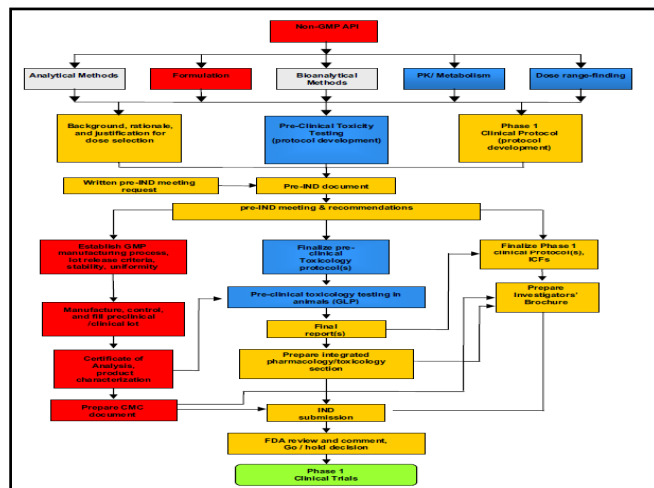
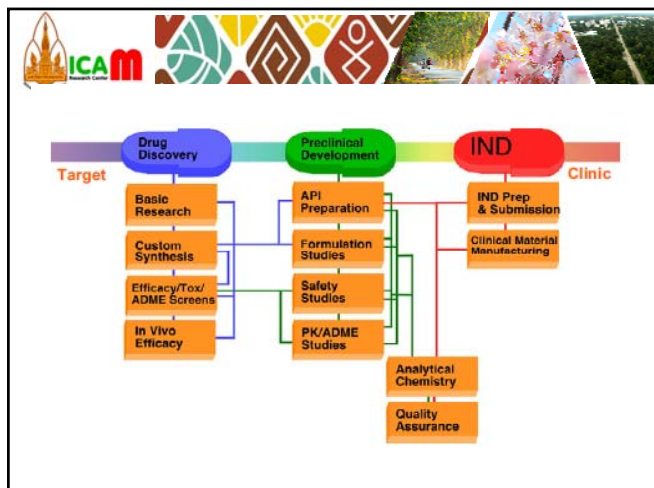




## Strategic research on natural products and herbs for brain and cognitive functions

**Jintanaporn Wattanathorn**

### Research and Development of Traditional Medicines and Natural Product

**Systematic screening**  
: Published literature on traditional medicinal plant use  
: Historical texts

**Advantages:**  
: Preselection of potentially active resources  
: Promising safety profile (age-long experience)  
: Cost-efficient and comparatively fast

**Perspectives:**  
: Research and Development  
: Quality Control and Production



### Research and Development

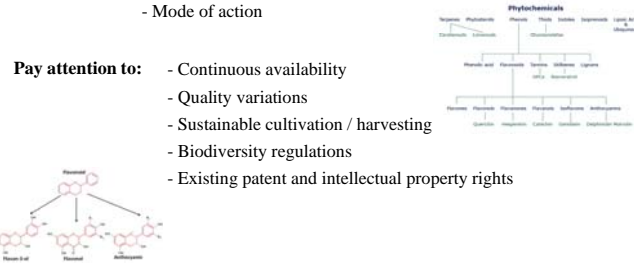
**Development of the test substance**

Define: - Active substance (*in phytopharmacy: native extract*)  
- Dosage form

Establish: - Physico-chemical profile (active compounds, marker)  
- Pharmacology

Investigate: - Mode of action

**Pay attention to:** - Continuous availability  
- Quality variations  
- Sustainable cultivation / harvesting  
- Biodiversity regulations  
- Existing patent and intellectual property rights



### Quality Control and Production


**Identity test, controls**

**Monographs** in pharmacopoeias for:

- Chemical substances
- Herbal raw materials

⇒ **Organisation of a monograph**

Definition:	chemical characterisation
Characters:	appearance, solubility
Identification:	microscopy, physico-chemical tests
Tests:	qualitative analysis
Assay:	quantitative analysis
Impurities:	chemical or microbiological impurities

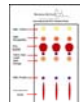
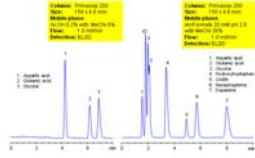



### Quality Control and Production

**In house controls**

Two standard analytical methods in phytopharmacy:

- **TLC** = Thin layer chromatography
- **HPLC** = High performance liquid chromatography




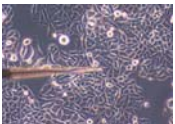
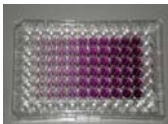
### Safety consumption and the efficacy of herbal products

**Preclinical development**

**In vitro profiling:**

- Biochemical assays (e.g. enzyme activity assays)
- Cell culture assays (e.g. cancer cell lines)
- Isolated tissue assays (e.g. mucosa model)

**In vitro toxicology:**  
Investigate potential toxic effects in bacteria- or cell cultures

Dr. Matthias Kreuter  
Head of **Alpinia Laudanum Institute** of Phytopharmaceutical Sciences AG Walenstadt, Switzerland


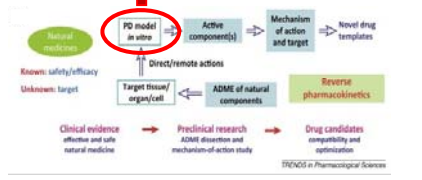
### Safety consumption and the efficacy of herbal products

**Preclinical development**

**In vivo testing** ⇒ **Animal model**


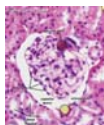
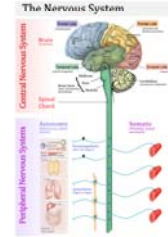
Herbal action:

- Behaviour and reaction (Nervous system)
- Physiology
- Histopathology

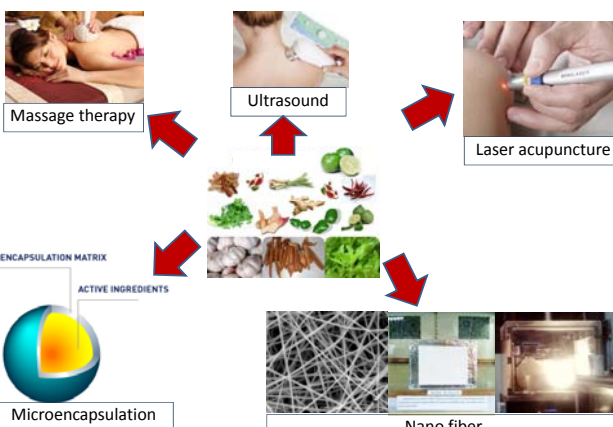



**Toxicology:**

- Acute toxicity
- Subchronic toxicity
- Tissue specific toxicity
- Tolerability

### Safety consumption and the efficacy of herbal products



ENCAPSULATION MATRIX

ACTIVE INGREDIENTS

Microencapsulation

Nano fiber


### Safety consumption and the efficacy of herbal products

**Preclinical development (continued)**

**Pharmacokinetic studies** ⇒ What does the body to the drug ?

investigate:

- Liberation
- Absorption
- Distribution
- Metabolism
- Excretion



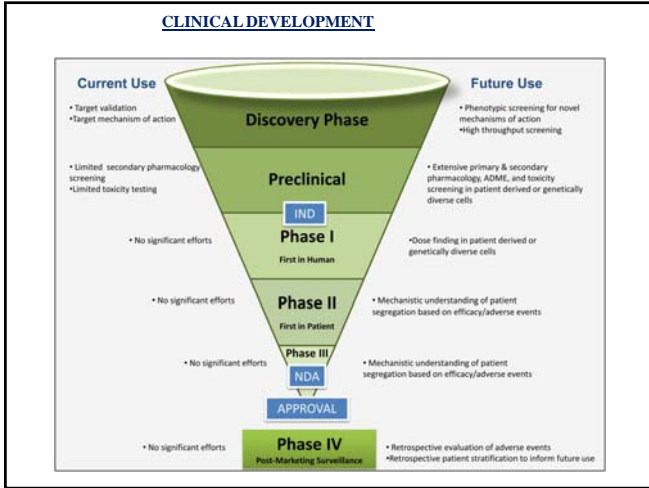
**Pharmacodynamic studies** ⇒ What does the drug to the body ?

investigate:

- Physiological effects
- Drug action
- Relationship between drug concentration and effect

**QUALITY CONTROL**

- Validation report
- Stability report
- Manufacturing protocol
- Development report (on going)



<b>Phase I studies</b>	⇒ 20 to 30 <b>healthy</b> volunteers
Investigate:	<ul style="list-style-type: none"> <li>Safety and tolerability</li> <li>Pharmacokinetics</li> <li>Pharmacodynamics</li> </ul>
<b>Phase II studies</b>	100 to 500 <b>patient</b> volunteers
Investigate:	<ul style="list-style-type: none"> <li>Safety and tolerability</li> <li>Pharmacokinetics</li> <li>Pharmacodynamics</li> <li>Efficiency</li> <li>Dosage to effect relationship</li> </ul>
<b>Phase III studies:</b>	Up to 1000 or more patient volunteers Monitor reaction to long term drug use. Study design: <ul style="list-style-type: none"> <li>Comparison to placebo or to standard therapy</li> <li>Multicentre and multinational trials</li> </ul>
<b>Phase IV studies</b>	Post marketing testing Investigate specific questions within the frame of the approved indication: <ul style="list-style-type: none"> <li>Expanded benefit-risk-profile</li> <li>Combination with other drugs</li> <li>Optimization (e.g. dosage, application)</li> </ul>

