



## OPEN ACCESS

EDITED AND REVIEWED BY  
Huangxian Ju,  
Nanjing University, China

\*CORRESPONDENCE  
Yiyang Dong,  
✉ yydong@mail.buct.edu.cn

RECEIVED 10 January 2026  
REVISED 24 January 2026  
ACCEPTED 26 January 2026  
PUBLISHED 03 March 2026

CITATION  
Lou X, Sun J, Tao WA and Dong Y (2026)  
Editorial: Highly efficient selections and  
applicable utilizations of aptamers as molecular  
recognition elements.  
*Front. Chem.* 14:1784694.  
doi: 10.3389/fchem.2026.1784694

COPYRIGHT  
© 2026 Lou, Sun, Tao and Dong. This is an  
open-access article distributed under the terms  
of the [Creative Commons Attribution License](#)  
(CC BY). The use, distribution or reproduction in  
other forums is permitted, provided the original  
author(s) and the copyright owner(s) are  
credited and that the original publication in this  
journal is cited, in accordance with accepted  
academic practice. No use, distribution or  
reproduction is permitted which does not  
comply with these terms.

# Editorial: Highly efficient selections and applicable utilizations of aptamers as molecular recognition elements

Xinhui Lou<sup>1</sup>, Jiefang Sun<sup>2</sup>, W. Andy Tao<sup>3</sup> and Yiyang Dong<sup>4\*</sup>

<sup>1</sup>Department of Chemistry, Capital Normal University, Beijing, China, <sup>2</sup>Beijing Key Laboratory of Diagnostic and Traceability Technologies for Food Poisoning, Beijing Center for Disease Prevention and Control, Beijing, China, <sup>3</sup>Department of Chemistry, Purdue University, West Lafayette, IN, United States, <sup>4</sup>College of Life Science and Technology, Beijing University of Chemical Technology, Beijing, China

## KEYWORDS

analytical chemistry, aptamer, aptasensor, biosensor, detection

## Editorial on the Research Topic

Highly efficient selections and applicable utilizations of aptamers as molecular recognition elements

Aptamers, invented in 1990s and often referred to as “chemical antibodies,” are single-stranded DNA or RNA oligonucleotides that bind to specific target molecules with high affinity and selectivity. These molecular recognition elements have emerged in recent years as powerful tools in various fields including detection, diagnostics, therapeutics, and biosensing. This Research Topic focuses on the latest advancements in aptamer selection methodologies and their practical applications, highlighting the growing importance of these versatile biomolecules.

The scope of the Research Topic brings together cutting-edge research on aptamer technology and representative applications, covering mainly the following three main areas.

- Novel selection techniques for high-efficiency aptamer identification
- Innovative biosensor development using aptamers as recognition elements
- Advanced applications for infectious disease control and food safety assurance

This Research Topic includes four featured articles as significant contributions that demonstrate the versatility and impact of aptamer technology.

“Application of DNA aptamers to block enterotoxigenic *Escherichia coli* toxicity in a *Galleria mellonella* larval model” - This study demonstrates the therapeutic potential of DNA aptamers in combating bacterial infections, using an innovative insect model system.

“Pyoverdine binding aptamers and label-free electrochemical detection of pseudomonads” - Presents a novel electrochemical biosensing platform for bacterial detection, showcasing the integration of aptamers with modern sensing technologies.

“Screening biotoxin aptamer and their application of optical aptasensor in food stuff: a review” - A comprehensive review that summarizes the technical points and difficulties of

typical aptamer screening processes and the latest progresses in rapid optical detection of biotoxins for food safety applications.

“Recent research progress in tetrodotoxin detection and quantitative analysis methods” – A minireview that summarizes methodological updates of tetrodotoxin detection and quantitative analysis, covering frontier detection schemes based on biological and cellular sensors, immunoassays and immunosensors, aptamers, and liquid chromatography-mass spectrometry.

The articles presented in this Research Topic has already garnered significant attention, with over 13,000 article views and 12 citations, reflecting the broad readership and growing interest in aptamer technology. The contributions highlight how aptamers are transitioning from laboratory curiosities to practical tools with real-world applications as well.

As selection methodologies continue to improve and application platforms expand, we anticipate that aptamers will play an increasingly important role in molecular recognition. The integration of aptamers with advanced nanomaterials, microfluidics, and point-of-care devices promises to revolutionize present analytical chemistry.

## Author contributions

XL: Writing – original draft. JS: Writing – original draft. WT: Writing – review and editing. YD: Project administration, Writing – original draft, Writing – review and editing.

## Funding

The author(s) declared that financial support was not received for this work and/or its publication.

## Acknowledgements

We extend our sincere gratitude to all authors who contributed to this Research Topic, the reviewers for their valuable insights, and the editorial team at Frontiers for their support in bringing this Research Topic to fruition.

## Conflict of interest

The author(s) declared that this work was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

## Generative AI statement

The author(s) declared that generative AI was not used in the creation of this manuscript.

Any alternative text (alt text) provided alongside figures in this article has been generated by Frontiers with the support of artificial intelligence and reasonable efforts have been made to ensure accuracy, including review by the authors wherever possible. If you identify any issues, please contact us.

## Publisher's note

All claims expressed in this article are solely those of the authors and do not necessarily represent those of their affiliated organizations, or those of the publisher, the editors and the reviewers. Any product that may be evaluated in this article, or claim that may be made by its manufacturer, is not guaranteed or endorsed by the publisher.