

Developmental origins of offspring obesity and diabetes: Programmed enhanced adipogenesis

Mina Desai and Michael G. Ross

David-Geffen School of Medicine at Harbor-University of California, USA

The epidemic of metabolic syndrome, including a marked increase in the prevalence of obesity and gestational diabetes mellitus among pregnant women, represents a significant public health problem. Both weight gain and body mass index are major predictors of diabetes; for every 1 kg increase in adult weight, the risk of diabetes increases by 4.5 to 9%. Although genetic factors may contribute to selected cases of obesity, environmental and epigenetic factors are likely more important. There is increasing recognition that the risk of adult obesity is clearly influenced by prenatal and infant environmental exposures. This tenet is the fundamental basis of developmental programming. Low birth weight, together with infant catch-up growth, is associated with a significant risk of adult obesity and type II diabetes. As an index of the public health significance, a striking 57% of type II diabetes can be attributed to programmed metabolic syndrome. Animal models have replicated human epidemiologic findings and elucidated potential programming mechanisms that include altered organ development, cellular signaling responses, and epigenetic modifications. Adipose tissue is one of the principal targets of programming that predisposes to offspring obesity. Our studies show that newborns of obese/high fat diet mothers and low birth weight newborns of maternal under-nutrition both exhibit programmed adipocytes that contribute to the development of obesity. These adipocytes have intrinsic trait of increased cell proliferation and enhanced propensity for fat storage. Knowledge of the mechanisms of fetal adipocyte programming will enable the development of novel therapeutics to prevent obesity and glucose intolerance.

Biography

Mina Desai is an Associate Professor with David-Geffen School of Medicine at UCLA and Director of Perinatal Research at Obstetrics and Gynecology Department. She obtained her Ph.D. in Biochemistry at University of Cambridge, Cambridge, UK. She has 69 peer-reviewed publications in journals of high repute, has authored 14 invited reviews and 4 book chapters to her credit. She is also an associate editor for Journal of Developmental Origins of Health and Disease and a reviewer for more than 15 international journals. She has been invited for more than 68 lectures and has procured more than 14 research grant awards.