Extension: 31511 Email: cmsun@mail.nctu.edu.tw

Prof. Chung-Ming Sun / Department of Applied Chemistry

Multidisciplinary Synthetic Approach, Combinatorial Drug Discovery, SiRNA Synthesis

Our primary research interests include the following three major parts: **(a)** We developed a new **multidisciplinary synthetic approach** comprising polymer support synthesis, microwave assisted synthesis and multicomponent condensation with metal-catalyzed C-H activation to facilitate synthesis of scaffold-directed library with a set of advantages like rapid process, simple purification and structural diversity in one shot. This strategy dramatically increases efficiency of overall multistep synthesis and formed a library of several new core templates to explore their biological activities (Figure 1). **(b)** Synthesis of Histone Methyltransferase G9a Inhibitor as the **Novel Cancer Stem Cell Therapeutics:** Our strategy is first exploring the roots of a disease to confirm the novel targets, synthesize and screen focused, well-designed compounds with combinatorial as well as diversity-oriented approach to optimize and design by molecular modeling. To fasten the drug discovery process, fast construction of medicinally interesting small molecules by developing new techniques in building bioassay screening platforms, molecular modeling algorithms and model construction to rational design chemical structures and pre-clinical PK properties respectively. Novel series of VEGFR-III inhibitors, with one recently approved (US 7825561 B2) (Figure 2). **(c) SiRNA (small interfering RNA) synthesis for drug design :** Chimeric oligonucleotide tetramer and hexamer were synthesized by the phosphoramidite approach using a 2+2 and 3+3 strategy, respectively. The concept of convergent synthesis provides an efficient route toward the synthesis of longer chimeric oligonucleotides, such as small interfering RNA oligonucleotides without the pollution of n-1 or shorter failures. This methodology offers an efficient and economical way to scale-up the synthesis of high-purity oligonucleotides for clinical trials and commercial uses.

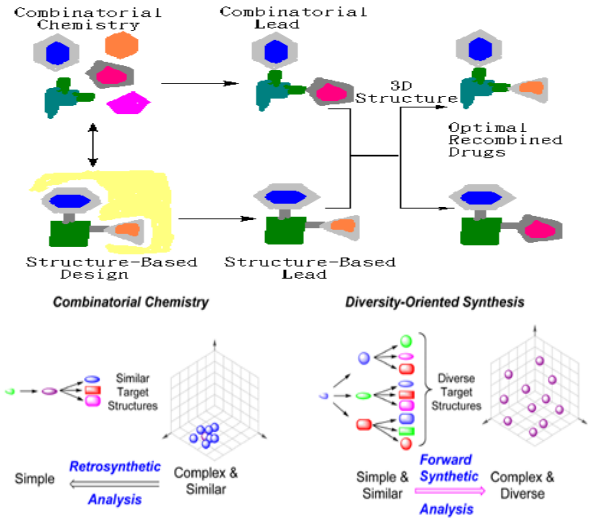

Figure 1

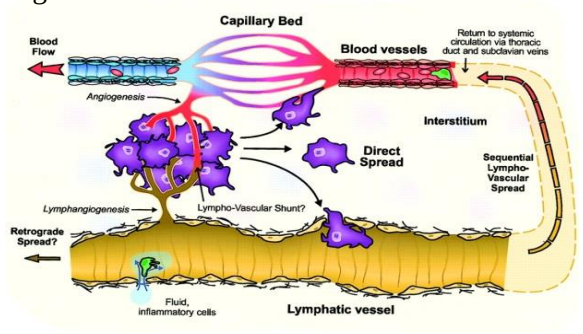

Figure 2

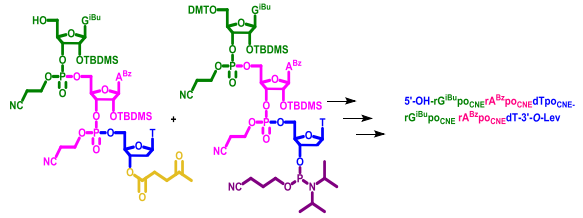

Figure 3