

## CORRESPONDENCE

more accurately reflect *in vivo* responsiveness; *i.e.*, the individual muscle fiber basis for masseter spasm is not yet explained.

**Agi Melton, M.D.**  
Staff Anesthesiologist  
Veterans Administration Hospital  
Reno, Nevada  
**Gerald A. Gronert, M.D.**  
Professor Emeritus of Anesthesiology  
**Joseph F. Antognini, M.D.**  
Associate Professor of Anesthesiology  
TB-170  
University of California  
Davis, California 95616  
jfantognini@ucdavis.edu

Anesthesiology  
2000; 92:629  
© 2000 American Society of Anesthesiologists, Inc.  
Lippincott Williams & Wilkins, Inc.

*In Reply.*—We greatly appreciate the interest of Drs. Melton, Gronert, and Antognini in our study. We do not believe that their findings of no response to halothane in cut masseter muscle bundles is necessarily inconsistent with our own observation of an increased sensitivity to caffeine and halothane in skinned muscle fibers.<sup>1-3</sup> Skinning muscle fibers may permit greater access of caffeine and halothane to the exposed contractile apparatus, which would account for the fact that the ranges of caffeine and halothane threshold concentrations in our study were lower than those found using different skinning and storage methods and different muscles.<sup>1,2</sup> However, the results from skinned masseter muscle were obtained using the same standardized testing methodology, laboratory, technicians, and equipment used to study the vastus muscle. In addition, the loss of low-molecular-weight intracellular proteins from skinned fibers such as ions, nucleotides, lipid derivatives, or ryanodine receptor-protein interactions may lead to different results from those seen with cut bundles.<sup>4</sup>

If we compare the results of Dr. Melton's results with our own, it appears that masseter and vastus sensitivities to halothane and caffeine may depend on modulators of sarcoplasmic reticulum function that are destroyed in skinned fiber (*e.g.*, dihydropyridine receptors from the T tubules) but not in cut muscle bundle preparations. It would have been surprising that all cut masseter muscle bundles contract in response to halothane *in vitro* because volatile anesthetics *in vivo* do not systematically exert sustained increased in masseter muscle tone. Different experimental conditions may reflect different levels of control of electrocontraction coupling, and may account for variations in observed response of masseter muscle *in vitro*. Clearly, additional studies are needed to clarify the role of endogenous modulators and environmental factors in the triggering of a masseter spasm episode.

## Reference

1. Reyford H, Adnet PJ, Tavernier B, Beague S, Ferri J, Krivosic-Horber RM, Haudecoeur G: Halothane induces calcium release from human skinned masseter muscle fibers. *ANESTHESIOLOGY* 1999; 90:1019-25
2. Adnet PJ, Reyford H, Tavernier BM, Etchriwi T, Krivosic I, Krivosic-Horber R, Haudecoeur G: In vitro human masseter muscle hyper-sensitivity: A possible explanation for increase in masseter tone. *J Appl Physiol* 1996; 80:1547-53
3. Melton AT, Antognini JF, Gronert GA: In vitro contracture tests on normal human masseter muscle. *Anesth Analg* 1997; 84:S368
4. Melton AT, Antognini JF, Gronert GA: Caffeine- or halothane-induced contractures of masseter muscle are similar to those of vastus muscle in normal humans. *Acta Anaesth Scand* 1999; 43:764-69

(Accepted for publication September 30, 1999.)

**Pascal J. Adnet, M.D.**  
Professor of Anesthesia  
**Benoît Tavernier, M.D.**  
Assistant Professor of Anesthesia  
**Hugo Reyford, M.D.**  
Assistant Professor of Anesthesia  
Department of Emergency Medicine and Anesthesiology  
HÙpital R Salengro  
CHU de Lille  
59037 Lille Cedex, France

## Reference

1. Adnet PJ, Reyford H, Tavernier BM, Etchriwi T, Krivosic I, Krivosic-Horber R, Haudecoeur G: In vitro human masseter muscle sensitivity: A possible explanation for increase in masseter tone. *J Appl Physiol* 1996; 80:1547-53
2. Reyford H, Adnet PJ, Tavernier B, Beague S, Ferri J, Krivosic-Horber RM, Haudecoeur G: Halothane induces calcium release from human skinned masseter muscle fibers. *ANESTHESIOLOGY* 1999; 90:1019-25
3. Melton AT, Antognini JF, Gronert GA: Caffeine-or halothane-induced contractures of masseter muscle are similar to those of vastus muscle in normal humans. *Acta Anaesth Scand* 1999; 43:764-69
4. Zucchi R, Ronca-Testoni S: The sarcoplasmic reticulum calcium channel/ryanodine receptor: Modulation by endogenous effectors, drugs and disease states. *Pharmacol Rev* 1997; 49:1-42

(Accepted for publication September 30, 1999.)