S36-4 Creation of artificial transcription factors towards control of biological activities

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A molecular tool that control activities of various genes at will is very attractive for medicinal application and biological research. Such molecules are required to recognize specific DNA sequences within huge genomes. We create artificial DNA binding proteins based on C2H2-type zinc finger motifs, which is one of the most ubiquitous DNA binding motifs, in order to control genes and clarify the roles of cis-elements on promoters. The zinc finger motif has attractive characteristics to create novel DNA binding proteins from following points, (1) recognition of 3 base pairs per motif mediated by specific amino acids, (2) a DNA binding module consistent of tandemly repeated zinc finger motifs and binds to continuous non-palindromic sequence as a monomer, (3) the DNA binding domain can be fused with various functional domains such as transcriptional regulation domains and DNA cleavage domains. Novel DNA recognition patterns can be obtained through replacement of amino acids that involve in DNA recognition. By connecting multiple zinc finger motifs, a long DNA sequence can be recognized. Therefore, such artificial zinc finger proteins have possibilities as new molecular tools; artificial gene-specific transcription factors and nucleases. In this symposium, I will introduce creation and function of artificial zinc finger-type transcription factors targeting clock gene promoters towards regulation and evaluation of biological rhythms.