HPV Therapeutic Vaccine Development
Vaccine Equity Mission

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ChulaVRC for Vaccine Equity
"[Kiat] worried that any vaccine developed in the West wouldn’t be available in Thailand and surrounding low-income countries for years,” Weissman said. When Ruxrunghatham told him the plan to produce the vaccine for distribution to countries that wouldn’t be able to buy one themselves, he said, “that sounded like a beautiful goal.”

*Forbes*

**This Thai Researcher Aims To Make His Country A Covid-19 Vaccine Powerhouse**
ChulaVRC Capacity on Vaccine Development: Current and Future

Design & Research Grade Production

- **1.** Design: ChulaVRC
- **2.** DNA: Outsource
- **3.** mRNA: ChulaVRC
- **4.** LNP: Encapsulation
- **5.** In vitro tests: ChulaVRC

Pre-clinical Studies

- **6.** ChulaVRC MDCU
- **7.** Chula NPRC

Clinical Development

- **cGMP:** Current: Outsource BNA, Thailand
- **Clinical:** Chula-CRC + Multicenter Phase 1-3

Vaccine Development Pipelines
- **Current:**
  - ChulaVRC initiative: 6 vaccines
  - Collaborator initiative: 3 vaccines
- **Future:** Chula GMP
HPV Therapeutic Vaccine
WHO Preferred Product Profiles to increase global public health value

1. **Regression** of Cervical Precancers (CIN—3)
   
   **AND/OR**

2. **Clearance** of oncogenic HPV type infections
   
   **AND/OR**

3. Prolonged effects **against Reinfecion or Recurrences**

At Least covers

- HPV16
- HPV18
Promising Results of HPV Therapeutic mRNA Vaccine Development
HPV16 mRNA vaccines – Protein Expression in VERO Cell Lines

Antigen 1

Antigen 2

Antigen 3

CONFIDENTIAL
The number of implanted TC-1 Luc cells effect to the kinetic of tumor growth in a dose-dependent manner.

**Number of TC-1 Luc cells**

- 5,000
- 10,000
- 20,000
- 50,000

**Tumor size (mm³)**

- 5,000
- 10,000
- 20,000
- 50,000

Day 7

Day 10

Day 13
Can a single dose of HPV16 – mRNA vaccine elicit tumor cells regression in mice given after 5,000 and 10,000 TC-1 Luc cells implantation?
Results of a Single Dose of HPV16–mRNA Vaccine in Mice Given after 5,000 and 10,000 TC-1 Luc Tumor Cells Implantation

**TC-1 Luc tumor growth kinetics by bioluminescence**

**Dose 1**

TC-1 Luc 5,000 or 10,000 cells (S.C.)

10 μg mRNA-LNP
Or NSS (i.m.)

**Day 0**

**Day 3**

**Day 21**

TC-1: 5,000 cells

NSS

Ag2

TC-1: 10,000 cells

NSS

Ag2

**Day 21**

**Confidential**

Note: Horizontal line indicates the background of bioluminescence at Day 0 before tumor implantation.
STUDY: Preventive Efficacy Design

Can 2 doses of HPV16 –mRNA vaccine prevent tumor growth in mice when subsequently implanted with 10,000 cells of TC-1 Luc?
Results of HPV16 –mRNA Vaccine as as Prevention

TC-1 Luc tumor growth kinetics by bioluminescence

Note: Horizontal line indicates the background of bioluminescence before tumor implantation.
In Summary

• We have proven that this WHO Asian RnD consortia is highly committed and capable to develop the target vaccine in a timely manner

• In HPV-related tumor mouse model, our HPV Tx vaccine candidate has shown highly effective as a single dose to either prevent or treat HPV-related cancer in a mouse tumor model

• HPV antigen selection will be finalized soon. Tentatively: HPV16-HPV18 (will cover 70% of cases) will be the first prove-of-concept candidate for further clinical development