Electronic Supplementary Material
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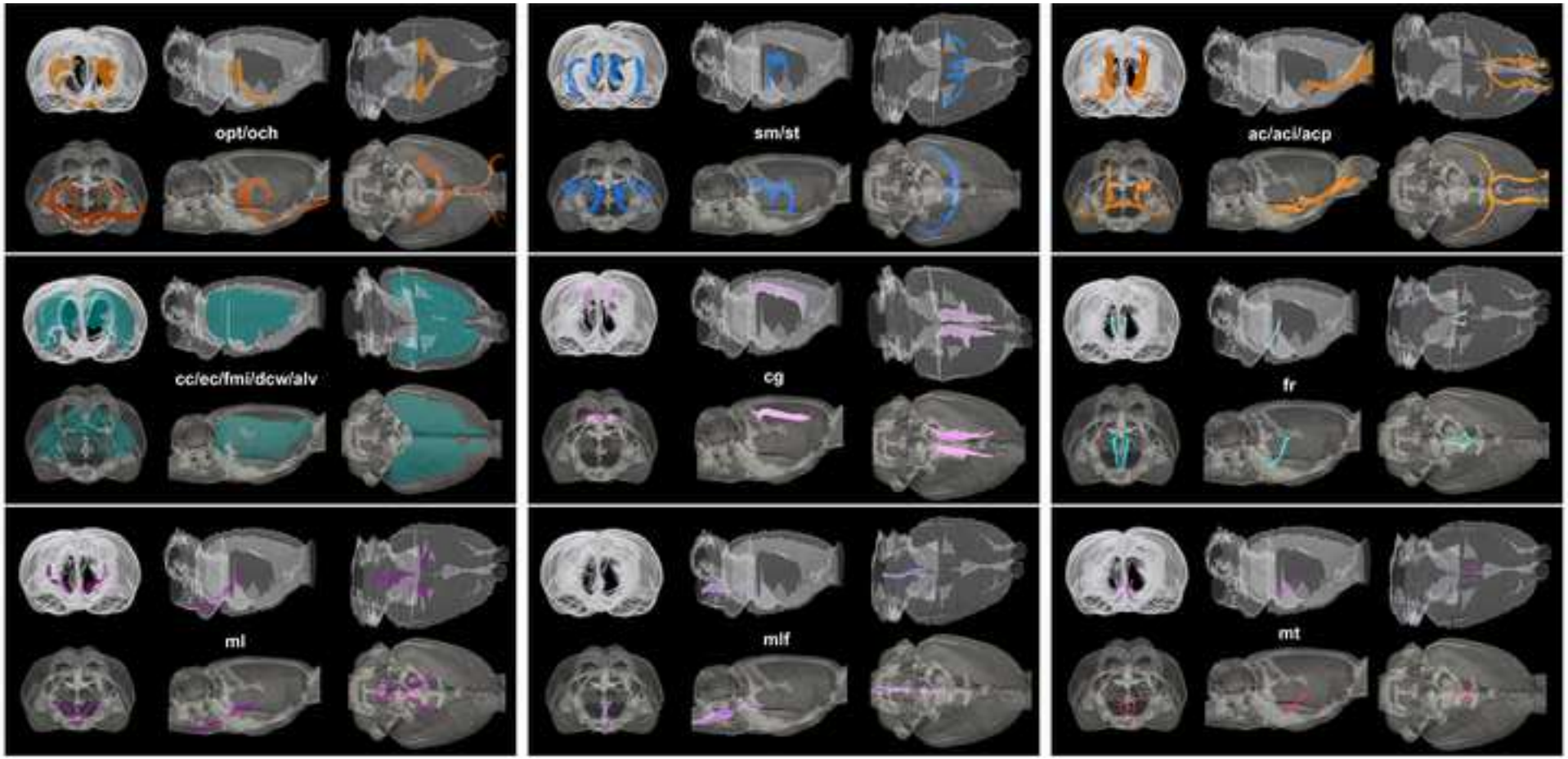

Electronic Supplementary Material

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Structure	Track count	Mean track length (μm)	Track length std (μm)
ac	21142	13.4	5.84
lo R	13349	5.2	2.13
lo L	11315	4.94	2.01
cc/dcw/ec	333172	11.06	3.89
cg R	5238	4.54	1.67
cg L	4049	4.48	2.03
ot/och/on	46853	10.44	5.9
f/fi/vhc	14254	8.06	3.78
ic/cp/py	91692	6.84	2.86
sm/st	11292	4.83	2.1
mt	1624	2.27	0.78
fr R	2377	3.05	0.88
fr L	2670	3.39	1.04
ml	16158	3.28	1.66
mlf	10703	6.81	5.03

We matched the silver-stained sections (left hemisphere) with the MR images (right hemisphere) and labeled the segmented structures. The color-coded list of the structures that we labeled and analyzed is presented in Table 2.

Fig 3. Three-dimensional rendering of the rat brain, showing three different structures. (A) Frontal (A1 A4), lateral (A2, A5) and dorsal (A3, A6) view of the fornix/fimbria of the hippocampus/ventral hippocampal commissure. These structures were found to be significantly different based on their volume calculations however; the location and the orientation of the fibers are in agreement. (B) Frontal (B1, B4), lateral (B2, B5) and dorsal (B3, B6) view of the internal capsule. The internal capsule volumes are quite similar between the reconstructed histology and the MR segmentation, and the position and the expansion of the structure shows sufficient overlap. (C) Frontal (C1, C4), lateral (C2, C5) and dorsal (C3, C6) view of the lateral olfactory tract. The lateral olfactory tract shows high inter-modality similarities in terms of volume and spatial extent. In all cases, the outline of the entire brain is shown in transparency for spatial reference.

Fig 4. Three-dimensional rendering of all structures analyzed in this report. Although we only analyzed a small fraction of the entire white-matter volume of the brain, we captured many of the largest and most prominent tracts in the forebrain. This figure illustrates the complex intertwined structure of the major white matter tracts in the forebrain.

Table captions

Table 1. Stereotaxic coordinates of the analyzed anatomical sections and MR images and their discrepancy

Table 2. List of myelin fiber tracts analyzed by both semi-automated DTI segmentation and manual 3D reconstruction of the mapped structures on serial sections using NeuroLucida and NeuroLucida Explorer by MBF Bioscience. Colors are used to indicate their corresponding structures hereafter.

Table 3. Volumes of segmented and mapped white matter structures and total brain volume (left and right hemisphere values combined) calculated by using FACT, Runge-Kutta, Interpolated Streamline and Tensorline fiber tract segmentation methods compared with anatomical, histological measurements.

Supplementary material

Fig 1. Three-dimensional rendering of the rest of the analyzed structures, including the anterior commissure, the corpus callosum, the cingulate, the fasciculus retroflexus, the medial lemniscus, the medial longitudinal fasciculus, the mammillothalamic tract, and the optic tract, and the stria medullaris. The figures show the frontal, lateral, and dorsal views.

Table 1. Mean tract length and standard deviation measurements for each of the analyzed white matter structures. Tracking parameters were FA threshold of 0.25 and angle threshold of 45 degrees.