Fluorescent Biosensors based on Graphene Oxide for Diagnostics and Drug Discovery

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New bioanalytical platforms should overcome limitations of conventional assay methods—detection limits, cost issues, labors, efficiencies, quantitativeness, reproducibility, etc. In this talk, I will introduce recent studies which harness graphene derivatives for developing bioanalytical platforms to quantitatively analyze various enzyme activities and biomarkers including helicase and microRNA. The systems rely on attractive interaction between graphene oxide and nucleic acids and fluorescence quenching by graphene oxide. Quantitative microRNA sensing was successfully demonstrated in living cells. Recently, we employed one of the graphene-based bioassay systems to anti-viral drug screening and identified potent hit compounds to treat hepatitis C. This study shows that a new nanobio-technology can be routinely implemented in drug discovery with high-throughput capability, providing many advantages over conventional methods.

References

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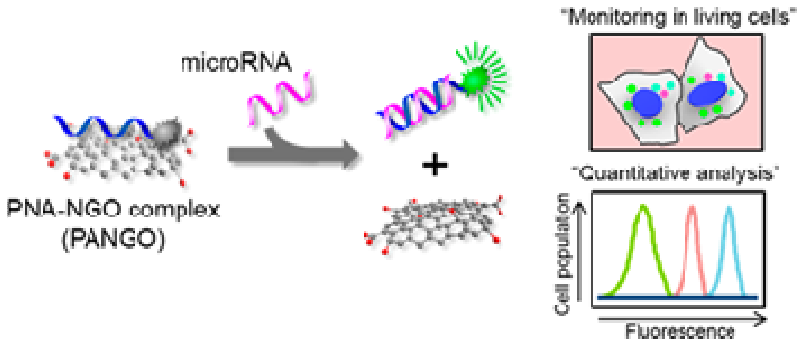

Figure 1: Scheme of a nanosized graphene oxide (NGO) based miRNA sensor, which allows quantitative monitoring of target miRNA expression levels in living cells.