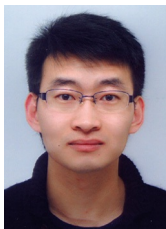


# Rapid Naked-Eye Discrimination of Cytochrome P450 Genetic Polymorphism through Non-Crosslinking Aggregation of DNA-Functionalized Gold Nanoparticles



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The front cover artwork is provided by the group of Tohru Takarada at RIKEN (Japan). The image shows a colorimetric single-nucleotide polymorphism (SNP) genotyping method that uses spontaneous aggregation of DNA-modified gold nanoparticles (DNA–AuNPs) for the simple and rapid SNP genotyping of the human cytochrome P450 2C19 monooxygenase gene. For more details, read the full text of the Full Paper at 10.1002/open.201600110.

## What is the most significant result of this study?

We had already developed a colorimetric assay for discriminating single-base differences within chemically synthesized oligonucleotides by utilizing unique colloidal behaviors of DNA-modified gold nanoparticles (DNA–AuNPs). The current study demonstrates that this colloidal assay's protocol is fully compatible with a commercially available kit for isolating genes from human hair roots. This has enabled us to actually perform naked-eye SNP genotyping with our own hairs in the laboratory within a few hours. We got excited at checking answers by using a DNA sequencer.

## What future opportunities do you see (in the light of the results presented in this paper)?

The present study may allow us to make an assay kit that can be used in small hospitals without any special instrumentation. As a gene target, the P450 gene presented in this work is of practical importance, owing to the clinical impact in relation to metabolism of dosed pharmaceutical drugs. We hope that the assay kit for the SNP genotyping of the P450 gene would be helpful in promoting personalized medicine.

## What other topics are you working on at the moment?

By employing the same DNA–AuNPs, we have constructed ordered AuNP assemblies that are capable of reversibly changing their structures in response to an external stimulus. In addition, we have recently reported that the DNA–AuNP trimers exhibit reversible interparticle distance changes. We believe that such dynamic nanomaterials are useful in various research fields, including electronic device fabrication and drug-delivery systems.

## What advice can you give to students interested in your field?

We would like to encourage students to have an interest in broad research areas and communicate with many great scientists that have diverse backgrounds. It is also recommended to read the newest edition of introductory textbooks for different or slightly related research areas during the prosecution of current projects. This may be helpful to conceive next ideas.

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