Beagle

The aim of Czeibert et al., was to both improve the cryosectioning method, test its limits and create a high-resolution macro-anatomical image series of a Beagle brain, which at the time of the study did not exist. A two-year-old female Beagle has been scanned with CT and MRI ante and post mortem, then the arteries of the head were filled with red resin. After freezing to -80°C, a neurocranium block was created and was embedded into a water-gelatin mix. Using a special milling device and a DSLR camera, 1112 consecutive RGB-color cryosections were made with a 100 µm layer thickness and captured in high resolution (300 dpi, 24-bit color, and pixel size was 19.5 x 19.5 µm). Image post-processing was done with Adobe Photoshop CS3 and Thermo Scientific Amira 6.0 softwares, and as a result of the proper alignment and coregistration, visualization and comparing was possible with all the applied imaging modalities (CT, MRI, cryosectioning) in any arbitrary plane. Surface models from the arteries, veins, brain and skull were also generated after segmentation in the same coordinate system, giving a unique opportunity for comparing the two-dimensional and three-dimensional anatomy. This is the first study which focuses directly to this high-definition multimodal visualization of the canine brain, and it provides the most accurate results compared to previous cryosectioning studies, as using an improved method, higher image quality, more detailed image, proper color fidelity and lower artefact formation were achieved. Based on the methodology we described, it can serve as a base for future multimodal (CT, MR, augmented- or virtual reality) imaging atlases for medical, educational and scientific purposes [1].

1)
Czeibert K, Baksa G, Grimm A, Nagy SA, Kubinyi E, Petneházy Ö. MRI, CT and high resolution macro-anatomical images with cryosectioning of a Beagle brain: Creating the base of a multimodal imaging atlas. PLoS One. 2019 Mar 7;14(3):e0213458. doi: 10.1371/journal.pone.0213458. eCollection 2019. PubMed PMID: 30845177.