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Sigma-Aldrich, Tokyo university develop microRNA

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Singapore: Sigma-Aldrich's innovative biological products and services business Sigma Life Science signed an exclusive collaboration with Dr Hideo Iba and Dr Takeshi Haraguchi at the University of Tokyo to release Mission synthetic and Lentiviral microRNA Inhibitors. These are based upon the Tough Decoy (TuD) design for the long-term suppression of any miRNA endogenous to humans or mice.

Custom designs for other species are available upon request. Each microRNA inhibitor is designed using a proprietary algorithm that evaluates all possible sequences for the design predicted to best maintain the TuD structure, providing maximal miRNA recognition and binding.

Naturally-occurring miRNAs inhibit translation of a large percentage of mRNAs encoding human proteins and play pivotal roles in oncogenesis, development, cell differentiation, and immune responses. Iba and Haraguchi invented TuD RNAs1,2 as a more potent tool to suppress specific miRNAs and thus investigate their biological functions.

In contrast to current approaches that use single-stranded RNAs, such as sponge decoys and locked nucleic acids, TuD RNAs are double-stranded. This, along with a stem-loop stabilized secondary structure, resists cellular nuclease degradation and facilitates sustained miRNA inhibition for longer than one month. In addition, both strands of a TuD RNA contain an miRNA binding site for more efficient sequestration of target miRNAs at lower, nanomolar concentrations.

"Drs Iba and Haraguchi's Tough Decoy RNAs are an elegant and more practical tool for exploring the impact of microRNA gene regulation on human disease. Sigma Life Science's mission is to support this field's rapid development by making keystone technologies like this broadly accessible," says Dr Supriya Shivakumar, director of emerging technologies at Sigma Life Science.

Sigma Life Science provides the TuD RNAs in both synthetic and lentiviral formats to support transient miRNA knockdown as well as long-term miRNA suppression without repeated transfections. The miRNA binding sites are designed using human and mouse sequence data from the most recent version of miRBase.

Many other tools for miRNA screening, identification, and validation experiments are available from Sigma Life Science. These include synthetic human miRNA mimics, a miRNA isolation kit, a method to identify the specific gene(s) that a miRNA

targets (licensed exclusively from Dr Joop Gaken at King's College London, and a library of human 3â€²UTRs for validating many miRNA gene targets.