Entorhinal Cortex Projections to Neocortex

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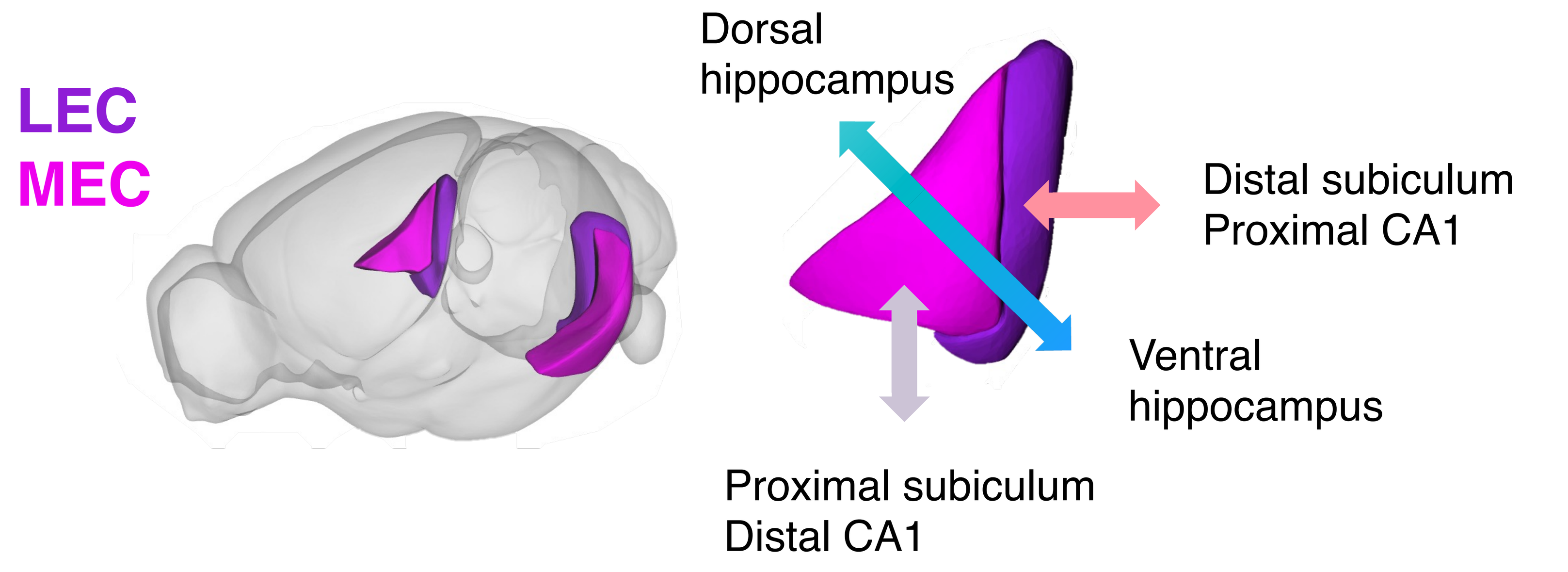
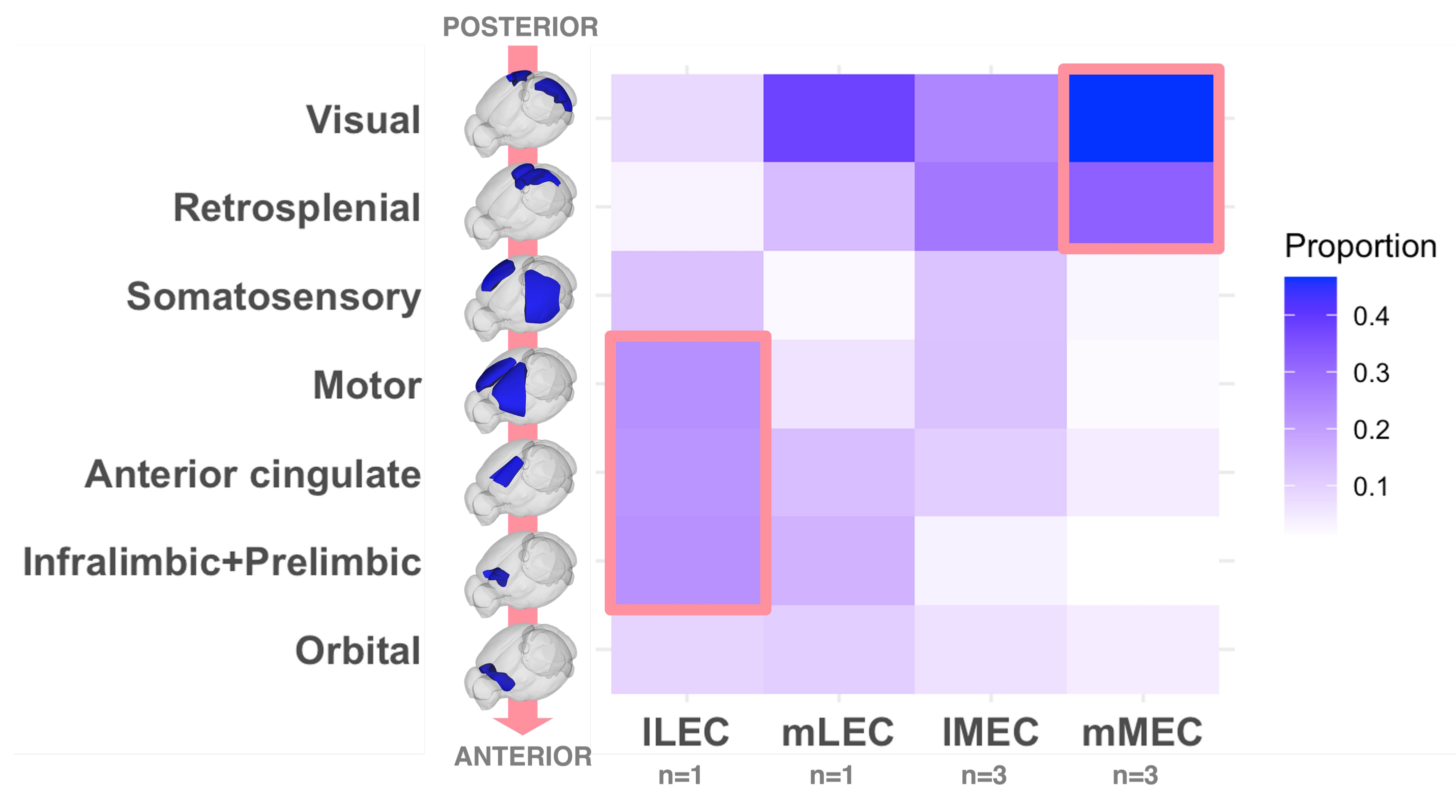
Entorhinal Cortex Topography

- Entorhinal cortex (EC) can be divided into two main parts – medial (MEC) and lateral (LEC).
- LEC and MEC are responsible for contextual episodic and spatial memory, respectively [1].
- EC and hippocampus have topography along the dorsoventral axis and MEC and LEC are connected to different parts of the hippocampal formation along its distal - proximal axis [2].
- Layer 5a neurons project to other cortical areas [3].

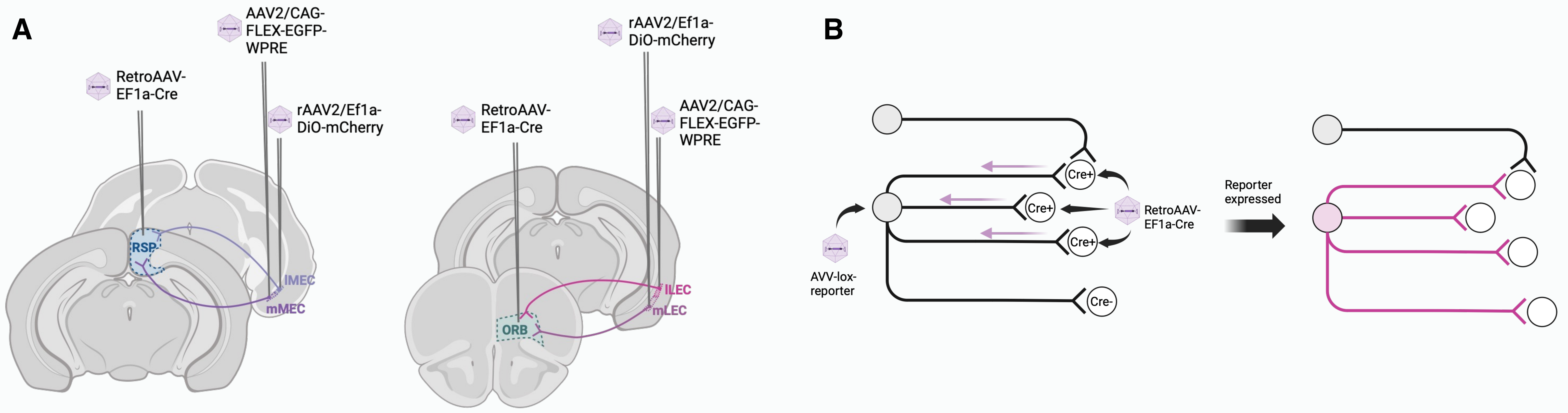


Distribution of Axon Pixels from 4 Injection Sites Across Cortical Areas

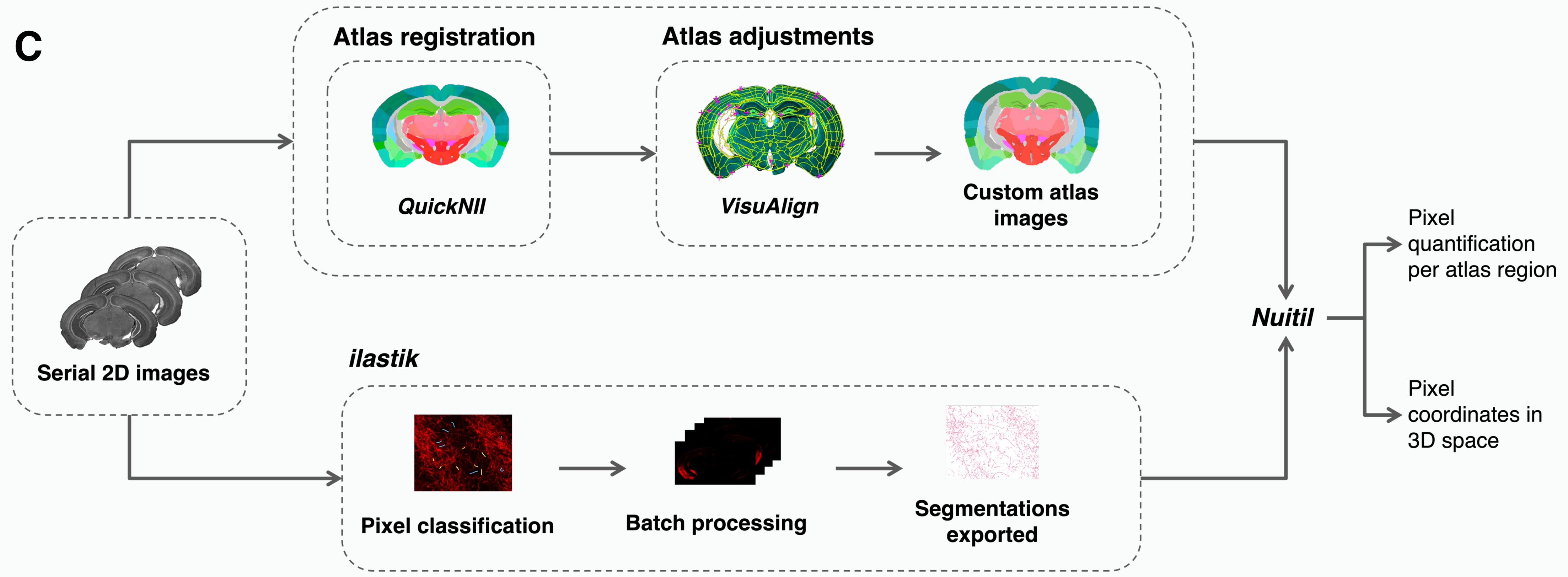


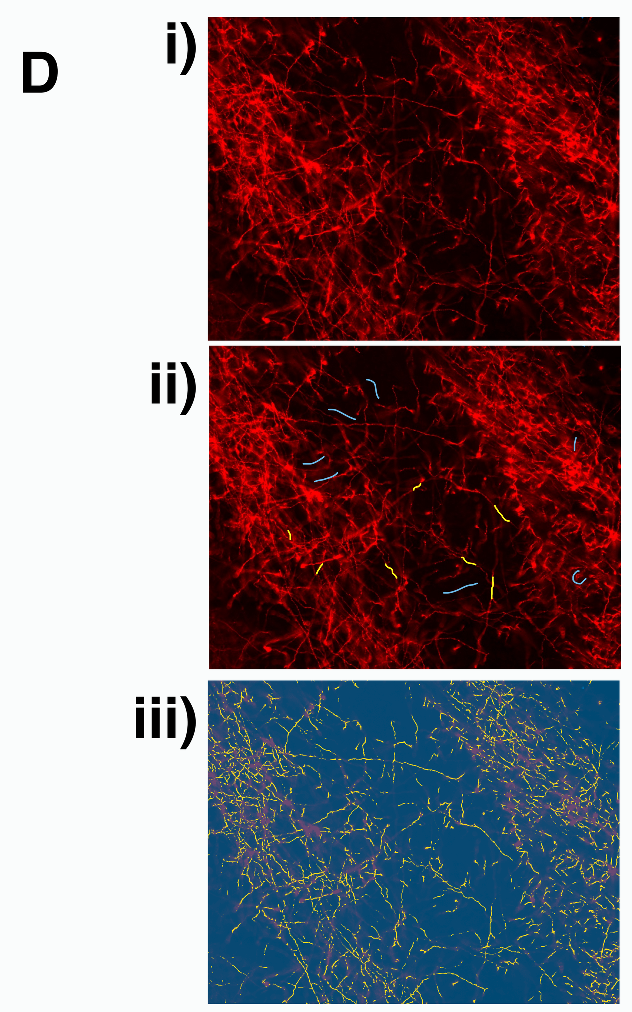
Lateral LEC (lLEC) projects mainly to decision-making and motor control regions, while medial MEC (mMEC) targets visual areas. The area in between appears less specialised. Anteroposterior topography can be seen.

Injection Procedure and Image Analysis Using QUINT



A) Cre recombinase-carrying retrovirus is injected into the orbital or retrosplenial area. The selected EC band Layer 5a is injected with a Cre-dependent reporter-carrying virus. **B)** When the Cre recombinase gene is expressed, the reporter gene starts to be expressed in axons, labelling them. Thus, the projections of different EC parts are labelled.





C) *QUINT* workflow [4]. It allows registering the brain images to a customised atlas. Meanwhile, *ilastik* is trained to recognise axons in the fluorescence channel. After batch processing, custom atlas images and axon segmentations are processed together to extract information in 3D space. **D) *ilastik* processing**. **i & ii)** ilastik is trained to recognise axon and background pixels, **iii)** *ilastik* generates segmentations based on training

Acknowledgements & References

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