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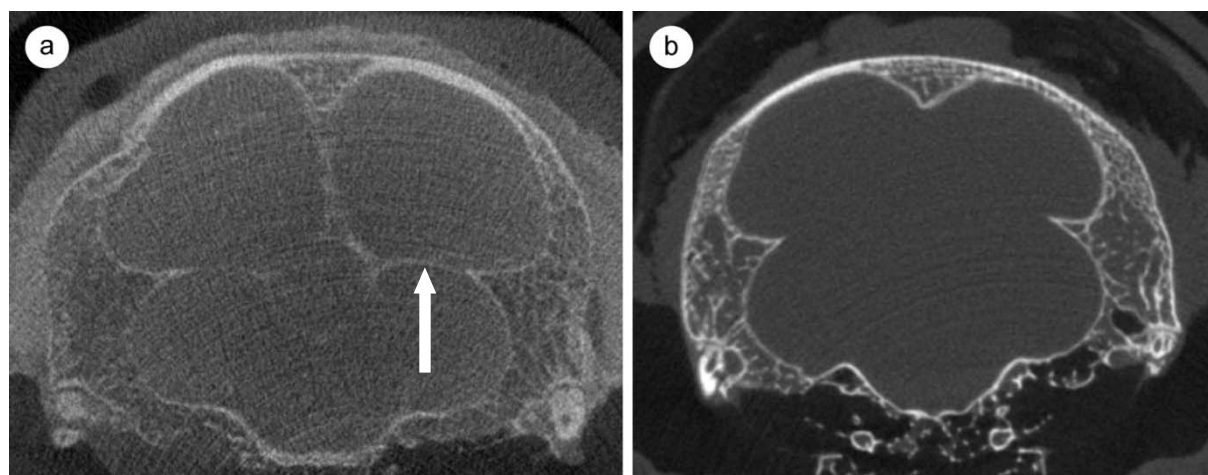
A combined MR and CT study for precise quantitative analysis of the avian brain.

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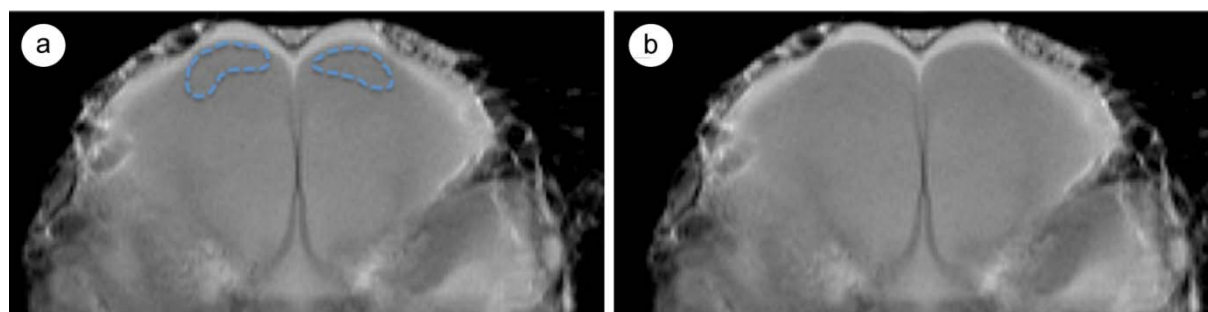
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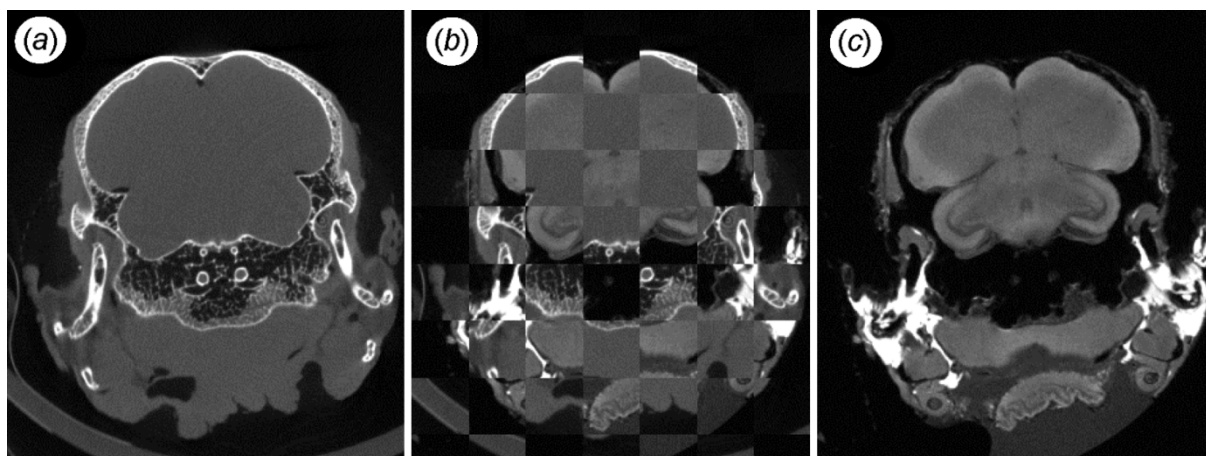
Additional information for Results and Discussion



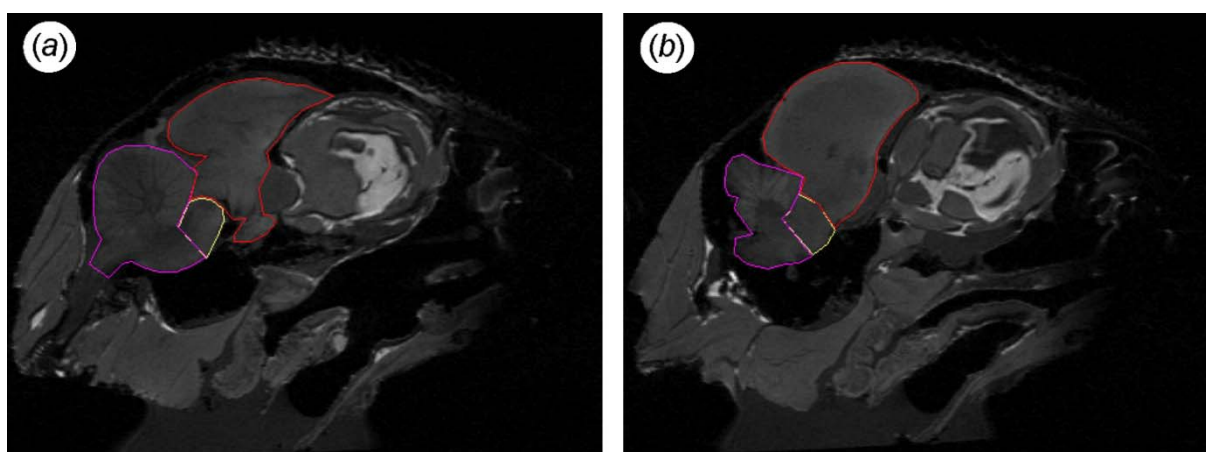
Supplementary Figure 1 | Comparative effects of SPT treatment for improved CT contrast of intracranial structures in adult *Phasianus colchicus*. (a) Visualization of a male specimen with SPT showing enhanced contrast between major brain tissue regions; (b) female specimen with no internal structures detected when SPT was withheld. Arrow indicates internal structures visible only after SPT treatment.



Supplementary Figure 2 | MR imaging (2D RARE) of a control sample (*Opisthocomus hoazin*) to test the effects of prolonged scan time. (a) Visualization immediately following removal from medium; (b) visualization after 13 hours prolonged scanning. Highlighted area (dashed line) was targeted for comparative T₂ calculations.



Supplementary Figure 3 | Co-registration of CT and 3D RARE MR images of the cranium from an adult (male) *Phasianus colchicus*. (a) CT image; (b) checkerboard mosaic image (from CT and MR) registered by mutual information minimization in 3D; (c) MR image.



Supplementary Figure 4 | Delineation of brain compartments in 3D RARE MR images of the cranium from an adult (male) *Phasianus colchicus*. (a) Saggital middle plain; (b) saggital plane 2.7 mm from the middle plain. Colour demarcation: red = prosencephalon; yellow = mesencephalon; purple = cerebellum and hindbrain (rhombencephalon). Compartmental areas were delineated manually based on Karten *et al.*¹

References

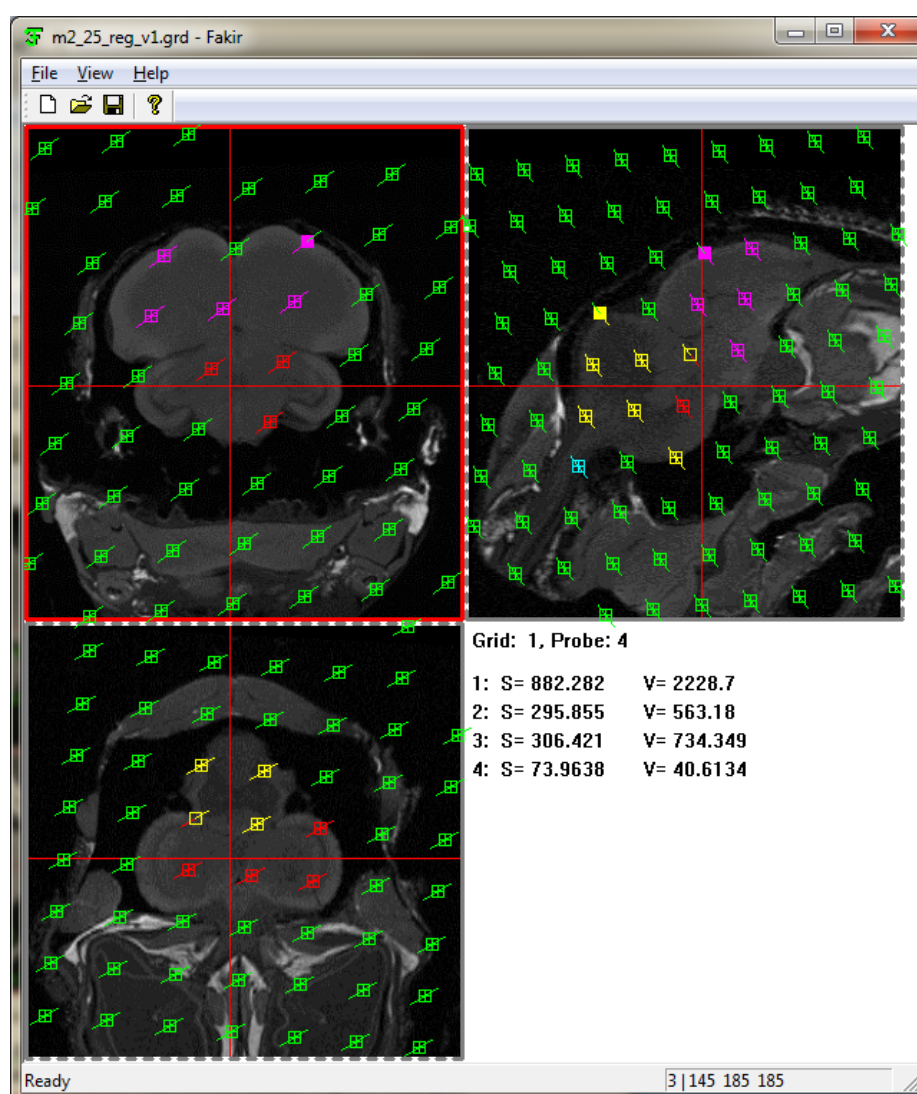
Karten, H. J., Brzozowska-Prechtl, A., Lovell, P. V., Tang, D. D., Mello, C. V., Wang, H., & Mitra, P. P. Digital atlas of the zebra finch (*Taeniopygia guttata*) brain: A high-resolution photo atlas. *J. Comp. Neurol.* **521**, 3702–3715 (2013).

Additional information for Methods

Supplementary Table 1 | Parameters for relaxometry measurements of T_1/T_2 versus SPT. Abbreviations:

• T_1 , utilizes saturation recovery sequence; •• T_2 , utilizes CPMG sequence.

Parameters	• T_1	•• T_2
Recycle delay (s)	10	5
Number of points	10	2000
Duration factor	1.85	-
Pulse separation (ms)	-	1
Echo number	-	2000



Supplementary Figure 5 | Screen capture of the Fakir probe compartmental brain volume measurements from an adult (male) *Phasianus colchicus*. Orthoslice includes one of seven parallel line sets. Colour demarcation: green = non-brain tissues or space; purple = prosencephalon; red = mesencephalon; yellow = cerebellum and hindbrain (rhombencephalon); cyan = spinal cord. Filled squares delimit the brain surface.