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white matter; Introduction; Brain macrostructure and microstructure
Quantitative volumetric brain analysis: segmentation; Structural segmentation methods; Imaging requirements; Sources of error; Analysis of brain segmentation results; Volumetric analysis; Surface analysis; Segmentation methods: practical approaches; Segmentation workflow; Brain segmentation systems; Applications of brain segmentation analysis; Evaluation of normal aging; Neurodegenerative disease; Alzheimer's disease; Frontotemporal dementia; Epilepsy; Quantitative analysis of white-matter integrity: diffusion and tractographic analysis; Introduction; Local diffusion analysis
Regional diffusion analysis: tractography; Diffusion MRI methods; Application of diffusion MRI in the evaluation of white-matter integrity; Local dMRI measures of white-matter integrity and injury; Local measures of dMRI in demyelinating disease; Local measures of dMRI changes in normal aging; Local measures of dMRI in neurodegenerative disease; Regional measures of white-matter integrity: tractography; Tractography: axonal patterning; Tractography: brain connectivity; Tractography: applications; Diffusion MRI and tractography methods: practical approaches
Diffusion MRI and tractography workflows; Diffusion MRI and tractography systems; Future developments; Summary; References; Chapter 4: Functional magnetic resonance imaging; Introduction; Physiologic principles underlying bold fMRI; Metabolic and hemodynamic signals are surrogates for neural activity; Neurometabolic and neurovascular coupling; Synaptic activity dominantly drives signaling-related energy metabolism; Classic model: neural activity is linearly coupled to CMRGlc, CMRO2, and CBF; Experiment: at rest neural activity is linearly coupled to CMRO2, CMRGlc, and CBF
Experiment: with activation, neural activity is nonlinearly coupled to CMRGlc and CBF, but nearly linearly coupled to CMRO2