Chula VRC
Chula Vaccine Research Center
Faculty of Medicine, Chulalongkorn University

School of Global Health
Faculty of Medicine
Chulalongkorn University

HPV Therapeutic Vaccine Development

Vaccine Equity Mission

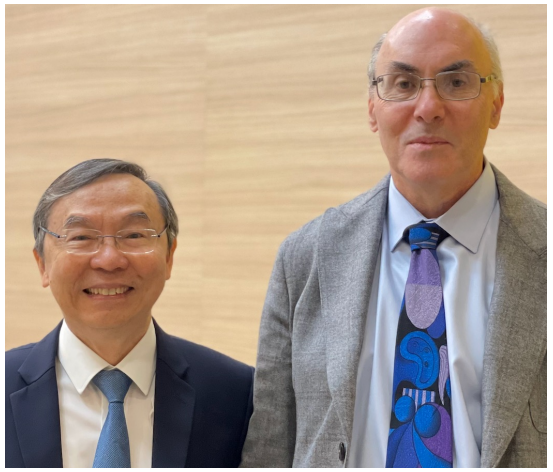
Kiat Ruxrungtham

Chula Vaccine Research Center,

Faculty of Medicine

Chulalongkorn University, Bangkok


ChulaVRC for Vaccine Equity



Prof. Drew Weissman, M.D., Ph.D.

The Perelman School of Medicine
University of Pennsylvania

He is a mRNA Pioneer

We started collaborating since 2017

"[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 Ruxrungtham 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

CORONAVIRUS | Dec 9, 2020, 06:00am EST | 3,269 views

This Thai Researcher Aims To Make His Country A Covid-19 Vaccine Powerhouse

Caroline Seydel Contributor ⓘ
Health
I write about advances in genetics and biotechnology

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ChulaVRC Capacity on Vaccine Development: Current and Future

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Design & Research Grade Production

Pre-clinical Studies

Clinical Development

Current

1 **Design**
ChulaVRC

2 **DNA**
Outsource

3 **mRNA**
ChulaVRC

4 **LNP**
Encapsulation
In vitro tests
ChulaVRC

5

ChulaVRC
MDCU

7

Chula
NPRC

cGMP

Current:
Outsource
BNA, Thailand

Clinical

Chula-CRC
+ Multicenter
Phase 1-3

Future
Chula GMP

Vaccine Development Pipelines
- ChulaVRC initiative : 6 vaccines
- Collaborator initiative: 3 vaccines

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HPV Therapeutic Vaccine

WHO Preferred Product Profiles *to increase global public health value*

At Least covers
HPV16
HPV18

1. **Regression** of Cervical Precancers (CIN—3)
   AND/OR
2. **Clearance** of oncogenic HPV type infections
   AND/OR
3. Prolonged effects **against Reinfection or Recurrences**

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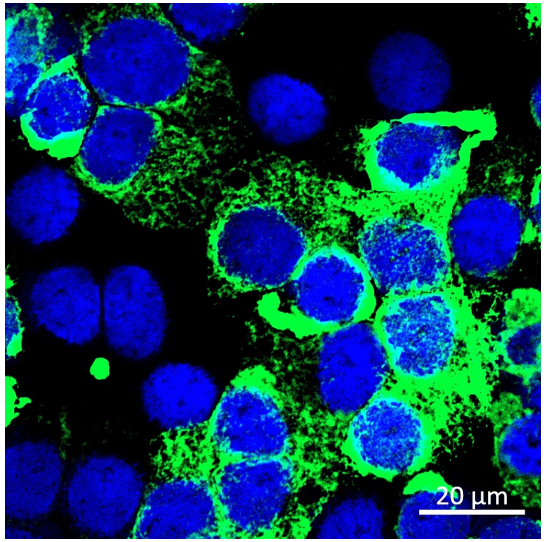
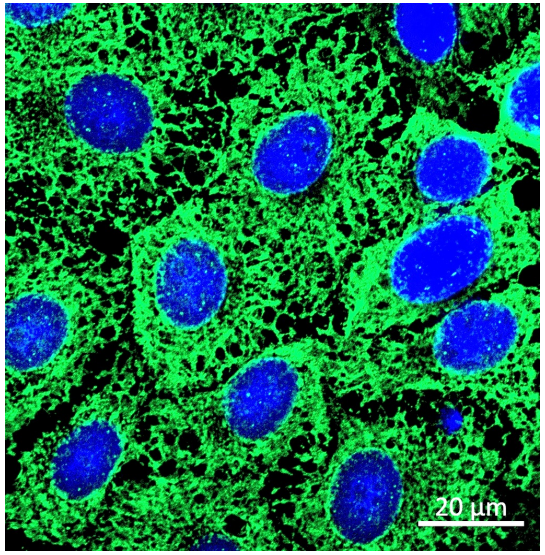
Promising Results of HPV Therapeutic mRNA Vaccine Development

HPV16 mRNA vaccines –Protein Expression in VERO Cell Lines

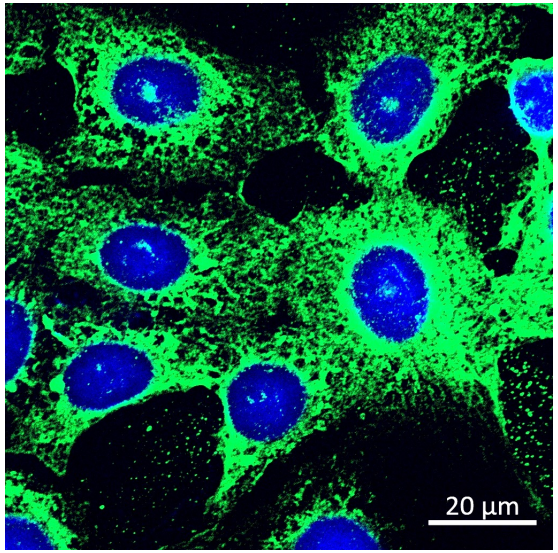
Antigen 1



Antigen 2



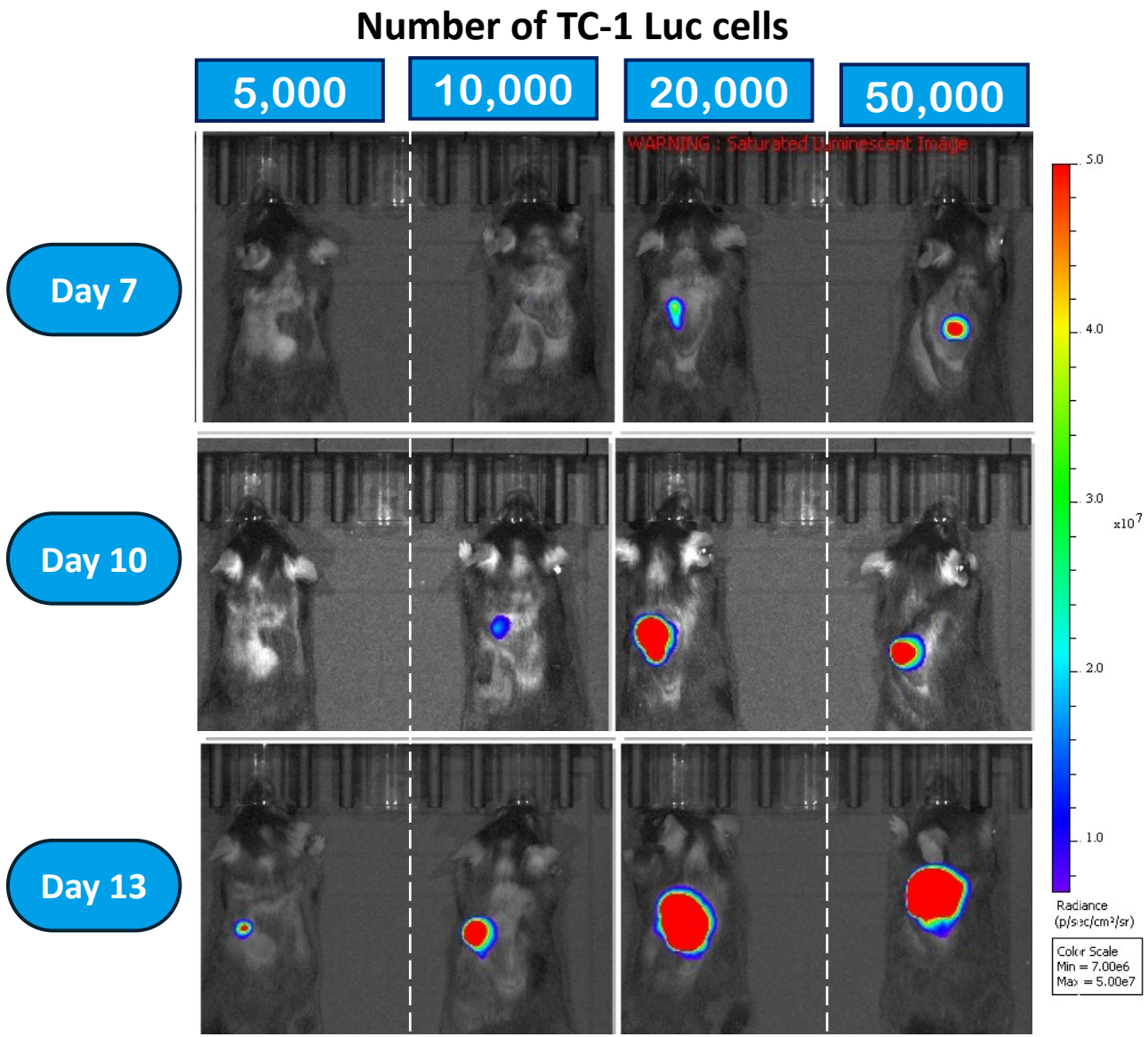
Antigen 3

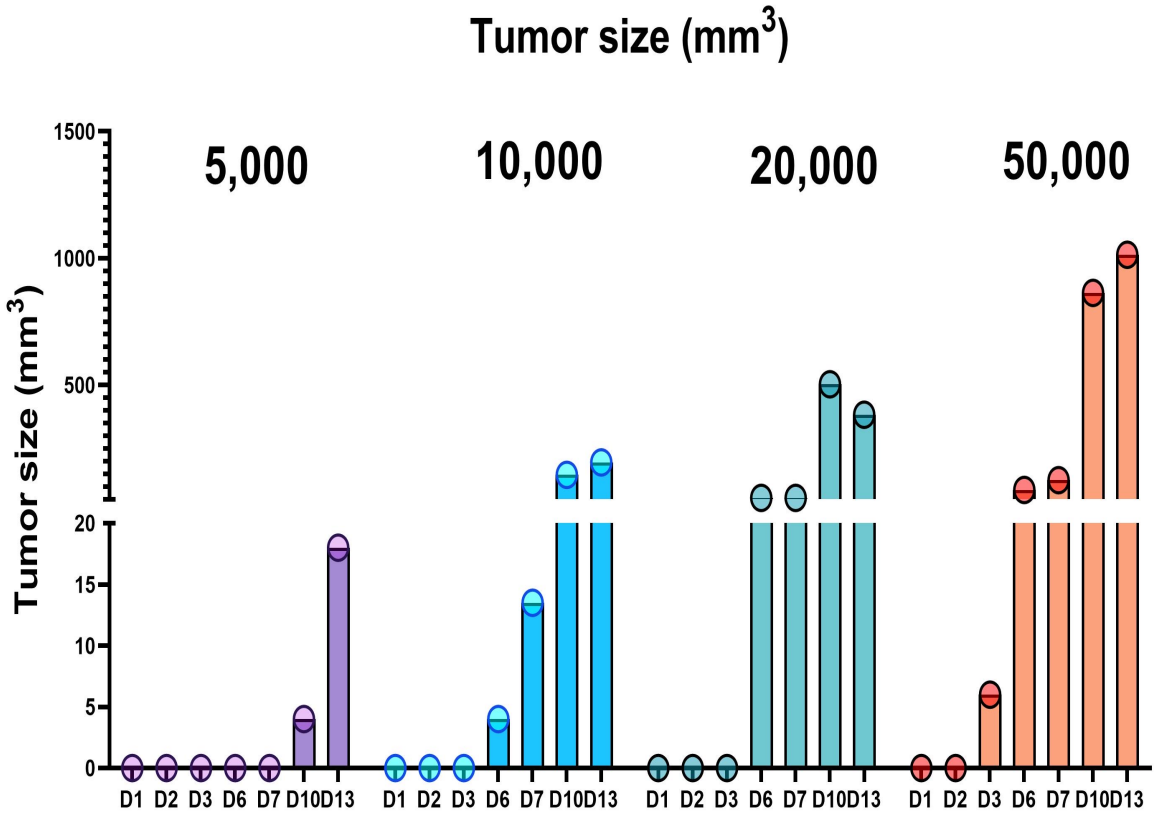


Supichcha

Eakachai

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





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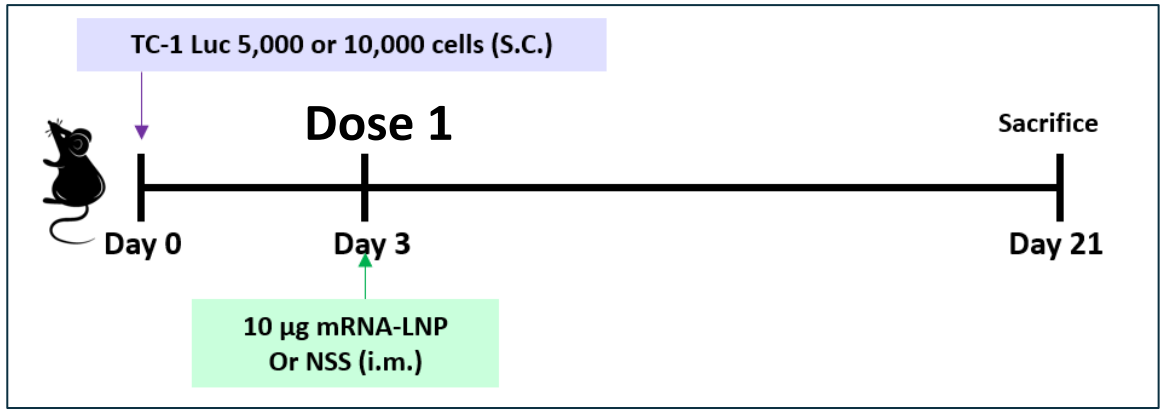
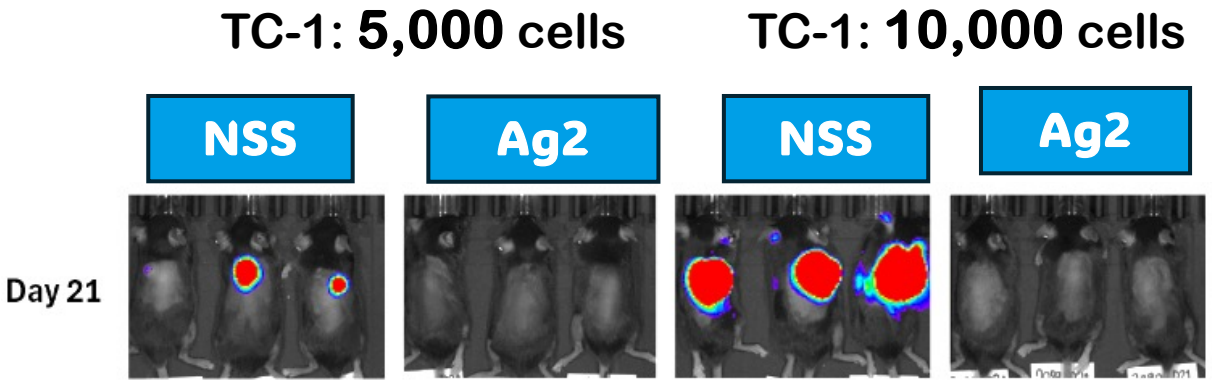
STUDY

Therapeutic Efficacy Design with a Single Dose Vaccine

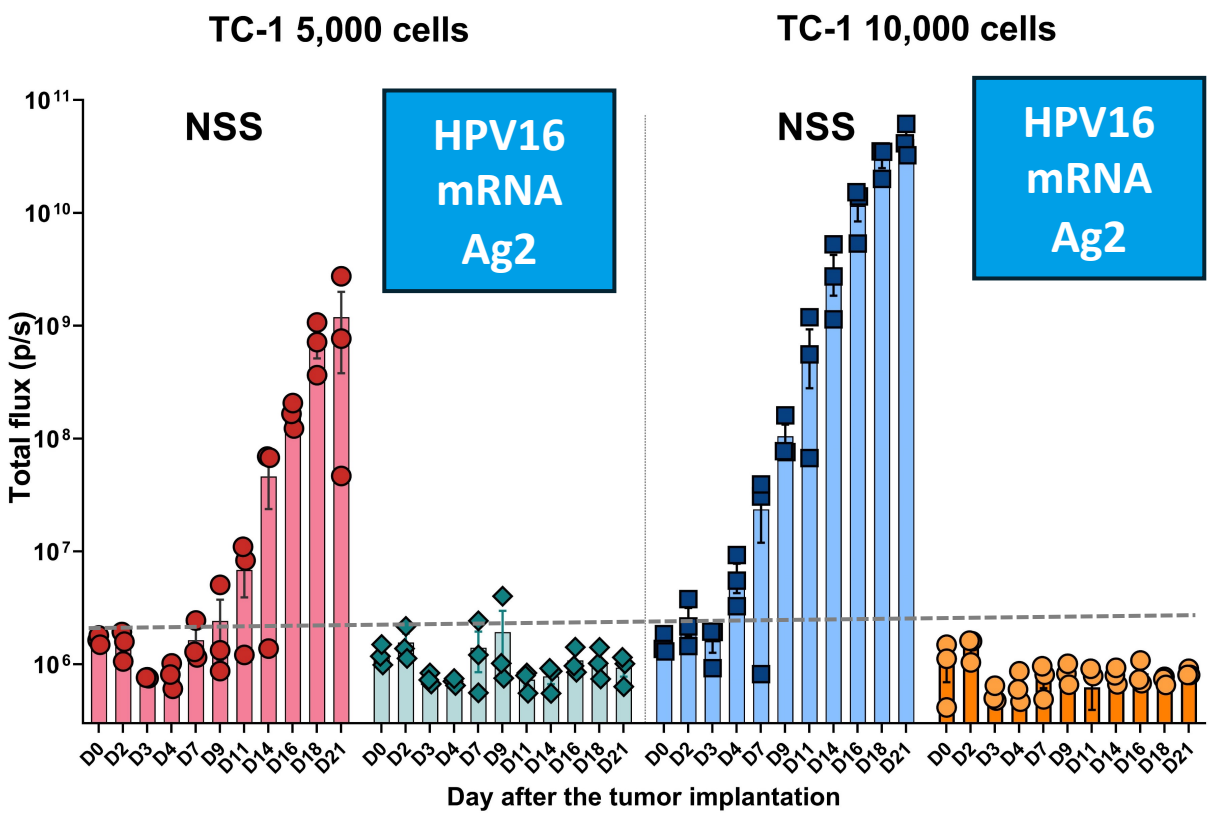
Can a single dose of HPV16 – mRNA vaccine elicit tumor cells regression in mice given after 5,000 and 10,000 TC-1 Luc cells implantation ?

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

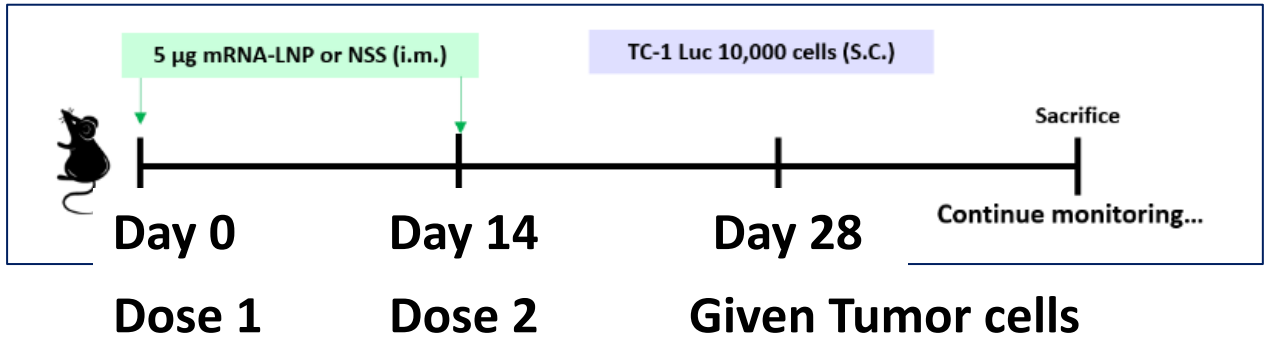


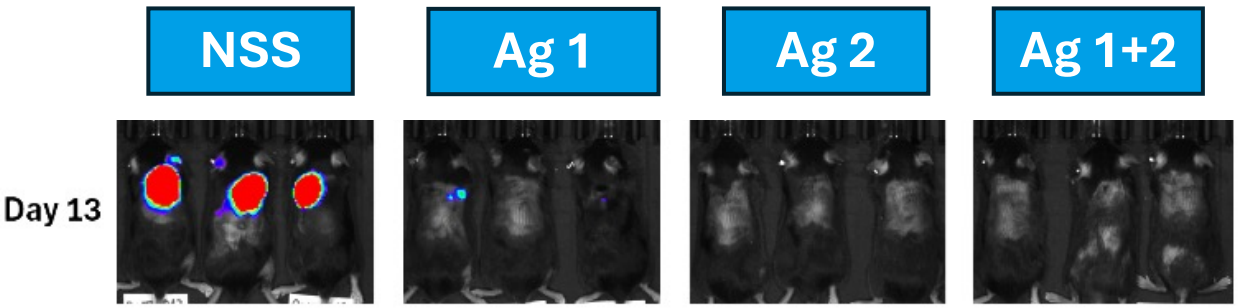
Note: Horizontal line indicates the background of bioluminescence at Day 0 before tumor implantation.

STUDY: Preventive Efficacy Design

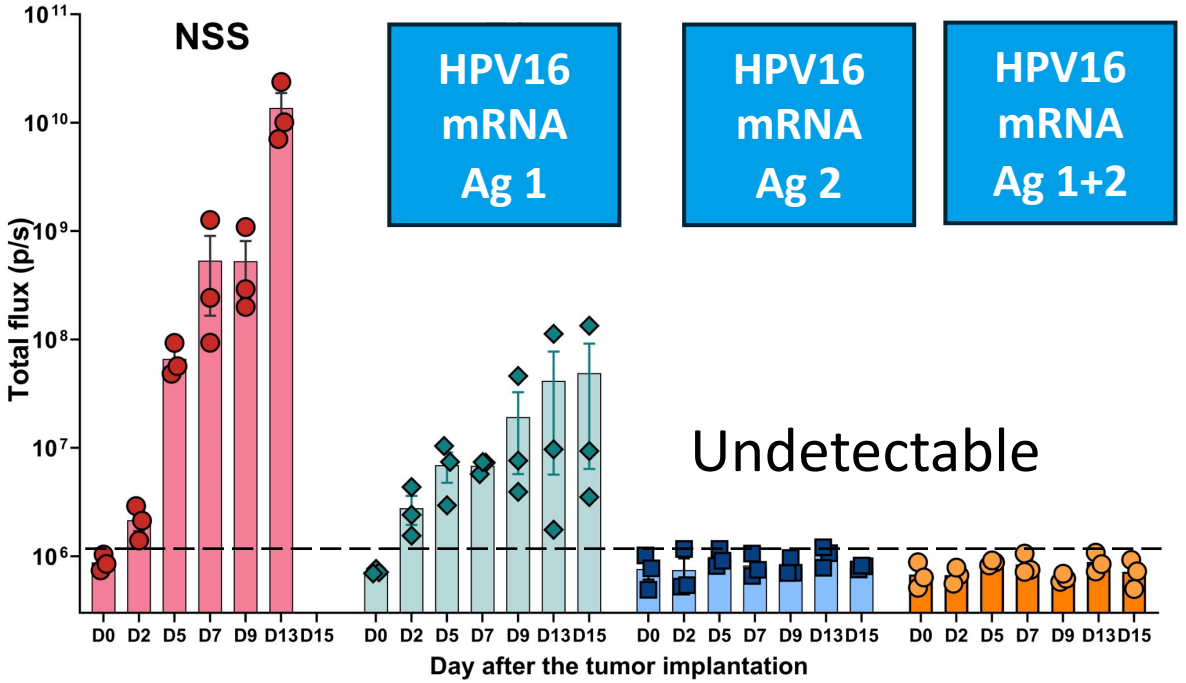
Can **2 doses** of HPV16 –mRNA vaccine prevent tumor growth in mice when subsequently implanted with 10,000 cells of TC-1 Luc ?

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 comitted 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 candiadate for further clinical development