Annotated Reading List

Barrionuevo G, Brown TH (1983) Associative long-term potentiation in hippocampal slices. Proc Natl Acad Sci USA 80:7347–7351.

This paper is used to introduce students to the use of hippocampal slices for LTP experiments, discuss the correct placement of electrodes on a hippocampal slice, and analyze results of potentiation.

Bauer D (2017) The Postsynaptic Density Unpacked. Unpublished.

This reading provides important supplementary material regarding the components of the postsynaptic density and their role in regulating which receptors are maintained or turned over at the synapse, which is helpful for students to understand Casimiro et al. (2011). Please contact the corresponding author to access this paper.

Bear MF, Connors BW, Paradiso MA (2016) Chapter 25: Molecular Mechanisms of Learning and Memory. In: Neuroscience: Exploring the Brain, pp814-818, 874-891. Philadelphia, PA: Wolters Kluwer.

Chapter 25 from this textbook provides a clear and detailed explanation of the molecular mechanisms involved in synaptic potentiation. It covers essential topics including the anatomy of the hippocampus, the properties and mechanisms of LTP in area CA1, the mechanisms of LTD, glutamate receptor trafficking during LTP and LTD, and synaptic scaling.

Bliss TV, Lømo T (1973) Long-lasting potentiation of synaptic transmission in the dentate area of the anaesthetized rabbit following stimulation of the perforant path. J Physiol (Lond) 232:331-356.

Figures from this paper were used to show students how the results of LTP experiments are commonly reported.

Casimiro TM, Sossa KG, Uzunova G, Beattie JB, Marsden KC, Carroll RC (2011) mGluR and NMDAR activation internalize distinct populations of AMPARs. Molecular and Cellular Neuroscience, 48:161-170.

This paper is used to discuss the molecular mechanisms that regulate LTD, focusing on how the coupled activation of NMDARs and mGluRs forms synaptic depression via the endocytosis of distinct populations of membrane AMPA receptors.

Malenka RC, Nestler EJ, Hyman SE (2009) Chapter 5: Excitatory and Inhibitory Amino Acids. In: Molecular Neuropharmacology: A Foundation for Clinical Neuroscience, (Snyder A, Brown RY, ed), pp119-130. New York: McGraw-Hill Medical.

This reading provides important supplementary material for understanding the structure and function of glutamate receptors involved in the process of LTP including NMDARs, AMPARs, and mGluRs.

Sheng M, Kim E (2011) The postsynaptic organization of synapses. Cold Spring Harb Perspect Biol a005678.

This paper about the structure and organization of the postsynaptic density can be used in lieu of Bauer (2017) as supplementary reading to help students better understand Casimiro et al. (2011)

Tsien JZ, Huerta PT, Tonegawa S (1996) The essential role of hippocampal CA1 NMDA receptor–dependent synaptic plasticity in spatial memory. Cell, 87:1327-1338.

This paper is used to discuss the molecular mechanisms that regulate LTP and explain the standard practice of using fEPSP slope rather than amplitude as a measure of potentiation.

Turrigiano GG, Leslie KR, Desai NS, Rutherford LC, Nelson SB (1998) Activity-dependent scaling of quantal amplitude in neocortical neurons. Nature, 391:892.

This paper is used to discuss the essential role of synaptic scaling in maintaining synaptic homeostasis in response to potentiation.