CSIR-CCMB

**Y chromosome regulates genes on other chromosomes involved in male reproduction**

Y chromosome is known to be the male determining chromosome. It is a smaller chromosome in comparison to the X, its partner. It was not known to have any function except sex determination.

The DNA sequences on Y chromosomes are by and large present in multiple copies and very few of them code for proteins. They were earlier thought to function as packing material for the few protein coding genes on Y chromosome. Given no obvious function, most part of DNA of Y chromosome was considered junk.

Studies done at CSIR-Centre for Cellular and Molecular Biology (CCMB), Hyderabad, by a team headed by Prof. Rachel Jesudasan, show striking novel regulatory functions of Y chromosome DNA. These studies have been recently published in BMC Biology. They have shown a bunch of DNA repeats on mouse Y chromosome, which regulate genes expressed from other chromosomes in testis, specifically those required in reproduction. They also showed that these repeats are species-specific, i.e., they are not present in other species. These repeats give rise to a class of small RNAs called piRNAs. This is the first report of piRNAs from Y chromosomes.

“Our earlier studies on human Y chromosome had shown sex and species-specific repeats on the Y chromosome regulate a reproductively important protein-coding RNA transcribed from chromosome number 1. Along with this study, these are the first reports of interaction between the Y chromosome and other chromosomes. Thus, consolidating the two studies, we see a more pervasive regulation of genes associated with reproduction by Y chromosome”, says Prof Jesudasan.

“As the species evolve, these repeats also co-evolve and gradually are no longer be able to regulate reproduction of the species. Thus, it appears that these repeats are at the fulcrum of species identity and evolution”, she adds.

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