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LETTER

Can insulin response patterns predict metabolic disease risk in individuals with normal glucose tolerance? Reply to Crofts CAP, Brookler K, Henderson G [letter]

Adam Hulman[1,2,3] · Dorte Vistisen[4] · Charlotte Glümer[5] · Michael Bergman[6] · Daniel R. Witte[1,2] · Kristine Færch[4]

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To the Editor: We would like to thank Crofts et al [1] for their positive and constructive comments regarding our article [2]. The main reason why we have not explored insulin response in the Danish Inter99 cohort using the latent class trajectory approach is fairly technical. Serum insulin values are usually log-transformed before analysing them as continuous outcomes because of their skewed distributions. In our study, this would mean we would model a piecewise-linear trajectory on the log-scale (Fig. 1a), which results in a rather unrealistic shape when transformed back to the original scale (Fig. 1b). Imposing the peak at 30 min is already a big restriction; therefore, we did not want to put this further constraint on the shape of the insulin response curve.

Furthermore, insulin levels are highly variable, and their analysis is laboratory-dependent and expensive, limiting their utility for clinical purposes. Their potential use in prediabetic substratification is the subject of another investigation that we are planning to pursue in the EGIR-RISC (European Group for the study of Insulin Resistance: Relationship between Insulin Sensitivity and Cardiovascular disease risk) cohort [3], using glucose and insulin measurements at more than three time-points during a 2 h oral glucose tolerance test.

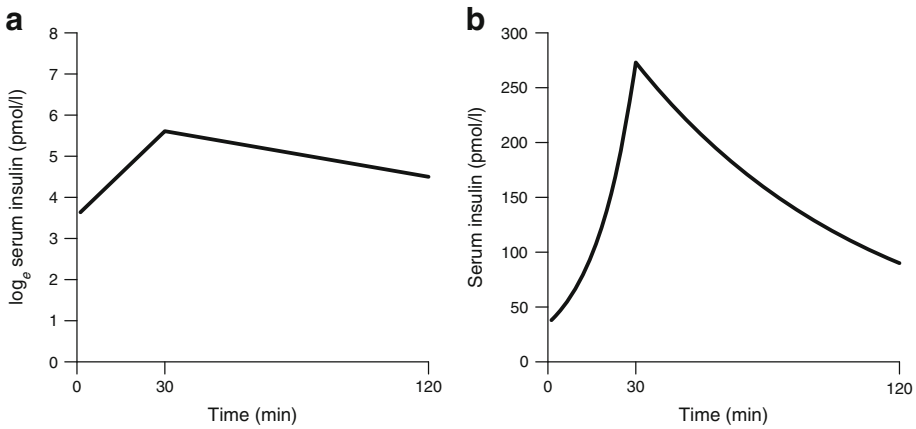

Fig. 1 Serum insulin trajectory on the (**a**) logarithmic and (**b**) original scale. The curves represent a fictional participant for the purpose of demonstration

✉ Adam Hulman
adam.hulman@ph.au.dk

[1] Department of Public Health, Aarhus University, Bartholins Allé 2, Building 1260, DK-8000 Aarhus C, Denmark

[2] Danish Diabetes Academy, Odense, Denmark

[3] Department of Medical Physics and Informatics, University of Szeged, Szeged, Hungary

[4] Steno Diabetes Center Copenhagen, Gentofte, Denmark

[5] Research Center for Prevention and Health, Glostrup Hospital, Glostrup, Denmark

[6] Division of Endocrinology, Diabetes and Metabolism, NYU School of Medicine, NYU Langone Diabetes Prevention Program, New York, NY, USA

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Contribution statement AH was responsible for drafting the response. All authors contributed to critical revision and approved the final version to be published.

References

1. Crofts CAP, Brookler K, Henderson G (2018) Can insulin response patterns predict metabolic disease risk in individuals with normal glucose tolerance? Diabetologia https://doi.org/10.1007/s00125-018-4581-7
2. Hulman A, Vistisen D, Glümer C, Bergman M, Witte DR, Færch K (2018) Glucose patterns during an oral glucose tolerance test and associations with future diabetes, cardiovascular disease and all-cause mortality rate. Diabetologia 61:101–107
3. Hills SA, Balkau B, Coppack SW et al (2004) The EGIR-RISC STUDY (the European group for the study of insulin resistance: relationship between insulin sensitivity and cardiovascular disease risk): I. Methodology and objectives. Diabetologia 47:566–570