Title: VALIDATION OF A PREDICTIVE PHYSIOLOGICAL MODEL TO SUPPORT PERSONALIZED MEDICINE IN TYPE 2 DIABETES

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Background and aims: We evaluated the accuracy of a predictive physiological model for simulating the predicted glucose response to metformin therapy in individuals with type 2 diabetes (T2D). The model is a computer-based, interactive decision support system that enables clinicians to perform individualized simulations that test various treatment options for the prediction of glucose profiles in response to various metabolic interventions.

Methods: This two-step validation study used an independent dataset collected in a clinical trial that assessed glucose response in a cohort of individuals with type 2 diabetes who transitioned from diet/exercise treatment to metformin therapy. The primary objective was to evaluate the quality of the model both in terms of fitting the dataset as well as the accuracy of prediction.

Results: Data from 16 T2D patients were included in the analysis. The overall fit between observed and modeled glucose profile values showed concordance pre- and post-metformin treatment (Figure) with notable accuracy as measured by mean absolute relative difference (MARD): 8.1% and 12.6%, respectively. Parkes Error Grid analysis also showed strong correlation pre- and post-therapy: r2 = 0.89 & SSE = 18.3 and r2 = 0.55 & SSE = 27.9, respectively, which was confirmed by two-sample Kolmogorov-Smirnov test.

Conclusions: The integration of predictive modeling approaches into clinical decision support tools has the potential to optimize clinician time and accuracy in determining the most effective treatment regimen for each T2D patient.