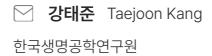
한빛사 논문

조회 22









Biosens. Bioelectron., Feb 20 2024, 253 S0956-5663(24)00152-0 | https://doi.org/10.1016/j.bios.2024.116147

Multifunctional self-priming hairpin probe-based isothermal nucleic acid amplification and its applications for COVID-19 diagnosis

Authors and Affiliations ^

Hansol Kim ^{a,b}, Seoyoung Lee ^a, Yong Ju ^a, Hyoyong Kim ^a, Hyowon Jang ^{a,b}, Yeonkyung Park ^{a,b}, Sang Mo Lee ^a, Dongeun Yong ^c, Taejoon Kang ^{b,d}, Hyun Gyu Park ^a

^aDepartment of Chemical and Biomolecular Engineering (BK 21 four), Korea Advanced Institute of Science and Technology (KAIST), 291 Daehak-ro, Yuseong-gu, Daejeon, 34141, Republic of Korea ^bBionanotechnology Research Center, Korea Research Institute of Bioscience and Biotechnology (KRIBB), 125 Gwahak-ro, Yuseong-gu, Daejeon, 34141, Republic of Korea ^cDepartment of Laboratory Medicine and Research Institute of Bacterial Resistance, Yonsei University College of Medicine, 50-1 Yonsei-ro, Seodaemun-gu, Seoul, 03722, Republic of Korea ^dSchool of Pharmacy, Sungkyunkwan University, 2066 Seobu-ro, Jangan-gu, Suwon, Gyeonggi-do, 16419, Republic of Korea

Corresponding authors: Taejoon Kang, Hyun Gyu Park

Abstract

We herein present a multifunctional self-priming hairpin probe-based isothermal amplification, termed MSH, enabling one-pot detection of target nucleic acids. The sophisticatedly designed multifunctional self-priming hairpin (MSH) probe recognizes the target and rearranges to prime itself, triggering the amplification reaction powered by the continuously repeated extension, nicking, and target recycling. As a consequence, a large number of double-stranded DNA (dsDNA) amplicons are produced that could be monitored in real-time using a dsDNA-intercalating dye. Based on this unique design approach, the nucleocapsid (N) and the open reading frame 1 ab (ORF1ab) genes of SARS-CoV-2 were successfully detected down to 1.664 fM and 0.770 fM, respectively. The practical applicability of our method was validated by accurately diagnosing 60 clinical samples with 93.33% sensitivity and 96.67% specificity. This isothermal one-pot MSH technique holds great promise as a point-of-care testing protocol for the reliable detection of a wide spectrum of pathogens, particularly in resource-limited settings.

논문정보

- 형식 | Research article
- 게재일 | 2024년 02월 (BRIC 등록일 2024-03-08)
- 연구진 | 국내 연구진
- 분야 <u>생명과학 > 생물공학</u>









목록

댓글 0

로그인

관련 링크

- 강태준님 전체 논문보기
- 연구자 키워드

• 연구자 ID

	ORCID 0000-0002-5387-6458 Web of Science Research ID(Publons)AAS-1967-2020
	✓ Lab/개인 홈페이지
	Google Scholar
	✓ PubMed
•	관련분야 연구자보기
	바이오센싱 및 나노바이오물질
•	소속기관 논문보기
	한국과학기술원 한국생명공학연구원 성균관대학교
•	관련분야 논문보기
	생물공학
•	해당논문 저자보기

김한솔 (KAIST, KRIBB)

박현규 (KAIST)