

Should doctors and other health care workers “pre-warm” intravenous (IV) solutions before giving them to patients?

- A. Someday, some of you will prescribe and/or administer bags of IV saline to patients. Those bags are 0.9% sodium chloride solutions in water. What is the molarity of sodium in the saline solution?

Having trouble? Review questions from Chapter 6: 22, 44, 45, 46, and 47.

- B. Why is there precisely 0.9% sodium chloride in the solutions? Why not just use water in the IV to rehydrate your patients? Connect your answer to one of the colligative properties.

Having trouble? Review questions from Chapter 11: 60 and 61.

- C. There is also dissolved air in the bags of saline. Air is about 78% N_2 and 21% O_2 . You can neglect the other components of air. Based on what we've said so far, identify all the solvents and solutes in the bag of IV saline. Describe all the intermolecular forces in the bag.

Having trouble? Review questions from Chapter 11: 20, 21, and 22.

- D. Estimate the concentration of N_2 in a bag of IV saline. If you make assumptions in the course of your calculation, say what they are.

Having trouble? Review questions from Chapter 11: 23, 34, and 25.

- E. Injecting air bubbles in patients' IVs is dangerous to the patients. A 2016 research study warned health care workers that, even if they are careful to avoid air injection when starting patients' IVs, substantial bubbles can form as the IV solution is warmed in the body. (The paper recommended pre-warming the IV bag.) Explain what is happening at a molecular level, using a diagram to justify your answer.

Having trouble? Review questions from Chapter 11: 4 and 5.