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Non-invasive PET/MR imaging of CBF and CMRO2

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The gold standard for imaging cerebral blood flow (CBF) and the cerebral metabolic rate of oxygen (CMRO2) are complex and invasive PET techniques. Hybrid PET/MR imaging can greatly simplify the procedures by acquiring PET data while simultaneously obtaining MRI measurements of whole-brain (WB) CBF and CMRO2. The aim of this work is to present hybrid PET/MR methods to image CBF and CMRO2. PET/MR imaging of CBF (PMRFlow) and oxidative metabolism (PMROx) can either calibrate PET data explicitly by incorporating the WB MRI measurements into the PET kinetic model, or by scaling the IDIF obtained from the WB time-activity curve and performing a fitting routine. The implementation of PMRFlow and PMROx allow for head-to-head comparisons between emerging MR methods and well-established PET measurements for imaging cerebral metabolism.

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