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Does halothane or sevoflurane inhibit NO-stimulated soluble guanylyl cyclase activity under physiological conditions?

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To the editor: Masaki and Kondo reported that halothane and sevoflurane produced significant inhibition of NO-stimulated soluble guanylyl cyclase activity [1]. However, their results are completely different from ours [2] and those of Zuo and Johns [3]. The difference may result from differences in the methods. The reaction mixture of Zuo and Johns consisted of Tris-HCl, isobutylmethylxanthine, $MnCl_2$, adenosine triphosphate, guanosine triphosphate, creatine phosphate, and creatine phosphokinase, and the mixture was gassed with humidified carrier gas (95% O_2, 5% CO_2). Although Masaki and Kondo did not describe the carrier gas, I think that perhaps they did not use a carrier gas, which may have led to unphysiologically hypoxic or energy-depleted experimental conditions. Is there not a possibility that O_2 competes with NO for the NO-binding site on the enzyme? If that is the case, then the effects of halothane and sevoflurane can be neglected, because the concentration of O_2 is much higher than that of halogenated volatile anesthetics under physiological conditions.

References

1. Masaki E, Kondo I (1998) Attenuation of nitric oxide-stimulated soluble guanylyl cyclase from the rat brain by halogenated volatile anesthetics. J Anesth 12:81–86
2. Terasako K, Nakamura K, Miyawaki I, Toda H, Kakuyama M, Mori K (1994) Inhibitory effects of anesthetics on cyclic guanosine monophosphate (cGMP) accumulation in rat cerebellar slices. Anesth Analg 79:91–96
3. Zuo Z, Johns RA (1995) Halothane, enflurane, and isoflurane do not affect the basal or agonist-stimulated activity of partially isolated soluble and particulate guanylyl cyclases of rat brain. Anesthesiology 83:395–404

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