

### 【Symposium 7-1】

## Exploring the Epigenetic Symphony: Unraveling the Roles of 5mC and 6mA in Shaping Renal Health CKD Development

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Epigenetic modifications, encompassing alterations in DNA and RNA, play a foundational role in orchestrating the intricate symphony of gene expression regulation. Within this expansive field, our exploration centers on two key epigenetic marks, 5mC and 6mA, seeking to unravel their profound implications in shaping the complex landscape of renal health.

DNA methylation stands as one of the three major epigenetic controls. In the context of 5mC, it signifies the addition of a methylation modification at the 5th position on Cytosine. This modification acts as a master regulator, exerting substantial influence over gene function. Despite its subtle nature, the significance of this epigenetic mark lies in its delicate modulation of gene activity, orchestrating the intricate molecular processes within the kidney. Introducing a dynamic dimension to the epigenetic narrative is the less-explored character, 6mA. In parallel with 5mC at the DNA level, 6mA arises as a methylation modification in RNA. This departure from traditional epigenetic studies highlights 6mA's regulatory influence extending from DNA to RNA, influencing various functions like splicing, translation, RNA decay, and enhancing RNA stability. The biological function of m6A modification varies based on the specific bindings with different m6A readers.

Analyzing human samples affected by CKD, clinical investigations have revealed noteworthy changes in both 5mC and 6mA. These specific epigenetic alterations, observed in the context of CKD, inspire a more profound investigation into their consequences for disease progression and presentation. Translational studies, which connect laboratory findings to real-world applications, shed light on the potential importance of correcting these irregular epigenetic modifications as a promising strategy for CKD treatment. Through this effort, the objective is to enhance understanding of the molecular complexities underlying kidney health and provide a roadmap for potential therapeutic strategies using the influence of epigenetic interventions. This contributes to the ongoing story of renal medicine, where the language of epigenetics guides the next steps in the pursuit of effective CKD management.

