

al. pointed out, the observation reported by Sears, Abdul-Rasool, and Katz² of eight consecutive patients without cardiac dysrhythmia who received a second dose of succinylcholine following induction with ketamine, permits inference of a rate of occurrence as great as 31%, approximately 1 in 3. This statistic does not give one much solace, and indeed the authors' letter of response³ to Benefiel indicates their clinical confidence in the pharmacologic regimen lay elsewhere.

JOSEPH GRAYZEL, M.D.
*Attending Physician, Cardiology
Division of Internal Medicine
Bergen Pines County Hospital
Paramus, New Jersey 07652*

Anesthesiology
71:321, 1989

In Reply:—The authors wish to thank Dr. Grayzel for deriving the correct formula that yields R as a function of n and P, his equation 4. He has also provided another useful equation, his equation 5, which enables the determination of the number of negative observations required to determine the upper limit of occurrence of an event (R) based on the P value.

We also note Dr. Grayzel's agreement with our results and the conclusions drawn from them.

DAVID J. BENEFIEL, M.D.
Director of Cardiovascular Anesthesia

Anesthesiology
71:321, 1989

An Effect of Temperature on Anesthetic Solubility and Partial Pressure: Clinical Importance

To the Editor:—Ori, Ford-Rice, and London suggest that opioid receptors represent a possible target influenced by general anesthetics, although they add that this influence might not produce the anesthetic state.¹ They find that 100% nitrous oxide and 2% halothane (the latter more than the former) decrease the density of binding sites for κ receptors from guinea-pig brain, and that halothane also decreases binding affinity. Both nitrous oxide and halothane decrease μ binding affinity.

It is not clear to me that these findings are relevant to anesthetizing concentrations of anesthetics. Although Ori, Ford-Rice, and London used what appear to be reasonable concentrations of anesthetic for equilibration of their homogenates, equilibration was accomplished at 0° C. Because an increase in temperature decreases the solubility of gases, including anesthetics, the subsequent increase in temperature applied by Ori, Ford-Rice, and London would increase the anesthetic partial pressure. The partial pressure of halothane that would result at 37° C would be about 8.9% of an atmosphere.² Such a partial pressure is eight times that required for anesthesia. Indeed, this interpretation would apply at any temperature because a decrease in temperature decreases anesthetic requirement.³ Perhaps we should reserve judgment on the effect of general anesthetics on opioid receptors until these elegant studies can be repeated at anesthetizing partial pressures.

EDMOND I. EGER, II, M.D.
*Professor of Anesthesiology
Department of Anesthesia
Science-455, Box 0464
University of California
San Francisco, CA 94143-0464*

REFERENCES

1. Ori C, Ford-Rice F, London ED: Effects of nitrous oxide and halothane on μ and κ opioid receptors in guinea-pig brain. *ANESTHESIOLOGY* 70:541-544, 1989
2. Eger RR, Eger EI II: Effect of temperature and age on the solubility of enflurane, halothane, isoflurane and methoxyflurane in human blood. *Anesth Analg* 64:640-642, 1985
3. Eger EI II, Saidman LJ, Brandstater B: Temperature dependence of halothane and cyclopropane anesthesia in dogs: Correlation with some theories of anesthetic action. *ANESTHESIOLOGY* 26:764-770, 1965

(Accepted for publication April 27, 1989.)

REFERENCES

1. Benefiel DJ, Eisler EA, Shepherd R: Letter to the Editor: Use caution when extrapolating from a small sample size to the general population. *ANESTHESIOLOGY* 70:160-161, 1989
2. Sears DH, Abdul-Rasool IH, Katz RL: The effect of a second dose of succinylcholine on cardiac rate and rhythm following induction of anesthesia with ketamine. *ANESTHESIOLOGY* 68:144, 1988
3. Abdul-Rasool IH, Sears DH, Katz RL: Letter to the editor. *ANESTHESIOLOGY* 70:161, 1989

(Accepted for publication April 26, 1989.)

EDWARD A. EISLER, M.D.
Director of Obstetrical Anesthesia

RODGER SHEPHERD, M.D., M.P.H.
Department of Epidemiology

*Pacific Presbyterian Medical Center
Clay at Buchanan Street
San Francisco, CA 94120*

(Accepted for publication April 26, 1989.)