

Natural Product Sciences in the Open Innovation Model

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Mission Statement

APAC Mission:

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

Drug Discovery Alliance

Promotion of open innovation in Asia to realize "drug discovery that originates in Asia".

3 Focus Areas to Promote Open Innovation

- ① Establish an '**Information Sharing System**' to promote the exchange of drug seeds between academia and research alliance representatives in pharma companies based on DSANJ system
- ② Promote a '**Networking Opportunity**' between ventures and business development representatives in pharma companies focused on compounds in the development stage at Asian Bio-conferences
- ③ Support '**Capacity Building**' to foster young scientists working in the drug discovery area at Asian Bio-conferences and promote governmental programs when available

Background

A concept of “APAC Natural Medicine Initiative (NMI)” was proposed by Thailand in October 2015 at BioJapan in Yokohama.

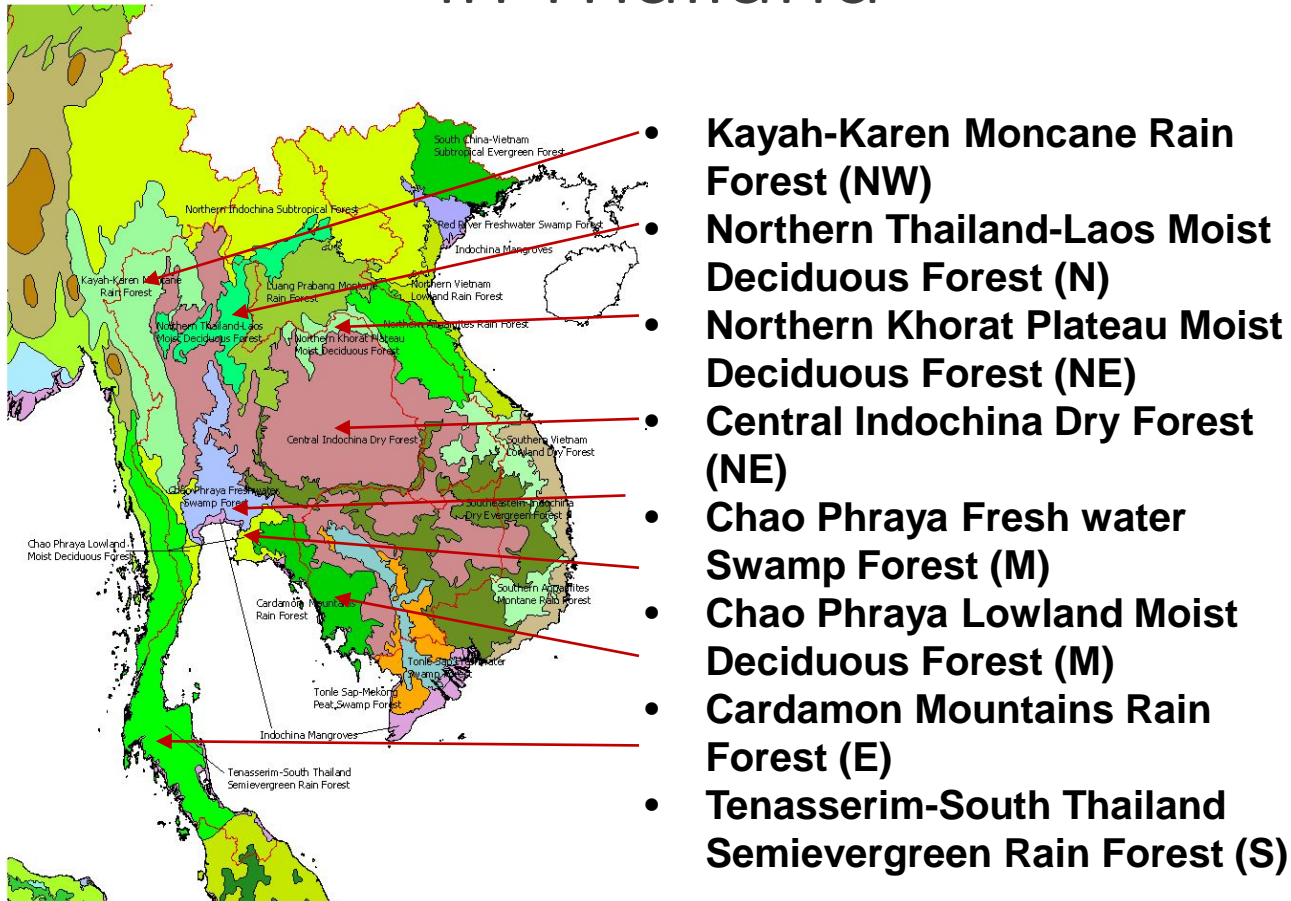
It was suggested that:

- APAC members have high potential in conservation and utilization of natural resources and a certain level of drug discovery capability
- Market potential for medicine from natural or semi-natural sources is expected to grow
- Focusing on natural resources could be a good starting point for *open innovation* style collaboration if we find a win-win collaborative model within APAC

NMI propose the sharing of...

- Materials
 - Under clear rules and protocols that are agreed among members, materials can be shared cross borders for research collaboration. This could possibly include compound libraries.
- Human resource
 - Exchange, training and visit programs for nurturing researchers and professionals should be one of the main capacity building item.
- Screening opportunity
 - Research facilities could be shared as needed for full or at least more efficient utilization.
- Technology
 - There are many ways to share technologies e.g. creative licensing deals, direct investment, joint venture, etc.

Ecological Diversity of Tropical Forests in Thailand



Data from the World Wildlife Fund

The Situation and Trends of Natural Products Research in Thailand

Situation

Continuous increase of research articles published internationally (ave.115 papers/year over the last 10 years)

Continuous increase of natural product compounds reported internationally (ave. 800 compounds/year), adding up to ~ 8,000 cpds

Apparent diversity of chemical groups

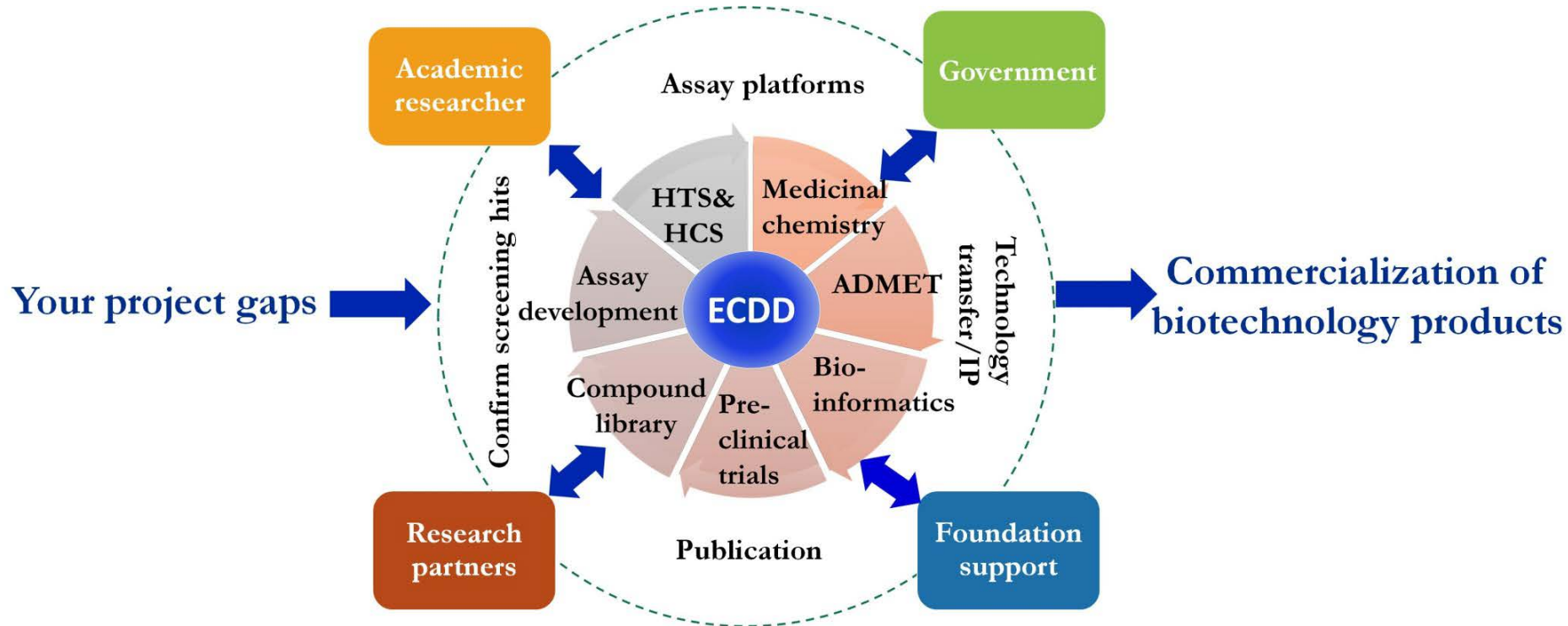
Tasks

Detail analysis on the structural types and biological sources is needed

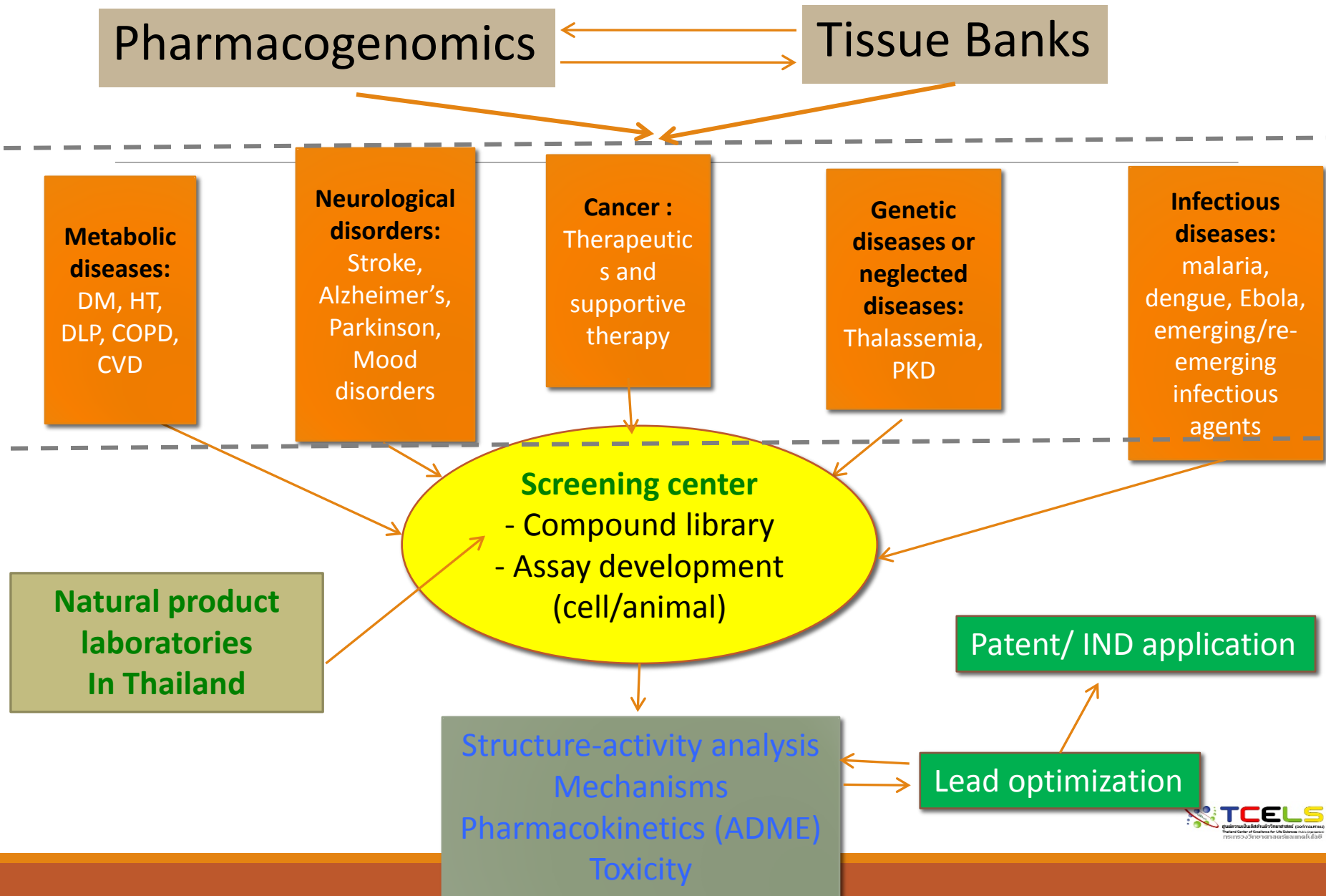
Registration and collection of these isolated natural products as “chemical library” would significantly enhance the drug discovery research activities in Thailand

With the presence of the “national” compound library, high-throughput screening in the country can then be established

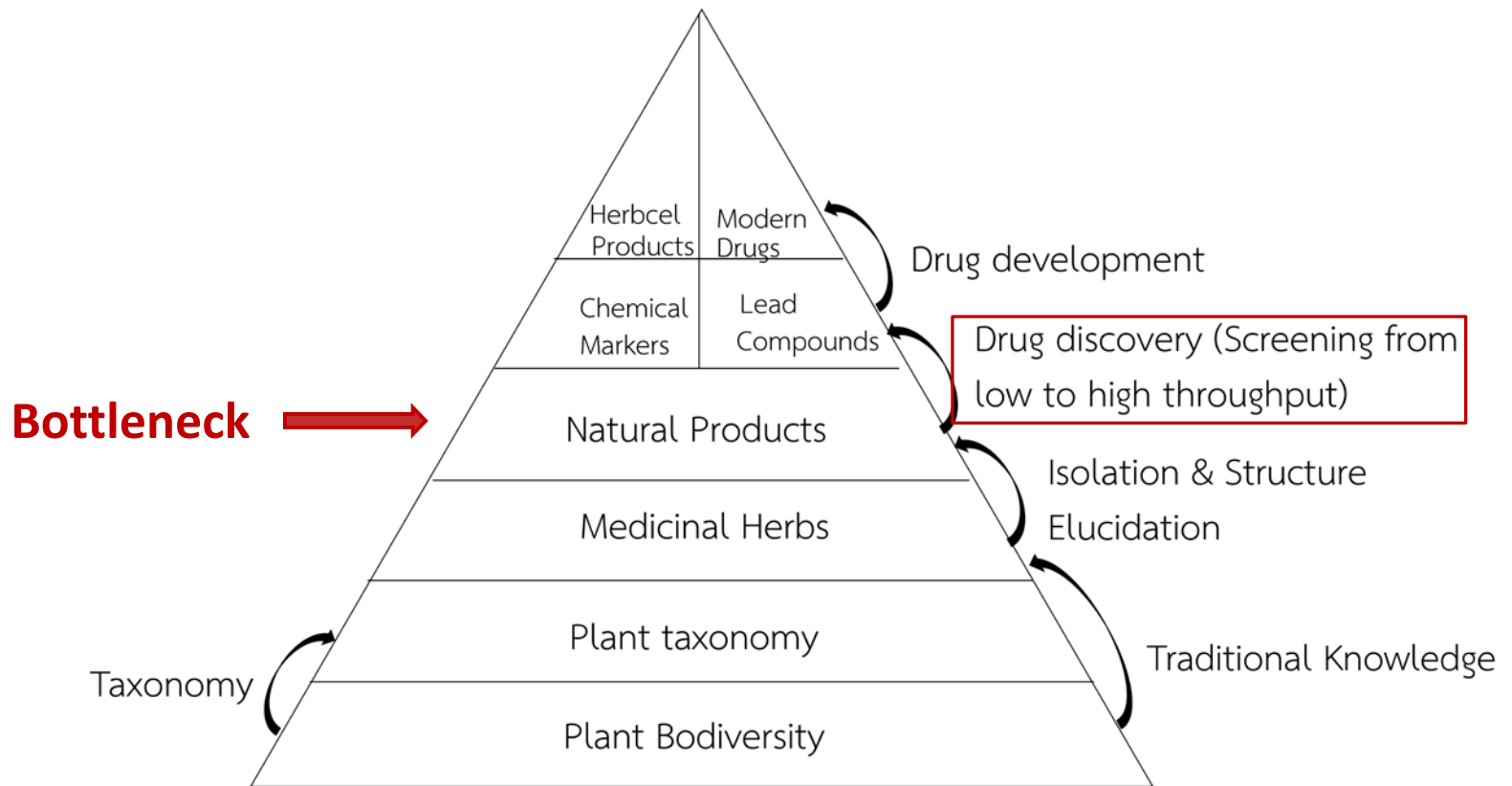
ECDD – Thailand's New Drug Discovery Research Facility



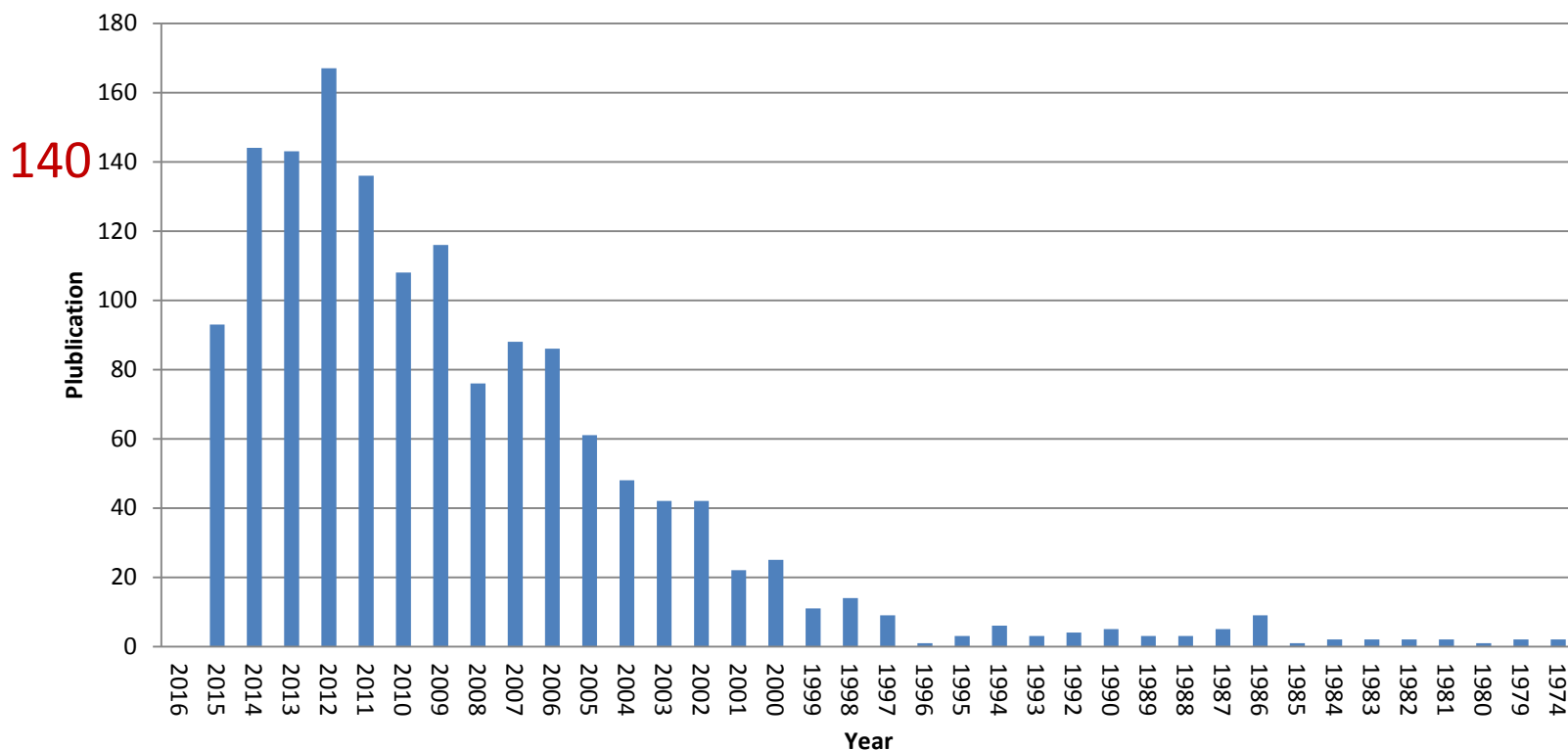
Concept working map for ECDD



Bottle Neck of Natural-Product Drug Discovery Research in Thailand

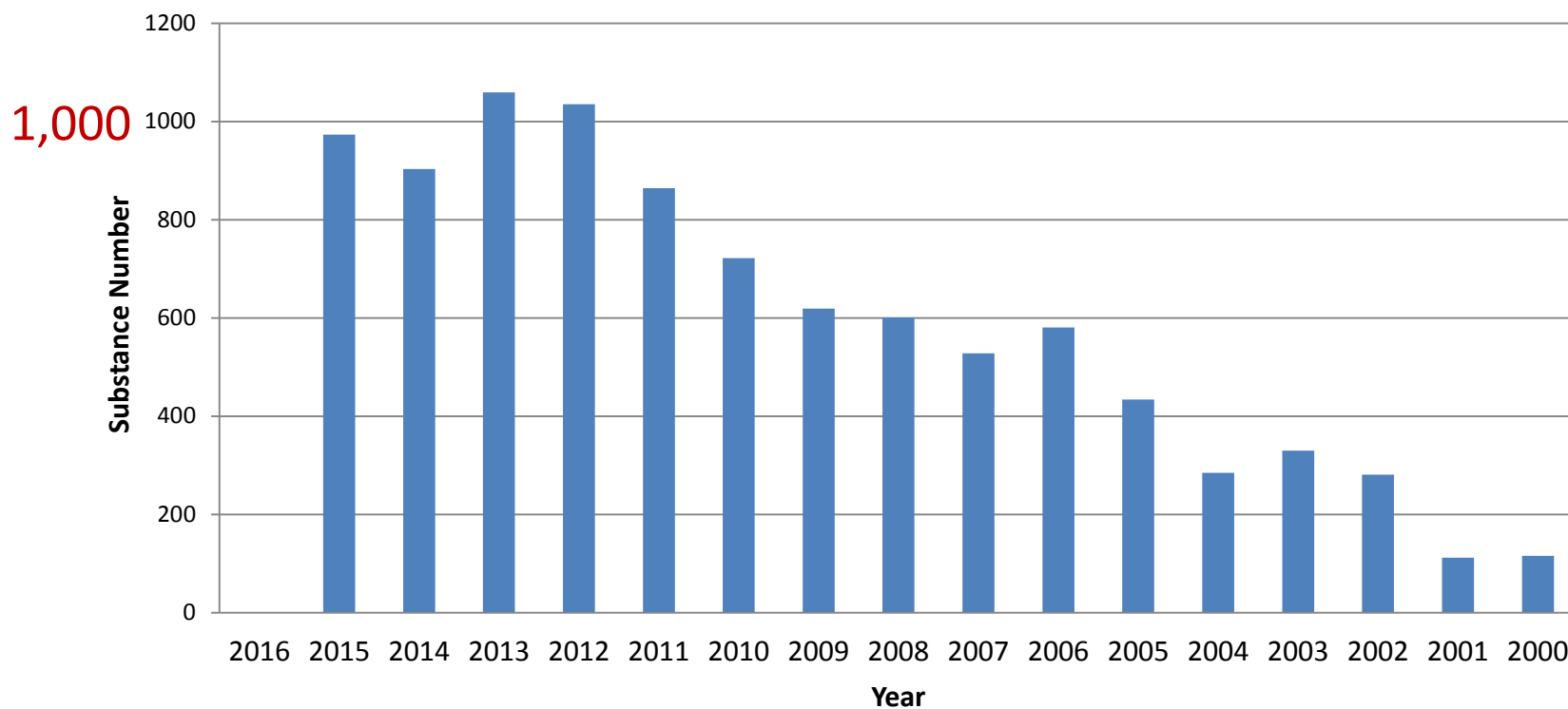


Publications of Natural Product Research Produced by Thai Researchers (from Scifinder Database)



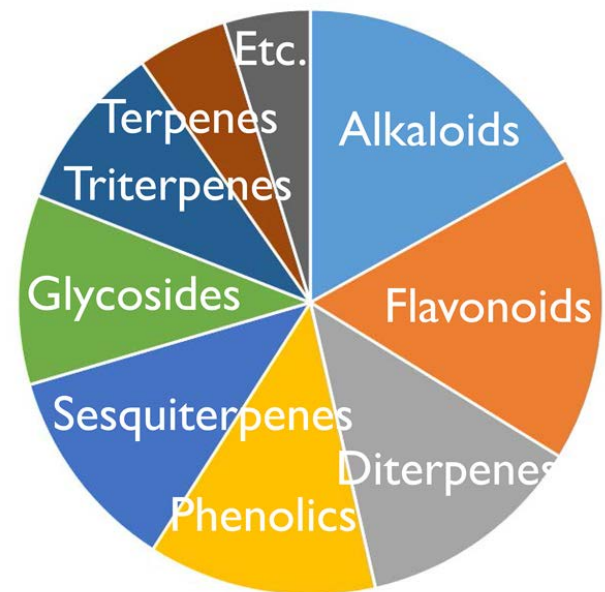
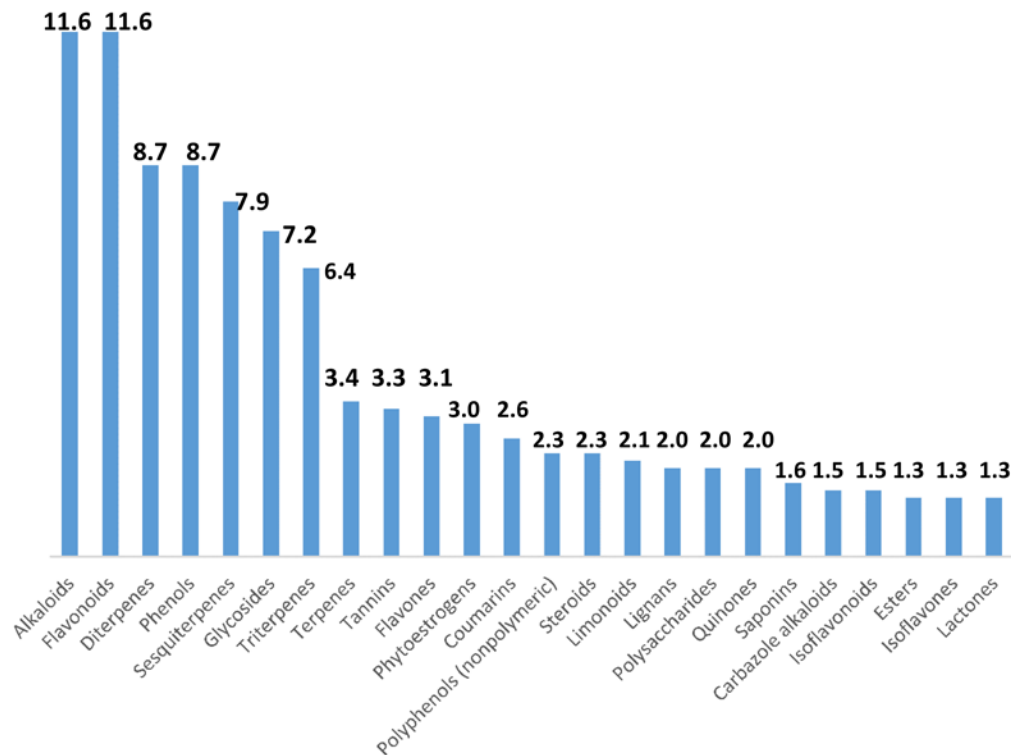
Source: Dr. Supakarn Chamni

Natural Product Compounds from Publications Reported by Thai Researchers (from Scifinder Database)



Source: Dr. Supakarn Chamni

Proportion of Natural Product Groups Isolated by Thai Researchers



Source: Dr. Supakarn Chamni

Establishment of “National Chemical Library of Thai Natural Products” – Thailand’s Own Open Innovation

- Granting agencies can use information from the chemical library as part of the granting/evaluation)
- Compound registration and collection (obtained from researchers)
- Signing agreement (researcher v the chemical library)
- Chemical directory with key information (source, structure, group of compound, biological activity(ies), publications, etc.)
- Analysis of the uniqueness of the Thai natural product collection (new chemical skeletons, compounds, detected biological activities)
- Compound collection in standard containers and conditions with possible preparation in 96- or 384- well plates for HTS
- Compound owners will obtain benefits when their compounds appear to become “Leads” with interesting biological activities
- Researchers can access to the database for knowing who is having what, for collaboration, asking for standards, for subsets of chemical groups for bioassay, etc.

Proposal for APAC – Focus: Capacity Building

1. A funding or co-funding scheme that is agreed upon by APAC members to utilize bioresources through research collaboration and to build capacity in research and development. Apart from financing, the funding scheme is to be equipped with the following mechanisms:
 - Training programs and personnel exchange
 - Consulting
 - Webinars and data sharing
 - Platform to increase visibility
 - Partnering/matchmaking event
2. A set of rules and protocols based on international agreement that is agreed among and applied to APAC members.

Action Plan

By October 2016

1. DA-EWG to Agree with the Concept
2. Members to convince each local policy makers/granting/implementing agencies for buy-in
3. Development of capacity building programs
4. Report at APAC Yokohama Meeting

By March 2017

1. Development of management systems
2. Implementing capacity building programs
3. Report at APAC Tokyo Annual Meeting

Creation of Mutually-Beneficial Relationships among APAC Open Innovation Members

Thailand (and other APAC members)

- Has valuable chemical collection and HTS capability
- Knows the status of both biological and chemical diversities of the country
- Information-based policy making, international relations and economic values

Local Research Granting / Policy making Agencies

- Has clear policy on natural product R&D for drug development
- Can develop high throughput screening technology using country-own bio-resources

Companies

- Pharmaceutical companies (both local and international) can participate in the drug discovery alliance
- Faster drug development and commercialization

Researchers

- Have more resources to upgrade and scale up their research projects
- Exponential growth of R&D in their area

