

## CORRESPONDENCE

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### Prevention of Fire Hazard during Laser Microsurgery

*To the Editor:*—The letter from Doctors Hirshman and Leon emphasizes again the risk of fire hazard during laser microsurgery,<sup>1</sup> either from direct beaming of the laser or spontaneous ignition when the critical temperature is exceeded.

We have found that muslin wrapping of the endotracheal tube is effective only as long as the material stays moist. Adherent foil is less effective, and may easily burn if direct contact is made with the laser beam. In addition, reflection of the beam from the surface, especially of aluminum containing substances, may cause "hot spot" burning on surrounding areas of tracheal mucosa.

In our experience, coating of the endotracheal tube with dental acrylic provides a smooth, adherent, non-reflective cover which appears to be totally nonflammable and can provide protection against temperature increases within the tube (fig. 1).

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FIG. 1. An endotracheal tube covered with a pink dental acrylic, which is molded and adherent to the tube.

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### Partition Coefficient vs. Dissociation Rate Constant as Determinant of Duration of Neuromuscular Blockade

*To the Editor:*—Further to the correspondence of Kopman<sup>1</sup> on the paper of Stanski and Sheiner,<sup>2</sup> I wish to make two comments to demonstrate the inconsistencies of Stanski's post hoc reasoning used in his reply.

If the muscle/blood or blood/fat partition coefficient were more important than the dissociation rate constant of drugs in determining duration of action, then the monoquaternalary pancuronium analogue, ORG NC45, which is more fat soluble than pancuronium, should be longer acting. In both the isolated arm and following bolus injection, it is very much shorter acting

(Bencini *et al.*).<sup>3</sup> Regarding decamethonium, it was demonstrated many years ago independently by Waser,<sup>4</sup> Taylor,<sup>5</sup> and Creese *et al.*<sup>6</sup> that decamethonium rapidly penetrates muscles and has a high affinity for muscle. According to Stanski's hypothesis, this should make it long acting in the isolated arm, while in our experiments, it had a recovery time 85 per cent shorter than *d*-tubocurarine.

Finally, I do not believe that the small increase in plasma level that occurs following the release into the circulation of the remnants of the 2 mg of *d*-tubo-

curarine injected into the isolated arm and its subsequent redistribution in the rest of the body, could possibly explain the difference between Stanski's calculated recovery index of 9 min and that observed of 12.9 min, a difference of almost 45 per cent.

Dr. Kopman's remark that the differences in receptor dissociation between drugs remains the most plausible explanation of observed results, remains unanswered by Stanski's reply.

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*In reply:* Instead of speculation regarding the drug-receptor events for the nondepolarizing muscle relaxants using indirect evidence such as Dr. Feldman's isolated arm studies or our pharmacokinetic and dynamic modeling concepts, it would be more instructive to examine the recent data of Armstrong and Lester<sup>1</sup> who have directly measured the kinetics of *d*-tubocurarine (dTc) onset and offset. Frog skeletal muscle fibers were studied using twin barrelled micropipettes to ionophorese either acetylcholine or dTc, and recorded the membrane potential of the muscle fiber intracellularly. They demonstrated that the rate of receptor-drug dissociation was extremely rapid, in the order of milliseconds, and began to approach the limits of measurement with the electrophysiological apparatus. There does not seem to be an electrophysiological basis for Dr. Feldman's concepts of drug receptor dissociation causing termination of muscle relaxant effect.

How can one conceptualize the rapid recovery of ORG NC45 in the isolated arm relative to pancuronium? One explanation using our pharmacokinetic concepts would be a lower muscle/blood partition coefficient. As Dr. Feldman observed, ORG NC45 is predicted by Savage *et al.*<sup>2</sup> to be more lipophilic than pancuronium, however, definite measurement of its muscle/blood partition has yet to be performed. Another factor that may allow more rapid

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recovery of ORG NC45 relative to pancuronium in the isolated arm is the deacetylation of the molecule to less active metabolites at pH 7.4 in plasma.<sup>2</sup> While the exact contribution of this chemical instability in terminating the effect of ORG NC45 remains to be determined, this effect occurring in plasma combined with muscle perfusion may be important factors in causing more rapid recovery with ORG NC45.

In summary, the work of Armstrong and Lester<sup>1</sup> does not seem to confirm the rate limiting aspects of drug receptor dissociation and more knowledge of the pharmacology of ORG NC45 is necessary before it can be compared to pancuronium or *d*-tubocurarine in the isolated arm experiments.

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