Target-triggered exponential signal amplification reaction for RNA detection

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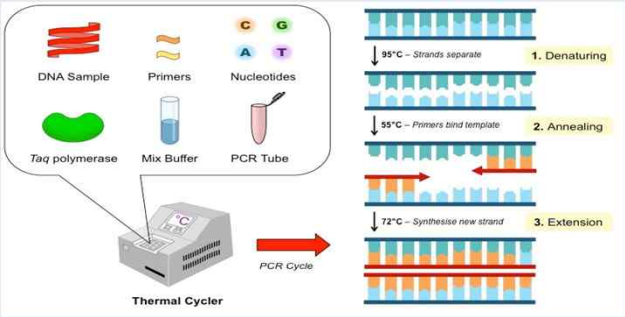
A. Introduction

Polymerase chain reaction (PCR)

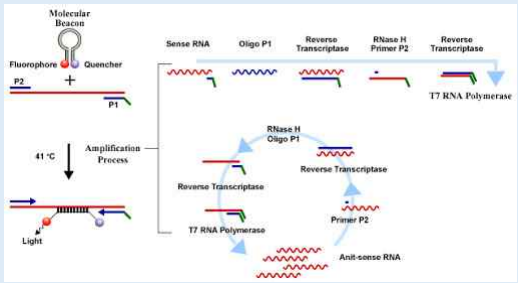


http://ib.bioninja.com.au/standard-level/topic-3-genetics/35-genetic-modification-and/pcr.html

Disadvantages

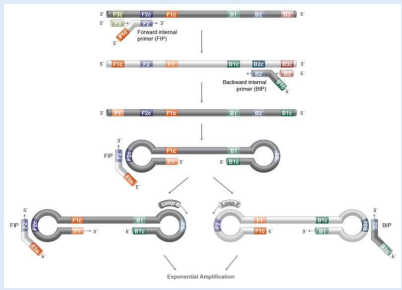
- Massive & expensive thermal cycler
- Not applicable to Point-of-care testing technology

Isothermal nucleic acid amplification



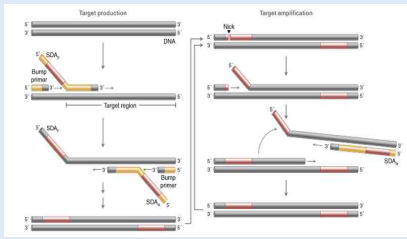
http://www.premierbiosoft.com/tech_notes/NASBA.html

Nucleic-acid sequence-based amplification (NASBA)



https://international.neb.com/applications/dna-amplification-pcr-and-qpcr/isothermal-amplification/loop-mediated-isothermal-amplification-lamp

Loop-mediated isothermal amplification (LAMP)



https://international.neb.com/applications/dna-amplification-pcr-and-qpcr/isothermal-amplification/strand-displacement-amplification-and-nicking-enzyme-amplification-reaction

Strand displacement amplification (SDA)

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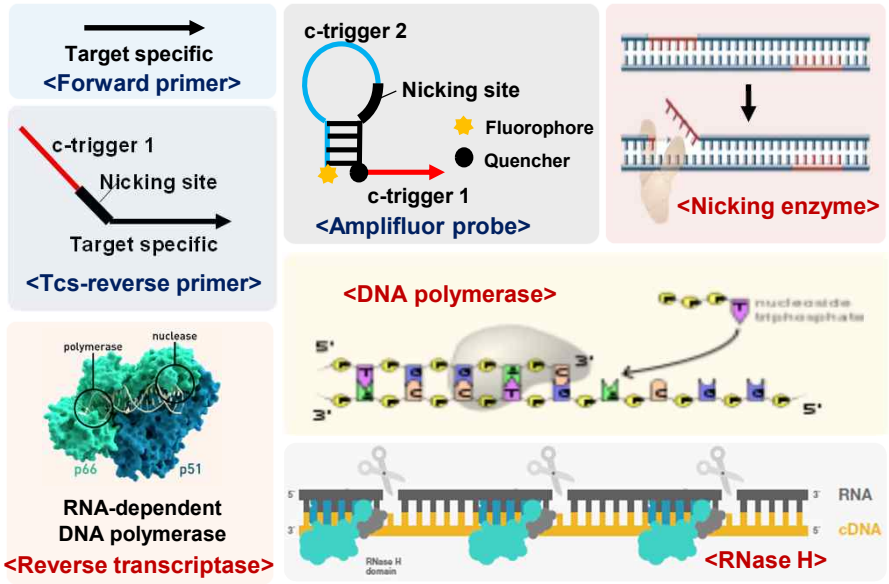
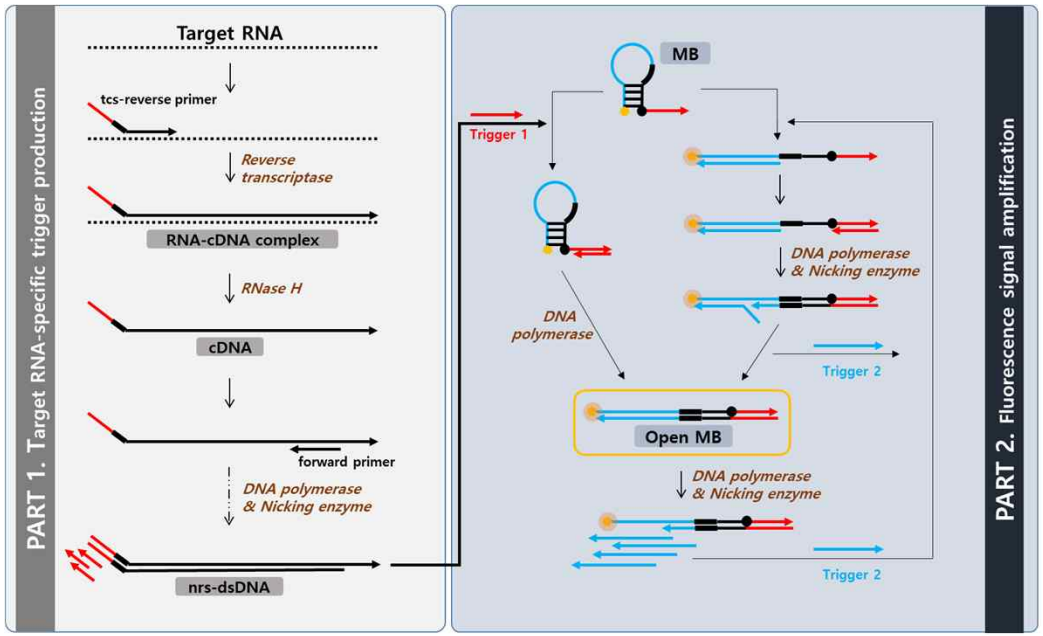
B. Schematic representation

- **Key components**



- **Target RNA-specific trigger induced exponential signal amplification reaction**



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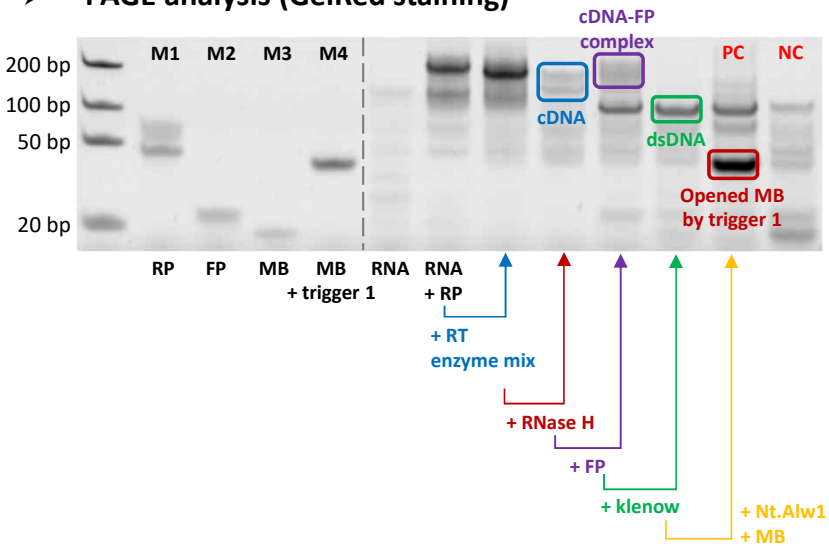
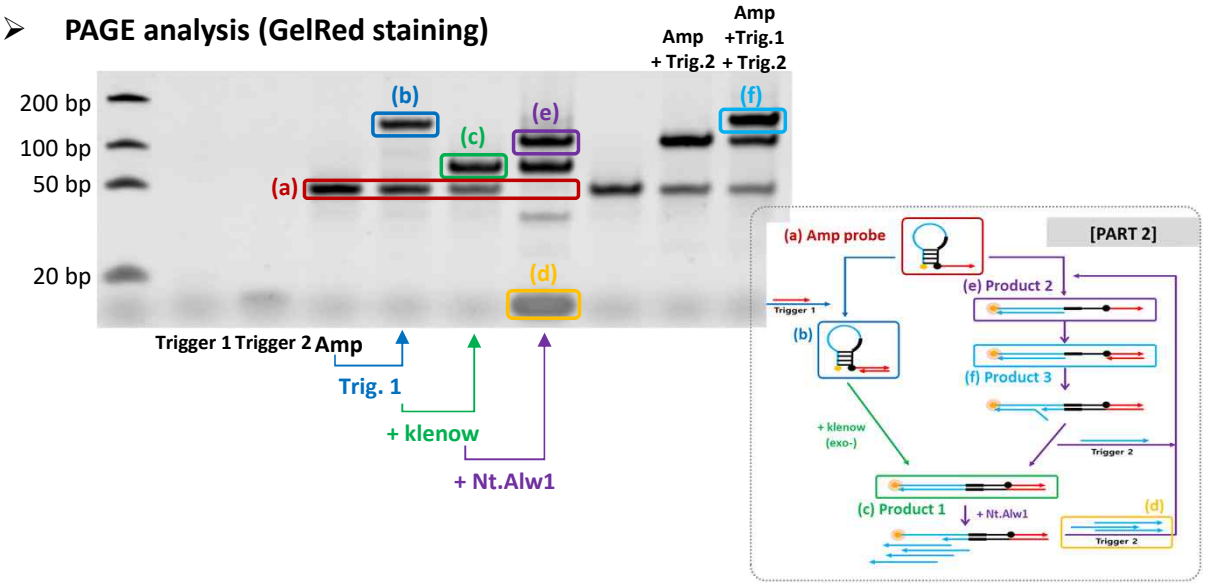
C. Results & Discussion

- **PART 1 feasibility test**
  - **PAGE analysis (GelRed staining)**



- **PART 2 feasibility test**
  - **PAGE analysis (GelRed staining)**



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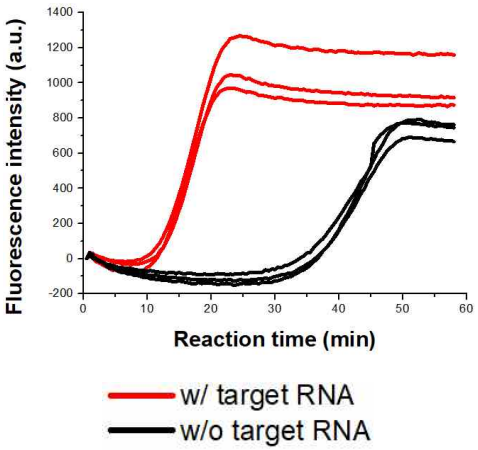
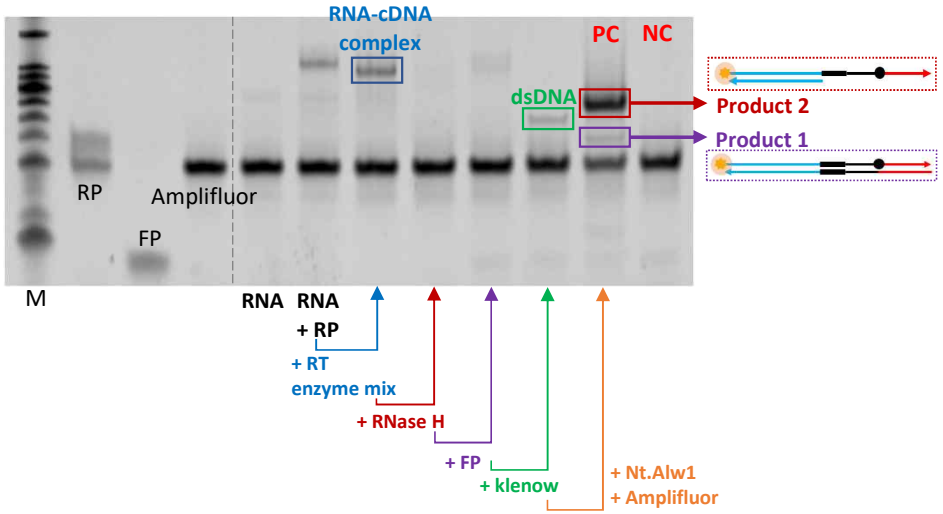
C. Results & Discussion

● Feasibility test of whole reaction

➢ **Real-time fluorescence analysis**

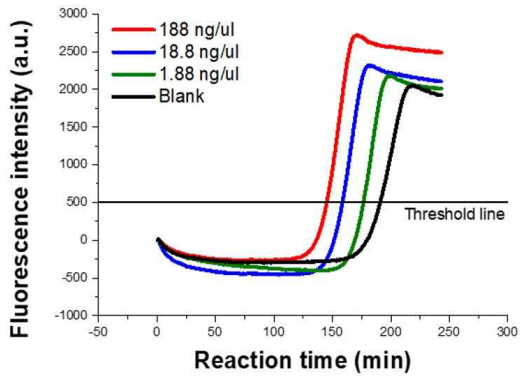


➢ **PAGE analysis (GelRed staining)**



● Sensitivity test

Target: total RNA of Brachionus rotundiformis



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D. Conclusion

Target-specific trigger-induced exponential signal amplification reaction

Development of novel real-time RNA detection method

Great insight for the development of self-operative isothermal amplifying system enabling target RNA detection

Applicable to the development of isothermal amplification system for detection of several virus (e.g. SARS-CoV-2, MERS-CoV), pathogens, or cancer cells

A powerful platform for the multiplex isothermal detection of several RNA target by employing multiple trigger-specific Amplifluors