

Thirdly, a new idea has been proposed. The problem among obesity, weight reduction and diet content has been unsolved worldwide for a long time. The new idea transcends the conventional calorie balance theory, and it can clinically explain that excessive secretion of insulin causes obesity [15]. As a new theory on obesity and weight reduction, a carbohydrate-insulin model was proposed. The authors advocated this theory were Ludwig and Ebbeling, who have continued research at the Harvard University Obesity Prevention Center[16]. In their previous report, LCD and low GI diet were effective compared with CR [16]. Among them, long-term management of CR for obesity was unsuccessful because the energy balance theory is inadequate. As a new theory, the Carbohydrate - Insulin Model of Obesity: Beyond “Calories In, Calories Out” was reported [17].

A new model will be compared with the conventional model. In the conventional energy balance model, clinically common case would be shown in the following [18]. As a person overeats and decreases physical activity, energy balance become positive. Then, blood energy substrate of glucose and lipid increases, and body fat accumulates. When he has energy-limiting meal for weight reduction, he always feels hunger and wants to take more. As decreased calorie intake and body fat reduction, basal metabolism rate falls and energy consumption also decreases. ~~Therefore,~~ him to keep energy balance negative for long.

On the other hand, newly proposed “carbohydrate-insulin thinking”[17]. The starting point is the excessive secretion of insulin in response to increased carbohydrate ingestion. Then, body fat accumulates and the substrate (sugar, lipid) of blood energy decreases. From this process, a person feels hunger and tends to have more energy intake. As the important point of this new theory, the cause of obesity would be the excessive insulin secretion, and the compensation of the energy substrate in blood. As a result, he would have increased appetite and excessive energy intake.

As a supporting evidence for glucose-insulin model, there is a report using bidirectional Mendelian randomization analysis of genome-wide association studies[19,20]. Higher genetically determined IRI was strongly associated with higher BMI, which was consistent with a causal role in obesity. On contrast, higher genetically determined BMI was not associated with IRI.

Based on the Carbohydrate-Insulin Model, Ludwig et al. have issued 6 items of dietary recommendations[17]. The essences of those are summarized in the following: i) Reduce high-glycemic load (GL) carbohydrates, ii) Emphasize low-GL carbohydrates such as nonstarchy vegetables and nontropical whole fruits, iii) When consuming grain products, choose whole kernel or traditionally processed alternatives, iv) Increase nuts, seeds, avocado, olive oil, and other healthful high-fat foods, v) Maintain an adequate, but not high, intake of protein, vi) Replace with ~~metabolic syndrome or type 2 diabetes.~~

In summary, new theory of the carbohydrate-insulin model of obesity was introduced and discussed. There have been several

~~genetic~~ genetic predisposition. Further discussion concerning effective diet for obesity and metabolic syndrome would be expected in the future study.

References

1. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

2. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

3. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

4. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

5. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

6. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

7. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

8. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

9. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

10. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

11. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

12. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

13. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

14. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

15. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

16. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

17. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

18. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

19. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

20. Ludwig Z, Ebbeling CB, Ludwig DS. *Carbohydrate-Insulin Model of Obesity: Beyond “Calories In, Calories Out”*. *PLoS ONE* 2015; 10(12): e0142462. doi:10.1371/journal.pone.0142462

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~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ 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~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ ~~Bando~~ ~~et~~ ~~al.~~ ~~Open~~ ~~Access~~ ~~Journal~~ ~~of~~ ~~Obesity~~ ~~Treatment~~ ~~and~~ ~~Weight~~ ~~Management~~ ~~©~~ ~~2018~~ ~~Hiroshi~~ 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