

# Placenta Development Associated Factor GCM Contributes to NTDs

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Neural tube defects (NTDs) are severe congenital defects caused by the neural tube closure failure during the early embryonic development. It places the heavy physical, mental and economic burden on society and families. Over 20 years of NTDs studies from the fields of epidemiology, epigenetics, genomics etc, indicated that NTDs are thought to arise from complex interactions of genes and environmental conditions. The exact mechanisms and the relationship between folate deficiency, related dysmetabolism and NTDs still remain unknown. Genetic, non-genetic, epigenetic, and environmental factors all contribute to the prevalence of NTDs. The genetic basis is not yet well understood, but several nongenetic risk factors have been identified as have possibilities for prevention by maternal folic acid supplementation. Adequate folate intake during the preconception period helps protect against a number of developmental malformations, including NTDs. Researches claim that 50%~ 70% of NTDs in humans could be prevented by the periconceptional consumption of folic acid [1,2]. Therefore, folate deficiency can cause folate and its related dysmetabolism which may lead to abnormalities in fetal development.

Previous study showed that GCM1 (glial cell missing 1), as a specific cell destiny determining factor of placenta development in mammal, can be a novel target of the  $\beta$ -catenin/TCF4 complex during the regulation of the fusion of

syncytiotrophoblast (ST) cells [3,4]. Aberrant high expression of Gcm1 in fetus brains from low-folate NTDs samples was occasionally found, suggesting its participation in nerve system development. Gcm1 is testified an important integrating point to connect Wnt/ $\beta$ -catenin signaling and neurodevelopment under folate deficiency. It is reasonable to believe that much more genes may be involved in neural tube development when the folate level is changed and further studies are required to explore the underlying interaction between them in the development of NTDs.

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