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Hyperglycemia and Hyponatremia

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To the Editor:

I would like to make a few comments on the insightful theoretical study of the hyponatremic effect of a 100 mg% rise in serum glucose (ΔNa/ΔGlu) recently reported by Dr. Wolf.[1] Although the introduction states that this topic was examined experimentally only once, by Hillier et al,[1] there are at least two other such studies, one by Seldin and Tarail[3] (in which ΔNa/ΔGlu was estimated[4] to be 1.74 mM/100 mg%), and another by Shalwitz et al.[5] Shalwitz et al also found that serum [K] rose concomitantly with glucose. To explain that observation, they suggested a transport mechanism for potassium affected by glucose and insulin, an idea somewhat like the modification Dr. Wolf made to his model—i.e., as glucose rises, a progressive depression occurs in the Na/K pump—in order to account for the surprising post hoc finding of Hillier et al that ΔNa/ΔGlu steepened as glucose rose. Does the author's model predict the behavior of [K] as glucose rises? The unmodified model predicted the opposite, i.e., a shallowing of ΔNa/ΔGlu as glucose rises, as did two prior theoretical studies.[6,7] The explanation for this should be that the amount of water moving out of the cells progressively decreases with each successive 100 mg% rise in glucose, but this appears to be misstated in the results section as an "*increase* in water moving out of the cells."