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विज्ञान एवं प्रौद्योगिकी विभाग, भारत सरकार के अधीन एक स्वायत्त संस्थान
सम विश्वविद्यालय संस्थान

Jawaharlal Nehru Centre For Advanced Scientific Research
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To whom it may concern

Dr. Chandrima Das has established a vibrant research group in Saha Institute of Nuclear Physics, Kolkata. The focus of her laboratory has been to understand the underlying epigenetic regulations that play a pivotal role in fine-tuning gene expression programs in human diseases by a class of proteins called chromatin readers/effectors.

Dr. Das' group has identified the role of histone H2BK120 Ubiquitination that are maintained by E3 ligases harbouring atypical PHD finger, onto chromatin promoting epithelial gene expression and suppressing Epithelial-Mesenchymal transition (***Nat Commun., 2019***). Additionally, her group has shown that maintenance of the H3K27me3 landscape and turning off crucial cancer signaling programs are parallelly maintained by the chromatin reader protein. These proteins directly regulate extracellular matrix genes, which, when activated, can alter matrix stiffness and increase the invasive and metastatic potential of the cells (***Cell Reports, 2024***).

The research of her group also explores how chromatin readers recognize gene body modifications such as H3K36 methylation or H4K16 acetylation, thereby suppressing spurious transcription events within genes. These proteins also form complexes with the RNA polymerase machinery, enhancing transcription programs (***J Biol Chem., 2016***). These proteins are also found to get recruited to the intergenic regions of the chromatin suppressing the expression of the long noncoding RNA which regulates the differentiation committing genes antagonistically (***Cell Death Dis., 2022***). These epigenetic regulators are also found to suppress the pluripotency and proliferation-promoting genes and promote terminal differentiation programs thereby preventing tumorigenesis (***Biochem J., 2017; J. Bioscience, 2020***).

Dr. Das' group has established how epigenetic mechanisms regulate metabolic programs in response to nutrient abundance. They have shown that epigenetic readers bind to H3K4me3 marks onto chromatin and program the suppression of the gluconeogenic genes through its association with the NuRD chromatin remodeling complex (***J Biol Chem., 2017***). These chromatin readers can also form distinct complexes in short-term or prolonged high glucose exposure to the cells and regulate the glycolytic or oxidative-phosphorylation pathways (***FASEB J., 2021***). Besides nutritional epigenetics, Dr. Das's group is also trying to understand the impact of epigenetic alteration during an oncoviral infection. Interestingly, they identify epigenetic programs that suppress the IFN-□ signaling pathways, potentially aiding viral persistence (***J Biol Chem., 2017, ACS Infectious Diseases, 2024***). Furthermore, her group has shown how H3K18 acetylation marks are recognized by chromatin reader proteins, aiding the recruitment of complexes such as SirT2/HNF4α/Tet2 that remove DNA methylation landmarks, thus activating target genes (***FEBS J, 2022***). This regulatory mechanism, employed by HBV to program gluconeogenic genes, supports the bio-energetic demands for their proliferation within the host cells.

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Dr. Das' group investigates the pressing problem of therapeutic resistance. They have shown that oncogenes maintained in poised epigenetic states (H3K4Me3/H3K27Me3) may be activated during chemotherapy resistance. The ability of the epigenetic readers to reinstate the repression state through their potential interacting partners, sensing bivalent chromatin landscapes may lead to chemosensitization (***Cell Death Dis., 2022***). Dr. Das' group has identified certain ATRA-responsive chromatin readers, offering prospects in retinoid-based therapies (***Biochim Biophys Acta Gene Regul Mech., 2017; Biochemistry, 2024***).

Dr. Das has successfully guided several young scholars, with seven completing their Ph.D. research under her supervision. She has also mentored six Research Associates. Besides, she is actively involved in the Science Outreach Program and is also an active member of the Asian Forum of Chromosome and Chromatin Biology and Asian Epigenomics initiative of 6 Asian countries. I strongly recommend her "***Sun Pharma Science Foundation Research Fellowships***".

Thank you

Regards
Tapas

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