

CHAIRMAN'S OVERVIEW

MEMBRANE SUBGROUP SYMPOSIUM ON LOCAL ANESTHETIC EFFECTS

Nearly all of us take a keen personal interest in the clinical aspects of local anesthetics from time to time. These potent agents are also interesting scientifically, however, at least in part because of the wide range of their often dramatic effects. They can disorder the lipids in membrane bilayers, alter membrane surface charge, block voltage-gated channels of nerve in complicated ways that depend on the history of channel use, affect excitation-contraction in muscle, and dramatically alter the time-course of the acetylcholine-produced conductance increase at the neuromuscular junction. Because the mechanism of local anesthetic effects has been studied with increasingly sophisticated techniques in recent years, I thought that a symposium that reviews their mechanism of action would be timely.

As local anesthetic effects are studied with techniques ever closer to the molecular level, most workers seem to be arriving at some version of the theory that these agents act by physically blocking a channel in some membrane. Nerve (Strichartz), muscle (Almers), and synaptic effects (Steinbach) all seem to fit most neatly with this idea. Local anesthetics have a profound influence on the local structure of lipids in bilayer membranes, however, and this influence might still account for local anesthetic action in many cases (Trudell). Most likely, channel blocking, surface charge effects, and lipid disordering all occur simultaneously, and one or the other of these mechanisms may dominate in a particular system.

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