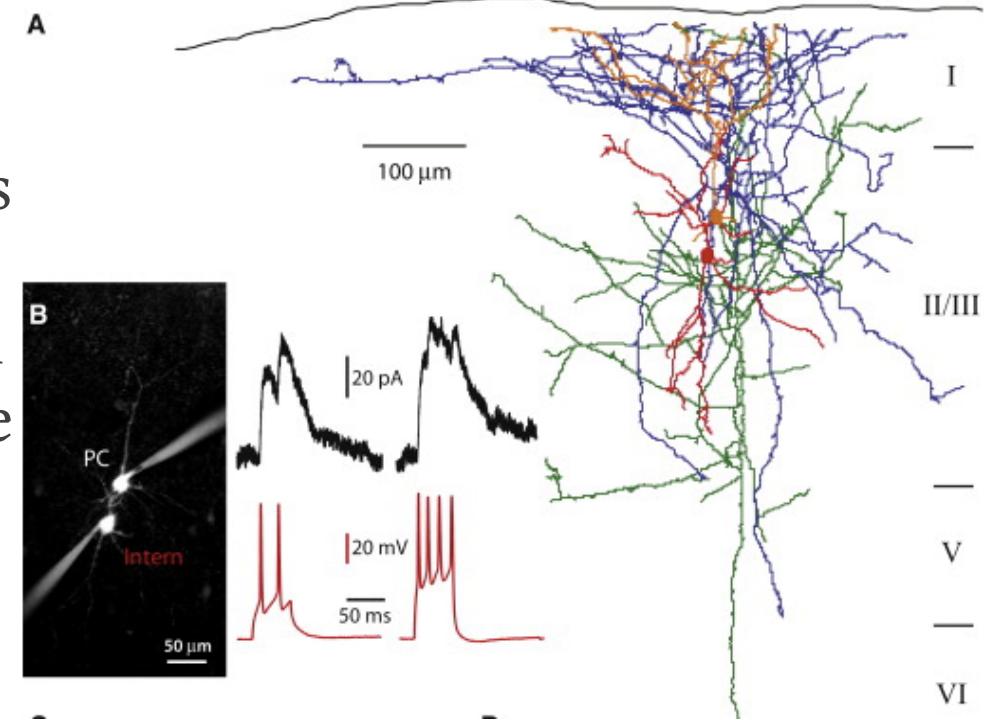


Dense Inhibitory Connectivity in Neocortex

Elodie Fino and Rafael Yuste
Presented by Mónica Rodríguez

Summary

- Investigation of the basic structure of cortical microcircuits by mapping the connections between somatostatin-positive GABAergic interneurons and pyramidal cells in mouse frontal cortex



Opportunity

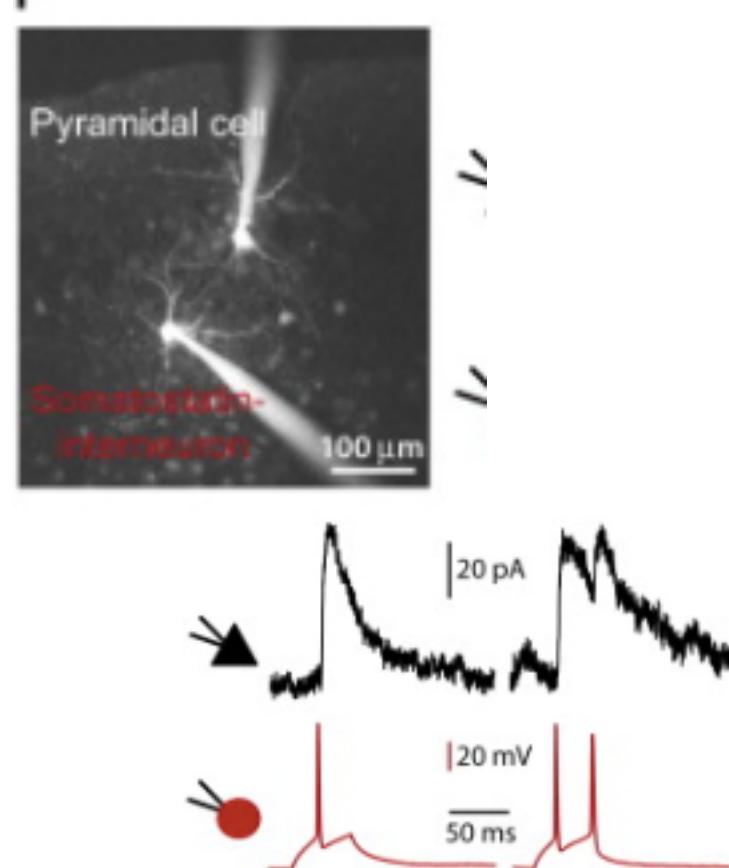
- “The Neocortex is the largest part of the mammalian brain yet its function is still poorly understood”
- Unknown whether each cortical region has a “specific, dedicated circuit.”

Challenge

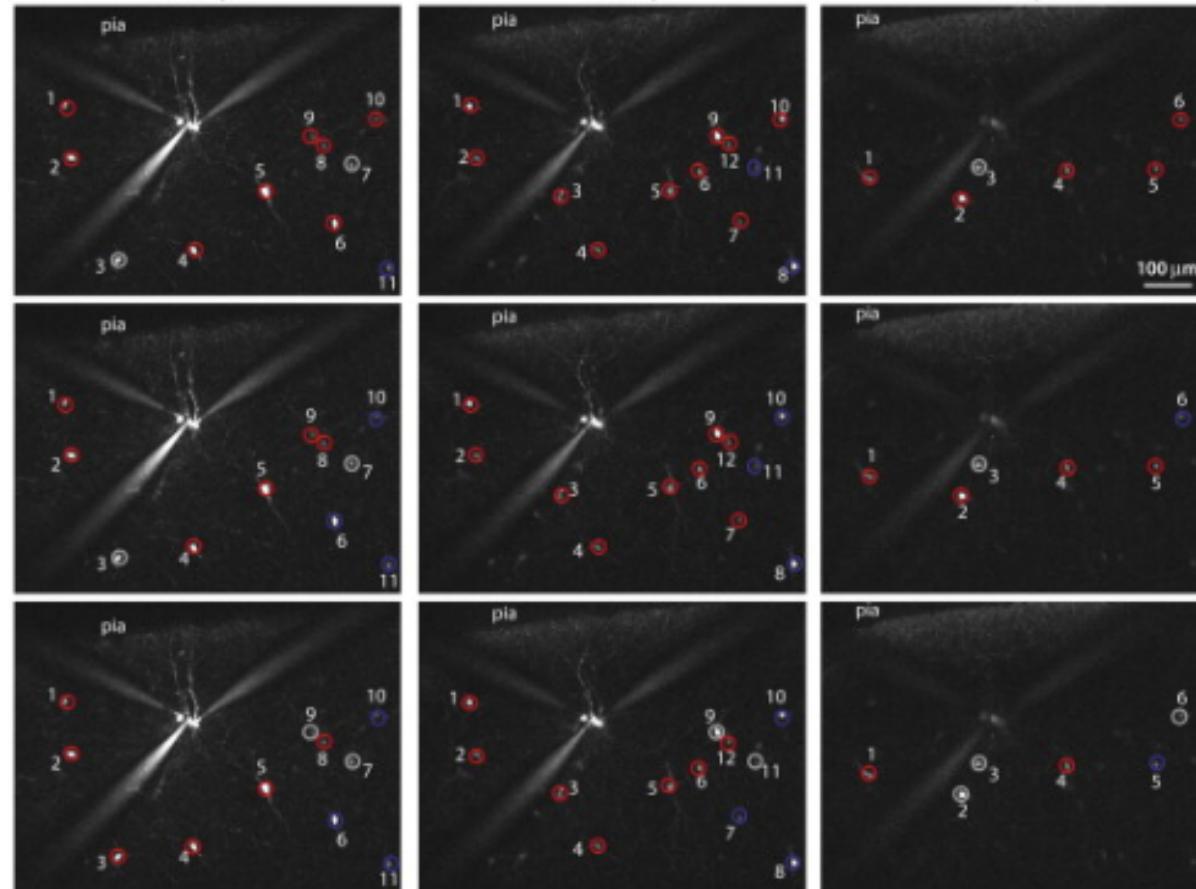
- To study the connections one must reveal synaptically connected neurons
- It is difficult to study all of the connections within a given area with recent methods as they are limited in the amount of connections that can be tested in an experiment

Action

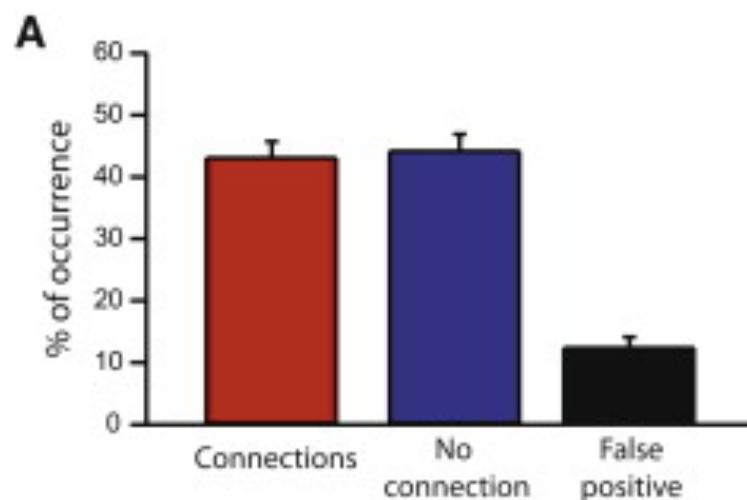
- Two-photon Photostimulation uncaging of RuBi-Glutamate to produce an action potential in the GABAergic interneuron
- Responses in surrounding Pyramidal cells were recorded



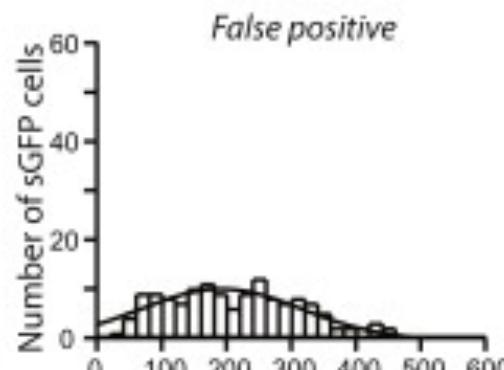
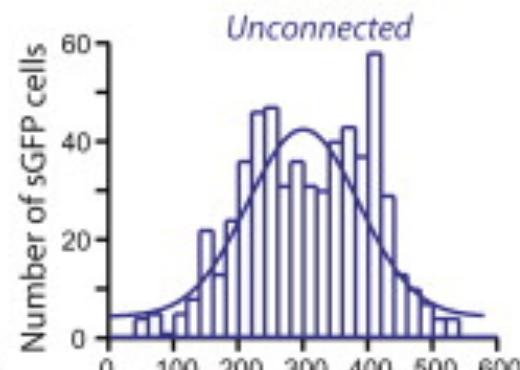
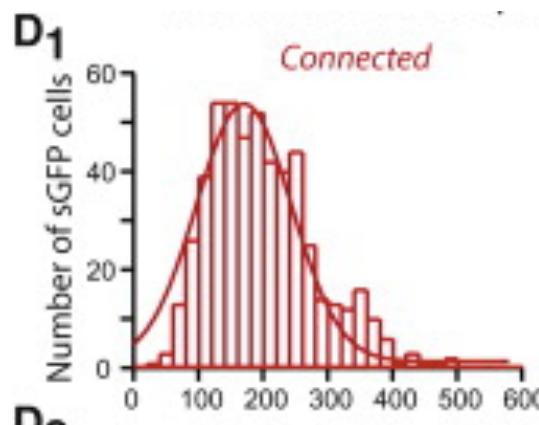
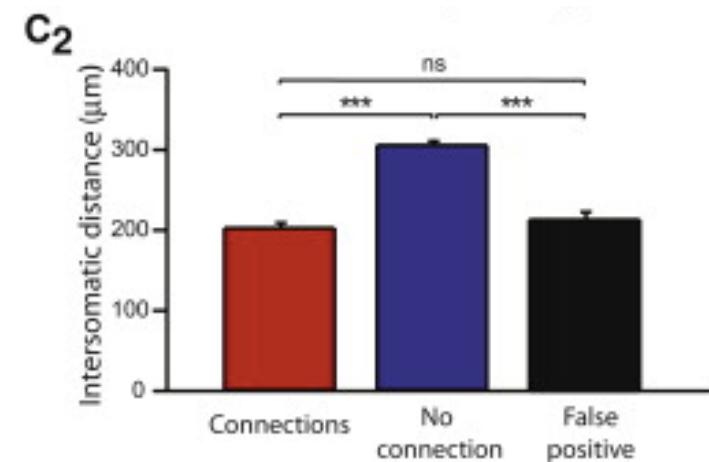
Resolution



Resolution

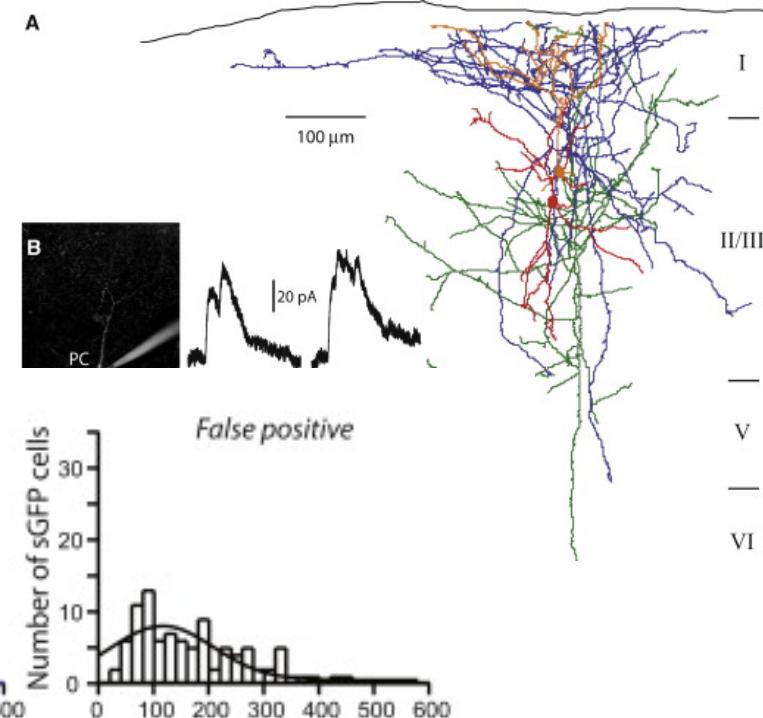
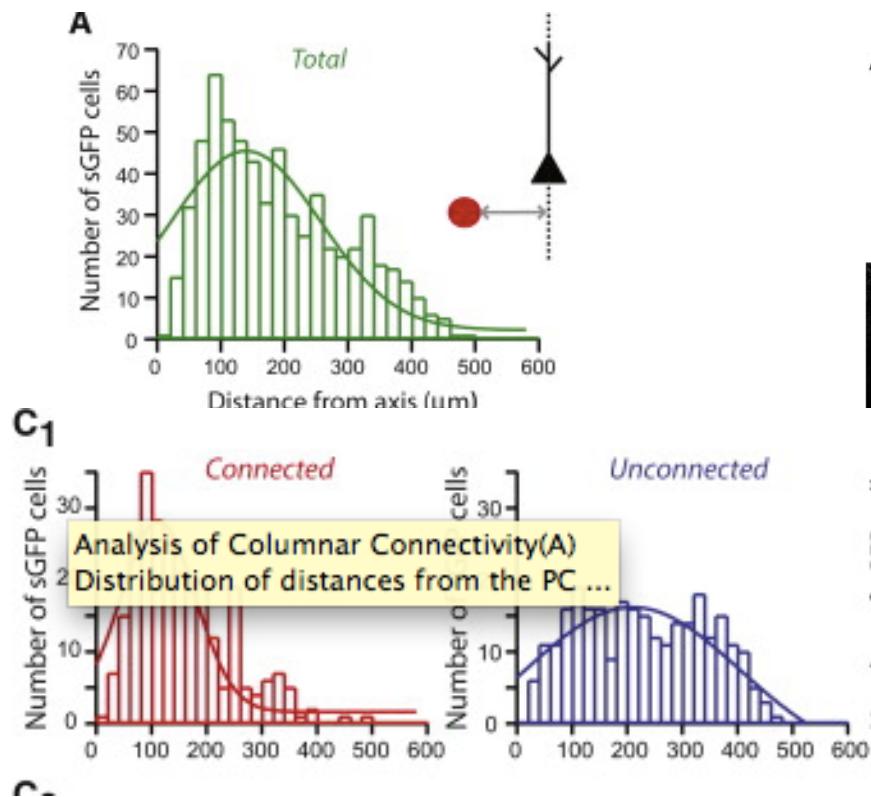


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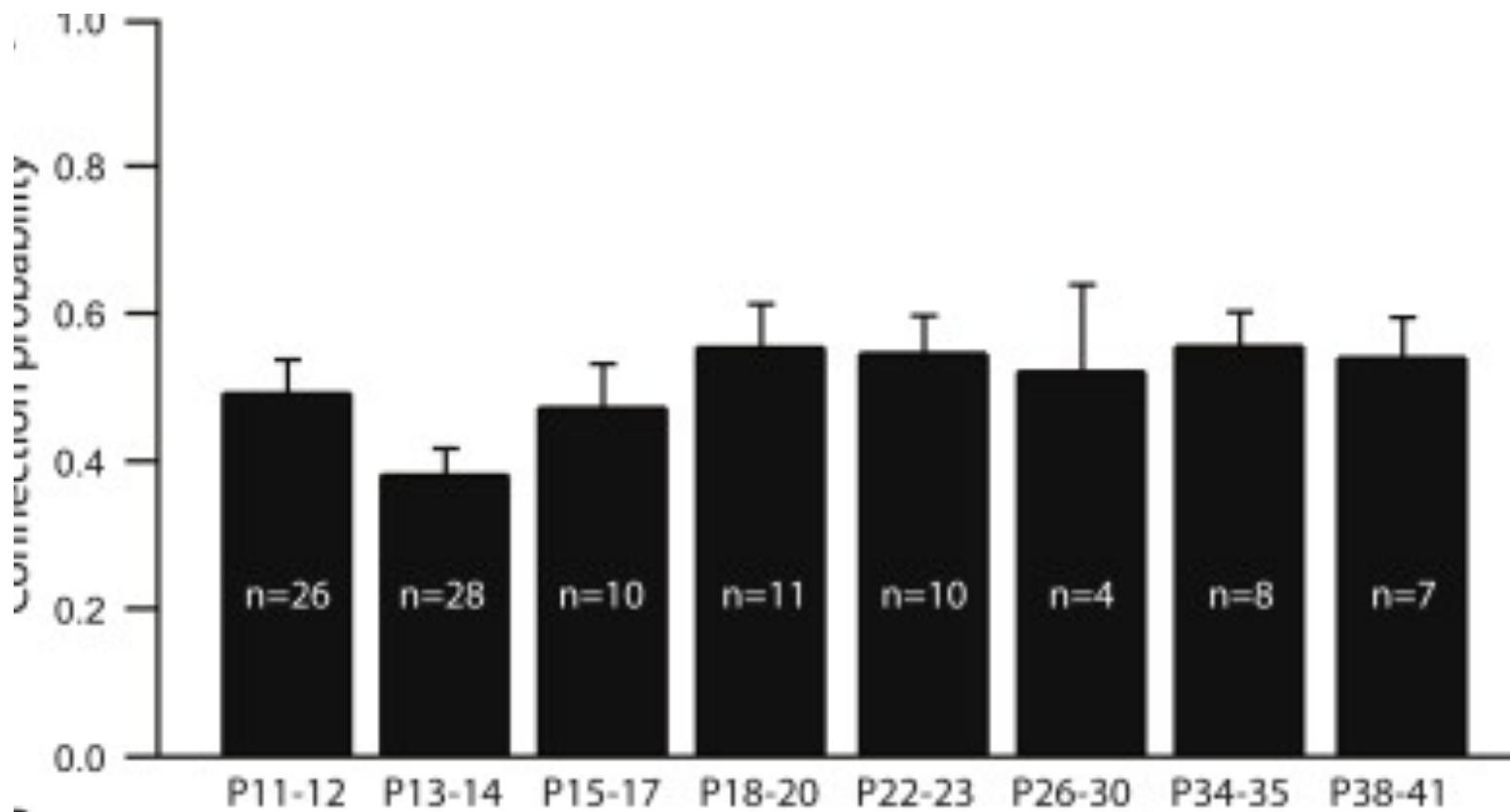


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Resolution



Resolution



Future

- Further studies in other cell types and areas of the neocortex to find if there is similar dense connectivity in those areas, or more distinct specific connection.

Discussion

- Connectivity was probably underestimated as slicing of the brain may have broken connections
- Mapping implies a model where connectivity is maximized.
“every neuron may be connected to each local.”
- Suggests that interneuron inhibition serves to stabilize and control pyramidal cell circuits.

