

References

1. Hubbell WL, Metcalfe JC, Metcalfe SM, et al: The interaction of small molecules with spin-labeled erythrocyte membranes. *Biochim Biophys Acta* 219:415-427, 1970
2. Trudell JR, Hubbell WL, Cohen EN: The effect of two inhalation anesthetics on the order of spin-labeled phospholipid vesicles. *Biochim Biophys Acta* 291:321, 1973
3. Trudell JR, Payan DG, Chin JH, et al: The antagonistic effect of an inhalation anesthetic and high pressure on the phase diagram of mixed dipalmitoyl-dimyristoylphosphatidylcholine bilayers. *Proc Natl Acad Sci USA* 72:210-213, 1975
4. Barker RW, Brown FF, Drake R, et al: Nuclear magnetic resonance studies of anaesthetic interactions with haemoglobin. *Br J Anaesth* 47:25-29, 1975
5. Metcalfe JC, Seeman P, Burgen ASV: The proton relaxation of benzyl alcohol in erythrocyte membranes. *Mol Pharmacol* 4:87-95, 1968
6. Pauling L: A molecular theory of anesthesia. *Science* 134:15-21, 1961
7. Miller SL: A theory of gaseous anesthetics. *Proc Natl Acad Sci USA* 47:1515-1524, 1961
8. Devaux P, McConnell HM: Equality of the rates of lateral diffusion of phosphatidylethanolamine and phosphatidylcholine spin labels in rabbit sarcoplasmic reticulum. *Ann NY Acad Sci* 222:489-498, 1973

Fluids and Electrolytes

HYPERGLYCEMIA AND CONGESTIVE HEART FAILURE Rapid increases in serum osmolality may occur with diabetes-induced hyperglycemia. A 39-year-old man had had diabetes mellitus since the age of 4 years. His course had been complicated by numerous episodes of ketoacidosis, as well as renal insufficiency, retinopathy, peripheral and autonomic neuropathy, peripheral vascular disease, and congestive cardiac failure. He was being treated with insulin, digoxin, furosemide, and a 1,500-calorie diet with 40 g protein and 2 g sodium. On the day prior to admission, he had consumed approximately 1,500 g of watermelon, half a cantaloupe, several pears, and other foods at a party. The next day, because of dyspnea on mild exertion, he was hospitalized. Blood glucose was 932 mg/100 ml, blood urea nitrogen 84 mg/100 ml, serum osmolality 338 mOsm/kg, and plasma ketones were negative. Serum sodium and potassium were normal, while chloride was 88 mEq/l and carbon dioxide content 25 mEq/l

1. The patient was dyspneic and using his accessory muscles of respiration. Hepatomegaly was present, as was peripheral pitting edema. He was treated with insulin but did not receive any cardiotoxic drug. His condition improved rapidly and he was discharged on the third hospital day. It is postulated that his improvement was due largely to the movement of fluid from the extracellular to the intracellular space, and resulted only in small part from net fluid loss from the body. Although the author indicates that treatment of congestive heart failure with insulin alone is inadvisable in a patient with hyperglycemia and renal insufficiency, one should be aware that changes in blood glucose concentration (and therefore serum osmolality) may be significant in redistributing fluid volume. (Axelrod L: *Response of congestive heart failure to correction of hyperglycemia in the presence of diabetic nephropathy*. *N Engl J Med* 293:1243-1245, 1975.)