# MR Microscopy of Human and Porcine Neurons

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### Introduction

Previously we reported images on human and porcine tissues that for the first time demonstrate cellular processes, and last year that quantitative MR measurements were feasible. The long term goal of these kinds of studies is to obtain quantitative data at the cellular level that will fundamentally change our understanding of the origins of MR signals in tissues. Here we show true correlative histology that complements this work, leading to publication.

## Experimental

As described previously, MR microscopy was conducted on a 600MHz Oxford narrow bore spectrometer interfaced to a Bruker console, using a probe incorporating a 500 micron diameter microsurface coil. The same tissue was then submitted for optical microscopy using a silver stain specific for neurons.

## Results and Discussion

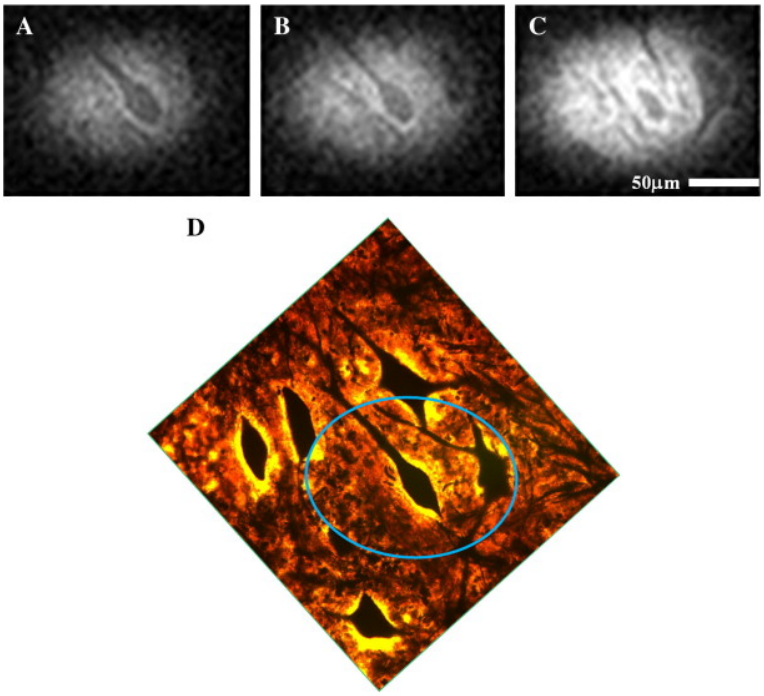


**Figure 1.** Correlative histology identifying porcine neuronal processes with Bielschowsky's silver stain. Three consecutive images (ABC) taken from our 3D, diffusion-weighted dataset (6.25 µm isotropic) are presented with their corresponding correlative histology (D) which positively identifies the structures seen in our MRM as cell bodies and their neuronal processes. The highlighted region in the histology image (blue oval) roughly approximates the portion of the tissue slice captured in our MR data.

## Conclusions

Coupled with our previous work showing cellular processes and qualitative measurements, these correlative histological data fully validate these studies, and demonstrate the first imaging of human and porcine neurons. These data were published this year in Neuroimage (1).

## Acknowledgements

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## References

(1) Flint *et al*., Neuroimage. 2012 Apr 2;60(2):1404-1.