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3D printed stereotax multimodal imaging compatibility assessment

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ABSTRACT

PET/CT and MRI for multimodal image compatibility.

This protocol is supplementary to the manuscript:
Liang, L., Zimmermann Rollin, I., Alikaya, A., Ho, J.C., Santini, T., Bostan, A.C., Schwerdt, H.N., Stauffer, W.R., Ibrahim, T.S., Pirondini, E., Schaeffer, D.J., 2024. An open-source MRI compatible frame for multimodal presurgical mapping in macaque and capuchin monkeys. *BioRxiv* https://doi.org/10.1101/2024.02.17.580767

PROTOCOL REFERENCES

3D printable stereotaxic frame: https://github.com/SchaefferLab/Macaque-Stereotax

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GUIDELINES

The FDG doses are for proof of concept, and even smaller doses of a radioligand may suffice for practical use, depending on exposure and technical considerations.

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We use this protocol and it's working

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MATERIALS

Imaging Equipment

- Small preclinical PET/CT scanner (Si78; Bruker BioSpin GmbH, Ettlingen, Germany)
- Paravision-360 software package (version 3.2; Bruker BioSpin Corp, Billerica, MA, RRID: SCR_001964)

Materials

- 3D printed stereotaxic eye and ear bars (https://github.com/SchaefferLab/Macaque-Stereotax)
- [18F] fluorodeoxyglucose (FDG)
- MRI-compatible nylon screw
- small gauge syringe

PET/CT and MRI for multimodal image compatibility

1 Preparation of eye bars and ear bars: With a syringe, fill the ear and eye bars with a small dose (0.05 MBq ear bar, 1.54 MBq eye bar) of [18F] fluorodeoxyglucose (FDG) and seal the chamber with a MRI-compatible nylon screw. Note that these doses are for proof of concept, and even smaller doses of a radioligand may suffice for practical use, depending on exposure and technical considerations.

2 PET Imaging: Place the ear and eye bars in a small preclinical PET/CT scanner (here we used the Si78; Bruker BioSpin GmbH, Ettlingen, Germany) and use the Paravision-360 software package (version 3.2; Bruker BioSpin Corp, Billerica, MA, RRID: SCR_001964) for image acquisition.

3 CT Acquisition: Acquire a CT scan using the same PET/CT scanner equipped with a Low Dose 1 mm aluminum filter. Here we used a “step and shoot” method with a 0.6-degree gantry step for image acquisition.

4 Image Reconstruction: Reconstruct the CT images using the filtered back projection algorithm.