

Abstract

Gene loops are chromatin structures formed by juxtaposition of distal genomic regions. Since these regions are often involved in transcription cycle control, gene loops therefore provide another mechanism of regulation of gene expression. This thesis summarizes recent findings about gene loops, focusing specifically on loops formed by interactions between promoter and terminator regions of genes transcribed by the eukaryotic RNA polymerase II. Different cases of gene loops discovered in several yeast genes, the mammalian *BRCA1* tumor suppressor and the HIV-1 integrated provirus are described, including mechanisms that possibly lead to the formation of these structures. Since gene loops and interactions between promoter and terminator in yeast have been linked to the transcriptional memory, their involvement in this phenomenon is discussed. Finally, as *BRCA1* and HIV-1 are directly linked to serious human diseases, the potential significance of alterations of gene loops in the development of various pathological conditions is presented.

Keywords: gene loops, chromatin loops, chromatin conformation, transcriptional memory, transcription, gene expression, regulation