



COMMENT ON KRAMER ET AL.

## Glucagon Response to Oral Glucose Challenge in Type 1 Diabetes: Lack of Impact of Euglycemia. *Diabetes Care* 2014;37:1076–1082

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We read with interest the article by Kramer et al. (1) investigating the effect of a short period of euglycemia or hyperglycemia on glucagon concentrations following a 50-g oral glucose tolerance test. The authors conclude that while there is a paradoxical increase in glucagon after a 50-g oral glucose challenge in subjects with type 1 diabetes, a short episode of hyperglycemia or euglycemia has no effect on the magnitude of increase in glucagon that is observed. However, the authors' own data show evidence to the contrary. The glucagon excursion following glucose was assessed by three parameters. The incremental area under the curve for glucagon during the hyperglycemia visit was shown to be nearly 10 times higher than that observed during the euglycemia visit. The results were

highly significant ( $P = 0.028$ ) as detailed in Table 2. In addition, the data on glucagon-to-glucose ratio, though short of significance, show a statistical trend at  $P = 0.10$ . With the wide SD, an increase in the numbers, even by 2, could have resulted in statistically significant results. The only parameter assessing glucagon response that was not significant was the longitudinal changes in glucagon, which may have been affected by the lower baseline glucagon that was seen during the hyperglycemic visit.

While we agree that achievement of a short period of euglycemia may not be the only approach to reducing glucagon in type 1 diabetes, we suggest that the conclusion from their data is that hyperglycemia results in increased glucagon concentrations. This is important in the

context of understanding the pathophysiology of postprandial hyperglucagonemia and hyperglycemia in diabetes. We would also suggest that the authors confirm that the assumptions made to calculate the 80% power of the study were met based on their observations. This is important as one of the parameters assessing the glucagon response in their study showed a trend toward significance.

**Duality of Interest.** No potential conflicts of interest relevant to this article were reported.

### References

1. Kramer CK, Borgoño CA, Van Nostrand P, Retnakaran R, Zinman B. Glucagon response to oral glucose challenge in type 1 diabetes: lack of impact of euglycemia. *Diabetes Care* 2014;37:1076–1082

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