

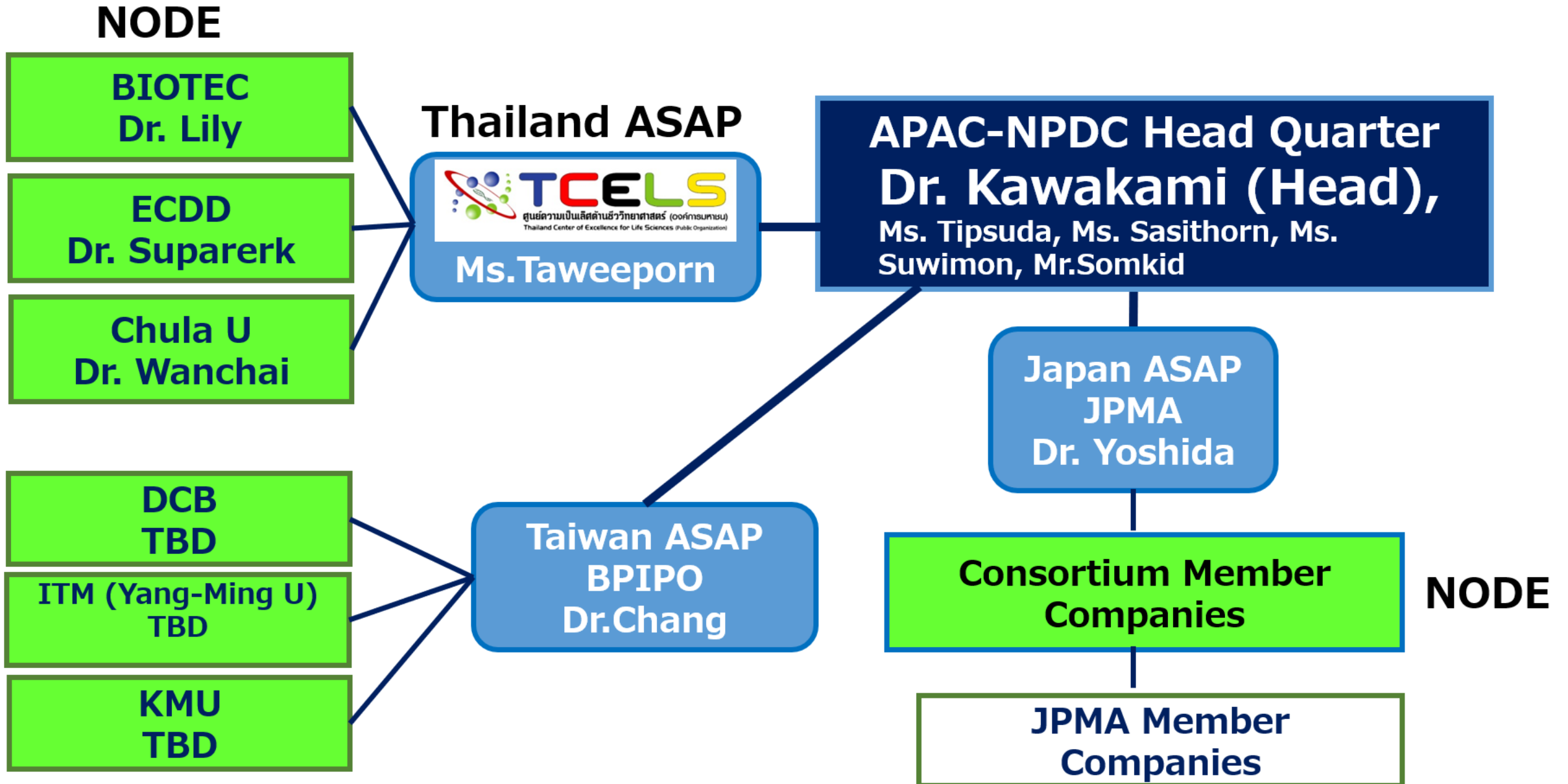


ECDD: an Open Innovation Platform for Drug Discovery and Development in Thailand

Dr. Suparerk Borwornpinyo, Founder and Director
Excellent Center for Drug Discovery, Mahidol University

April 9th, 2019

Organization Structure of ANPDC in Thailand



Organization Structure of ANPDC in Thailand

NODE

BIOTEC
Dr. Lily

ECDD
Dr. Suparerk

Chula U
Dr. Wanchai

Thailand ASAP



APAC-NPDC Head Quarter
Dr. Kawakami (Head),
Ms. Tipsuda, Ms. Sasithorn, Ms.
Suwimon, Mr. Somkid

Japan ASAP
JPMA
Dr. Yoshida

Taiwan ASAP
BPIPO
Dr. Chang

DCB
TBD

ITM (Yang-Ming U)
TBD

KMU
TBD

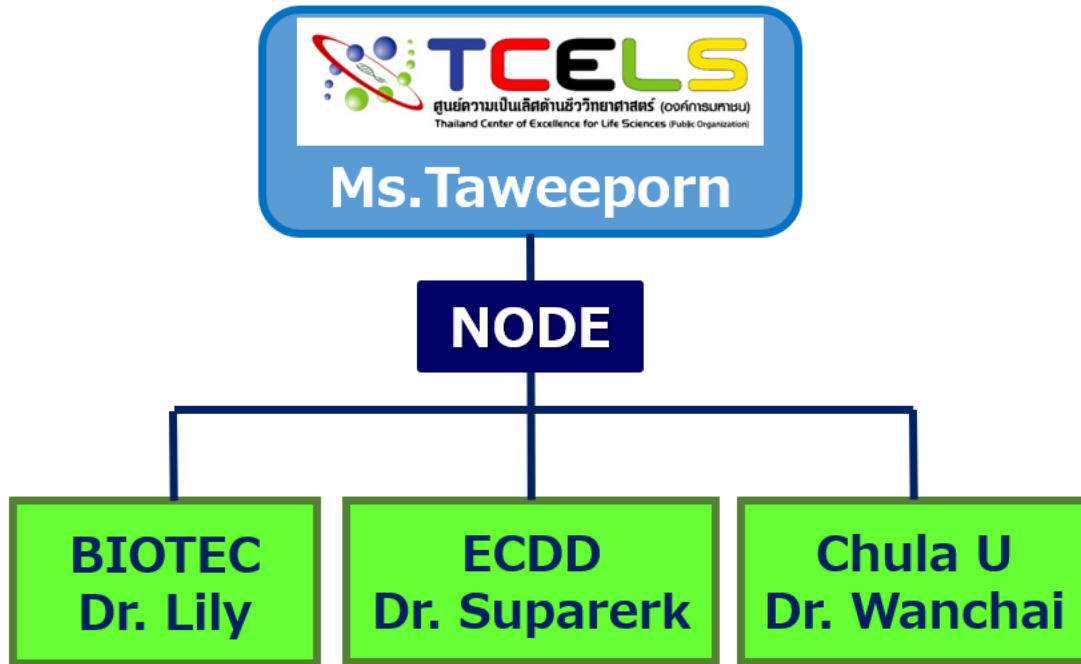
Consortium Member Companies

JPMA Member Companies

NODE

Updated ANPDC in Thailand

Thailand ASAP



1. Pilot project for Thai Network in Natural Product Drug Discovery

- **Phase I (Pre-pilot project):** 80 compounds from BIOTEC were screened using ECDD breast cancer model
- **Phase II: (Pilot project)**
 - 1,200 compounds from Chula, 2,000 compounds from ECDD, and 1,000 compounds from BIOTEC will be screened in phase II using iPSC-derived MN cell death assay.





Robotic system

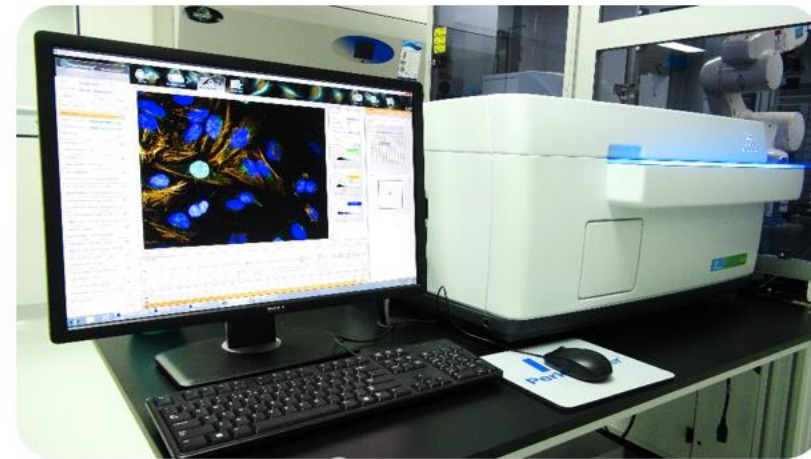
established in 2016:
TCELS-Mahidol University
(SC and MD Ramathibodi Hospital)



Compound plate



Assay plate (Cell plate)

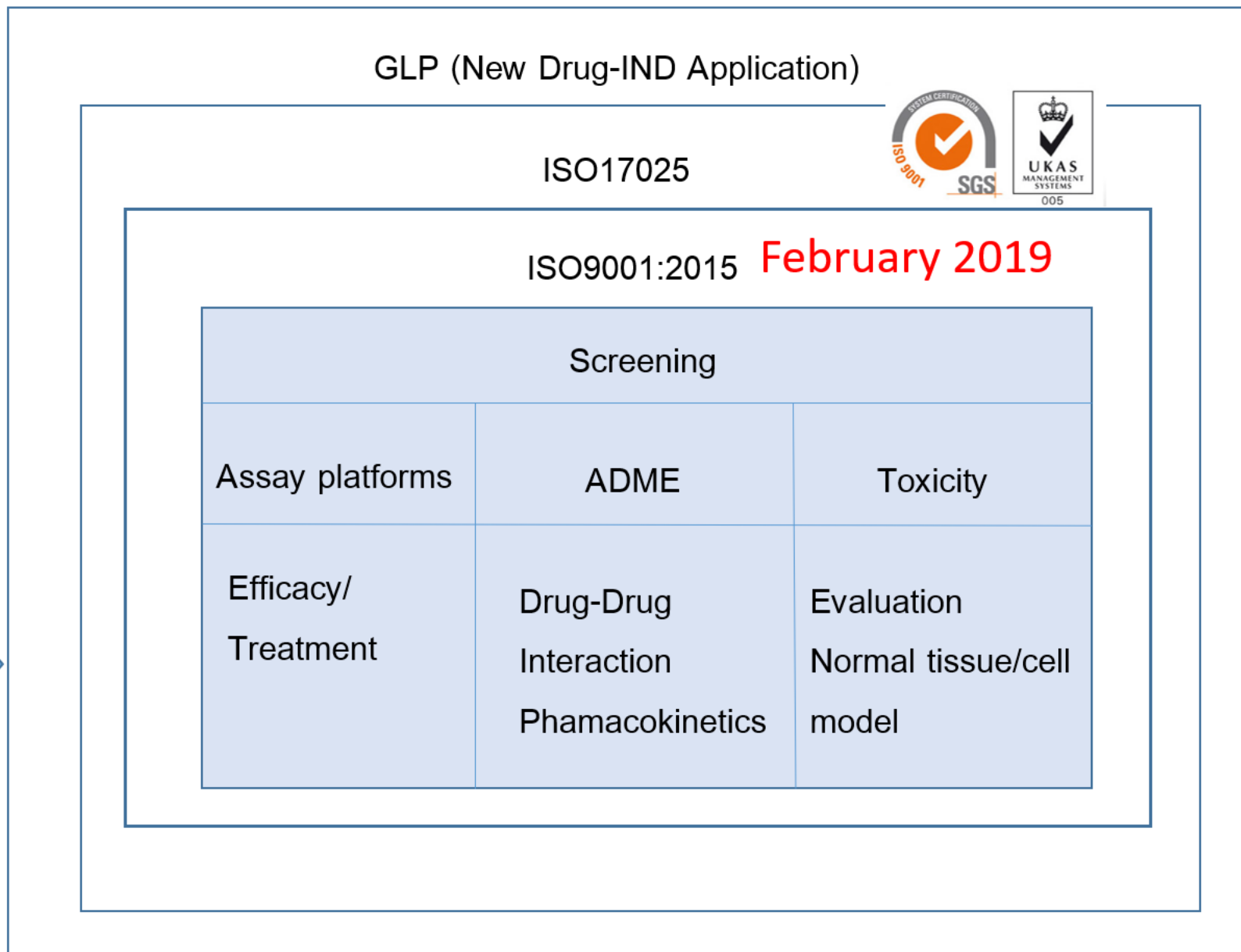


High-Content Imaging system

Natural compounds



Herbal Medicines
Supplements
Nutraceuticals
Functional Foods
Cosmetics
Material Sciences
etc.



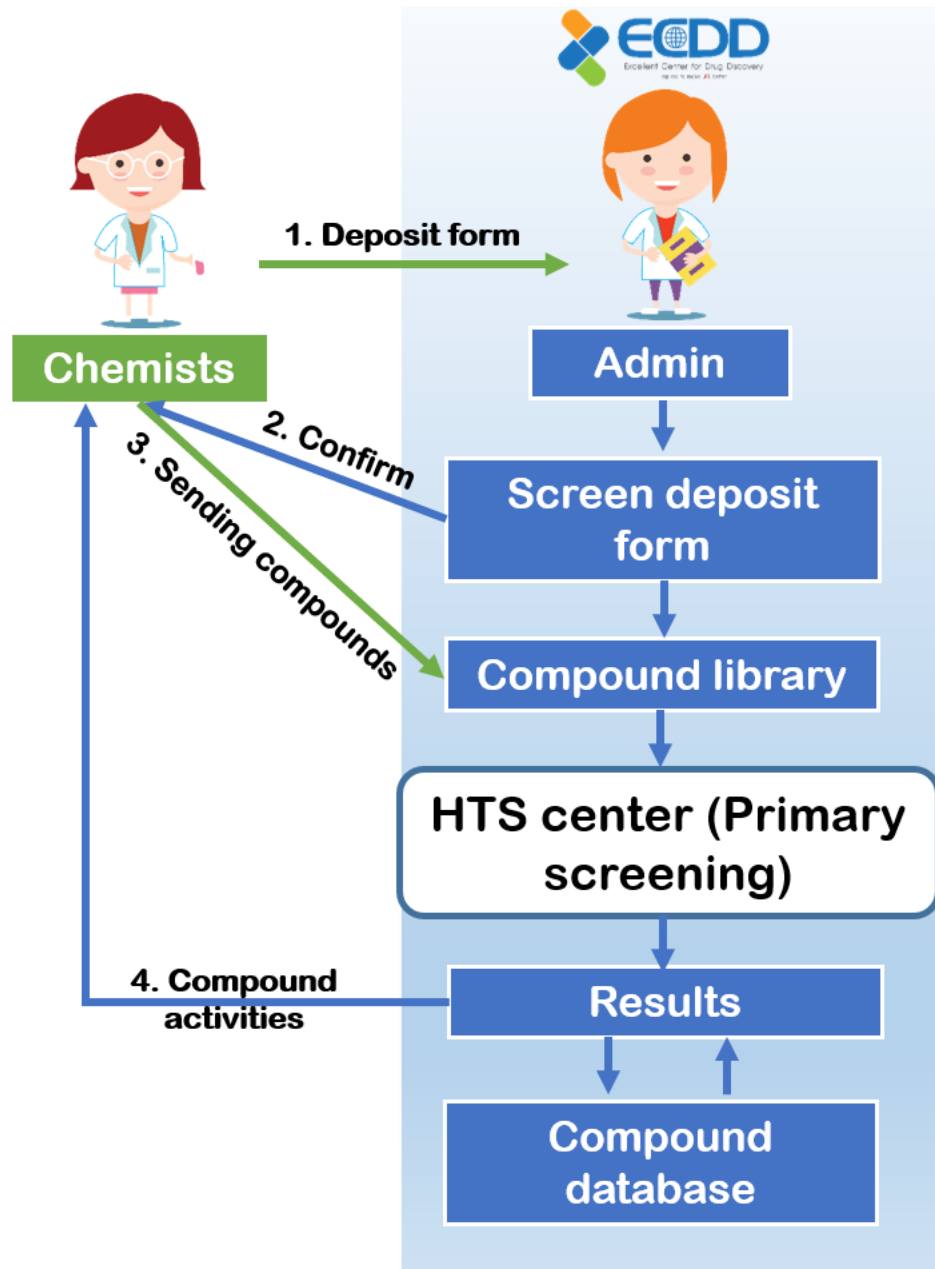
For Industry
Formulations
Drug candidates



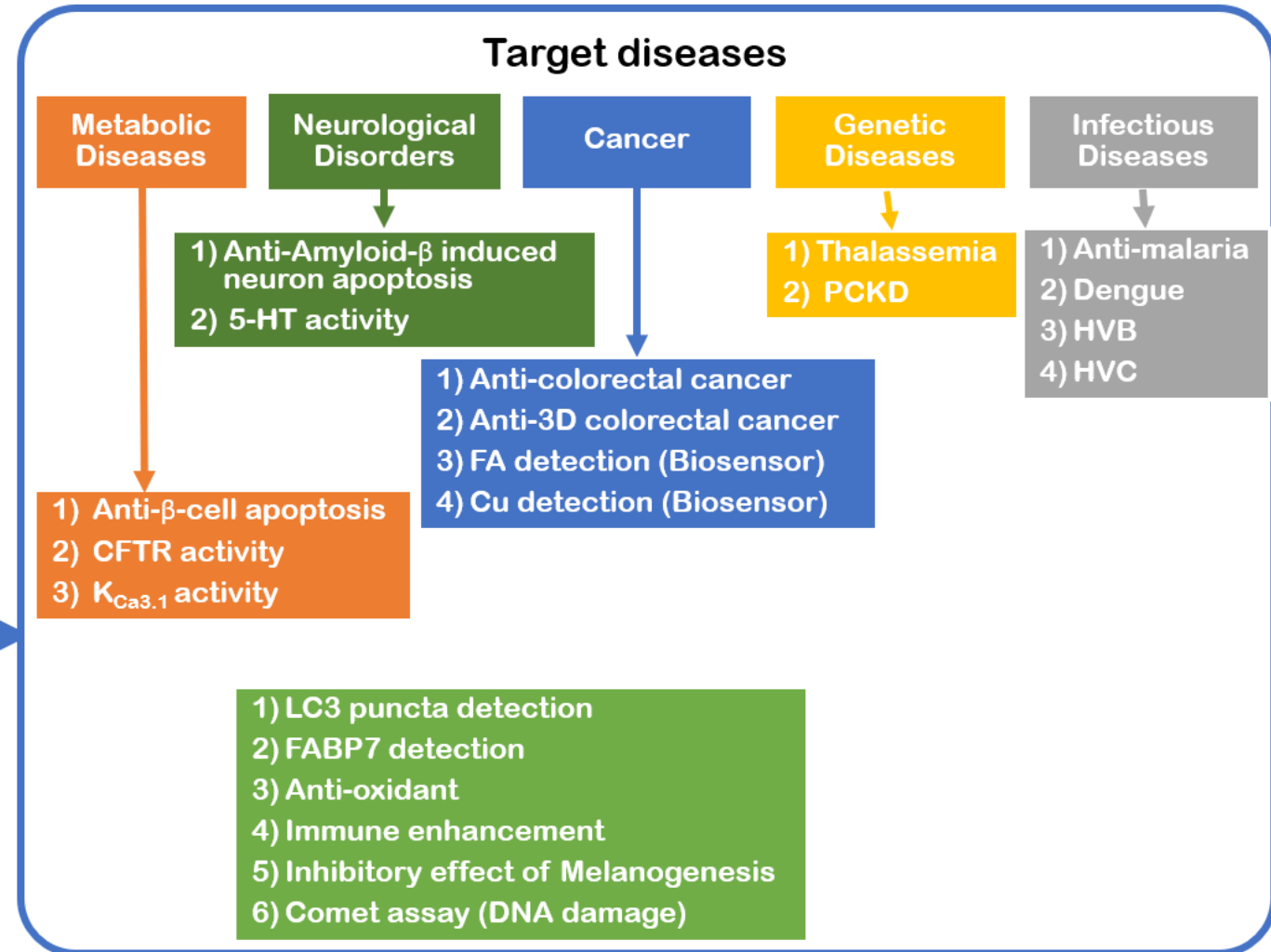
Safety/Efficacy
Assurance
Control



1) Compound Library



2) Biological Assay/Toxicity



Pre-Pilot Project Proposal (tentative)

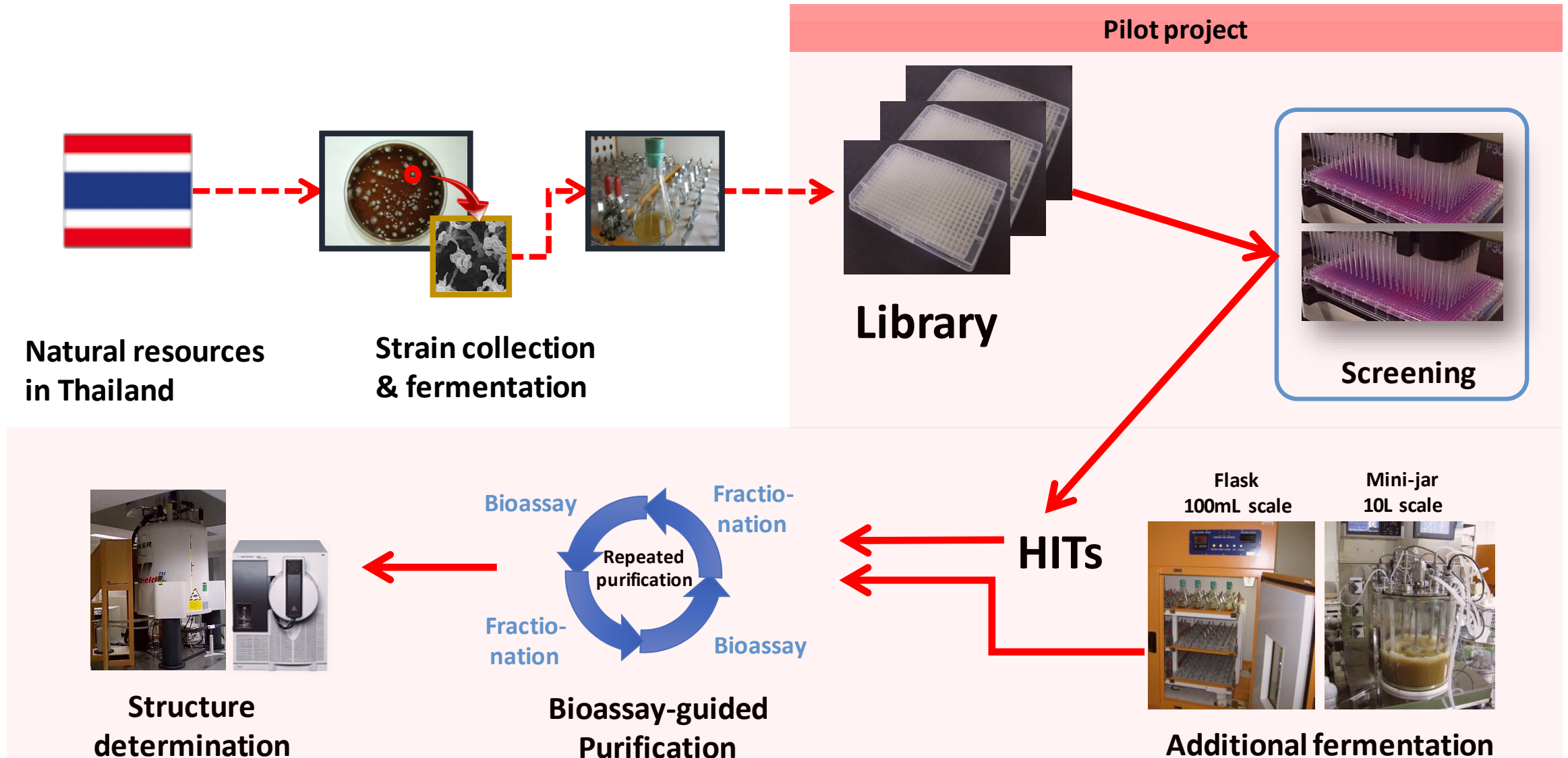
Objective

Confirm the work flow of assay systems for NPDD PJs
(e.g. compound logistics, screening, bioassay-guided purification and identification)


Assay plan

- **Assay**
Cell proliferation assay against one cancer cell line (e.g. MDA-MB-231 cell line)
- **Library**
1,000~2,000 purified natural compound library (stored in ECDD and BIOTEC)
1,000~2,000 selected extracts (stored in BIOTEC)
- **Checkpoints**
Checkpoint 1: Identify hit compounds/extracts with reproducibility
Checkpoint 2: Determine active compound(s) from one hit extract
- **Timeline**
Complete in 3 to 5 Months (if possible by May, 2018)

Bioassay-guided purification & identification




NPDD Project: Timeline for Screening



Send Compounds
(4th wk July)

- 60 crude extracts
- 20 purified compounds



Screening System
Optimization
(April)

- MDA-MB-231 cells
- 384-well HTS
- Z-factor = 0.78
- Reproducibility $r^2 = 0.98$





Screening
To get Hit Compounds
(2nd wk August)

- 1 uM or ug/ml at 24 h = 1
- 10 uM or ug/ml at 24 h = 4
- 1 uM or ug/ml at 72 h = 8
- 10 uM or ug/ml at 24 h = 74




5 Fractions

- BS56135_C
- BS56204_C
- BS56083_B
- BS54208_B
- BS55073_C



Fractionation of
Hit Compounds
(3rd wk September)

- 5 Fraction-1ul = 345
- 5 Fraction-10ul = 345
- 5 Fraction-100ul = 345
- 5 Fraction-100ul_Dilute#2 = 345

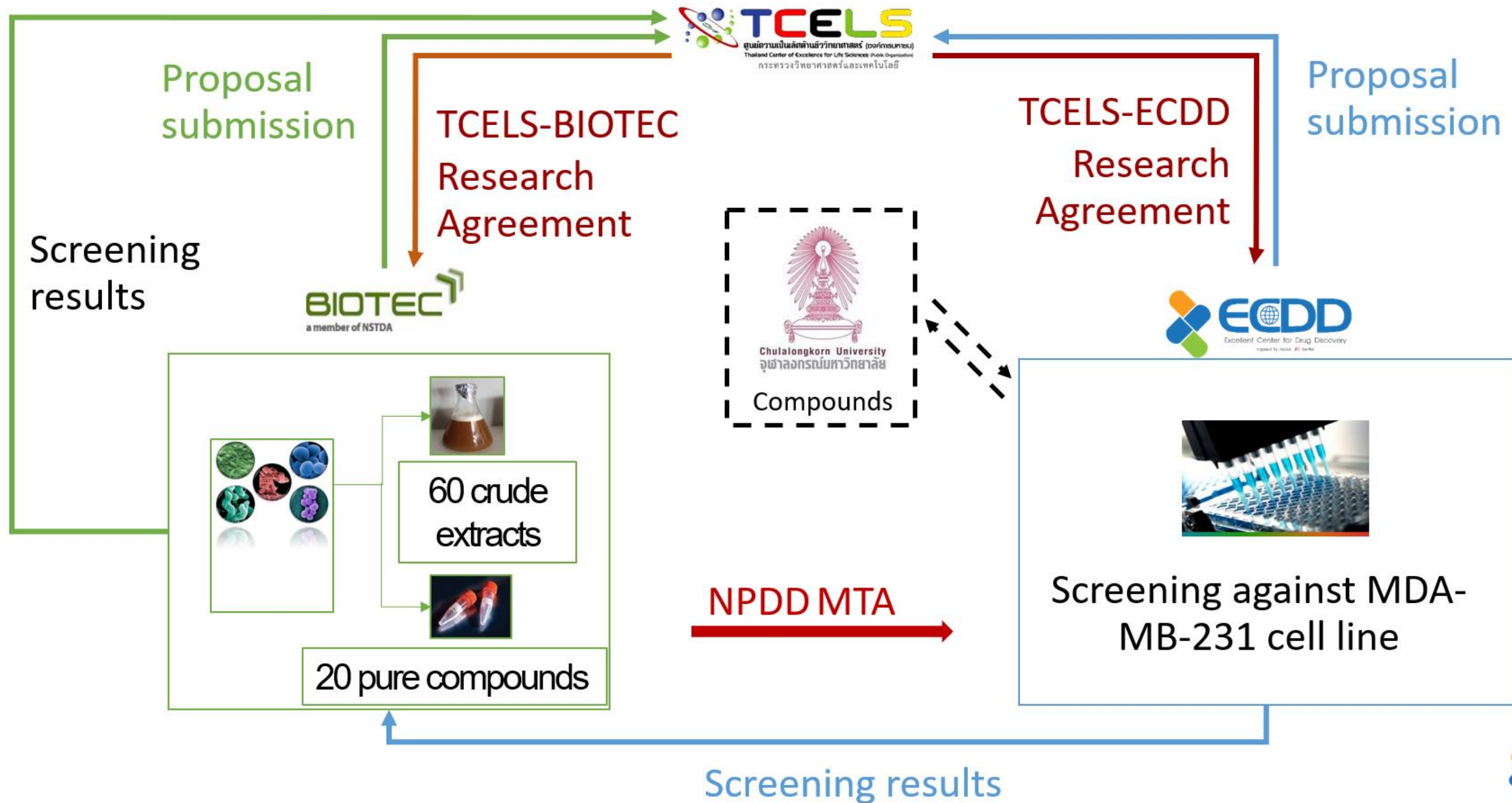
Screening of
The Fraction
(October)

- 5 Fraction-1ul_at 24 h = 0
- 5 Fraction-10ul_at 24 h = 3
- 5 Fraction-100ul_at 24 h = 92
- 5 Fraction-100ul_Dilute#2_at 24 h = 31
- 5 Fraction-1ul_at 72 h = 1
- 5 Fraction-10ul_at 72 h = 23
- 5 Fraction-100ul_at 72 h = 268
- 5 Fraction-100ul_Dilute#2_at 72 h = 134




Toxicity test

Pre-Pilot Project for Thai Network in Natural Product Drug Discovery



APAC DA-EWG: Pillar 5 Drug Discovery using Natural Product



Preparation for Pilot Project Internship for technology transfer (Bilateral communication)

- 4 month (February-May, 2019) internship at Takeda Shonan Research Center (tech-transfer & capacity building)
- Mr. Phongthon Kanjanasirirat (ECDD, Mahidol University)



Overall scheme of the NPDD initiative with Thai institutions

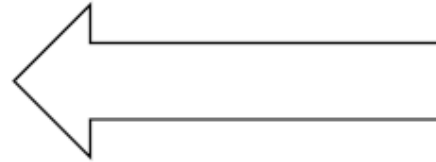
Capacity building through phenotypic screening

iPark/Japan

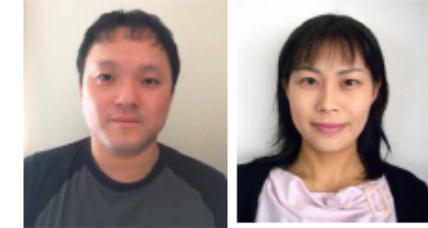


MN cell death assay
MNP stocks

1. Tech transfer for HTS/HCS
2. Drug discovery knowledge

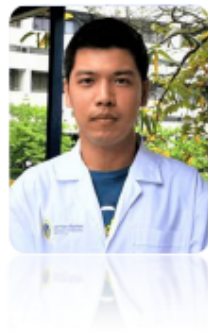


Masaaki-san **Keiko-san**



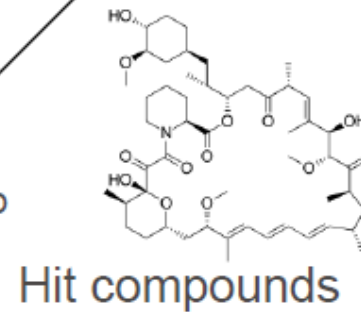
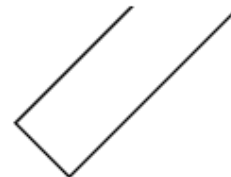
1. Receive the results
2. Make decision for further collaboration

Thailand



After 3-6 months
Return to Thailand

Perform HTS/HCS for
Natural Product(NP) lib



Overall scheme of the NPDD initiative with Thai institutions

Capacity building through phenotypic screening

iPark/Japan



MN cell death assay
MNP stocks

1. Tech transfer for HTS/HCS
2. Drug discovery knowledge

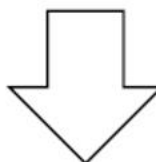


Masaaki-san **Keiko-san**



1. Receive the results
2. Make decision for further collaboration

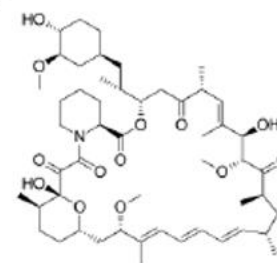
Thailand



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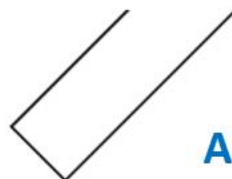
1st June

Perform HTS/HCS for
Natural Product(NP) lib

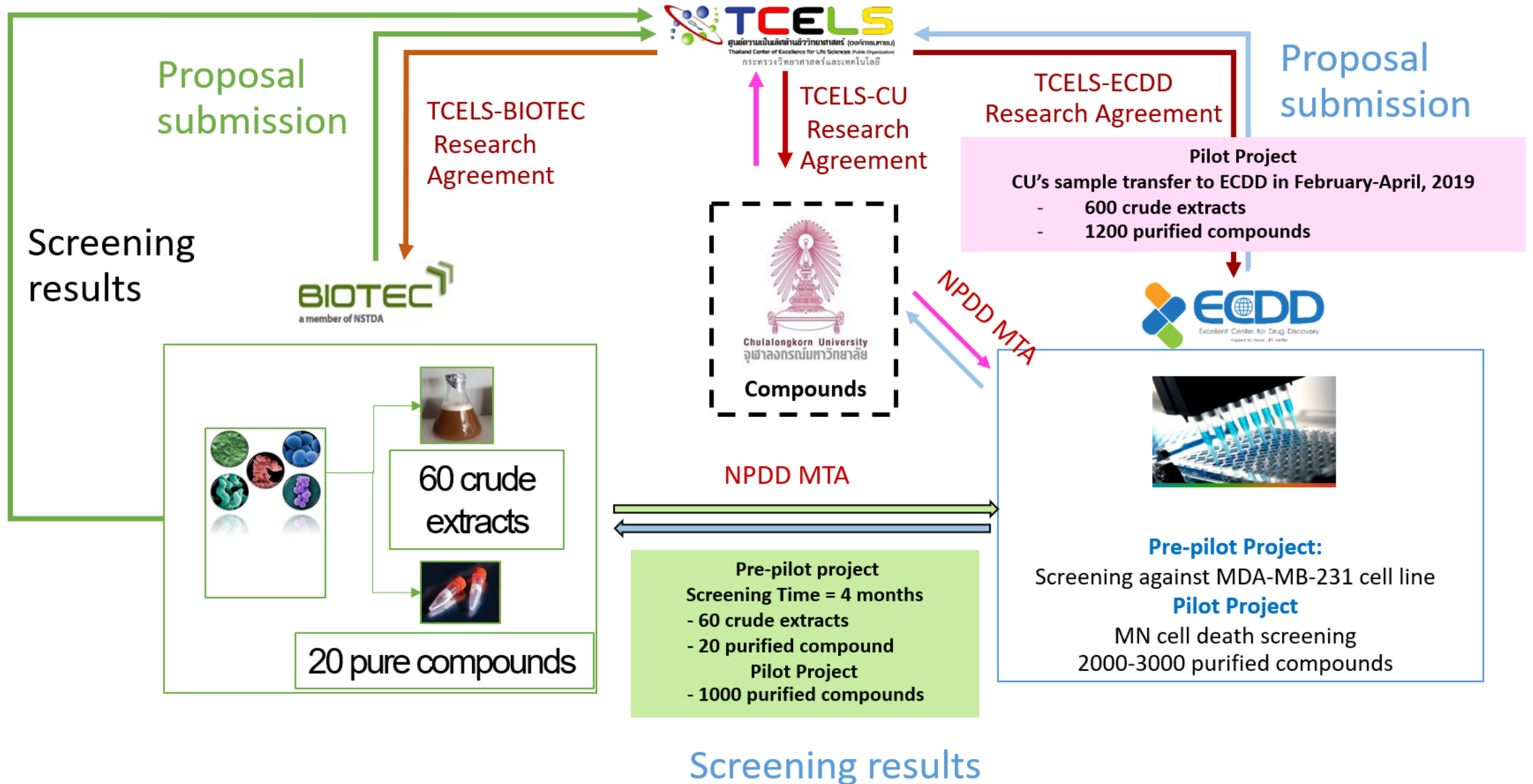


Hit compounds

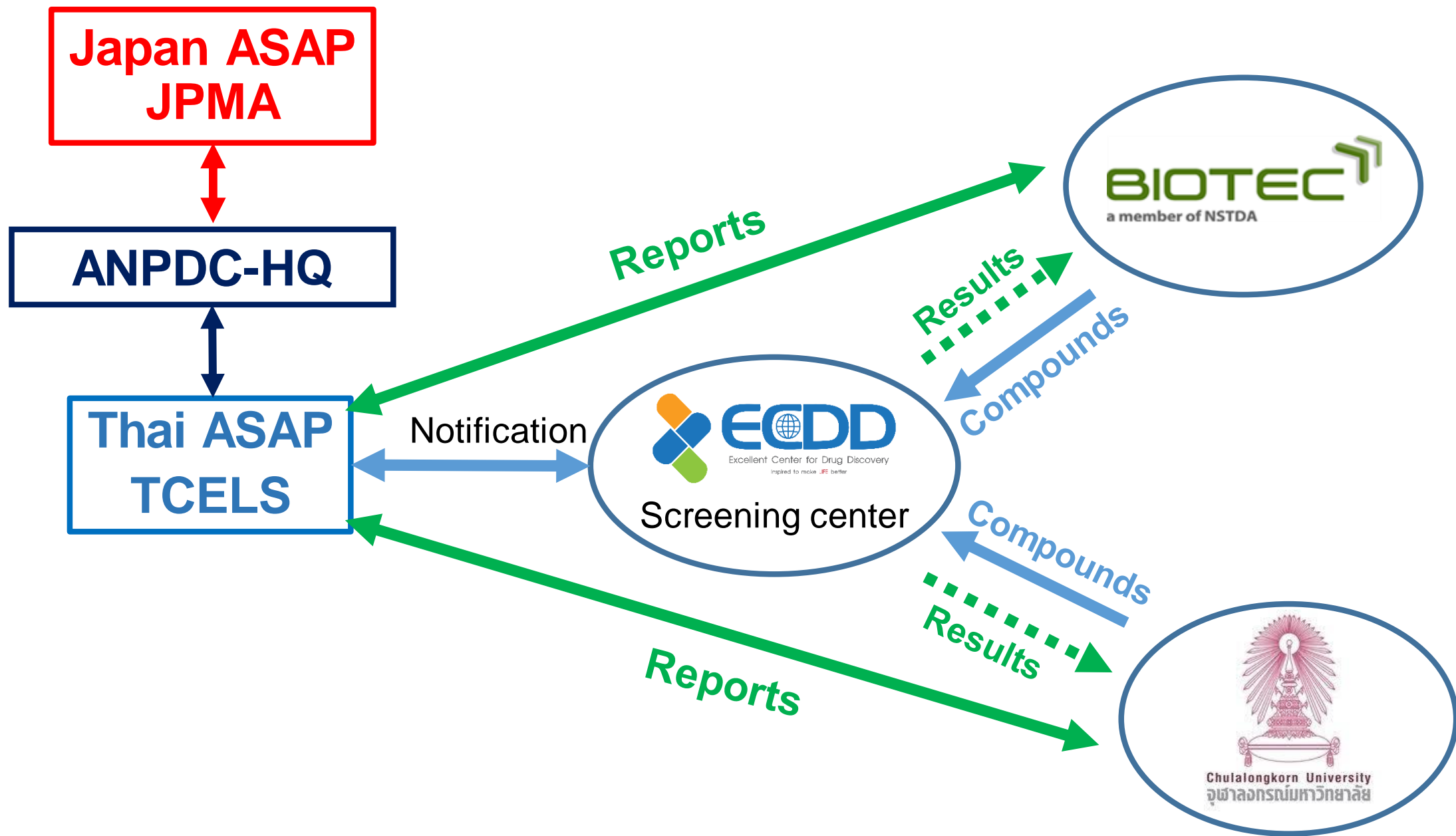
August – October



Pilot Project for Thai Network in Natural Product Drug Discovery



Data Sharing





Together WE Strong

