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## Non-coding RNAs: The master regulators of immunity against phytopathogens

**Raj Kumar Joshi**

Siksha O Anusandhan University, India

The whole genome tilling and RNA-Seq analysis has revealed that pervasive transcription is a widespread feature of all eukaryotic genomes. Recent evidences indicate that a significant portion of this unannotated transcripts called the 'dark matter' are actually non-coding RNAs with important role in a wide range of biological processes. However, the repertoire and functions of ncRNAs (microRNAs and long non-coding RNAs) largely remains unexplored with respect to defense against phytopathogens. To investigate their role in disease resistance, we have used next generation sequencing approaches to identify ncRNAs responsive to necrotrophic fungi in multiple plant-microbe interactions. A stranded RNA-Seq has resulted in 3181 lncRNAs responsive to *Sclerotinia sclerotiorum* infection in *Brassica napus*. A reciprocal expression pattern of the sense/antisense transcript pairs suggested steric clashes of transcriptional machinery and lncRNA mediated inactivation of sense promoter during pathogen attack. Functional characterization of these lncRNAs using RNAi knock-down lines demonstrated their possible role in immunity of canola against *Sclerotinia sclerotiorum*. Another study on small RNA-seq analysis has resulted in forty-six microRNAs responsive to *Fusarium* basal rot infection in *Allium sativum*. Overexpression of a selective set of miRNAs in transgenic garlic plants revealed enhanced resistance to FOC through up-regulated expression of defense-responsive genes and decreased fungal growth. These results indicate that multiple ncRNAs are involved in plant immunity and are critical elements in the defense network of plants against pathogenic fungi.

### Biography

Raj Kumar Joshi is an Assistant Professor at the Centre of Biotechnology, Siksha O Anusandhan University, India where he teaches graduate level courses on Plant Genomics and Genetic Engineering. He also serves as Group Leader of the Centre's Plant Functional Genomics Group, and in that capacity he supervises the overall research activities on the functional aspects of non-coding RNAs during plant-microbe interactions. He has initiated a collaborative research with Prof. Nat Kav from University of Alberta, Canada to explore the functional role of long non coding RNAs in the anti-fungal networks of *B. napus*. He is a Life Member of the Society of Plant Biochemistry/Biotechnology and the Association of Biological Chemists in India.

rajjoshi@soauniversity.ac.in

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