

# Update on pillar 5 initiative “Natural Compound-based Drug Discovery”

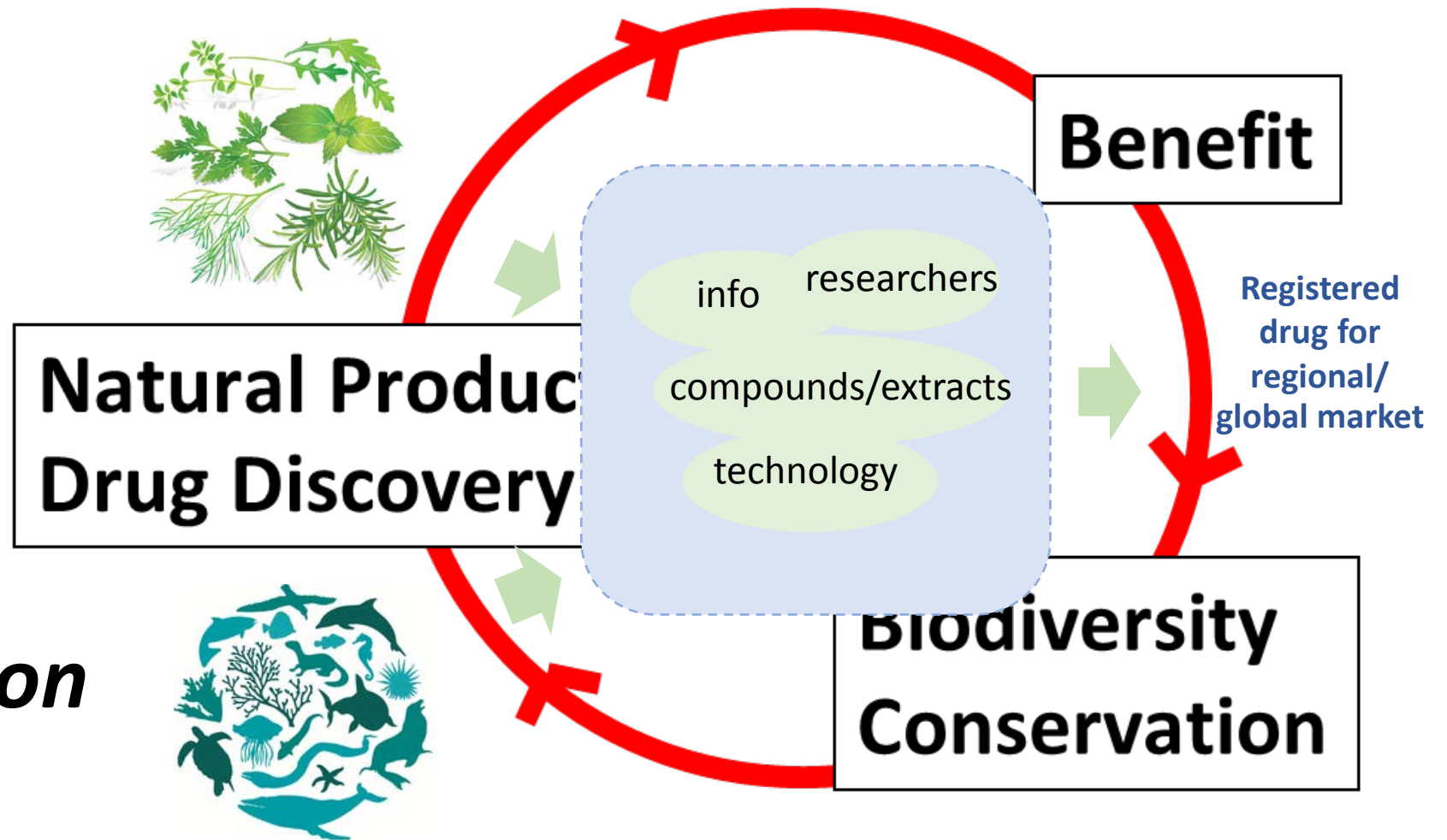
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CEO, TCELS (Thailand)

10 April 2018, Tokyo



To expedite the launch of innovative medicines  
for the peoples in Asia.



*open innovation platform*

**New Technology**

Screening technology for extracts  
Synthetic biology using microbes  
Analog synthesis using microbes  
Other s

**New Platform**

Construct isolated compound library  
Construct mid size compound library  
Construct DB for Dereplication  
Others

**Drug Discovery Capability of Pharma Industry in Japan**

# Our Near-Term Goals

Guidelines

2016-2018

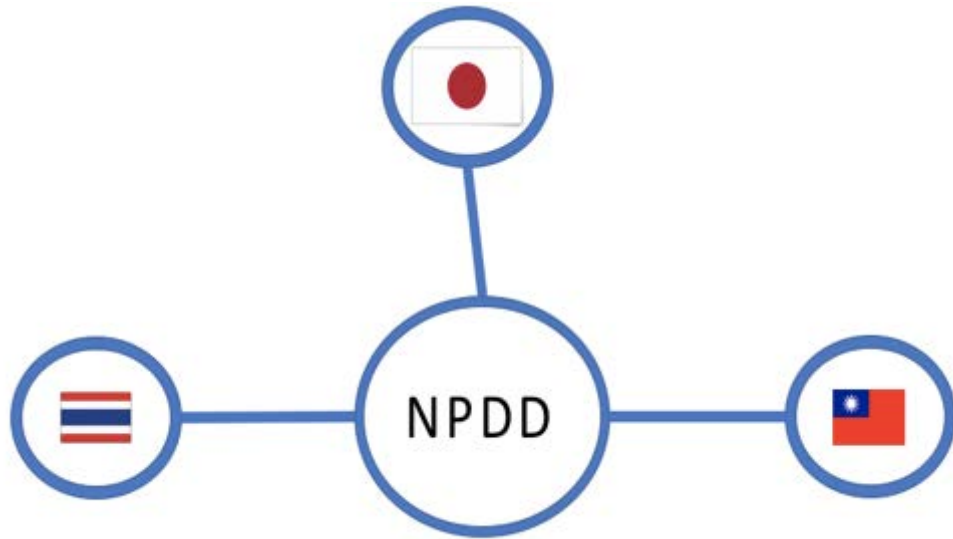
Pilot Projects

2018-

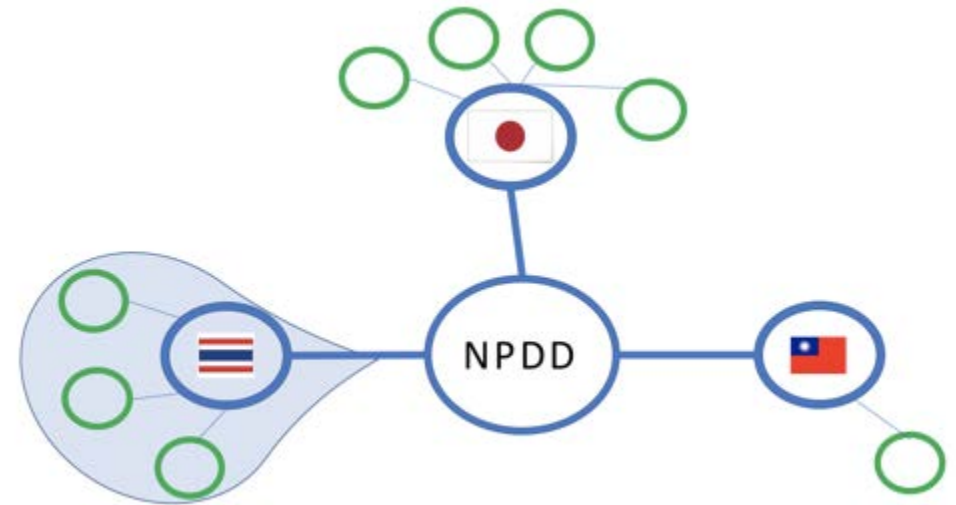
Capacity Building

2018-2020

# NPDD International Network Structure

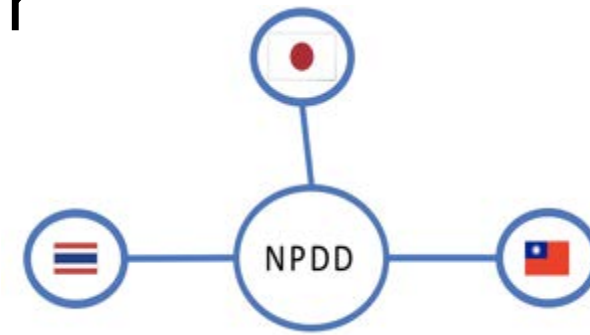


- NPDD ASAP nodes
- NPDD Network Agreement

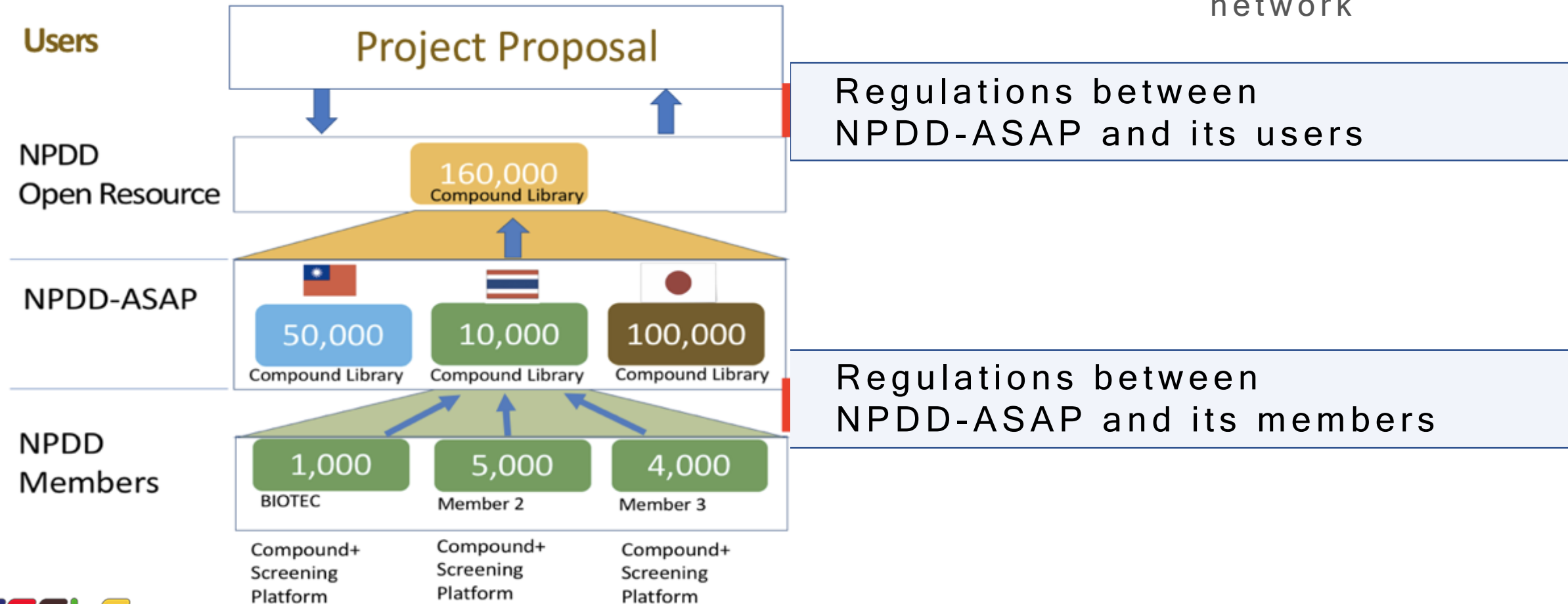


- Member Nodes of National Network

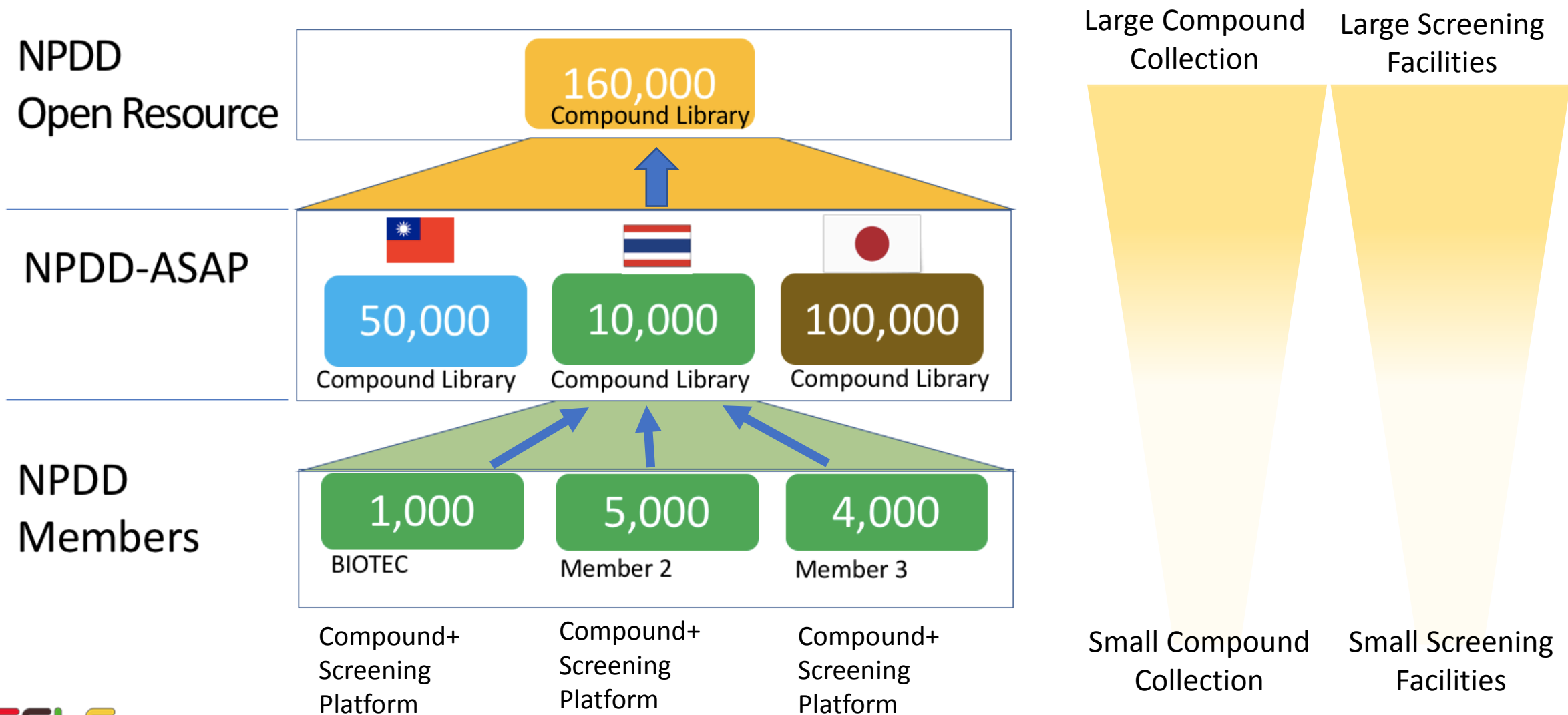
# Guideline for the cross-border collaboration in the Natural Product for Drug Discovery (NPDD) network



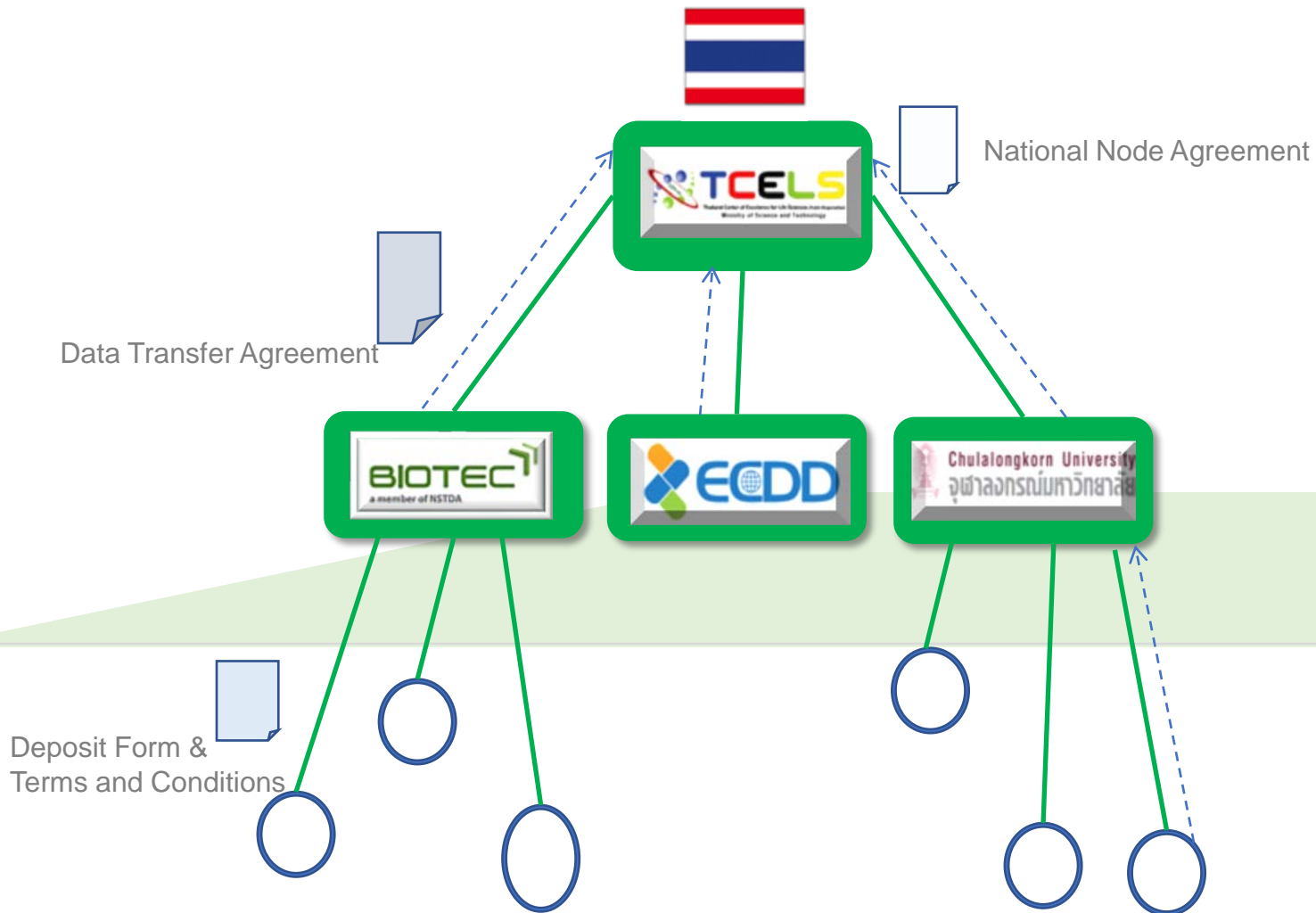
Agreement within the Natural Product on Drug Discovery (NPDD) network



# Sharing resources with NPDD

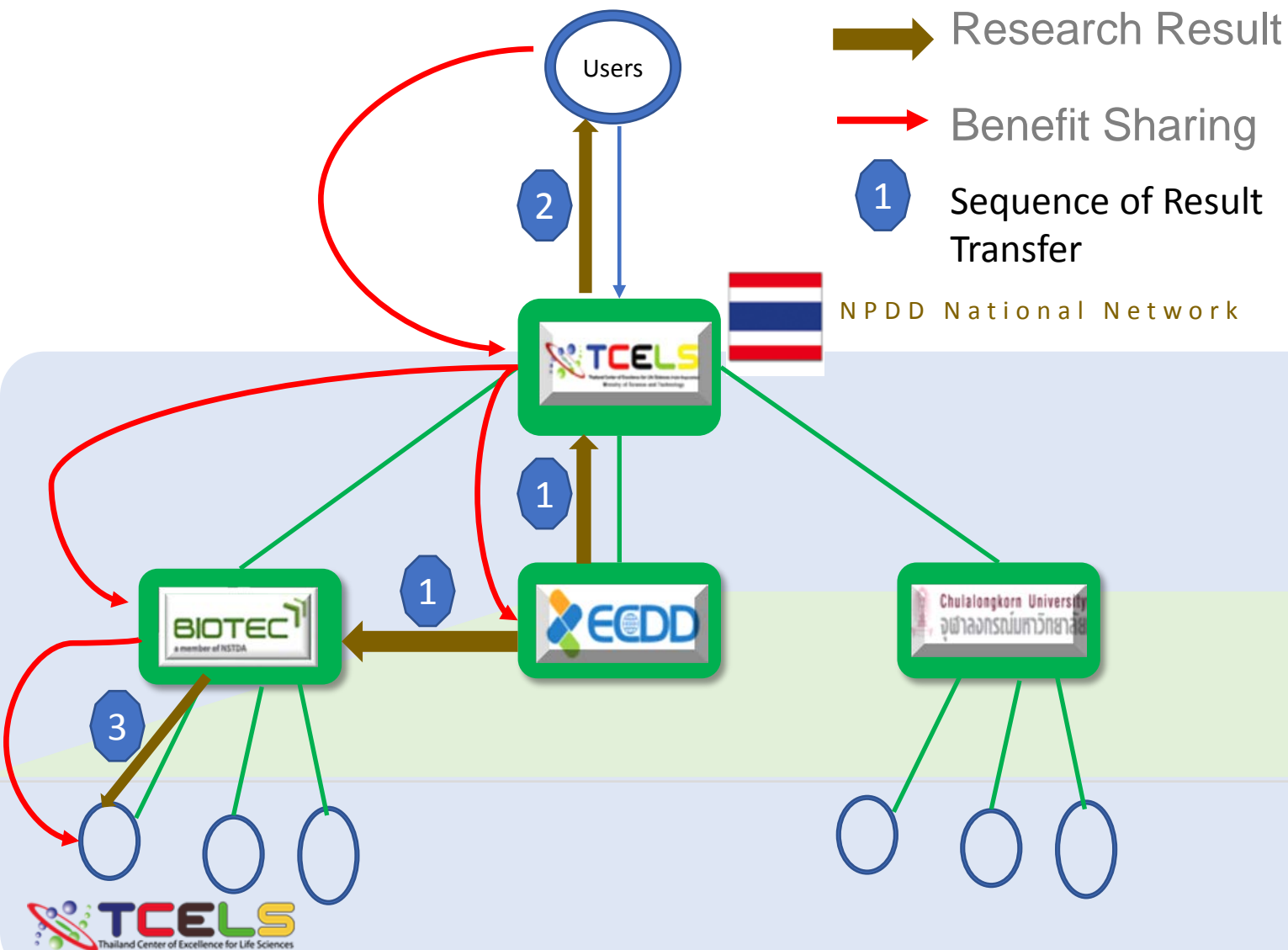


# NPDD National Network



- **Natural Product on Drug Discovery Aggregate Service Access Point (NPDD-ASAP)** – The one-stop hub of each country that participate in Natural Product for Drug Discovery (NPDD) network. NPDD-ASAP coordinates activities between network nodes within the country
- **Network node** - an entity, designated by a NPDD-ASAP, to participate in the network activities. Network node can be a single entity or a representative of compound library/data/technology holders
- **Collaborative partners under the National Node.** Each member obligatory contributes to the network with their resources, technology and expertise under the “Deposit form” to broaden the range of natural compounds and technology

# Research Result & Benefit Sharing



1. Compound provider (BIOTEC in this case) and NPDD-ASAP will primarily receive screening results and data on compounds identified as hits from ECDD
2. NPDD-ASAP will share the result back to the user as agreed in the Project Agreement
3. The National Node will shared the result back to the compound depositors as agreed in the "Deposit form"
4. If the project results in the filling (or obtaining) of intellectual property protection or commercialization of project results, the NPDD-ASAP will receive benefits (e.g. licensing fee, upfront fee, royalty fee, etc.) and NPDD-ASAP will distribute the benefit to the national nodes based on their contributions.



# Benefits of the guideline

- Overcome the limits due to fragmentation of individual policies and provide most valuable resources for drug development
- Access to high diversity of natural compounds with less time for doing paper work
- Ensure users to access natural product collections that comply with CBD, the Nagoya Protocol, national and international regulations
- Allow international cooperation in the collection, conservation, use, and development of new natural compounds for drug research

# Pilot Project Proposal

Modified from JPMA slides \*\*

## Objective




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

## Assay plan

- **Assay**  
Cell proliferation assay against one cancer cell line (e.g. HeLa cells)
- **Library**  
1,000~2,000 purified natural compound library/or extract (ECDD, CU and BIOTEC)
- **Checkpoints**  
Checkpoint 1: compounds/extracts were assayed with reproducibility  
Checkpoint 2: Determine active compound(s) from one hit extract
- **Timeline**  
Completed in 6 Months (if possible by June 2018)

# Pilot Project :Thai Network in Natural Product Drug Discovery (NPDD)

Objective plan: 6 months (after signed agreement)

Nodes	Objective plan	Budget (MB)	Term Of Reference (TOR)	Proposal Approval	Sign Agreement
BIOTEC 	<ul style="list-style-type: none"> <li>- 80 Compounds → ECDD</li> <li>- Fractionation ≤ 5 compounds</li> <li>- Isolation up to 3 hit extracts</li> </ul>	xxxx	Approved (23.3.18)	On process	With in 16 <sup>th</sup> April
CHULA 	<ul style="list-style-type: none"> <li>- Compounds → ECDD</li> <li>- Compounds preparation: Extract , Chromatography, spectroscopy (Chemical Structure)</li> </ul>	xxxx	Approved (15.3.18)	On process	With in 16 <sup>th</sup> April
ECDD 	<ul style="list-style-type: none"> <li>- Establish a database of 2,000 compounds for testing with breast cancer cells (MDA-MB-231) By HTS</li> <li>- Lead compounds cytotoxic tests</li> </ul>	xxxx	On approval processes		

Early April: Complete Signed on MOU  
31 May 2018: Press Conference of MOU

Month	Activities	Output
Feb	<ol style="list-style-type: none"> <li>1. Setting up the assay in Thailand (ECDD)</li> <li>2. Drafting the agreement for the pilot project</li> </ol>	An Assay platform is set up at ECDD, Thailand
Mar	<ol style="list-style-type: none"> <li>1. Assays of ECDD compounds</li> <li>2. Signing agreements (ECDD/CU/TCELS/BIOTEC)</li> </ol>	Assay results from ECDD <u>cpds</u> (1000 <u>cpds</u> screened)
Apr	<ol style="list-style-type: none"> <li>1. Compounds sent from CU and BIOTEC to ECDD</li> <li>2. Hit extracts were sent to BIOTEC for fractionation</li> </ol>	Assay results (Extracts and pure <u>cpds</u> /1000 <u>cpds</u> screened/1 hit extract was fractionated)
May	<ol style="list-style-type: none"> <li>1. Assay of compounds at ECDD</li> <li>2. Fractionation and isolation of compounds from the hits</li> </ol>	Assay results (Extracts and pure <u>cpds</u> /1000 <u>cpds</u> screened/1 hit extract was fractionated)
Jun	<ol style="list-style-type: none"> <li>1. Assay of compounds at ECDD</li> <li>2. Fractionation and isolation of compounds from the hits</li> </ol>	Assay results (Extracts and pure <u>cpds</u> /1000 <u>cpds</u> screened/1 hit extract was fractionated)

### Outcome of the project

1. Thai network has set up and implemented
2. At least 3000 cpds and/or extracts have been assayed

# Progress (plan 6 months: April-September)

	objective plan	month					
		1	2	3	4	5	6
BIOTEC	1. 80 Compounds → ECDD						
	2. Fractionation < 5 compounds						
	3. Isolation up to 3 hit extracts						
ECDD	1. Material preparation for the Compounds from BIOTEC and CHULA (barcode tube & Plate)	/start					
	2. Assay optimization corresponding to SOP (from 96 well plate to 384 well plate)		/start				
	3. anti-cancer test with MDA-MB 231 (primary screening)						
	4. Does response test of Lead compound						
	5. Cytotoxicity test (lung, kidney, skin cells)						
Chula	1. Compounds --> ECDD * prepare 200 compounds from Chula and request from 9 universities networks to 1,000 compounds	/ *					
	2. Prepare crude Extract						
	3. Chromatography purification for testing						
	4. Chemical structure identification by spectroscopy						







