https://doi.org/10.30895/2312-7821-2024-12-3-299-308-fig3-eng

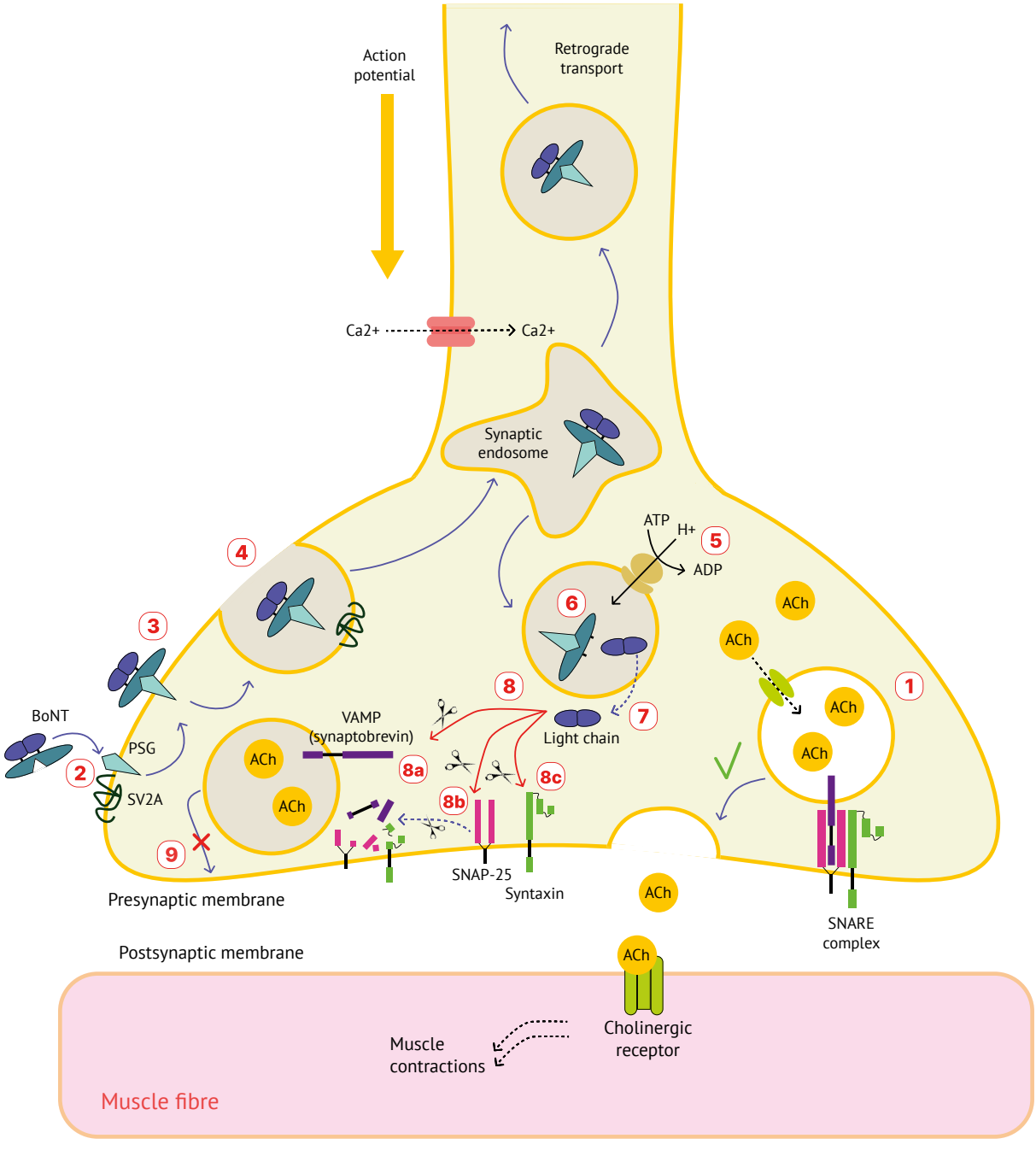

Fig. 3. Mechanism of damage to presynaptic nerve endings by botulinum neurotoxin (BoNT) (1) Normal acetylcholine (ACh) release. (2–3) High-affinity binding of the BoNT heavy chain to proteins of the presynaptic membrane of skeletal and autonomic cholinergic nerve terminals, with high binding selectivity due to the ability of BoNT to interact with two structures of the presynaptic membrane, including polysialoganglioside (PSG) and synaptic vesicle glycoprotein 2A (SV2A, a transmembrane protein of synaptic vesicles). (4) Receptor-mediated endocytosis of the PSG–BoNT complex. (5) Acidification of the synaptic endosome environment. (6) Release of the BoNT light chain from the heavy chain. (7) Release of the BoNT light chain from the somatic endosome into the cytoplasm. (8) Destruction of target proteins—SNAP–25 (synaptosomal-associated protein), VAMP (vesicle-associated membrane protein; synaptobrevin), and syntaxin—by the light chain of BoNT. (8a) Cleavage of VAMP by BoNT/B, BoNT/D, BoNT/F, and BoNT/G. (8b) Cleavage of SNAP–25 by BoNT/A, BoNT/E, and BoNT/C. (8c) Cleavage of syntaxin by BoNT/C. (9) Disruption of acetylcholine exocytosis