

Coils for Optogenetic fMRI Applications

MR Coils Made-to-Measure

Optogenetic functional Magnetic Resonance Imaging (ofMRI) is a technique that combines optical activation of the brain with functional MRI. This allows to monitor cell type-specific mapping of functional neural circuits and their dynamics across the whole brain.

The stimulation is achieved through an optical fiber that delivers light of a specific wavelength deep into the brain. This in turn sets the demand for coils that give access for these fibers while still maintaining best possible SNR and brain coverage.

RAPID Biomedical meets this requirement with a set of different coils starting with single channel implantable loops that are connected to a separable coil electronics only for the fMRI. The obvious benefit of these coils are the maximized access to the skull. For better coverage and SNR in deeper brain regions we added quadrature coils as well as 3 channel phased arrays with different openings.

These coils are individually adaptable to most established MR systems.

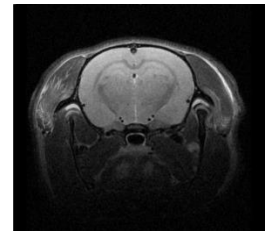
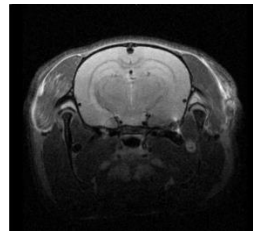


Image courtesy: Basil Künnecke
F. Hoffmann-La Roche Ltd, Basel, Switzerland
Rat head images acquired with a quadrature receive coil @ 9.4 T

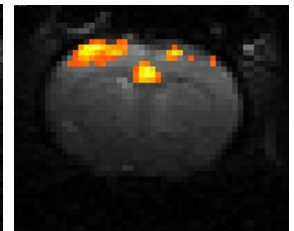
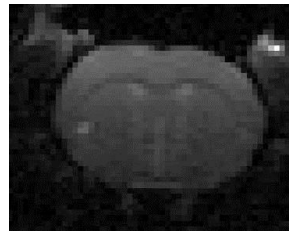


Image courtesy: Mikko Kettunen
University of Eastern Finland, Kuopio, Finland
Mouse head images acquired with an implantable loop linear receive coil @ 7 T

Specifications

No Medical Device! Caution – The use of the devices described above is limited to investigational use on laboratory animals or other tests that do not involve human subjects.

B ₀ -field strength	3 T to 11.7 T
housing dimensions	inner diameter according to application
weight	approx. 0.2 kg