

## Nucleic acid biosensors for the detection of heavy metal ions

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Heavy metal ions (such as Hg<sup>2+</sup>, Pb<sup>2+</sup>, Cu<sup>2+</sup>, etc.) are widespread pollutants with distinct toxicological profiles that can cause deleterious effects on human health and the environment even at low concentrations. Thus, routine detection of trace amounts of heavy metal ions with high sensitivity is central for environmental monitoring. Conventional methods including cold vapor atomic absorption spectroscopy (CV-AAS), cold vapor atomic fluorescence spectroscopy (CV-AFS) and inductively coupled plasma mass spectroscopy (ICP-MS) have been widely used for heavy metal ion detection. Although they offer high sensitivity and accuracy, those analytical techniques require expensive and sophisticated instrumentation, skilled personnel and time-consuming sample pretreatment processes, which limit their wide applications in routine measurements. Thus, it is highly desirable to develop on-site biosensors for heavy metal ion detection without instrumentation. In our lab, we focus on developing nucleic acid biosensors for heavy metal ion detection using DNAYzmes, aptamers, and G-quadruplex as the molecular recognition elements. Employing colorimetric analysis, lateral flow strip biosensor, glucometer readout, and fluorescence detector as the sensing platform, our proposed biosensors would be promising strategies for heavy metal ion detection which offer prominent advantages of improved sensitivity, convenience and no need for the washing and separation steps during on-site applications.

### Biography

Lingwen Zeng has received his PhD degree in Genetics from McMaster University, Canada in 1993. From 1994 to 1997, he had his Post-doctoral training in the University of Chicago, USA. He has then worked in three publicly traded companies (Quest Diagnostics Inc., Scios Inc., and Genetics Computer Group Inc.) in USA as a Research Scientist and Project Manager. He has returned to China in 2001 and joined Institute of Environmental and Food Safety, Wuhan Academy of Agricultural Science and Technology in 2015 as a Principle Investigator and Director General. His research focuses on exploring novel technologies in the areas of diagnosis for human diseases, food and environmental safety and stem cell research.

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