

# RNA Polymerases IV and V: evolution and function

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October 14, 2017

## Abstract

This is gonna be the last thing I'll write.

## 1 Introduction

Most of the known non-coding RNAs (ncRNAs) correspond to intergenic sequences or transcripts with unknown functions. In mammals, two of the increasingly known long ncRNAs are *Xist* and *Tsix* which are involved in the regulation of adjacent genes. In plants, small-interfering RNAs (siRNAs) guide the process of chromatin modifications. These ncRNAs are generated from dsRNAs precursors and processed by dicer (DCL) enzymes into 21-24 nucleotides long siRNAs before associating with Argonaute proteins (AGO).

## 2 The paradox of epigenetic control

Need for transcription in order to transcriptionally silence the same region. [1]

### 2.1 The RNA-mediated DNA-methylation pathway (RdDM)s

## 3 RNA Polymerase IV

how it produces siRNAs and what do they bind to : AGO specific and dicer specific. from: [2] and from [3] picture from: [4]

### 3.1 The subunits

- NRPD

### 3.2 The products and their function

- what genes are silenced and how
- DNA methylation

[5]

## 4 RNA Polymerase V

\* open up dna or make transcripts for binding for ago ? see: [6]  
see: [7]

### 4.1 The subunits

[8] [9]

- NRPE

[10]

### 4.2 The function

two proposed models as in [5]

## 5 Future outlook

It is still unclear what templates the two polymerases use *in vivo* and how the transcription is regulated in order not to produce aberrant non-coding RNAs. Further studies could be led to investigate both the transcription initiation and the role of the RNA primers in that and the termination steps. The association of Pol V to the chromatin involves seems to involve more factors than the few one discussed in this work, as shown in [11]. Nevertheless their specific function is still unclear and could be elucidated in further studies.

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