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 COMMENTS AND  
 RESPONSES
 

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**Insulin Assay  
 Standardization:  
 Leading to Measures  
 of Insulin Sensitivity  
 and Secretion for  
 Practical Clinical  
 Care**

Response to Heinemann

**H**einemann (1) has addressed this issue in detail; his discussion reviews the salient points regarding this highly confusing topic. The vagaries he outlines subsume the reasons that have consistently driven us to strongly recommend the use of SI units for reporting insulin concentrations. Within the work as described in our publications (2,3), we used recombinant DNA-derived human insulin (generously provided by Novo Nordisk Pharmaceuticals and Eli Lilly and Company), which was carefully weighed (in mg or  $\mu\text{g}$ ) or prepared from pre-weighed lyophilized material, to yield amounts in solution to provide values in concentrations of pmol/l for immunoas-

say calibrators or standards. Thus, we were able to use the molecular weight of insulin (5,808 Da) to yield an insulin concentration in SI units. Several people collaborating with us on both our articles had extensive experience with insulin assays, especially in industry, and worked with us to make sure we used what was considered to be the appropriate conversion factor:  $1 \mu\text{U/ml insulin} = 6 \text{ pmol/l}$  (4). Although the numerical conversion is 6, we differ in units from Heinemann, who used  $1 \mu\text{U/ml insulin} = 6 \text{ nmol/l}$ .

Overall, we did discuss the choices for numerical conversion factors. In the end, we continue to advocate the use of SI units to express the circulating concentrations of both insulin and C-peptide concentrations.

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DOI: 10.2337/dc10-0478

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**Acknowledgments**—No potential conflicts of interest relevant to this article were reported.

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