Comparison of HOMA-IR, HOMA- β % and disposition index between US white men and Japanese men in Japan in the ERA JUMP study: was the calculation of disposition index legitimate? Reply to Yamauchi K, Sato Y, Nakasone Y et al [letter]

Vasudha Ahuja¹ · Akira Sekikawa¹

Received: 1 April 2015 / Accepted: 7 April 2015 / Published online: 10 May 2015
© Springer-Verlag Berlin Heidelberg 2015

Keywords Disposition index · HOMA- β % · HOMA-IR · Race

Abbreviation

DI Disposition index

To the Editor: We thank Yamauchi et al for their letter [1] on our recent article [2] in which we reported that, based on fasting samples, white men living in the USA have higher insulin resistance, insulin secretion and disposition index (DI) than Japanese men living in Japan. Yamauchi et al [1] point out that DI calculated using fasting measures of insulin resistance and insulin secretion is a function of basal glucose levels. Furthermore, they mention that basal levels of glucose may not always be a good indicator of beta cell function. Here, we reply to their comments. First, the notion that DI calculated using fasting measures is a function of fasting glucose levels is nothing new but has previously been demonstrated by Mari et al [3]. Second, we agree with Yamauchi et al [1] that estimates of DI based on fasting samples may not always be a good indicator of beta cell function—we mentioned in our paper that DI calculated using fasting measures of insulin sensitivity and insulin secretion is a less credible index of beta cell function and that this represents a major limitation and

thus the results should be interpreted with caution [1]. However, the uniqueness of our study lies in our samples: we used population-based samples with standardised methods, whereas all the other studies comparing insulin secretion and resistance used samples from volunteers or hospital-based samples [4]. Though Yamauchi et al [1] point out that other investigators have reported that the hyperbolic relationship between indices of insulin sensitivity and insulin secretion exist for a certain combination of the two but not all [5], our assumption of a hyperbolic relationship between insulin sensitivity and insulin secretion at basal levels is based on the work of other investigators, namely, Turner et al [6]. Furthermore, Yamauchi et al comment that the relationship between insulin sensitivity and insulin secretion, i.e. DI, is different between Japanese and white populations [1]. Our data showed the same results despite estimating DI using fasting samples. We agree that insulin resistance and secretion would be better evaluated by the hyperinsulinaemic–euglycaemic clamp, yet when comparing these across different racial groups, samples from volunteers are more likely than population-based samples to suffer from selection biases. Therefore, further studies evaluating insulin indices using direct methods and comparing these indices between whites in the USA and Japanese individuals in Japan in population-based samples are warranted to explore the hypothesis that a higher DI is one of the contributing factors to a lower susceptibility to developing type 2 diabetes in white men compared with Japanese men for a given BMI.

✉ Akira Sekikawa
akira@pitt.edu

¹ Department of Epidemiology, University of Pittsburgh, 130 N. Bellefield Avenue, Suite 546, Pittsburgh, PA 15213, USA

Funding This research was funded by the National Institute of Health (R01 HL68200) and by the Japanese Ministry of Education, Culture, Sports, Science and Technology (B16790335 and A13307016).

Duality of interest The authors declare that there is no duality of interest associated with this manuscript.

Contribution statement Both authors were responsible for drafting the article and revising it critically for important intellectual content. Both authors approved the version to be published.

References

1. Yamauchi K, Sato Y, Nakasone Y, Aizawa T (2015) Comparison of HOMA-IR, HOMA- β % and disposition index between US white men and Japanese men in Japan in the ERA JUMP study: was the calculation of disposition index legitimate? *Diabetologia*. doi:10.1007/s00125-015-3612-x
2. Ahuja V, Kadowaki T, Evans RW et al (2015) Comparison of HOMA-IR, HOMA- β % and disposition index between US white men and Japanese men in Japan: the ERA JUMP study. *Diabetologia* 58:265–271
3. Mari A, Ahrén B, Pacini G (2005) Assessment of insulin secretion in relation to insulin resistance. *Curr Opin Clin Nutr Metab Care* 8:529–533
4. Moller JB, Pedersen M, Tanaka H et al (2014) Body composition is the main determinant for the difference in type 2 diabetes pathophysiology between Japanese and Caucasians. *Diabetes Care* 37:796–804
5. Retnakaran R, Shen S, Hanley AJ, Vuksan V, Hamilton JK, Zinman B (2008) Hyperbolic relationship between insulin secretion and sensitivity on oral glucose tolerance test. *Obesity* (Silver Spring, Md) 16: 1901–1907
6. Turner RC, Holman RR, Matthews D, Hockaday TD, Peto J (1979) Insulin deficiency and insulin resistance interaction in diabetes: estimation of their relative contribution by feedback analysis from basal plasma insulin and glucose concentrations. *Metab Clin Exp* 28:1086–1096