The modulation of molecular properties of nucleosomes by Hepatitis B virus core protein (HBc)

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Chronic hepatitis B virus (HBV) persistent infection is the core driving factor for the progression of liver diseases such as liver cirrhosis and liver cancer. Its core pathological basis lies in the minichromosome formed by viral covalently closed circular DNA (cccDNA) in the host cell nucleus[1]. As an indelible "viral factory", this structure continuously drives viral replication and transcription. The HBV core protein (HBc) is a key structural component of this minichromosome, and previous studies have confirmed that it is involved in HBV transcription regulation. However, the specific interaction mode between HBc and nucleosomes, as well as the precise molecular mechanism by which it regulates viral transcription, remain unresolved key scientific issues[2][3].

To clarify the above mechanisms, this study prepared core research units such as nucleosomes and HBc N-terminal domain (HBc/NTD) through recombinant technology. Combined with dynamic light scattering (DLS), Precipitation assay characterization, electrophoretic mobility shift assay (EMSA), the physical and chemical properties of the target proteins were systematically characterized, and the interaction characteristics and affinity between HBc and nucleosomes were quantitatively analyzed. The results of this study are expected to reveal the core mechanism of HBc regulating HBV viral chromatin structure and transcription at the molecular level, and provide a theoretical basis and potential targets for the development of new anti-HBV drugs targeting cccDNA.

Reference

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