-59. doi: 10.1007/s00234-016-1756-0.

**Cerebral blood flow, transit time, and apparent diffusion coefficient in moyamoya disease before and after acetazolamide.**

Federau C, Christensen S, Zun Z, Park SW, Ni W, Moseley M, Zaharchuk G.  
Neuroradiology. 2017 Jan;59(1):5-12. doi: 10.1007/s00234-016-1766-y.

**Prediction of Blood-Brain Barrier Disruption and Intracerebral Hemorrhagic Infarction Using Arterial Spin-Labeling Magnetic Resonance Imaging.**

Niibo T, Ohta H, Miyata S, Ikushima I, Yonenaga K, Takeshima H.  
Stroke. 2017 Jan;48(1):117-122. doi: 10.1161/STROKEAHA.116.013923.

**Cerebral blood flow measured by arterial spin labeling MRI at resting state in normal aging and Alzheimer's disease.**

Zhang N, Gordon ML, Goldberg TE.  
Neurosci Biobehav Rev. 2017 Jan;72:168-175. doi: 10.1016/j.neubiorev.2016.11.023. Review.  
[Free Article](#)

**The severity of anaemia depletes cerebrovascular dilatory reserve in children with sickle cell disease: a quantitative magnetic resonance imaging study.**

Kosinski PD, Croal PL, Leung J, Williams S, Odame I, Hare GM, Shroff M, Kassner A.  
Br J Haematol. 2017 Jan;176(2):280-287. doi: 10.1111/bjh.14424.

**Quantification of Serial Cerebral Blood Flow in Acute Stroke Using Arterial Spin Labeling.**

Harston GW, Okell TW, Sheerin F, Schulz U, Mathieson P, Reckless I, Shah K, Ford GA, Chappell MA, Jezzard P, Kennedy J.  
Stroke. 2017 Jan;48(1):123-130. doi: 10.1161/STROKEAHA.116.014707.  
[Free PMC Article](#)

**Reply regarding lesional perfusion abnormalities on arterial spin labeling in Leigh disease.**

Whitehead MT, Lee B, Gropman A.  
Pediatr Radiol. 2017 Jan;47(1):126-127. doi: 10.1007/s00247-016-3738-0. No abstract available.

**Do lesional perfusion abnormalities on arterial spin labeling truly contribute to the diagnosis of Leigh syndrome?**

Finsterer J, Zarrouk-Mahjoub S.  
Pediatr Radiol. 2017 Jan;47(1):124-125. doi: 10.1007/s00247-016-3718-4. No abstract available.

**Fifty years of brain imaging in neonatal encephalopathy following perinatal asphyxia.**

Groenendaal F, de Vries LS.  
Pediatr Res. 2017 Jan;81(1-2):150-155. doi: 10.1038/pr.2016.195. Review.

**Increased cerebral blood flow among adolescents with bipolar disorder at rest is reduced following acute aerobic exercise.**

MacIntosh BJ, Shirzadi Z, Scavone A, Metcalfe AW, Islam AH, Korczak D, Goldstein BI. J Affect Disord. 2017 Jan 15;208:205-213. doi: 10.1016/j.jad.2016.08.060.

**Intracranial Arteriovenous Shunting: Detection with Arterial Spin-Labeling and Susceptibility-Weighted Imaging Combined.**

Hodel J, Leclerc X, Kalsoum E, Zuber M, Tamazyan R, Benadjaoud MA, Pruvo JP, Piotin M, Baharvahdat H, Zins M, Blanc R.

AJNR Am J Neuroradiol. 2017 Jan;38(1):71-76. doi: 10.3174/ajnr.A4961.

**Altered Glutamate and Regional Cerebral Blood Flow Levels in Schizophrenia: A <sup>1</sup>H-MRS and pCASL study.**

Wijtenburg SA, Wright SN, Korenic SA, Gaston FE, Ndubuizu N, Chiappelli J, McMahon RP, Chen H, Savransky A, Du X, Wang DJ, Kochunov P, Hong LE, Rowland LM.

Neuropsychopharmacology. 2017 Jan;42(2):562-571. doi: 10.1038/npp.2016.172.

**Recurrent Glioblastoma: Combination of High Cerebral Blood Flow with MGMT Promoter Methylation Is Associated with Benefit from Low-Dose Temozolomide Rechallenge at First Recurrence.**

Kim C, Kim HS, Shim WH, Choi CG, Kim SJ, Kim JH.

Radiology. 2017 Jan;282(1):212-221. doi: 10.1148/radiol.2016152152.

**Detection of Retinal Hemangioblastomas in von Hippel-Lindau Disease Using Three-Dimensional Arterial Spin Labeling MR Imaging at 3T.**

Nomura JI, Beppu T, Sasaki M, Fujiwara S, Ogasawara K.

Magn Reson Med Sci. 2017 Jan 10;16(1):1-2. doi: 10.2463/mrms.ci.2016-0030. No abstract available.

[Free Article](#)

**Differential diagnosis of mitochondrial encephalopathy with lactic acidosis and stroke-like episodes (MELAS) and ischemic stroke using 3D pseudocontinuous arterial spin labeling.**

Li R, Xiao HF, Lyu JH, J J Wang D, Ma L, Lou X.

J Magn Reson Imaging. 2017 Jan;45(1):199-206. doi: 10.1002/jmri.25354.



# Comparison of ASL Techniques / ASL Compared with Other Imaging Methods / ASL Combined with Other Imaging Methods

*new*

## Perfusion alters stiffness of deep gray matter.

Hetzer S, Birr P, Fehlner A, Hirsch S, Dittmann F, Barnhill E, Braun J, Sack I.  
J Cereb Blood Flow Metab. 2017 Jan 1;271678X17691530. doi: 10.1177/0271678X17691530.  
[Epub ahead of print]

*new*

## [Value of diffusion-weighted imaging, 1H-magnetic resonance spectroscopy and 3D whole-brain arterial spin labeling in the diagnosis of medulloblastoma].

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## The initial use of arterial spin labeling perfusion and diffusion-weighted magnetic resonance images in the diagnosis of nonconvulsive partial status epileptics.

Shimogawa T, Morioka T, Sayama T, Haga S, Kanazawa Y, Murao K, Arakawa S, Sakata A, Iihara K.  
Epilepsy Res. 2017 Jan;129:162-173. doi: 10.1016/j.eplepsyres.2016.12.008.

## A qualitative comparison of arterial spin labelling and dynamic susceptibility contrast MRI in 52 children with a range of neurological conditions.

Armitage PA, Skipper N, Connolly DJ, Griffiths PD.  
Br J Radiol. 2017 Jan;90(1069):20160495. doi: 10.1259/bjr.20160495.

## Intracranial Arteriovenous Shunting: Detection with Arterial Spin-Labeling and Susceptibility-Weighted Imaging Combined.

Hodel J, Leclerc X, Kalsoum E, Zuber M, Tamazyan R, Benadjaoud MA, Pruvo JP, Piotin M, Baharvahdat H, Zins M, Blanc R.  
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J Magn Reson Imaging. 2017 Jan;45(1):199-206. doi: 10.1002/jmri.25354.

## Functional Imaging / BOLD Others CBF Related

*new*

[The effects of flavanone-rich citrus juice on cognitive function and cerebral blood flow: an acute, randomised, placebo-controlled cross-over trial in healthy, young adults.](#)

Lamport DJ, Pal D, Macready AL, Barbosa-Boucas S, Fletcher JM, Williams CM, Spencer JP, Butler LT.

Br J Nutr. 2016 Dec;116(12):2160-2168. doi: 10.1017/S000711451600430X.

[Assessment of cerebral blood perfusion reserve with acetazolamide using 3D spiral ASL MRI: Preliminary experience in pediatric patients.](#)

Hu HH, Li Z, Pokorney AL, Chia JM, Stefani N, Pipe JG, Miller JH.

Magn Reson Imaging. 2017 Jan;35:132-140. doi: 10.1016/j.mri.2016.08.019.

## Perfusion Studies Other than on the Brain

[Perfusion has no effect on the in vivo CEST effect from Cr \(CrCEST\) in skeletal muscle.](#)

Kogan F, Stafford RB, Englund EK, Gold GE, Hariharan H, Detre JA, Reddy R.

NMR Biomed. 2017 Jan;30(1). doi: 10.1002/nbm.3673.

## Physiological Parameters besides CBF

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## ASL in Kidneys

*new*

[Measurement of arterial transit time and renal blood flow using pseudocontinuous ASL MRI with multiple post-labeling delays: Feasibility, reproducibility, and variation.](#)

Kim DW, Shim WH, Yoon SK, Oh JY, Kim JK, Jung H, Matsuda T, Kim D.

J Magn Reson Imaging. 2017 Jan 16. doi: 10.1002/jmri.25634. [Epub ahead of print]

*new*

[Respiratory motion prediction and prospective correction for free-breathing arterial spin labeled perfusion MRI of the kidneys.](#)

Song H, Ruan D, Liu W, Stenger VA, Pohmann R, Fernandez Seara MA, Nair T, Jung S, Luo J, Motai Y, Ma J, Hazle JD, Gach HM.

Med Phys. 2017 Jan 11. doi: 10.1002/mp.12099. [Epub ahead of print]

[Renal Arterial Spin Labeling Magnetic Resonance Imaging.](#)

Becker AS, Rossi C.

Nephron. 2017;135(1):1-5. doi: 10.1159/000450797.

**Arterial Transit Time-corrected Renal Blood Flow Measurement with Pulsed Continuous Arterial Spin Labeling MR Imaging.**

Shimizu K, Kosaka N, Fujiwara Y, Matsuda T, Yamamoto T, Tsuchida T, Tsuchiyama K, Oyama N, Kimura H.

Magn Reson Med Sci. 2017 Jan 10;16(1):38-44. doi: 10.2463/mrms.mp.2015-0117.

[Free Article](#)

**ASL Data Analysis/ Comparison of ASL Evaluation Methods/ Kinetic Models/ Data Corrections**

*new*

**The spatial coefficient of variation in arterial spin labeling cerebral blood flow images.**

Mutsaerts HJ, Petr J, Václavů L, van Dalen JW, Robertson AD, Caan MW, Masellis M, Nederveen AJ, Richard E, MacIntosh BJ.

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Epilepsy Res. 2017 Jan;129:95-100. doi: 10.1016/j.eplesyres.2016.12.009.

**Perfusion imaging of brain gliomas using arterial spin labeling: correlation with histopathological vascular density in MRI-guided biopsies.**

Ningning D, Haopeng P, Xuefei D, Wenna C, Yan R, Jingsong W, Chengjun Y, Zhenwei Y, Xiaoyuan F.

Neuroradiology. 2017 Jan;59(1):51-59. doi: 10.1007/s00234-016-1756-0.

**Pixel-by-Pixel Arterial Spin Labeling Blood Flow Pattern Variation Analysis for Discrimination of Rheumatoid Synovitis: A Pilot Study.**

Sakashita T, Kamishima T, Sugimori H, Tang M, Noguchi A, Kono M, Sutherland K, Atsumi T. Magn Reson Med Sci. 2017 Jan 10;16(1):78-83. doi: 10.2463/mrms.tn.2015-0145.

[Free Article](#)

**Comparison of long-labeled pseudo-continuous arterial spin labeling (ASL) features between young and elderly adults: special reference to parameter selection.**

Fujiwara Y, Matsuda T, Kanamoto M, Tsuchida T, Tsuji K, Kosaka N, Adachi T, Kimura H. Acta Radiol. 2017 Jan;58(1):84-90.

## Technical Improvement / Parameter Optimization

*new*

### [Prospective motion correction for 3D pseudo-continuous arterial spin labeling using an external optical tracking system.](#)

Aksoy M, Maclaren J, Bammer R.

Magn Reson Imaging. 2017 Jan 27. pii: S0730-725X(17)30025-5. doi: 10.1016/j.mri.2017.01.018. [Epub ahead of print]

*new*

### [Respiratory motion prediction and prospective correction for free-breathing arterial spin labeled perfusion MRI of the kidneys.](#)

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Med Phys. 2017 Jan 11. doi: 10.1002/mp.12099. [Epub ahead of print]

### [Quantitative measurement of cerebral blood volume using velocity-selective pulse trains.](#)

Liu D, Xu F, Lin DD, van Zijl PC, Qin Q.

Magn Reson Med. 2017 Jan;77(1):92-101. doi: 10.1002/mrm.26515.

### [Assessment of cerebral blood perfusion reserve with acetazolamide using 3D spiral ASL MRI: Preliminary experience in pediatric patients.](#)

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Acta Radiol. 2017 Jan;58(1):84-90.

### [Oxygen challenge magnetic resonance imaging in healthy human volunteers.](#)

Dani KA, Moreton FC, Santosh C, Lopez R, Brennan D, Schwarzbauer C, Goutcher C, O'Hare K, Macrae IM, Muir KW.

J Cereb Blood Flow Metab. 2017 Jan;37(1):366-376.

## Case Reports

*new*

### [A case of acute encephalopathy with biphasic seizures and late reduced diffusion: Utility of arterial spin labeling sequence.](#)

Kuya K, Fujii S, Miyoshi F, Ohno K, Shinohara Y, Maegaki Y, Ogawa T.

Brain Dev. 2017 Jan;39(1):84-88. doi: 10.1016/j.braindev.2016.07.003.

## Reproducibility Studies

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[Measurement of arterial transit time and renal blood flow using pseudocontinuous ASL MRI with multiple post-labeling delays: Feasibility, reproducibility, and variation.](#)

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J Magn Reson Imaging. 2017 Jan 16. doi: 10.1002/jmri.25634. [Epub ahead of print]

## Cohort Studies / Gender- and Age Dependencies

*new*

[Arterial Spin-Labeling to Discriminate Pediatric Cervicofacial Soft-Tissue Vascular Anomalies.](#)

Boulouis G, Dangouloff-Ros V, Boccara O, Garabedian N, Soupre V, Picard A, Couloigner V, Boddaert N, Naggara O, Brunelle F.  
AJNR Am J Neuroradiol. 2017 Jan 19. doi: 10.3174/ajnr.A5065. [Epub ahead of print]

*new*

[White Matter Hyperintensity Associations with Cerebral Blood Flow in Elderly Subjects Stratified by Cerebrovascular Risk.](#)

Bahrani AA, Powell DK, Yu G, Johnson ES, Jicha GA, Smith CD.  
J Stroke Cerebrovasc Dis. 2017 Jan 4. pii: S1052-3057(16)30419-0. doi: 10.1016/j.jstrokecerebrovasdis.2016.10.017. [Epub ahead of print]

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[The age-dependent effects of a single-dose methylphenidate challenge on cerebral perfusion in patients with attention-deficit/hyperactivity disorder.](#)

Schranter A, Mutsaerts H, Bouziane C, Tamminga H, Bottelier MA, Reneman L.  
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