

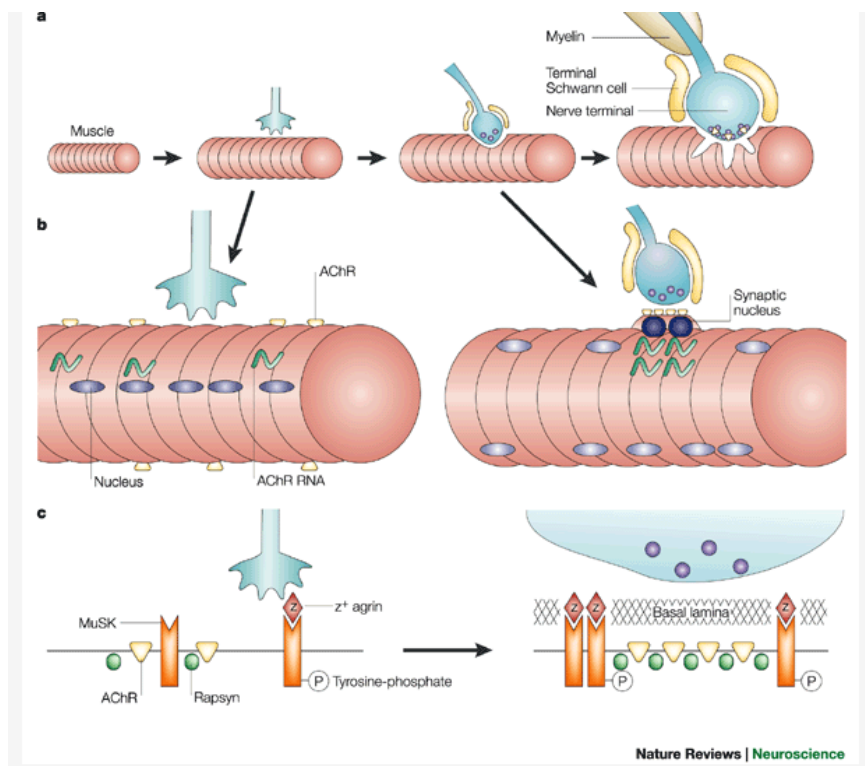
## Recitation 8 Worksheet

- 1) The figure below depicts the process of synapse formation at the neuromuscular junction. It illustrates the important process of agrin secretion by the nerve terminal, and its deposition into the synaptic basal lamina. Agrin is then shown to activate MuSK tyrosine kinase receptors on the postsynaptic muscle, resulting in the phosphorylation of rapsyn and the subsequent stabilization of acetylcholine receptors, leading to their clustering at junctional folds. Another process important in synaptogenesis is alluded to in the figure but is not explicitly depicted. What is this process, what molecule is involved and which signaling pathway is used?
- 2) Which of the following are true (choose all that apply):
  - a. CNS synapses do not contain a basal lamina
  - b. Synapses cannot form in a matter of a couple of hours
  - c. Neuroligins are presynaptic transmembrane proteins whose wide diversity is generated by alternative splicing
  - d. AchRs are already slightly clustered during development and the presence of agrin serves to stabilize the aggregation in certain clusters

Answers:

- 1) In a multinucleated muscle fiber, the nuclei right below the synapse migrate upward and increase transcription of acetylcholine receptor genes. This process involves the protein neuregulin, which is secreted by the nerve terminal and binds to ErbB on the muscle, a receptor tyrosine kinase which signals through the MAPK pathway. This signaling pathway leads to the upregulation of acetylcholine receptor expression in sub-synaptic nuclei.

- 2) A, D



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