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🌐 Preparation of Ex-Vivo Samples in Potato Starch Suspension for a Horizontal Bore MRI Scanner V.1

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Protocol status: Working

We use this protocol and it's working



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Abstract

Potato starch suspension (PSS) is used in micro-magnetic resonance imaging (micro-MRI) to suppress background signal intensity from water protons and motion artifacts, improving image quality for studying small specimens.^{1,2} Here we describe how to modify previously published protocols to work specifically in horizontal bore magnetic resonance scanners.

This ex-vivo sample preparation method is a low cost & simple approach to reducing background and motion effects.

Materials

Supplies/ Equipment

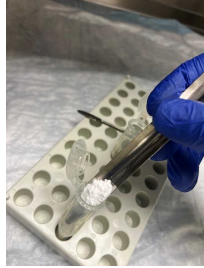
- Potato starch
- Cyanoacrylate super glue
- Phosphate-buffered Saline (PBS)
- Disposable Underpads / Absorbent Pads
- Scoopula (small & medium)
- Wooden popsicle sticks
- Conical tube (scientific) / conical centrifuge tubes

Before start

Personnel looking to implement the use of PSS to preserve and image ex-vivo samples for MRI should do as described in this document. Personnel should follow precautions to ensure full compliance with document and to minimize the risk of cross contamination to personnel & the environment.

Procedure

- 1 Scoop potato starch into a conical tube, only to cover roughly 20-25% of the bottom (Figure 1).



1

- 2 Then add PBS to roughly match the volume occupied by the PS (Figure 2). Swirl and poke the PS at the bottom of the tube in order to have all the PS be hydrated/wet.



2

- 3 Have your fragment/partial popsicle stick and apply cyanoacrylate super glue to it. Have your ex-vivo sample place it on top of the glue (Figure 3 and 4). Gently press down on the tissue sample to aid its binding. You may also want to add some more glue to the sides to achieve superior binding. You may gently push on the tissue after 1-2 minutes to get an idea of how well it has bound so far.
- 4 After your tissue is glued to the popsicle stick fragment then transfer it into the PSS containing conical tube (Figure 5).



5

- 5 Start slowly and incrementally packing the rest of the tube with PS & PBS (Figure 6). You don't want the ratio to be towards the water. The goal is to have the PS just barely hydrated enough. Slowly keep adding either PS or PBS to keep the balance and pad/push down on it to get rid of air bubbles (Figure 7).



6



7

- 6 Once you successfully packed the conical tube with barely hydrated PSS then you tightly close the cap to prevent evaporation (Figure 8).



8

7

Protocol references

Resources

1. Tomokazu Tsurugizawa, Takuma Kumamoto, Yoshichika Yoshioka, Utilization of potato starch suspension for MR-microimaging in ex vivo mouse embryos, iScience, Volume 25, Issue 12, 2022, 105694, ISSN 2589-0042, <https://doi.org/10.1016/j.isci.2022.105694>.

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2. Tomokazu Tsurugizawa, Takuma Kumamoto, Yoshichika Yoshioka, Micro-magnetic resonance imaging of ex vivo mouse embryos with potato starch suspension, STAR Protocols, Volume 4, Issue 3, 2023, 102483, ISSN 2666-1667, <https://doi.org/10.1016/j.xpro.2023.102483>.

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