Unexpected noncoding RNA roles in the regulation of the cancer genome

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A major shift in our conception of genome regulation has emerged in recent years. It is now obvious that the majority of cellular transcripts do not code for proteins, and a very significant subset of them are long RNAs (lncRNAs). Many lncRNAs have been shown to be functional, emerging as important regulatory molecules in tumor-suppressor and oncogenic pathways. For instance, we found that the transcription factor p53, which is crucial for the maintenance of cellular homeostasis, specifically regulates the expression of dozens of lncRNAs that constitute active components of this important tumor suppressor pathway. We found that some lncRNAs act at the chromatin level, not only influencing gene expression but also DNA replication and genomic integrity, representing a novel aspect of genome regulation and placing lncRNAs at the focal point of cancer biology. I will present our findings implicating lncRNAs in the regulation of these key aspects of cell division and stress response, with particular attention to the molecular mechanisms that underlie their function.

Maite Huarte
Biosketch

Maite Huarte obtained her PhD at Universidad Autónoma de Madrid and later worked in Harvard Medical School and the Broad Institute, initiating studies of long noncoding RNAs (lncRNAs) in gene regulation. She now leads a research group at CIMA (University of Navarra, Spain) that investigates the contribution of lncRNAs and other type of RNAs to epigenetic and non-epigenetic regulation in cancer cells. They have showed that lncRNAs play key roles in the regulation of several cancer pathways, influencing gene expression and genomic integrity.