

Abstract

Low birth weight is a complex multifactorial disease leads to high mortality and morbidity in newborn and associated with chronic diseases in adult life. Number of studies shows the genetic influence on birth weight is as high as 30 to 50 percent. However a little is known about the specific gene involvement of the disease. Gene identification is an utmost important factor to gain a better understanding on pathways that regulate fetal growth and maternal metabolism. It will allow discovering susceptibility genes for chronic diseases in later life. Identification of genes associated with complex multifactorial diseases is a challenging task. Despite the development of number of methodologies and tools to address this issue, they have failed due to complex nature of the problem. In this study I used a network approach as the methodology to identify and prioritize the disease genes associated with low birth weight.

Using Gene Prospector the initial gene list was retrieved and Cytoscape was used to generate a gene-gene interaction network. The resulted network was curated using an available “knowledge base” for the disease and it created the low birth weight specific network. The network was analyzed based on the degree of connection. Low birth weight associated single nucleotide polymorphisms were found by literature surveying and mapped with the Sri Lankan SNP profile.

As a final gene list, ten low birth weight specific genes and eight disease specific single nucleotide polymorphisms were identified. Four of the SNP rs7903146, rs10882102, rs8191754 and rs4929984 were identified in the Sri Lankan SNP profile.

Even though it is an important step in disease understanding process, little is known about gene involvement for the low birth weight. Using my methodology I was able to get a quantitative and a qualitative result by identifying the ten most associated genes for low birth weight. Also presence of low birth weight specific single nucleotide polymorphisms in the Sri Lankan SNP profile, gives a hint about the Sri Lankan individual’s history of low birth weight states and susceptibility of chronic disease like type 2 diabetic in future life.