

# Bolus Tracking Perfusion Imaging in the Brain with MRI

Quantitative method of the arterial input function for determination of the absolute cerebral blood flow values (CBF) in MRI

## Technology

While theoretically, evaluating the cerebral perfusion using MRI is central for acute stroke diagnostic, the actual standard procedure at stroke units is usually a CT measurement. Large clinical studies have given contradictive conclusions. The anticipated reason is the low accuracy of quantitative measurement of the arterial input function, a long-standing problem in perfusion MRI.

This novel method measures the arterial input function (AIF) in the carotid arteries in an additional slice, positioned along the neck to capture the signal in the carotid arteries at a higher time resolution. The aim is to achieve perfusion measurements with the MRI that are comparable to the gold standard – the positron emission tomography. The novel method is compatible with the clinical measurement protocol and has been already verified on phantom and animal experiments. The CBF in experimental animals agree well with the relevant literature values as well as with the results of performed PET measurement (the golden standard in perfusion imaging).

### Innovation

- Robust, direct arterial input function (AIF) quantification
- The AIF is obtained in terms of the tracer concentration in blood without adjustable parameters
- Compatible with the clinical measurement protocol
- The CBV in experimental animals agree well with results in performed PET measurements (the current golden standard in perfusion) (2014)

### Predominant Application

- Those who have the choice of taking an MRI image instead of a PET image for a perfusion measurement will opt for an MRI image.

### Development Status

- 2014: Successful phantom and animal studies. (Kellner E et al, (2014) Quantitative cerebral blood flow with bolus tracking perfusion MRI: measurements in porcine model and comparison with H215O PET. Magn Reson Med 72(6):1723–1734)
- 2018: The Method has successfully been applied to patients receiving contrast agents for clinical indications (Kellner E et al, (2018) Arterial input function in a dedicated slice for cerebral perfusion measurements in humans. Magn Reson Mater Phy (2018) 31: 439.

### Innovator

Prof. Dr. Kiselev, Dr. Kellner  
University Medical Center Freiburg  
Dept. of Radiology · Medical  
Physics

### Fields

MRI, Cerebral perfusion imaging

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CTF – The R & D Company of the  
Freiburg University and the Freiburg  
University Medical Center



### Contact

Dr. Kathrin Lauckner  
Campus Technologies Freiburg GmbH  
Stefan-Meier-Str. 8 | D-79104 Freiburg  
Email: Kathrin.Lauckner@campus-technologies.de  
Tel: +49 (0)761 203-5017  
Fax: +49 (0)761 203-5021