Epigenetic regulation of immune response in Arabidopsis thaliana

Plants and animals respond to ever changing environment by making changes in the physiological level of various proteins and metabolites. This rapid physiological change in response to the environment is achieved by the massive transcriptional reprogramming. Switching the genes on and off at right time in right place requires highly sophisticated transcriptional regulation. Before the advent of epigenetics, our understanding of the regulation of gene expression was limited to transcriptional activators, repressors, and enhancers. However, at present it is well established that epigenetics also plays a major role in the regulation of transcription to help the cell in responding and adapting to the changes in the environment. This epigenetic regulation of transcription is achieved through the modification of chemical structure of nucleotides through addition of methyl group in case of DNA and in case of nucleosomes through addition of various chemical moiety on the histone proteins. Apart from DNA and histone chemical modifications, small RNA, long non-coding RNA, and nucleosome positioning are a few other ways gene expression is controlled epigenetically. Epigenetics, through control of chromatin architecture, chromatin remodeling and DNA methylation controls expression of genes involved in almost all aspects of plant and animal growth and development including plant immunity. I will present our recent findings which illuminate new roles of the epigenetic mechanisms in plant immune response.