A novel H-shape adaptor-mediated isothermal exponential amplification reaction (HS-EXPAR) to identify target nucleic acid

Hansol Kim*a, and Hyun Gyu Parka

aDepartment of Chemical and Biomolecular Engineering, KAIST, Daehak-ro 291, Yuseong-gu, Daejeon 305-701, Republic of Korea
*hansoru93@kaist.ac.kr

Introduction: Exponential amplification reaction (EXPAR)

Purpose
Amplification of short nucleic acids

Materials
EXPAR template, polymerase, nicking enzyme

Mechanism
Repeated extension and generation of trigger strands

Advantage
Isothermal amplification without thermal cycling

Limitation
Limited to short nucleic acids with extensible 3’-OH

Application of EXPAR technology to detect long target nucleic acids

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(a) Without target DNA
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\textbf{(b) Traditional EXPAR}

- Diagram of the traditional EXPAR reaction process.
(c) With target DNA

Dual three way junction structure enhances target specificity

HS-EXPAR could reliably detect long target DNA
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(A) Component feasibility test
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(B) Target-specific length dependence of the reaction

(C) Discriminating capability for mismatched target sequences
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The limit of detection (LOD) (3σ/slope) was estimated to be 63 aM, which is quite comparable or even better than those from previously reported isothermal signal amplification methods.