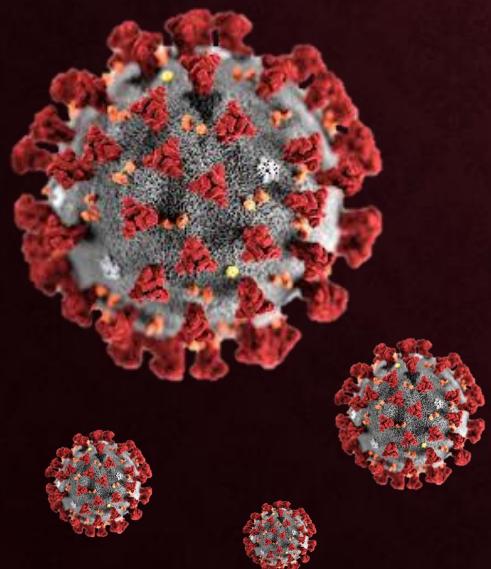


THAILAND BIOTECHNOLOGY: RESEARCH CHALLENGES AND GLOBAL COLLABORATION OPPORTUNITIES IN COVID-19 CRISIS



Adisak Romsang, Ph.D.

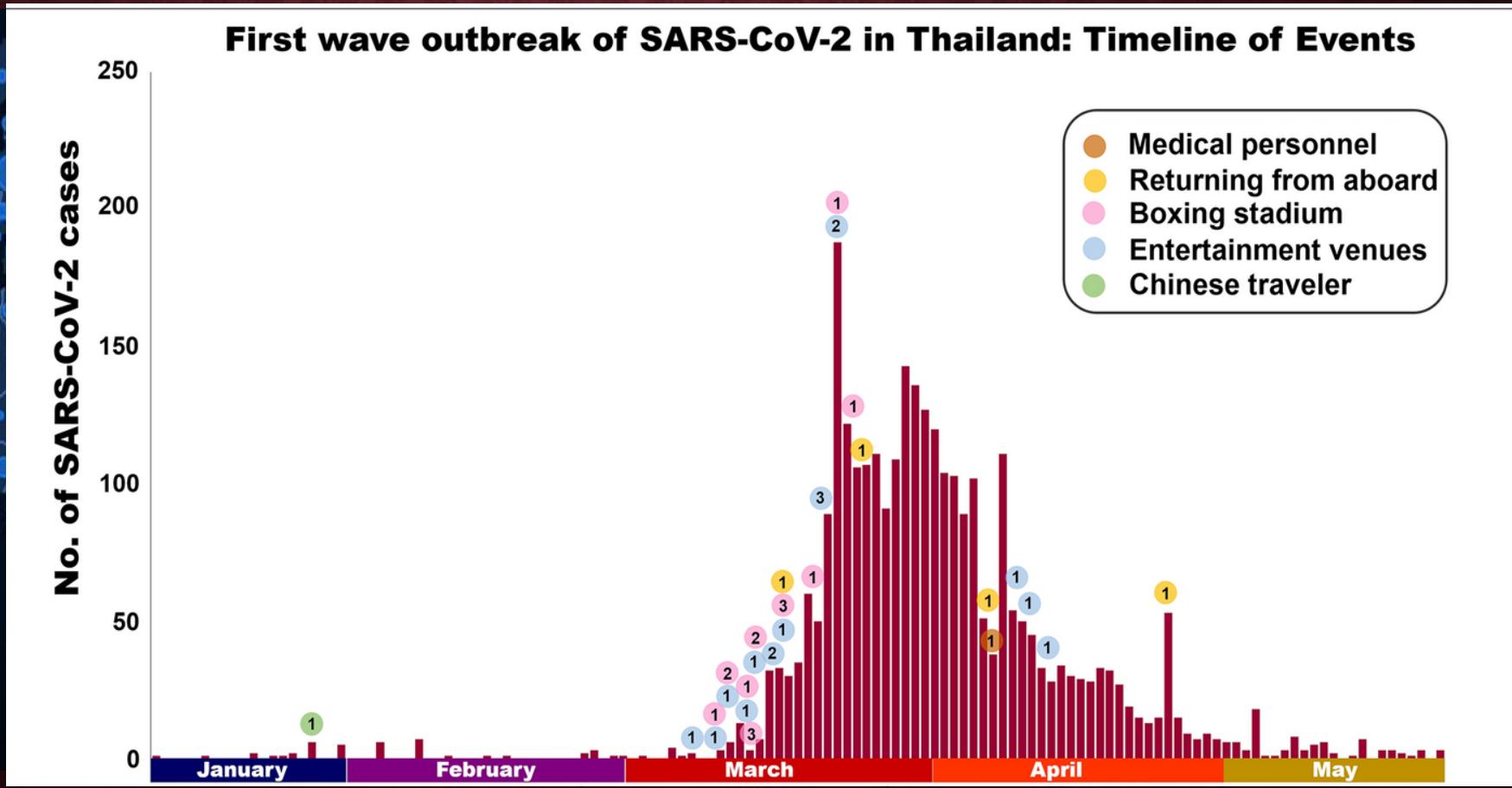
Thai Society for Biotechnology, BIOTEC, NSTDA, Thailand

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COVID-19 : THAILAND



WHO THAILAND: <https://www.youtube.com/watch?v=MnxO48joRZQ>

IMPACT OF COVID-19 IN THAILAND



Occupation

- Work from home
- School shutdown
- Online everything: working, operating, meeting, shopping and costuming
- E-learning and online classroom
- “Stay at home for the nation” policy



Economic

- Reduced by 5.3%
- Est.GDP at 2.4%
- Factories closed & stagnated business
- 8.3 million jobless
- Export falls to 6.3%
- Panic buying
- In short supply of viral protectants and disinfectants
- Telecom & internet markets grow up



Social and life style

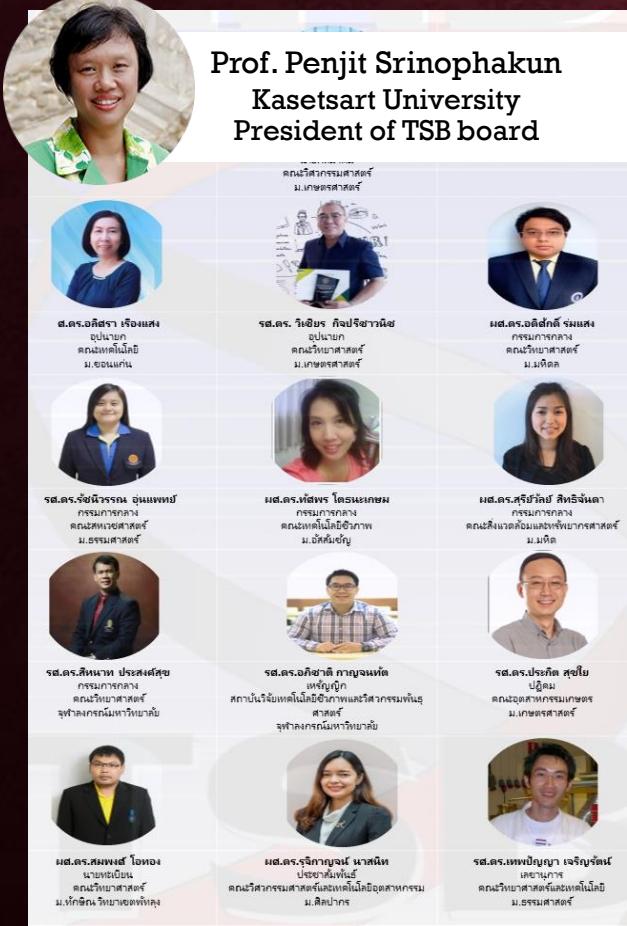
- Healthcare as #1 priority
- Social distancing 1-2 m.
- 14- day home quarantine
- Telecommunication
- Private transport
- Masked-face outside
- Alcohol gel as a carry-on item
- Washing hands & meals at home
- Airport monitoring
- Donations
- Big applause for medical staffs





BIOTECHNOLOGY

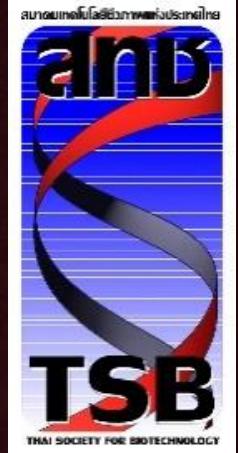
Research Challenges and Global Collaboration Opportunities in COVID-19 Crisis



Prof. Montarop Yamabhai
Suranaree University of Technology, Thailand



Asst.Prof. Adisak Romsang
Mahidol University, Thailand

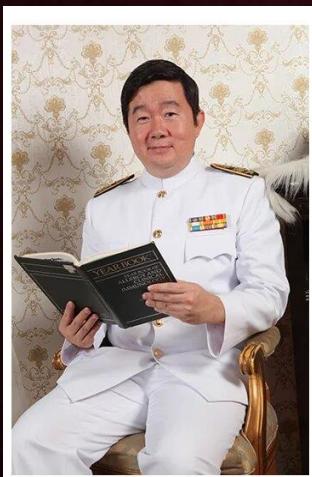




DETECTION OF SARS-COV-2 RNA RT-LAMP

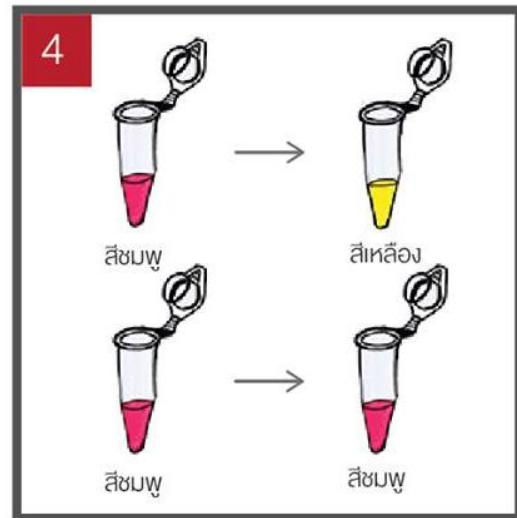
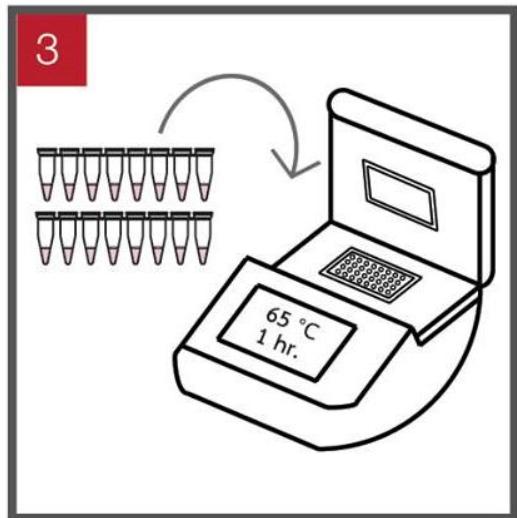
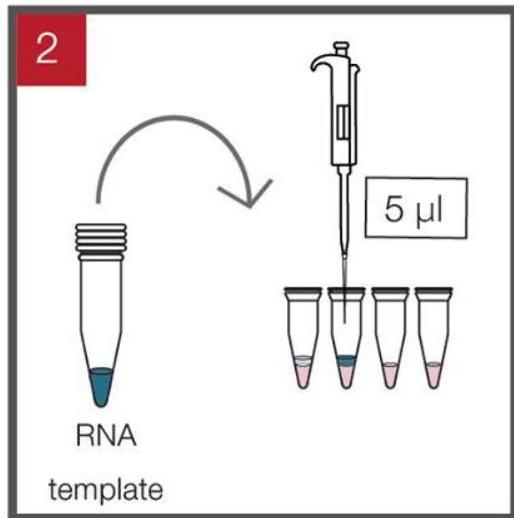
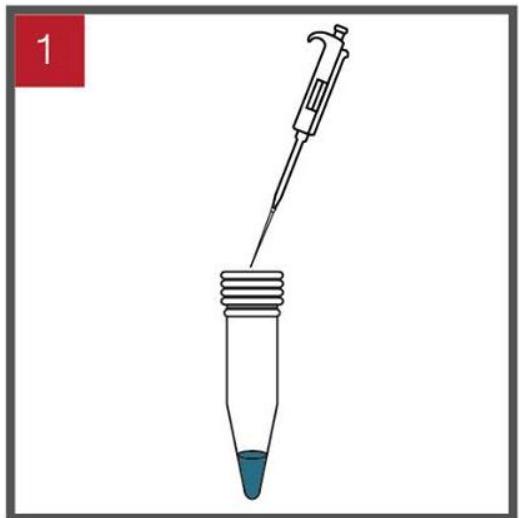
Zenostic Co., Ltd.

- Faculty of Science, Mahidol University
- Biotech Start Up
- Center of Excellence on Medical Biotechnology (CEMB)





Zenostic COVID-19 Detection Kit Workflow



ชุดตรวจ Zenostic COVID-19 detection kit
สำหรับการตรวจสืบเชื้อโควิด-19 โดยทีม Biotech Start Up มหาวิทยาลัยมหิดล



ADDITIONAL CONTACT INFO



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DETECTION OF SARS-COV-2 RNA CAS13-BASED ASSAY

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- *Synthetic biology for biopolymer synthesis and bioremediation*
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➤ **Clinical validation of a Cas13-based assay for the detection of SARS-CoV-2 RNA.** Nat Biomed Eng. 2020

Aug 26. doi: 10.1038/s41551-020-00603-x.



Clinical validation of a Cas13-based assay for the detection of SARS-CoV-2 RNA

Maturada Patchsung^{1,5}, Krittidas Jantarug^{1,5}, Archiraya Pattama^{2,15}, Kanokpol Aphicho^{1,15}, Surasit Suraritdechchai^{1,15}, Piyachat Meesawat^{1,15}, Khomkrit Sappaklaw^{1,15}, Nattawat Leelahakorn¹, Theerawat Ruenkam¹, Thanakrit Wongsatit¹, Niracha Athipanyasip¹, Bhumrapree Eiamthong¹, Benya Lakkansirorat¹, Thitima Phoodokmai¹, Nootaree Niljianskul¹, Danaya Pakotiprapha^{3,4}, Sittinan Chanarat⁴, Aimorn Homchan^{3,4}, Ruchanok Tinikul⁴, Phlaiwarong Kamutira⁴, Kochakorn Phiwaikow¹, Sahachat Soithongcharoen¹, Chadaporn Kantiwiriyawanitch¹, Vinutsada Pongsupas¹, Duangtip Trisirivirat¹, Juthamas Jaroensuk¹, Thanyaporn Wongnate¹, Somchart Maenpuen⁵, Pimchai Chaiyen¹, Sirichai Kamnerdnakta⁶, Jirawat Swangsri⁶, Suebwong Chuthapisith⁶, Yongyut Sirivatanauksorn⁶, Chutikarn Chaimayo⁷, Ruengpung Sutthent², Wansee Kantakamalakul², Julia Joung^{8,9,10}, Alim Ladha^{7,8,9,10}, Xin Jin^{8,9,11,12}, Jonathan S. Gootenberg^{9,13}, Omar O. Abudayeh^{9,13}, Feng Zhang^{8,9,10,13,14}, Navin Horthongkham^{9,13} and Chayasith Uttamapinant^{1,13}



Table 1 | Concordance between RT-qPCR and SHERLOCK detection of SARS-CoV-2 RNA.

		Clinical validation	
		All samples	
		Positive	Negative
SHERLOCK lateral-flow readout	Positive	71 (true positive)	0 (false positive)
SHERLOCK lateral-flow readout	Negative	10 (false negative)	73 (true negative)
SHERLOCK lateral-flow readout	Total	81	73
SHERLOCK fluorescence readout	Positive		
SHERLOCK fluorescence readout	Negative		
SHERLOCK fluorescence readout	Total		

In total, 154 clinical samples (81 positive) were part of pre-operative assessment. SHERLOCK was at $C_t < 33.5$ (Fig. 2).

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ISOLATION AND CULTURING FOR SARS-COV-2 RNA

Assoc.Prof. Arunee Thitithanyanont, M.D.

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- Molecular epidemiology and evolution of viruses
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➤ **Certified BSL-3 facility and Virus Isolation**





Assoc. Prof. Arunee Thitithanyanont, M.D.

Dept. Microbiology, Fac. Science, Mahidol University
Certified BSL-3 Facility and Virus Isolation

DRUG DISCOVERY AND DEVELOPMENT AGAINST COVID-19

Dr. Suparerk Borwornpinyo

- Biotechnology/ECDD
- Faculty of Science, Mahidol University
- Animal Cell Technology
- E-mail: suparerk.bor@mahidol.ac.th

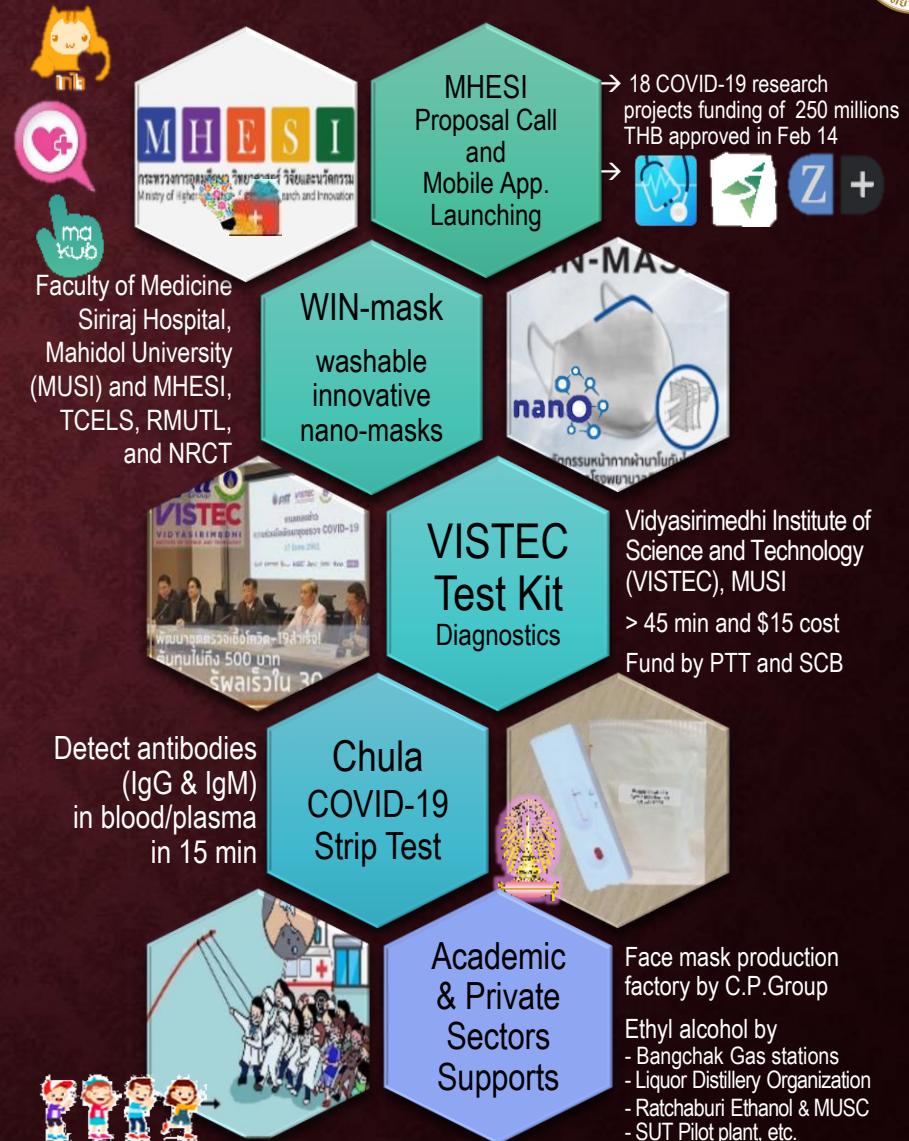
➤ ***Drug Discovery and Analysis***







RESEARCH AND INNOVATION IN THAILAND DURING COVID-19 CRISIS







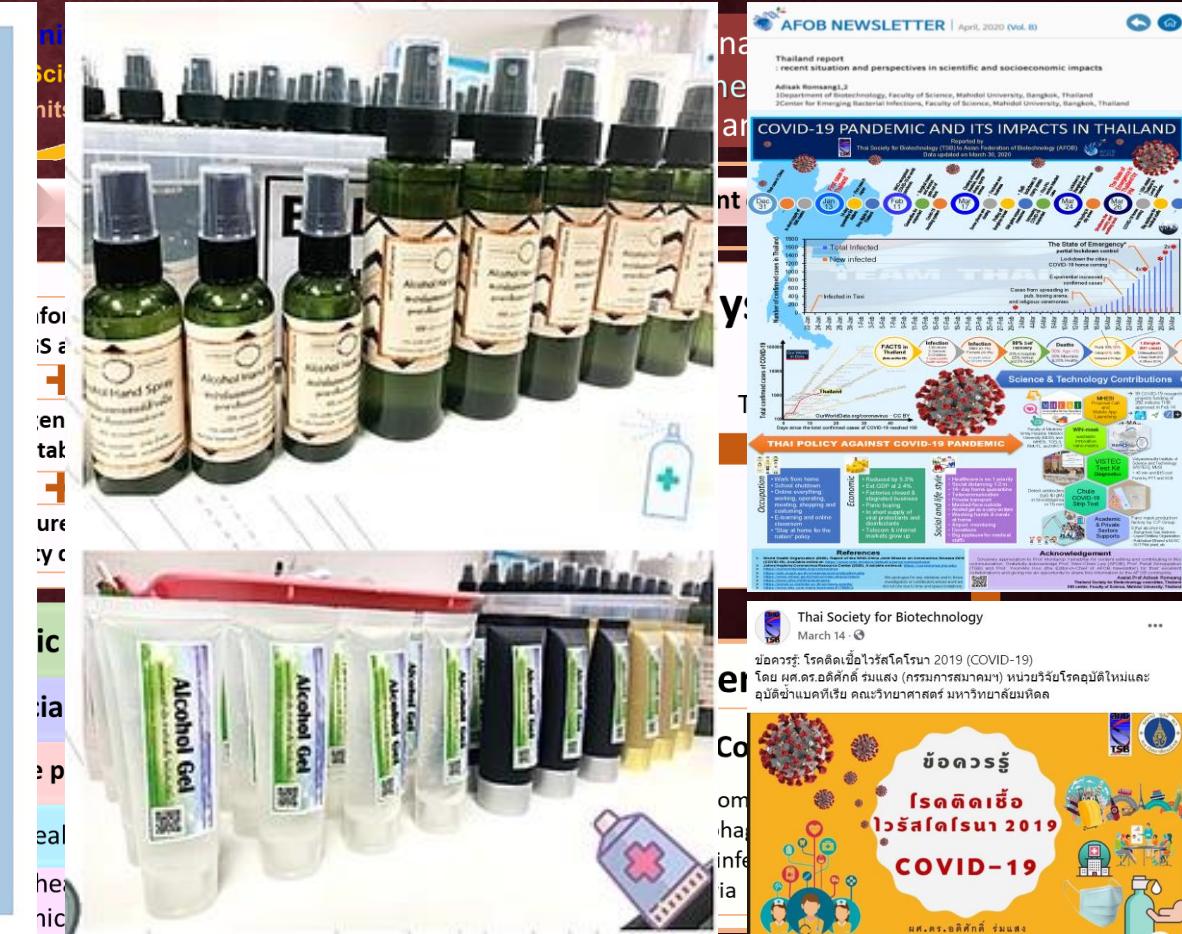
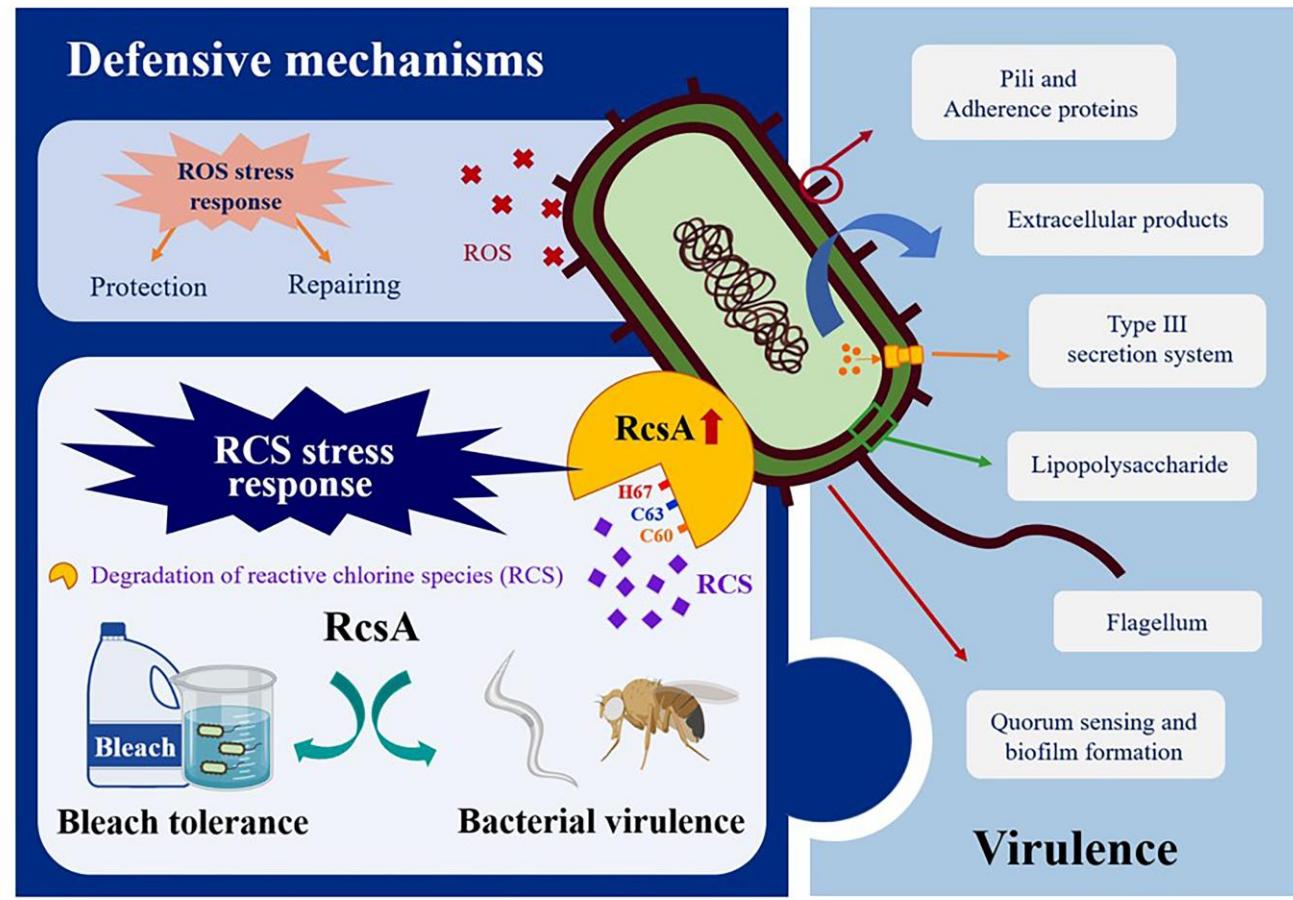
ARE WE READY FOR THE NEXT PANDEMIC?



**THAILAND'S EXCEPTIONAL
STRENGTHS AS THE WORLD'S
MEDICAL HUB**

CENTER FOR EMERGING BACTERIAL INFECTIONS

FAC. SCIENCE, MAHIDOL UNIVERSITY



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The 32nd Annual Meeting of the Thai Society for Biotechnology and International Conference (TSB 2020)

"Bio-circular-green economy for new normal"

November 26, 2020 / Bangkok, Thailand

Venue: Online Conference



THANK YOU FOR WATCHING

ACKNOWLEDGEMENTS

- Asian Federation of Biotechnology (AFOB)
- Thai Society for Biotechnology (TSB)
- Mahidol University, Faculty of Science (MUSC)
- Department of Biotechnology, MUSC
- Department of Microbiology, MUSC
- Center for Emerging Bacterial Infections, MUSC
- Excellent Center for Drug Discovery, MUSC



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