

GENETICS

POL III CROSS COUNTRY SKIING OVER NUCLEOSOME ROCKS

7.01.2007

The relationship of gene expression and DNA methylation looks still like a [mystery to me](#) but fortunately there is now [a second Arabidopsis paper](#) that has some news. As the authors write in the discussion the mechanism how DNA methylation interferes with transcript initiation is still unclear – it is assumed that methylated DNA is carrying repressive histone modifications.

A clear (and repeated) finding, however, is the strong influence of DNA methylation on gene expression, where LOW and HIGH expressed genes are not so much methylated than MEDIUM expressed genes. Another bias of methylation is found AWAY from gene ends. Gene size seems to be also somehow relevant for gene expression. Taken that all together they develop a model of Pol III moving along DNA strand between nucleosome rocks (POL III may disrupt these rocks that cross country skiers cannot ;-)).

Version A: Far distant nucleosomes – the transiting RNA polymerase exposes cryptic initiation sites that allow aberrant transcripts be processed by dicer into [siRNA](#) that will methylate DNA (and create nucleosomes?)

Version B: Average distant nucleosomes – continuous flow of disrupted nucleosomes by closely spaced polymerase working along DNA strand – normal situation?

Version C+D: Close distance nucleosomes – high polymerase density – polymerase stalling and collision – as a repression mechanism?