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REVERSAL POTENTIAL MEASUREMENTS FOR POTENTIALS
PRODUCED BY A GROUP OF CHOLINERGIC COMPOUNDS
IONTOPHORETICALLY APPLIED TO THE FROG ENDPLATE

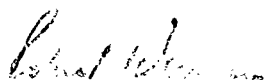
by

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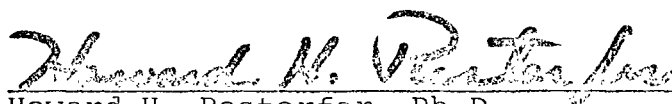
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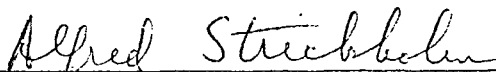
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Abstract

Do each of a group of strong and weak cholinomimetics depolarize the frog endplate via similar or dissimilar ionic mechanisms? Since the reversal potential is a measure of the ionic mechanism underlying a postsynaptic potential (PSP), the reversal potentials for each of the iontophoretic potentials produced by carbachol, nicotine, succinylcholine, edrophonium (weak), and heptyl-trimethylammonium (weak) were measured and compared to that for the acetylcholine (ACh) iontophoretic potential; each comparison was performed on a single endplate from a muscle sartorius. A PSP reversal potential was determined by interpolating the relationship between the height of the PSP and the experimentally varied membrane potential. The use of glycerol-treated muscle permitted the successive depolarization of a given endplate membrane to be performed in contraction-free conditions. No large differences were observed between the reversal potentials for each of the various cholinomimetic drug potentials and the ACh potential: Ratios of the driving force (PSP reversal potential minus the resting potential) for a cholinomimetic to that for ACh ranged from 0.95 (edrophonium) to 1.02 (succinylcholine). The mean \pm S.D. value of the reversal potential for the ACh potential was -2.8 ± 5.9 mV (16 fibers). PSP reversal potentials were shown to be independent of dose and of desensitization. The data strongly indicate that the endplate receptor is activated

in an all-or-none fashion and that, therefore, differences among the intrinsic activities of the weak and strong depolarizers may be due to differences in the probabilities that the various drug-receptor complexes will be active.

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