

# Target Dependent Short-Term Synaptic Plasticity Among Hippocampal Interneurons



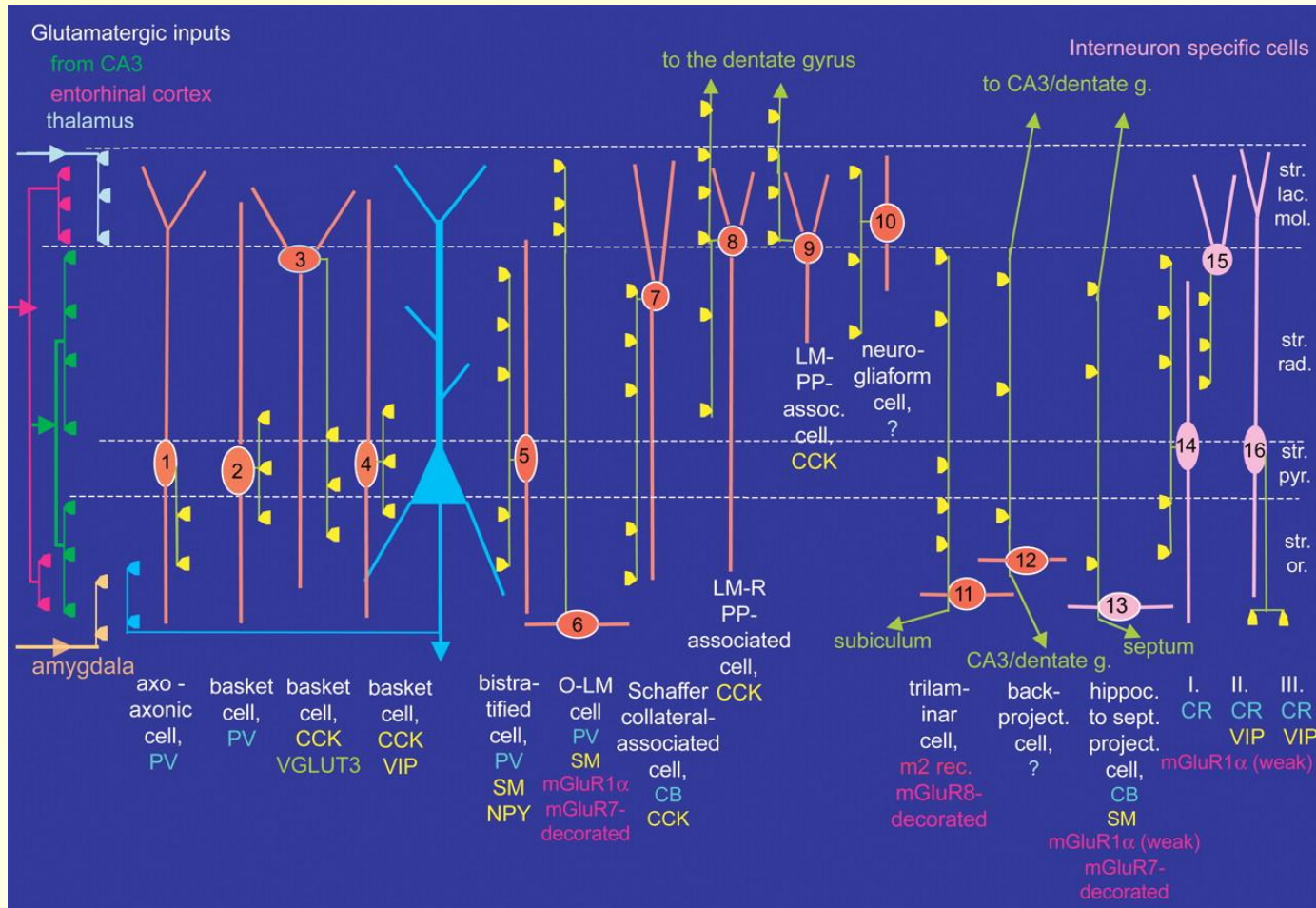
**Dr. Afia B Ali**

**Independent Research Fellow**

**Department of Pharmacology  
The School of Pharmacy  
University of London**

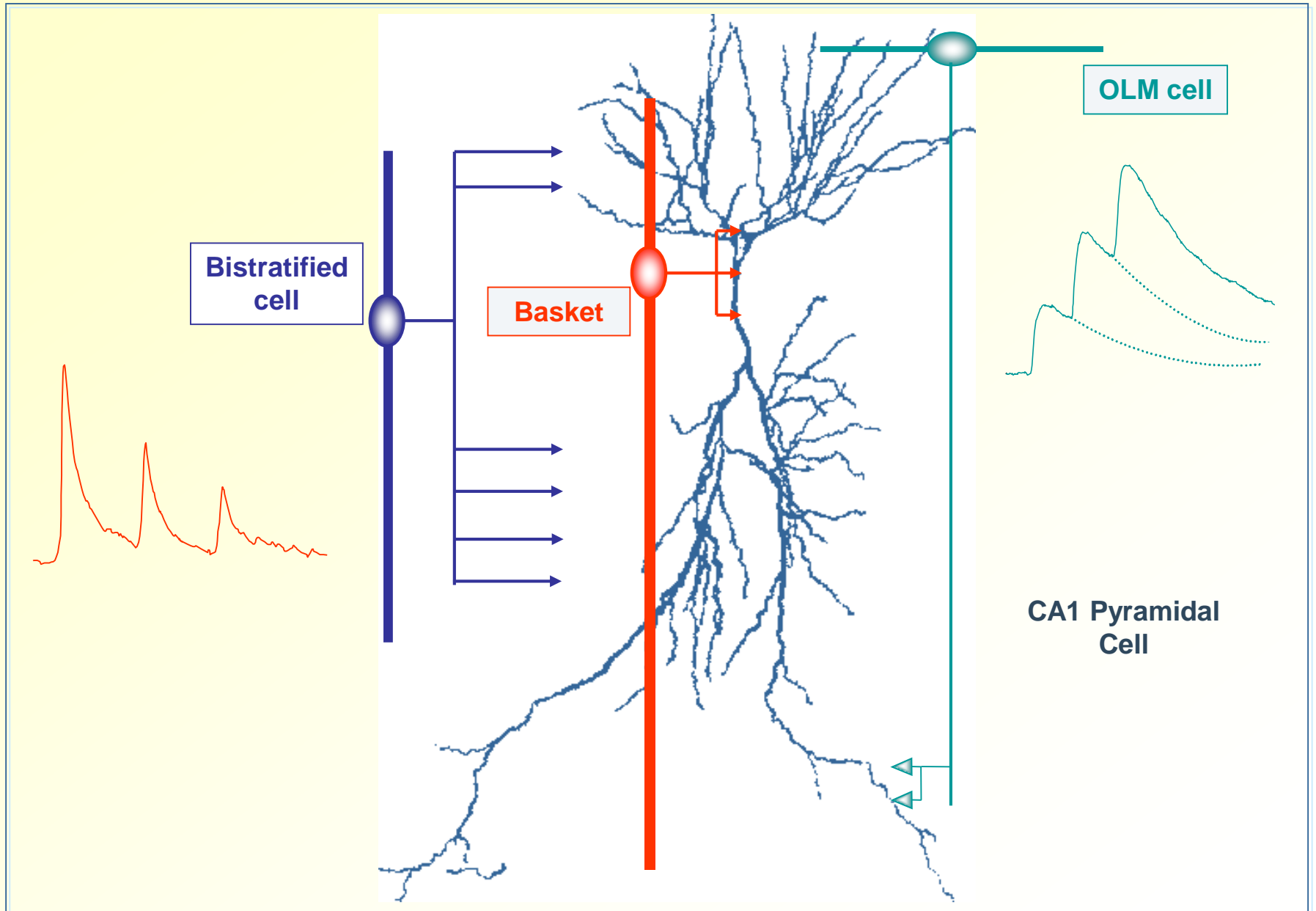
Supported by the MRC (NIA) and Novartis Pharma (Basel).

# Innervation of pyramidal cells by 12 types of GABAergic interneuron and interneurons by 4 types of interneuron specific cell in the CA1 area of the hippocampus

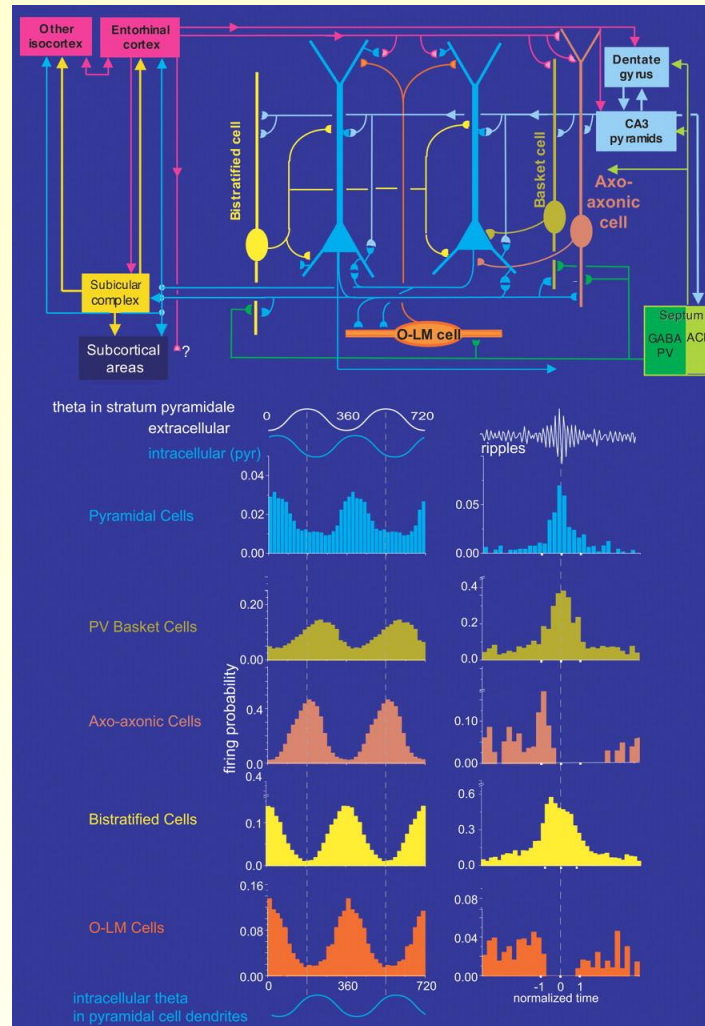


Somogyi, P. et al. J Physiol 2005;562:9-26

# Postsynaptic dependent



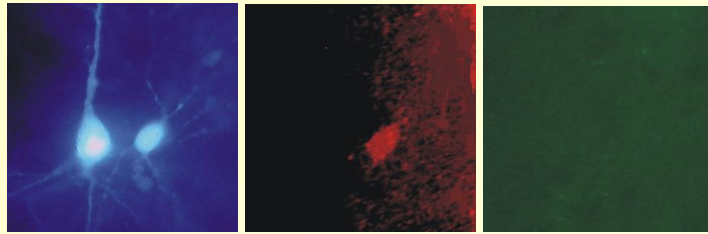
# Synaptic connectivity and distinct in vivo firing patterns of pyramidal cells and four types of interneurone embedded in the hippocampal network



Somogyi, P. et al. *J Physiol* 2005;562:9-26

# Method – paired recordings, biocytin labelling and double immunofluorescence

## Immunofluorescence

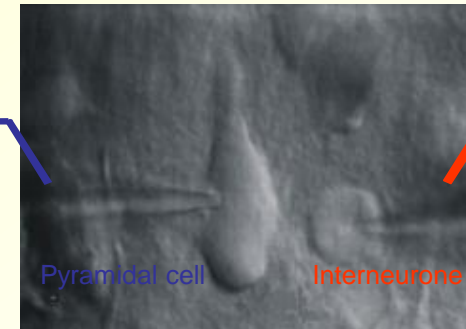


AMCA

PV

CCK

## Dual Whole-cell Recordings

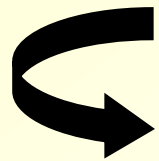
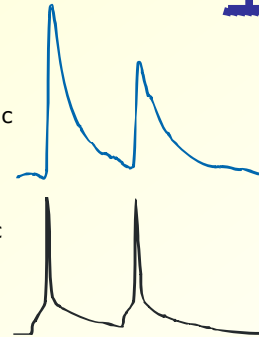


Pyramidal cell

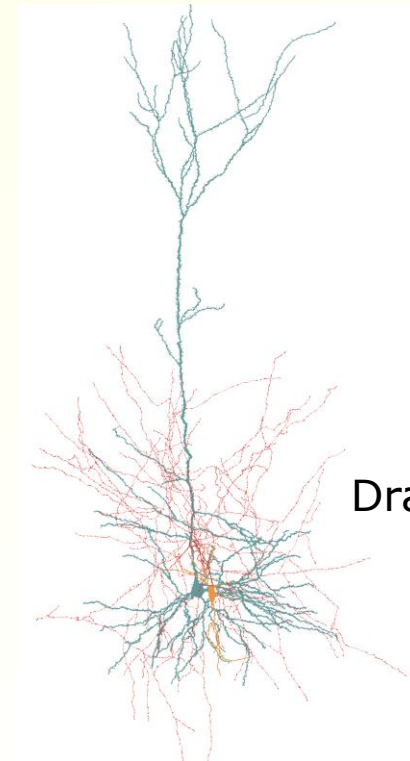
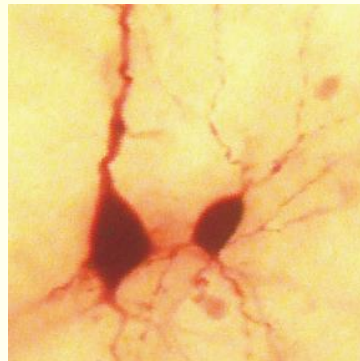
Interneuron

Postsynaptic

Presynaptic



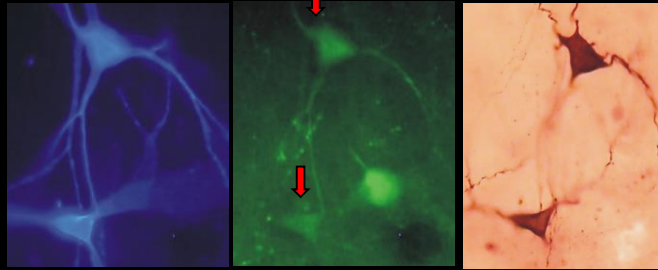
HRP



Drawing



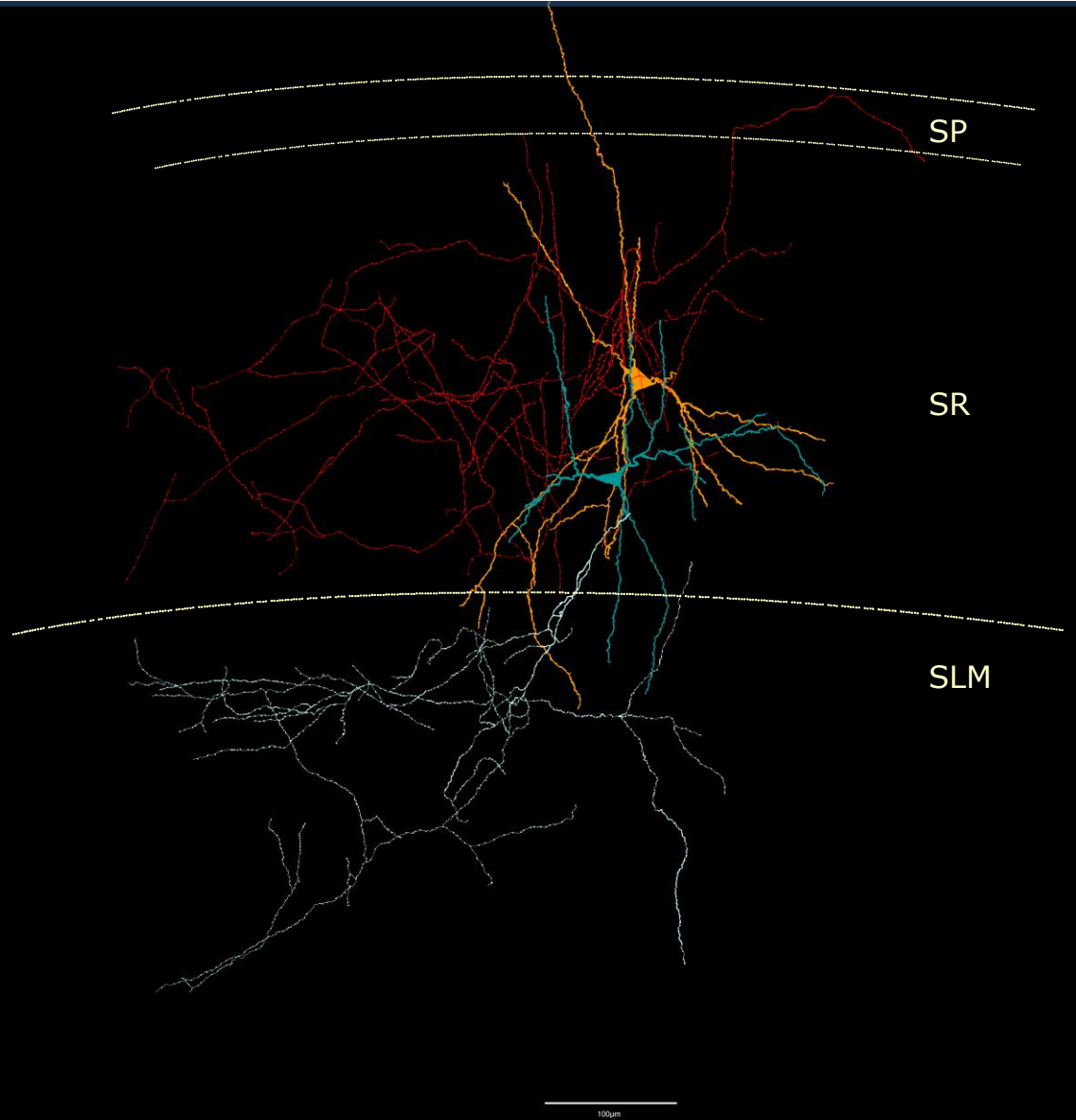
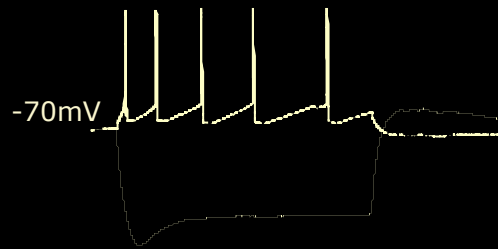
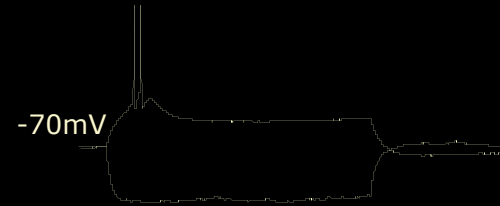
# Control of Inhibition – CCK Positive Interneurones



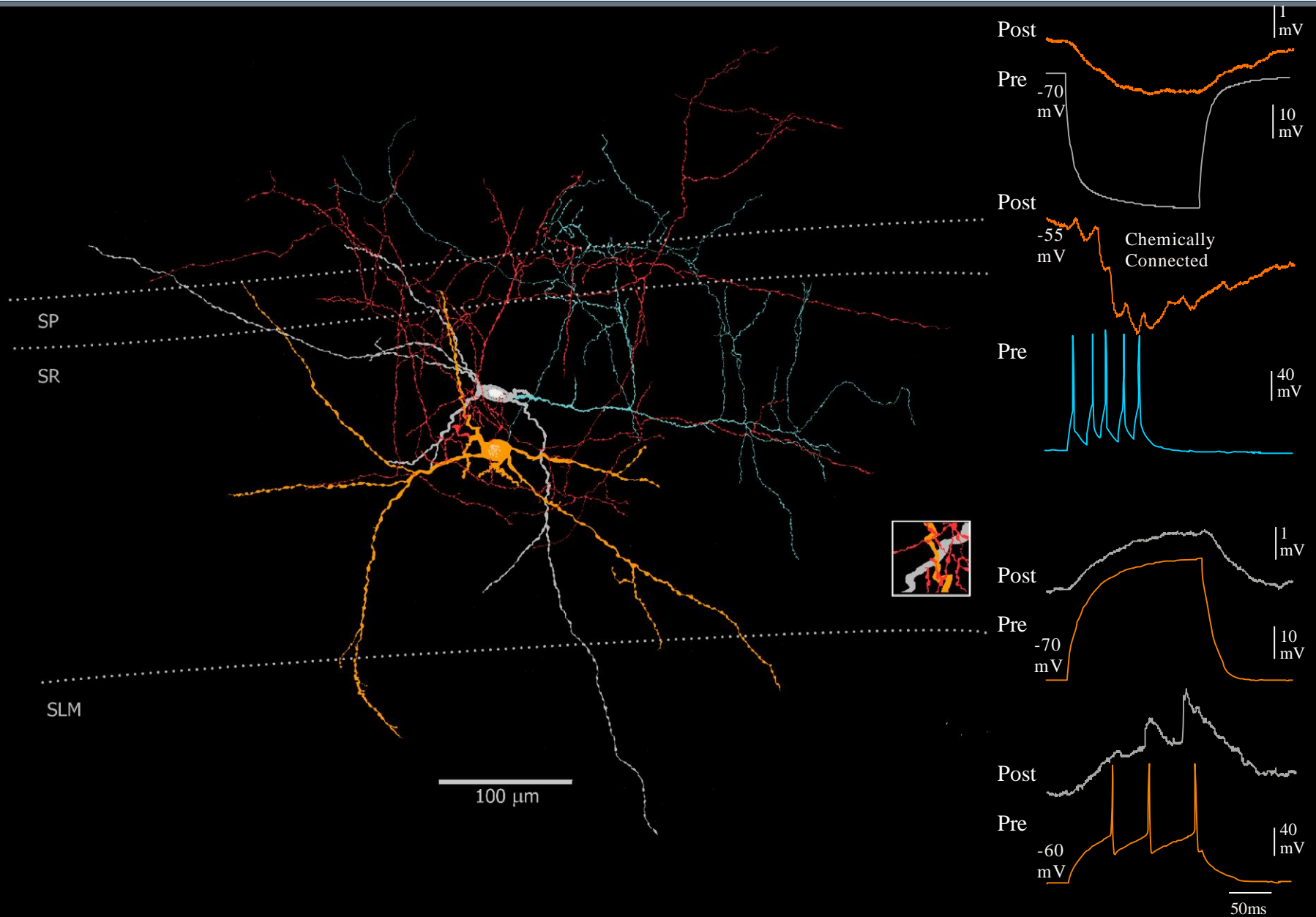
AMCA  
Biocytin

FITC  
CCK

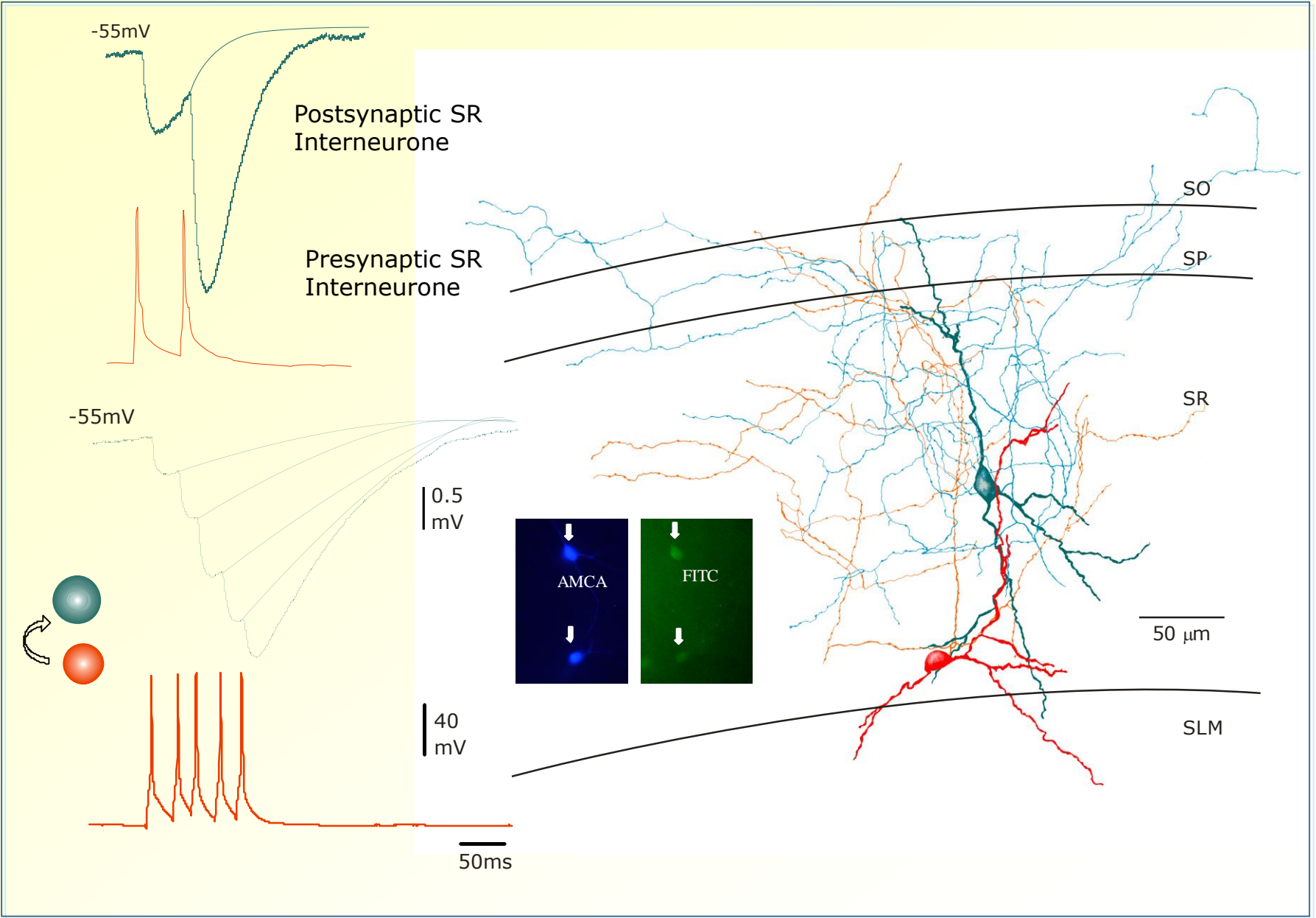
HRP



# Stratum Radiatum Interneurones - Electrically coupled

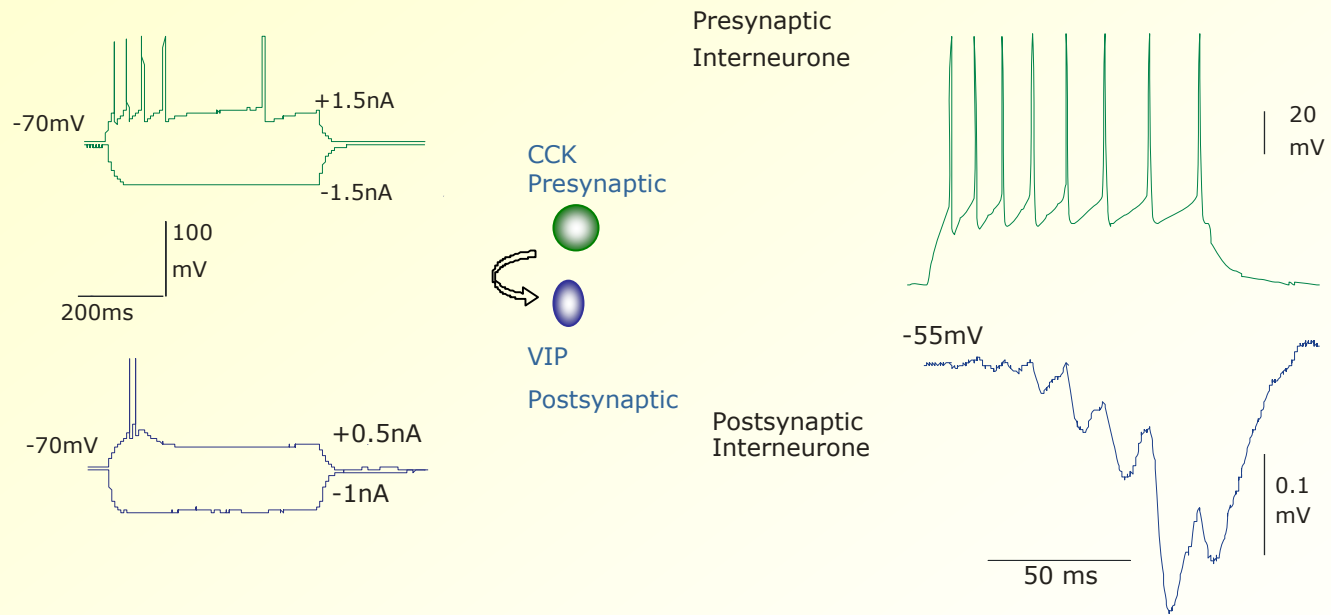


# Short-term synaptic dynamics elicited by SR/SLM Interneurones

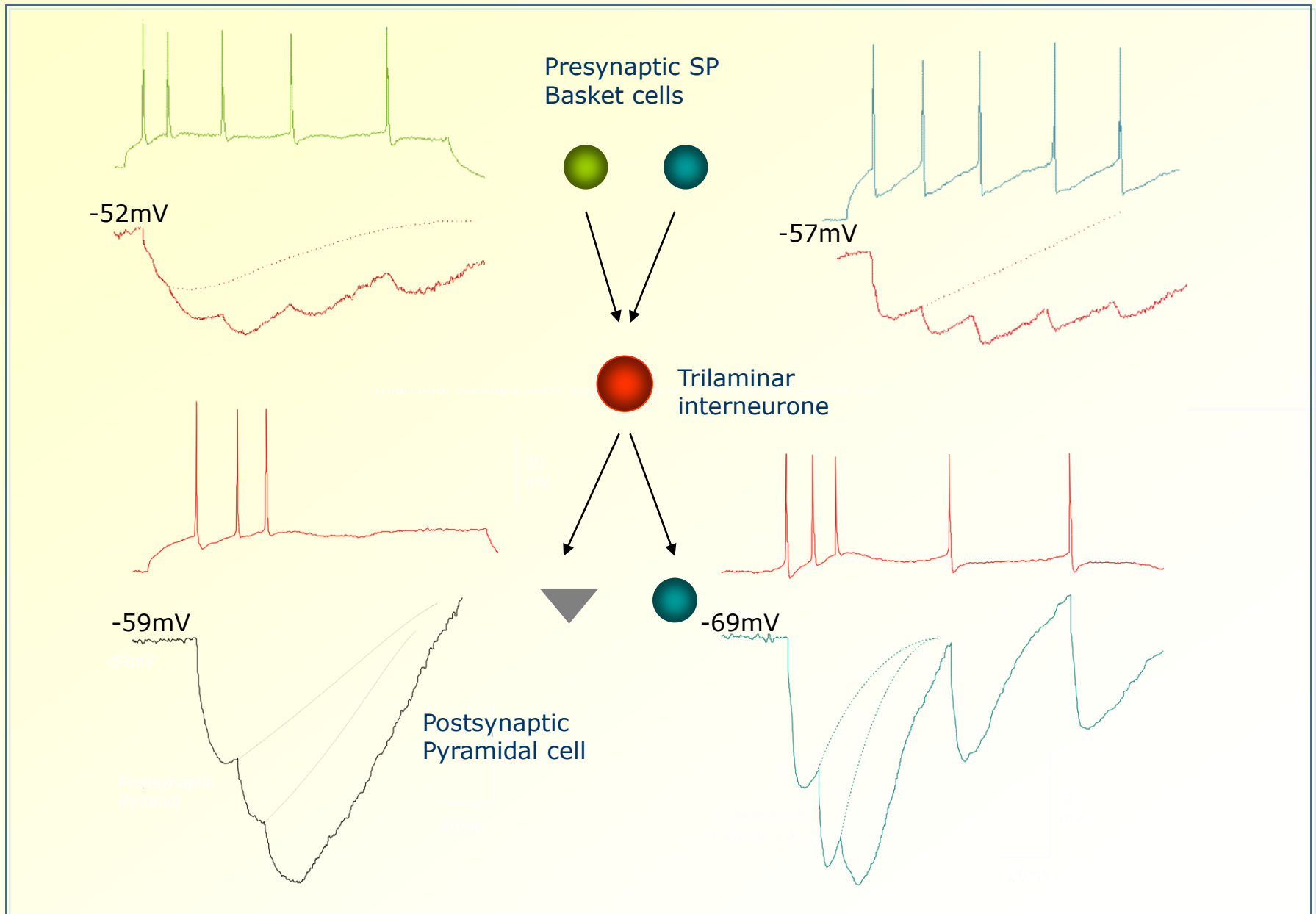




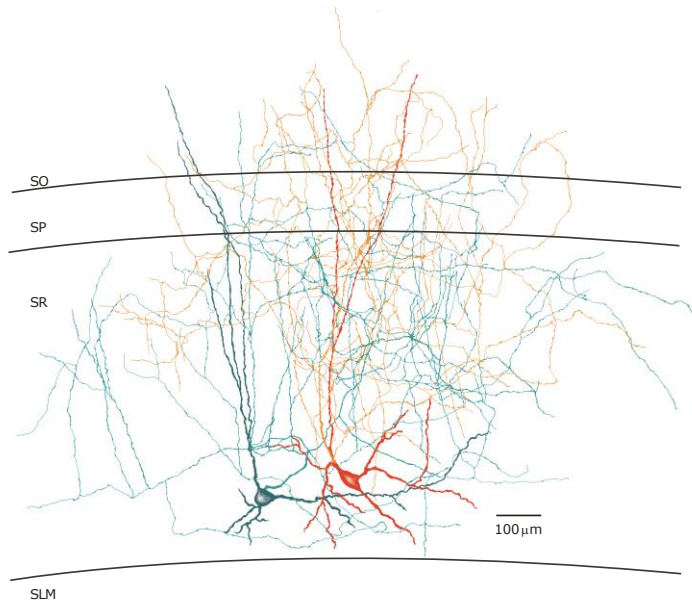
# Short-term synaptic dynamics elicited by SR/SLM Interneurones



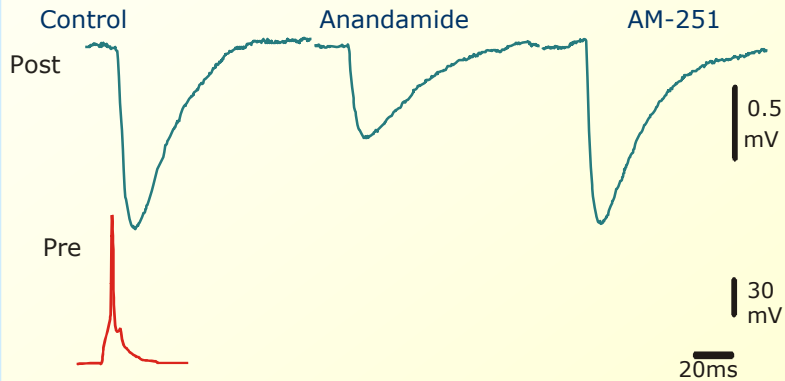
# Short-term synaptic dynamics elicited by SP Interneurones



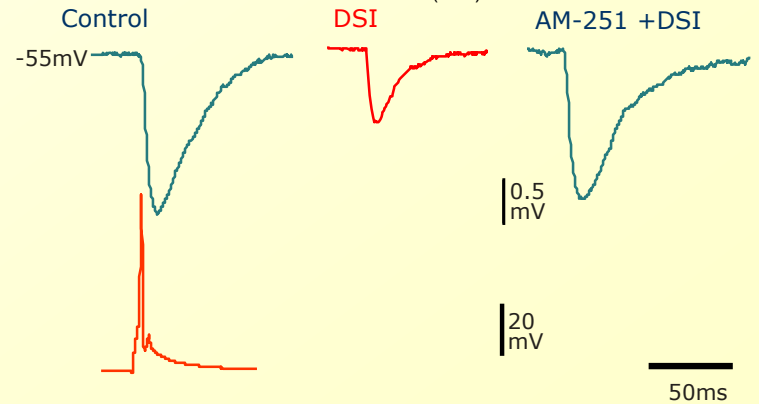
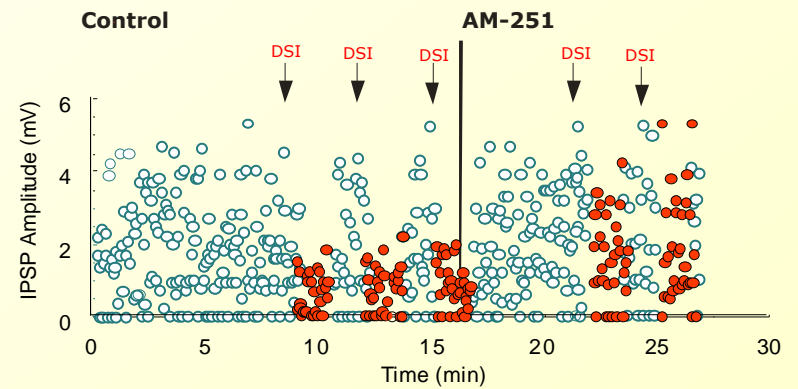
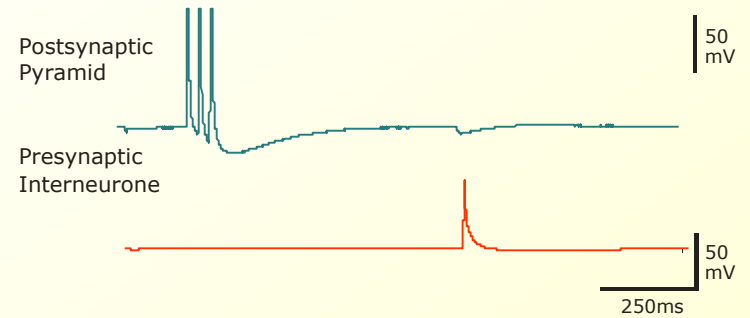
# Control of Inhibition – Presynaptic Cannabinoid Receptors



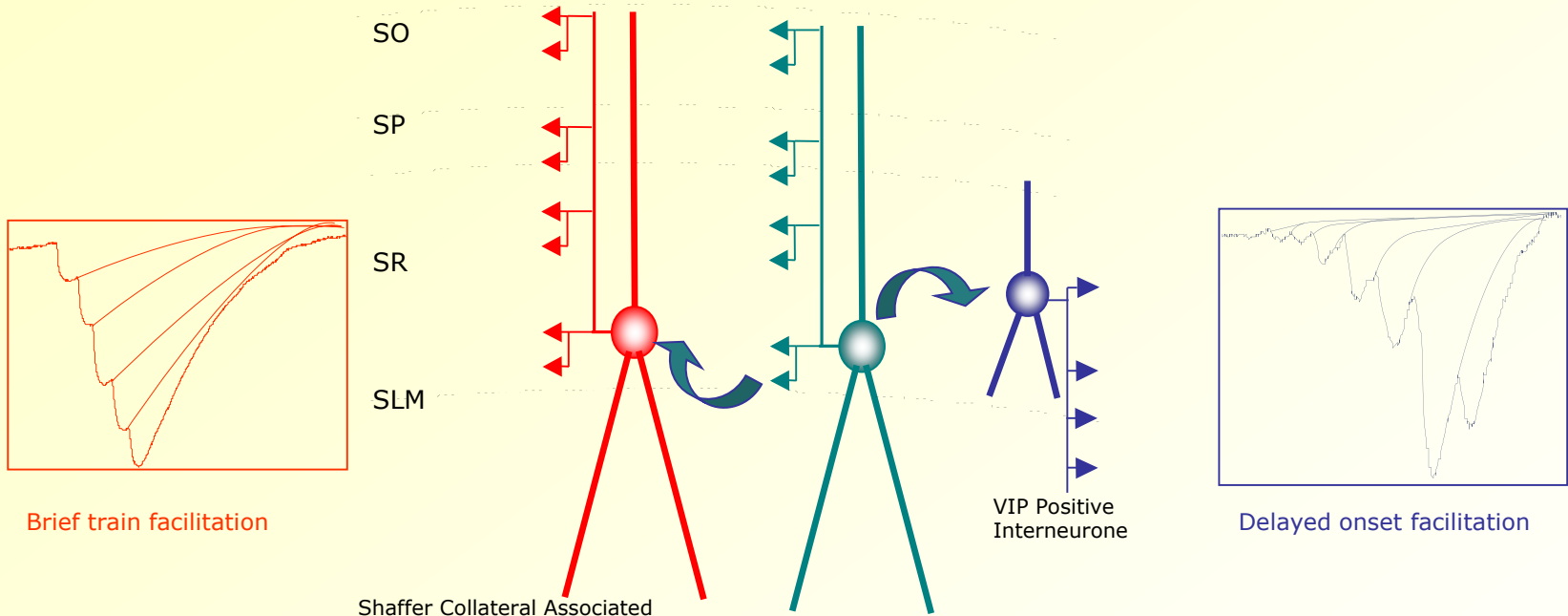
Shaffer Collateral Associated Interneurons  
CCK, CB



## DSI Protocol



# Conclusions

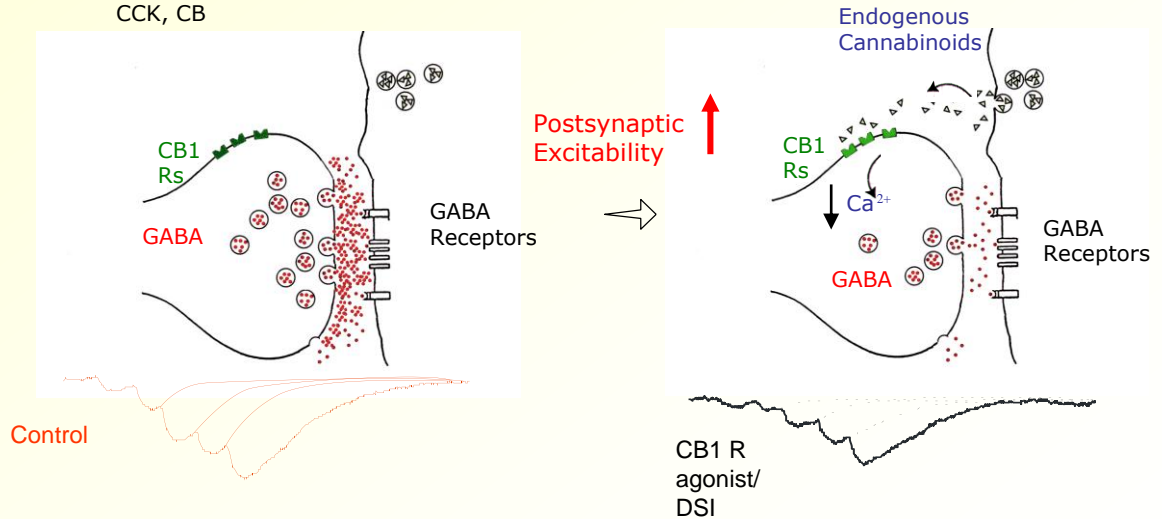


Brief train facilitation

Delayed onset facilitation

Shaffer Collateral Associated Interneurons  
CCK, CB

VIP Positive Interneuron



Control

CB1 R agonist/DSI

# Acknowledgments

## **Technical assistance**

Marina Todorova,

**This work was supported by the Medical Research Council  
(New Investigators award) and Novartis Pharma (Basel)**