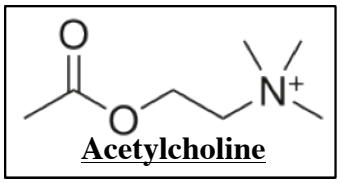
Acetylcholine Receptor Up-Regulation

Anesthetic Pearls: Anesthetic Implications of Acetylcholine Receptor Up-Regulation

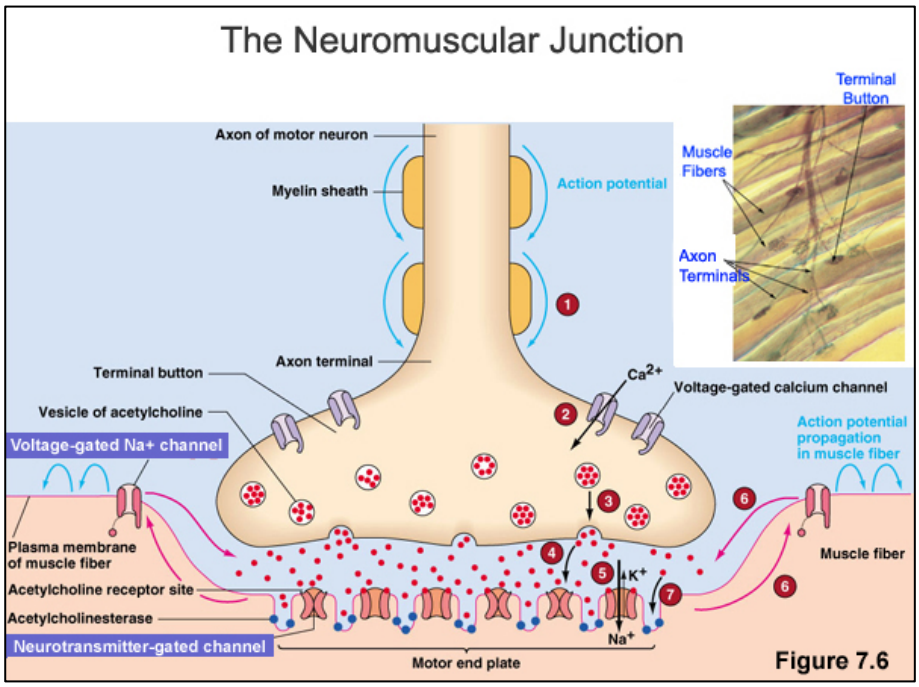


Acetylcholine

One of the most important concepts with **Acetylcholine Receptor Up-Regulation is the <u>effect on serum potassium levels</u>**. Succinylcholine is the drug that can trigger an acute increase in serum potassium levels. Under normal circumstances, Succinylcholine can cause serum potassium to increase 0.5 – 1.0 mEq/L. With acetylcholine receptor up-regulation, Succinylcholine induced increase in serum potassium can be much greater than 1.0 mEq/L.

In patients with the following disease states, acetylcholine receptor up-regulation can produce both dramatic and deadly episodes of hyperkalemia.

1. Burns (greatest risk with in a few days to 6 months post-injury)
2. Muscle diseases (Duchene's muscular dystrophy)
3. Neuromuscular disorders (Guillain-Barre, ALS, Friedrich's Ataxia)
4. Upper and Lower motor neuron disease
5. Trauma
6. Prolonged bed rest
7. Closed head injuries



The resultant serum hyperkalemia is thought to be secondary to up-regulation of extrajunctional acetylcholine receptors that cause an increased intracellular unloading of potassium when activated. The pneumonic "**C-BIG-K**" is helpful for remembering the acute treatment options for hyperkalemia. Emergent / acute treatment involves using **C**alcium (chloride centrally or gluconate peripherally), **B**icarbonate, **I**nsulin, **G**lucose, **K**ayexelate.