RECENT DEVELOPMENTS IN THE BIOMEDICAL APPLICATIONS OF '*IN VIVO*' RNA INTERFERENCE

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RNA Interference (RNAi) has become a powerful and widely used tool for the analysis of gene function and silencing mediated by double stranded RNA (dsRNAs) molecules, resulting in the specific posttranscriptional inactivation of genes. The first therapeutical applications of RNAi were demonstrated recently, including silencing of some viruses 'in vitro' (HIV, Hepatitis B, C and SARS). RNAi promotes potent and specific gene silencing through double-stranded RNA molecules, such as 21bp small interfering RNAs (siRNAs). This technique has recently been applied to adult mice with success. In the last years, increasing attention has emerged over RNA molecules as 'in vivo' therapeutical agents. Several examples of such molecules have been described *i.e.* small antisense RNAs, RNA aptamers, ribozymes and small interfering RNAs (siRNAs). siRNAs are 21-nucleotide RNA duplexes with a characteristic 2-nucleotides overhang in each 3' end and normally employed in RNA interference. siRNA-based approaches have been applied against prions, viruses and in genetic disorders. Other double-stranded RNA molecules were also efficient against bacterial and fungal infections as well as cancer therapy. The simplicity and low-cost of siRNA-based approaches could possibly revolutionize disease treatment. In this short presentation we will discuss the more recent developments in therapy based RNAi, as well as critical factors affecting the efficiency of this promising technique. We will also describe briefly our own experience in designing and carrying out 'in vivo' experiments with RNAi.