

A Role of NMR Spectroscopy in the Post-genomic Era

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The success of genome project brought us a vast amount of sequence information about whole genes for some species. In order to get functional understanding of un-annotated genes, a number of frontiers in structural biology proposed a new paradigm for structural research on the basis of given information. Structural biologists believe that the whole characters of the living cells come from the protein functions, which could be regulated by three-dimensional protein structures. Recently, the large number of protein structures determined by NMR and X-ray crystallographic techniques has provided valuable information about protein folding as well as biological functions of unknown genes. We have initiated a pilot project for NMR-based structural genomics to implement newly developed high-through-put structure determination techniques. Twenty two proteins from 4 target organisms, which are *Methanobacteriumbeeen themoautotrophicum*(MTH), *Helicobactor pylori*(HP), *E. coli* and *Thermoplasma acidophilum* (TA) have been chosen for this study. Especially, proteins from *H. pylori*, have been selected as a model system to apply newly-developed automation platform, whereas conventional methods have been applied to MTH proteins. Three dimensional structures determined from automatic structure calculation platform together with heteronuclear NMR data demonstrated the power of high-through-put NMR structure determination method. The structure-function of proteins will be discussed related to their predicted functions.