

A LONG-TERM MATERNAL DIET INTERVENTION IS EFFICIENT TO RECOVER THE OBESOGENIC EFFECT OF MATERNAL HF DIET ON NEXT-GENERATION

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Although it is suggested that a healthy pre-pregnancy food-intake behavior shift would be advantageous as an obesity prevention strategy for offspring, data are lacking. We previously reported that a short-term maternal diet intervention is not necessarily beneficial and may even be harmful to offspring. We hypothesized that a pre-pregnancy maternal diet intervention may prevent

offspring obesity; however, a longer term is required. In a murine model, we either continued on (HF-group) or switched the maternal diet from a HF to a NF for 1-week (H1N-group), five-week (H5N-group) or nine-week (H9N-group) before pregnancy. The offspring took the HF diet for 12 weeks after weaning. Compared to the HF group the H1N and H5N, but not H9N offspring, developed glucose intolerance earlier, with more severely imbalanced-glucose homeostasis and significant adipocyte hypertrophy. Similar to HF-group, H1N and H5N offspring displayed blunted insulin signaling, over-active adipocyte Akt signaling and over-active hepatic AMPK signaling with enhanced pAcc/Acc. However, H9N diets re-balanced glucose and lipid metabolism re-sensitized insulin signaling and normalized Akt and AMPK signaling. In summary, a longer-term pre-pregnancy diet intervention is required to recover the obesogenic effect of maternal HF diet on next-generation.