of perfusional thresholds and irreversible lesion volume remain important methodological issues. MRI findings were validated on PET results to improve reliability in acute stroke imaging.
Method In 10 patients DW- and PW-MRI were performed within 8 h after ischemic stroke and after 24 h. MRI-based definition of hypoperfusion volume and lesion size was compared to CBF, CMR02, and flumazenil binding (FMZ).
Results The volume of reduced CMRO2 corresponded to DWI lesion size. Reduced FMZ binding could be larger than the DWI defect at first measurement and correlated to the permanent infarct. The area of critically reduced CBF extended beyond the defect on initial DWI and PWI but correlated to lesion size on DWI after 24h.
Conclusion These preliminary data in a small patient group allow the comparison of multitracer PET and DW/PW-MRI in the acute phase of ischemic stroke. PET imaging provides the earliest and most reliable detection of irreversible neuronal damage and penumbra tissue. However, in most instances MRI enables a fair estimate of ischemic compromise.

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Functional imaging of visually guided hand movements

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Introduction Imaging studies in humans suggest that visuomotor control of forelimb and eye movements involves reciprocal connections between striate, extrastriate, parietal, motor and frontal areas related to movement performance and visuospatial coding of movement direction. The aim of our study is to investigate the functional role of the human extrastriate visual area V5 in the control of visually guided hand movements and the interaction between extrastriate visual areas, basal ganglia, parietal and motor areas by using functional MRI (fMRI).
Method 9 right-handed, healthy subjects performed visually guided hand movements, either tracking a horizontally moving target or performing a centre out task to a stationary target by moving a cursor using a MRI compatible joystick. Subjects' eye and hand movements were monitored during scanning. Brainvoyager 4.4 was used for data analysis.
Results Our results show significant neural activations in area V5 during visually guided hand tracking movements. Visuomotor tracking with central fixation versus replay condition engaged a neural network involving left sensorimotor cortex, bilateral SMA, pre-SMA, dorsal premotor cortex, intraparietal cortex, as well as left basal ganglia, thalamus and right anterior cerebellum. The centre out task activated the same areas, but the basal ganglia and thalamus to a greater degree and less so the premotor cortex. Additional activation in the right red nucleus was evident.
Conclusion Our results indicate that visual monitoring during tracking and reaching requires the involvement of area V5.
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Functional brain mapping of the sensorimotor cortex: an fMRI study

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Introduction We wanted to implement a vibrotactile-stimulation-paradigm within the MR-environment for functional brain diagnosis in patients with severe motor deficits.
Method Experiments were performed on a 1.5Tesla whole-body scanner. The vibrotactile-stimulation-paradigm was a 50Hz vibrotactile stimulus with an amplitude of 2mm applied via pneumatic tube to the right and left palm. The vibrating device is an electromotor with 50W performance and 6000U/min. A single examination consisted of two fMRI measurements, where the right and the left palm were vibrated. The whole study was performed in 20 healthy, right-handed male and female volunteers (age range 25–45 years). Statistical analysis was done with SPM99.
Results Vibratory stimulation of the right and left palm revealed contralateral activation of the primary motor cortex (MI), the primary and secondary somatosensory cortex (SI and SII) and the premotor area (PM). The supplementary motor area (SMA) within the frontal lobe was bilaterally activated. An ipsilateral activation foci was seen within the gyrus frontalis superior near the interhemispheric fissure, within the PM and the SI and SII. The strongest activation was found within the SI and SII followed by the MI. The PM and the SMA showed only weak activation.
Conclusion Vibratory stimulation to the right and left palm can lead to an activation response not only of sensory cortex, but also to an activation response of the motor cortex. This holds promise for the vibratory stimulation to be applied for functional brain mapping of the sensory motor cortex in patients with severe motor deficits.

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Investigations on the human central sympathetic pathway through the brainstem using a new method of three-dimensional mapping on the basis of digital post-processing MRI

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Introduction Information on the brainstem segment of the central sympathetic pathway is sparse. Experimental studies suggest integrative centres in the dorsolateral pontine tegmentum and in the medulla oblongata. To study the central sympathetic pathway in man we applied a new method of three-dimensional brainstem mapping using digital post-processing MRI by

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