

A Haspin promoter element induces tissue-specific methylation of a transcription region and the regulation of gene expression in mouse ova.

Abstract

HASPIN is a nuclear serine-threonine kinase originally identified in the mouse testis. Its 193 bp DNA promoter element (hereafter, 193PE) regulates bidirectional, synchronous gene expression in the germ cells of male mice. Recent studies have shown that Haspin is also expressed in trace amounts in somatic cells; HASPIN also functions in oocytes. Haspin expression is regulated by the tissue-specific methylation of Haspin genomic DNA regions, including somatic cells. This study investigated relationship between 193PE and DNA methylation by examining methylation status of transgenic mice carrying 193PE and a reporter gene. In somatic (liver) cells carrying the reporter gene, 193PE induced methylation as well as trace expression of the reporter gene. In the testis, 193PE induced hypomethylation and intense reporter gene expression. Expression of HASPIN in an egg was assessed using human chorionic gonadotrophin to induce ovulation in female transgenic mice. The results showed that 193PE induced tissue-specific methylation, which resulted in reporter gene expression in a mouse egg.