Therapeutic *In Vivo* Synthetic Chemistry

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The long-term goal of our research is to develop the working tools and methodologies that will form the foundation of "Therapeutic *In Vivo* Synthetic Chemistry". The main benefit of this approach is that synthetic transformations can be directly performed at target regions within the body to generate molecules that elicit localized biological effects. This method should largely circumvent off-target binding and instability issues associated with current drug administration techniques. In these years, we have engaged this topic through two different approaches. The first is through the usage of glycosylated artificial metalloenzymes, where the primary aim is to exploit the chemoselectivity of embedded, non-natural transition metal catalysts for the synthesis/release of bioactive molecules. The second approach is rather centered on discovering chemical probes with novel and selective reactivity to biological metabolites naturally overexpressed in cancer cells. Once developed, the objective is then to adapt them for synthesizing diagnostic probes or anticancer drugs. A part of our strategies has already met with successful outcome in clinical trials and could be applied to pharmaceutical fields and hospitals. Overview and future prospect will be discussed.

Ref: http://www.noritanaka-cap.mac.titech.ac.jp