

Seminar

■ SPEAKER

Prof. Seong Wook Yang (Yonsei University)

■ TITLE

Simple and Fast detection of microRNAs using a silver nanocluster Nucleic Acid (NA/AgNCs) probe.

■ ABSTRACT

MicroRNAs (miRNAs) are a class of regulatory small RNAs that control various biological roles in the degradation and translation of target messenger RNAs in plants, animals, and single-cell eukaryotes. Because of the important roles of miRNAs in many cellular events, extensive studies have been performed to unveil the precise mechanism of miRNA biogenesis and miRNA functions. However, the commercial monitoring systems for miRNAs are elaborative and cost-inefficient such as small RNA blot analysis, real-time PCR, and next-generation sequencing. To overcome the hurdles in miRNA studies, we aim to develop new bio-sensing technologies for miRNA detection in vivo and in vitro. Using the fluorescence properties of DNA-silver nanoclusters (DNA/AgNCs), we have designed a DNA/AgNCs probe that can detect the presence of a target miRNA. Here, we show that the red fluorescence of the DNA/AgNCs probe is diminished upon the presence of target miRNA without pre- or post-modification, the addition of extra enhancer molecules, and labeling. The DNA/AgNCs probe emission was lowest when the complementary miRNA target was present and was significantly higher for four other control miRNA sequences, showing the efficiency of DNA/AgNCs sensors. In addition, we have explored the biological and nano-chemical phenomena of AgNCs-dependent fluorescence, by which a crucial principle of DNA-based AgNCs formation can be understood.

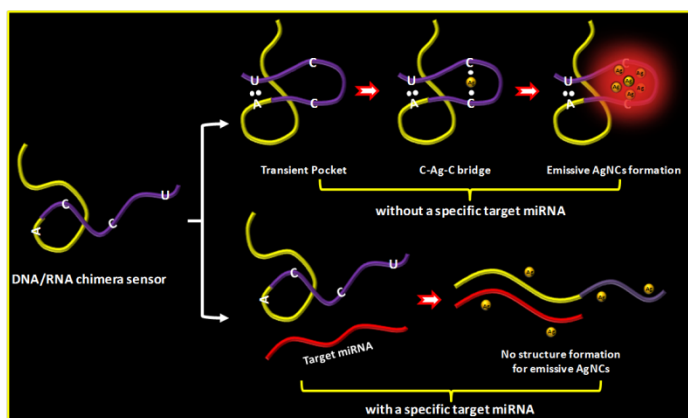


Figure 1: A schematic cartoon shows the suggested hypothesis of emissive AgNCs formation in a flexible RNA strand. Non self-complementary RNA is competent to form a transient pocket if it contains random A and U bases. The flexibility of RNA backbone appears to be important to induce the transient structure. The transient structure may increase the probability of cytosine to cytosine encountering and subsequent C-Ag+-C formation. Although only one base pairs of A=U and C≡G were exemplified in the cartoon, we speculate that serial cytosine bases may be required to generate strong fluorescence.

■ **DATE AND VENUE**

Jan. 4, 2022 (Tuesday, 11:00 - 12:00)

Virtual Seminar

■ **LANGUAGE**

Korean

■ **INVITED BY**

Director Minhaeng Cho