**NMR applications for the studies on biomolecular structure and function**

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Abstract

NMR (Nuclear Magnetic Resonance) spectroscopy is a powerful tool that provides information on the structure, dynamics, and interactions of biological macromolecules such as proteins and nucleic acids. In this seminar, I will introduce NMR studies on RNA structure and function, RNA – peptide interaction, and protein – drug interaction. First, the function and structure of telomerase RNA will be discussed. Telomerase maintains the 3’-end of chromosome. Telomerase is a ribonucleoprotein complex, and its minimal construct is composed of telomerase RNA (TER) and telomerase reverse transcriptase (TERT). Among two essential domains of TERT, the structure and function of three-way junction of the CR4-CR5 domain will be discussed. Second, the interaction between pre-miRNA-155 and a peptide will be introduced. MicroRNAs (miRNAs), a single-stranded noncoding RNA, regulate expression of target genes through either degradation of target mRNAs or inhibition of translation. MiRNA-155 is one of the most potent miRNAs that block apoptosis in human cancer. It is upregulated in various cancers and has oncogenic activity. Here, the tertiary interaction between a peptide and pre-miRNA-155, the precursor of miRNA-155, and its effect on apoptosis of cancer cell will be discussed. At last, I will briefly introduce the binding interaction between HSP70 protein and its small molecule inhibitor, apoptozole (Az).