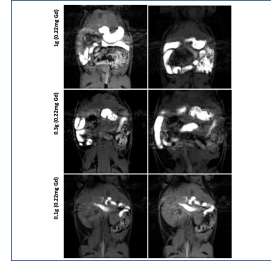


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MRI Imaging of the Gut

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Protocol status: Working

We use this protocol and it's working

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Abstract

This test is used measure peristaltic activity in the upper portion of the gut.

Materials

- DietGel Recovery, Cat#72-06-5022 ClearH2O, ME, USA
- Gadolinium [Gd-DTPA powder] Cat#381667, Sigma Aldrich, St. Louis, USA
- 7T rodent MRI BioSpec 70/30; Bruker Instruments, Billerica, USA

Protocol

- 1 Habituate mice to eat Diet gel (Cat#DietGel Recovery, ClearH2O, ME, USA) for at least a week.

Note

Habituation takes ~7 days of training until mice consume voluntarily approximately 1g of diet gel.

- 2 Fast mice for 12 to 18 hours.

- 3 Prepare 10g of Diet gel mixed with 22.4mg of Gadolinium [Gd-DTPA powder] (Cat#381667, Sigma Aldrich, St. Louis, USA).

Note

Boil the diet gel in warm water until its composition is completely liquid, let it cool down for 2-3 min and add the gadolinium powder, mix it well and mixed solution will return to it semi-solid gel state.

- 4 Give 0.3g of Diet Gel-Gadolinium mix to each mouse.

Note

0.3g of the Diet Gel-Gadolinium per mouse might vary depending on mouse weight. For a 30g mouse this amount will be enough to fill immediately the upper GI tract, however in our experience an amount of 1g is enough to get a visible contrast in the GI lumen.

Note

Following 12 to 18 hours of food restriction, mice should eat the gel within 2 to 5 min.

- 5 Using a 7T rodent MRI (BioSpec 70/30; Bruker Instruments, Billerica, USA), position the animal in prone and monitor respiratory activity patterns.

**Note**

Respiratory gating is highly recommended for image quality.

6 Localize the longitudinal axis of the stomach.

7 Perform series of alternating volumetric and fast scans.

Note

Volumetric scans are performed using a FLASH sequence, parameters should be troubleshooted for each investigator, however reference parameters for repetition time, echo time, angles, and thickness can be taken from Lu et al, 2018.

8 Sequences commonly take 2 min, repeat for as long as your experimental setting requires.

Protocol references

Lu KH, Cao J, Oleson S, Ward MP, Phillips RJ, Powley TL, Liu Z. Vagus nerve stimulation promotes gastric emptying by increasing pyloric opening measured with magnetic resonance imaging. *Neurogastroenterol Motil.* 2018 Oct;30(10):e13380. doi: 10.1111/nmo.13380. Epub 2018 May 24. PMID: 29797377; PMCID: PMC6160317.