Altered adipogenesis under micronutrient deficiency: *In vitro* approach using mesenchymal stem cells

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Early intrauterine nutritional insult combined with lifestyle changes have been well documented to increase the risk of adiposity and associated chronic diseases (CDs) during adulthood. Indeed, inflammation in visceral adipose depot has been pinned down as the major confounding factor underlining the CDs which include insulin resistance (IR), obesity, T2 diabetes, CVD, hypertension etc., having significant impact at global scenario. In this context, development of model systems (*in vitro* and *in vivo*) have immensely helped to bridge the gap towards understanding the pathophysiology of CDs, yet the mechanisms are still obscure. The present study has been explored the feasibility of BM-MSCs as an *in vitro* model to delineate the mechanisms underlying folic acid deficiency *in situ* vis a vis to understand the developmental vs. nutritional programming with reference to adipogenesis. Our findings are in agreement with the reported *in vivo* data to support for an altered adipogenesis with up-regulated inflammation. We have demonstrated for an induction in visceral adipocity with increase in triglyceride levels and mRNA of visfatin and leptin. Further, inflammation, apoptosis and oxidative stress were all significantly increased as compared to controls (MNC). This study forms the basis to report for the first time, application of BM-MSCs as an *in vitro* model system to study nutritional programming (deficiency/over nutrition) to recreate physiological milieu akin to intrauterine conditions.

Biography

Vijayalakshmi Venkatesan has completed her PhD in Biochemistry (National Institute of Nutrition) awarded from Osmania University, Hyderabad, India. She has pursued Postdoctorate from CCMB followed by induction as a Senior Faculty in Liver Research Centre at Hyderabad, India. In 2002, she was recruited as Assistant Director at National Institute of Nutrition (ICMR) and initiated the area of Stem Cell Research and she is currently Scientist F. She has more than 60 papers in peer reviewed journals and has been in the Advisory Board of several stem cell centers in India. She has also received the prestigious Biomedical Fellowship from Government of India to visit Karolinska Institute, Sweden.

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