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Role of long non coding RNA in macrophage polarization

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Adipose tissue macrophages (ATMs) are pivotal regulators for adipose tissue function specifically contributing to the pathogenesis of obesity associated cardiovascular diseases, diabetes and other metabolic syndromes. Macrophages play these critical roles, particularly through a unique shift in polarized activation status from an anti-inflammatory M2 function in lean adipose tissues to a pro inflammatory M1 activation in adipose tissues of obese individuals. Modulatory network governing ATMs polarized activation has been investigated but the full picture remains unveiled. To understand the regulatory hierarchy of ATM intracellular network, we profiled RNA library from macrophages at various activation status- M0, M1 and M2.

Among 23400 aligned unique loci from the RNA-sequencing results, 12904 displayed differential expression pattern during macrophage polarization. The most enriched Gene Ontology term in the category of KEGG pathways are Toll like receptor and Inflammatory signalling pathways. As a consequence, B cell and T cell receptor signaling pathways are significantly impacted by the Th1 or Th2 stimulated by activated macrophages. In addition, microRNAs also displayed unique pattern of expression in M0, M1, or M2 macrophages, including the anti-inflammatory regulator miR-223 that we identified recently. Other non-coding regulators are also identified in this profile study, including MALAT1. Further investigation using a BMDM *in vitro* system, we found that MALA1 is up regulated during classical activation and down regulated in alternate activation. Function analysis of MALAT1 in macrophage activation will be further evaluated in MALAT1 deficient mouse models for their *in vivo* contribution of ATM function and subsequent contribution to obesity induced system insulin resistance.

Biography

Srikanth Kanameni is a Ph.D. candidate in the Biomedical Sciences Program at Texas A&M University, College Station, Texas, USA. His research focuses on dissecting the epigenetic networks in immune cell function, specifically adipose tissue macrophage activation. He is incorporating both computational and wet lab experiments to unveil novel long non coding RNAs which will have significant regulatory role in macrophage polarization.

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