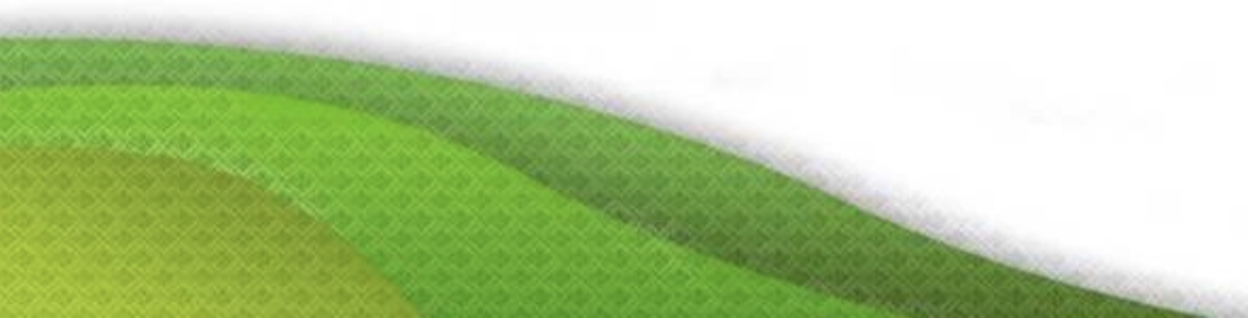


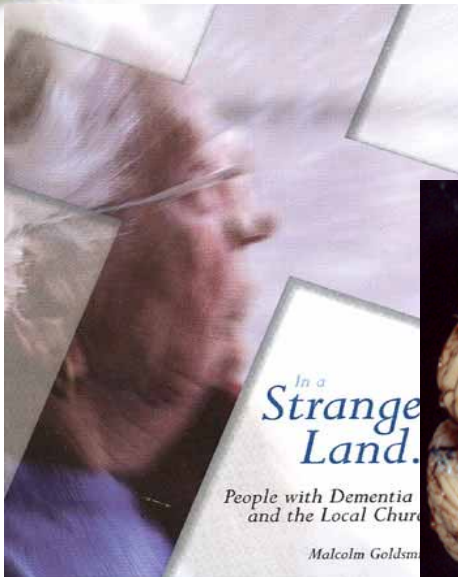
Medicinal use and commercial potential of indigenous herbs and plants in Thailand-Case study on herbs for memory

Associate Professor Jintanaporn Wattanathorn
Integrative Complimentary Alternative Medicine Research
and Development Group



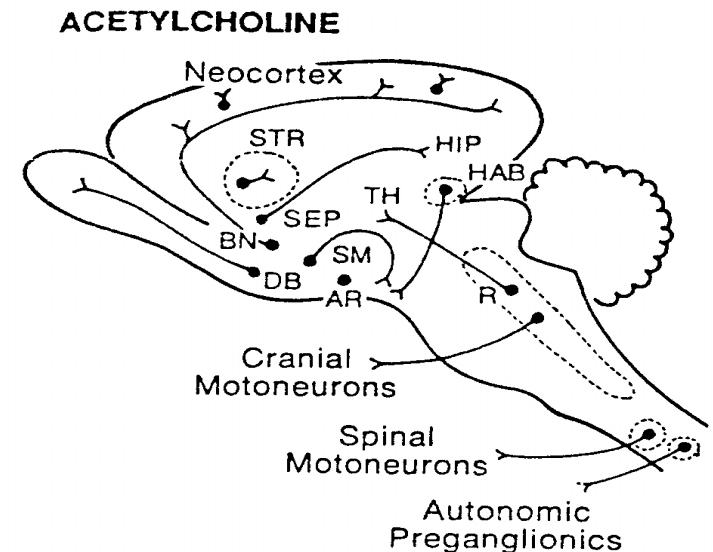
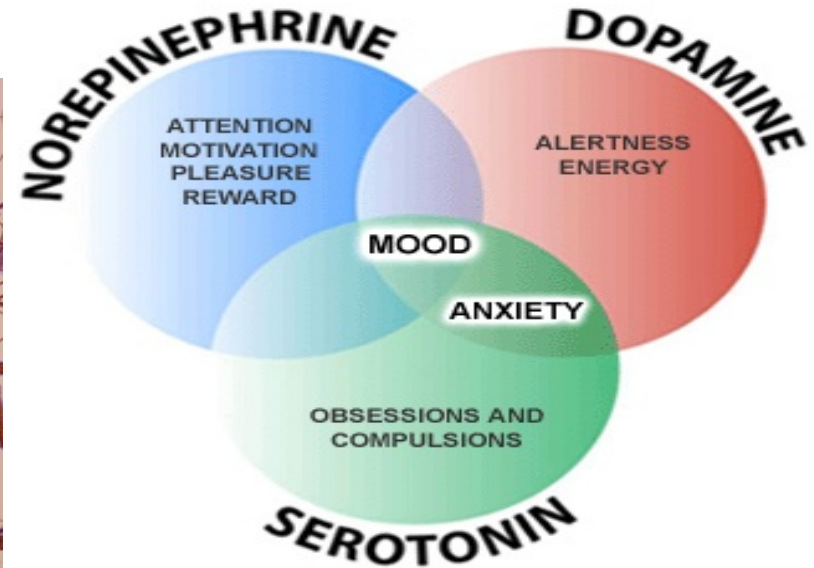
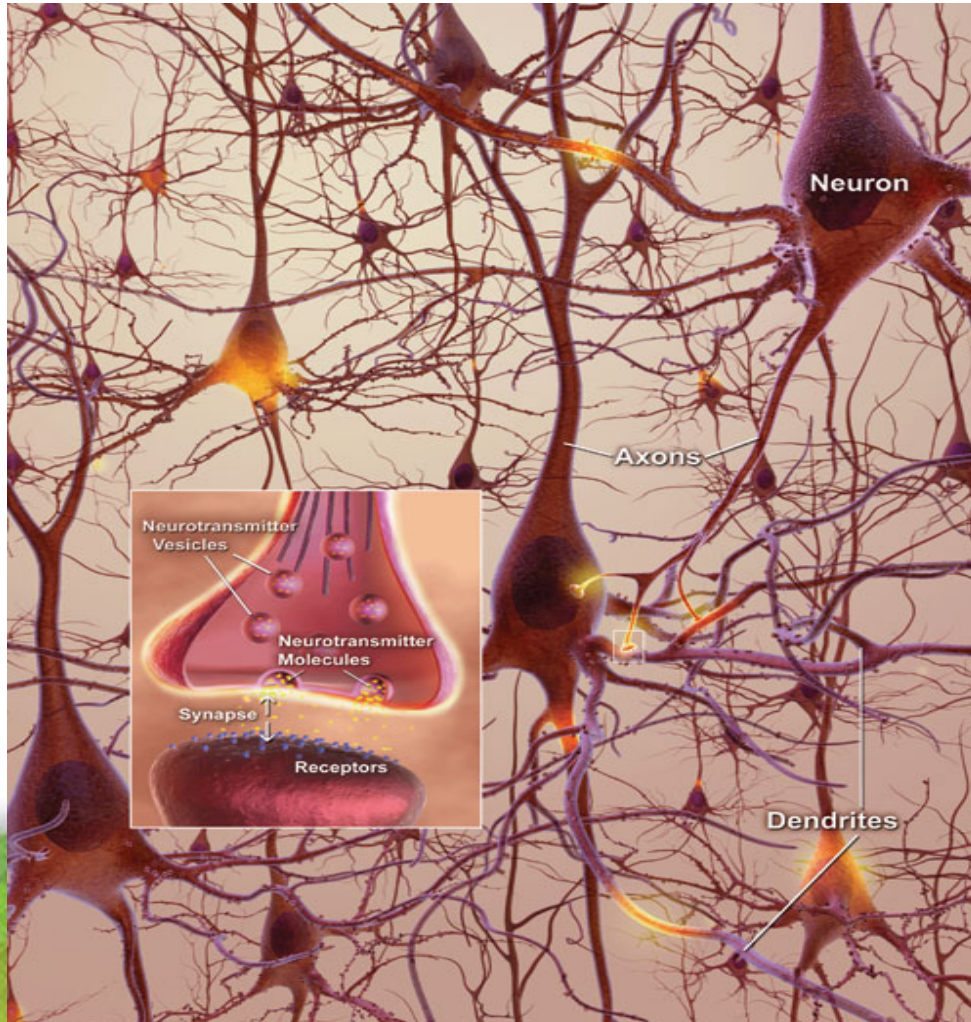
Content

- Memory Impairment
 - How to develop food supplement for memory enhancement
 - Case study
- 

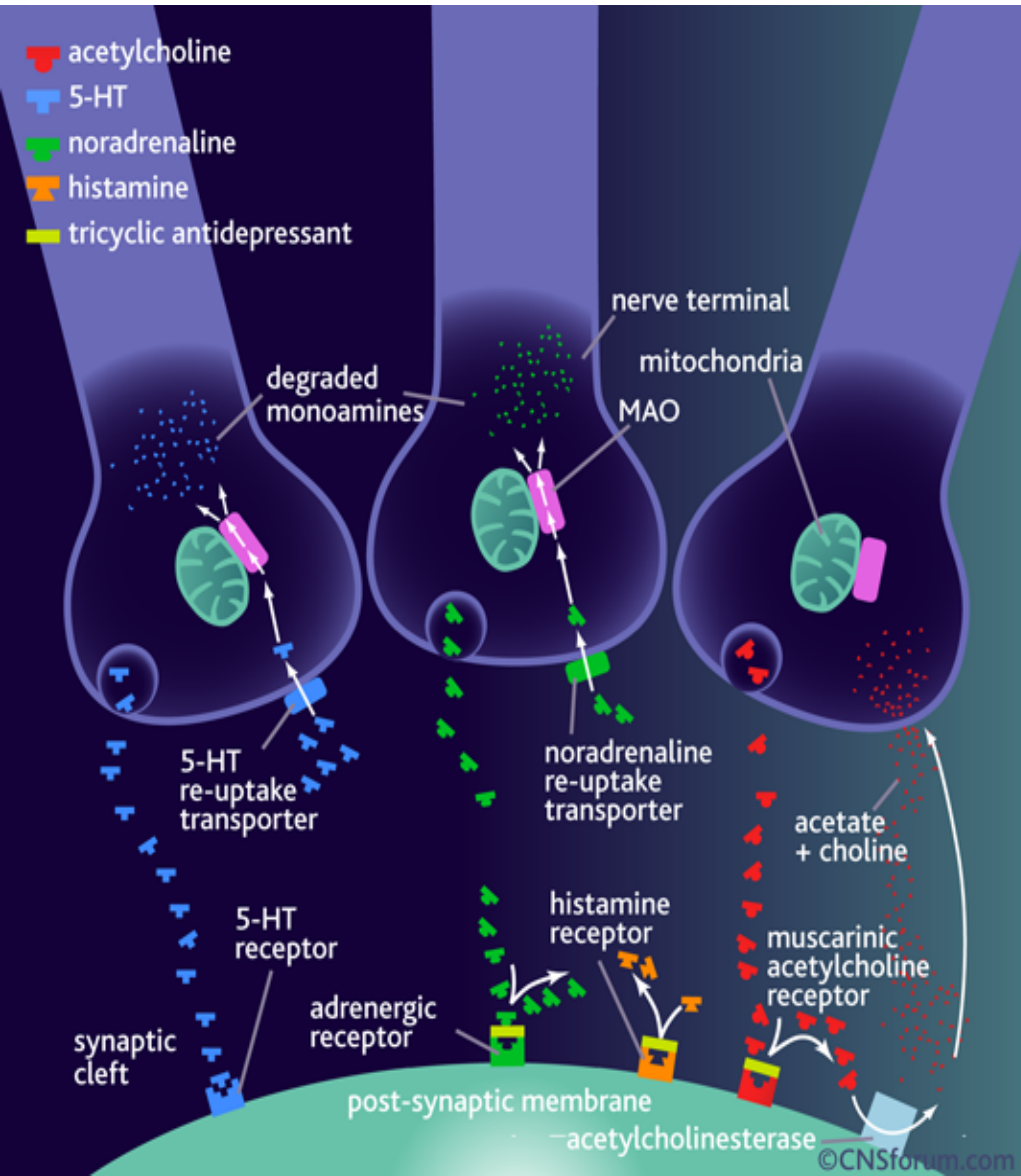


- The disorders of the nervous system have been proposed to be the major medical need for the 21st century.
- The occurrence of dementia and age related brain disorders is dramatically on the rise as life expectancy increases.

Cognitive function & Transmitters



Neurotransmitters



Acetylcholine

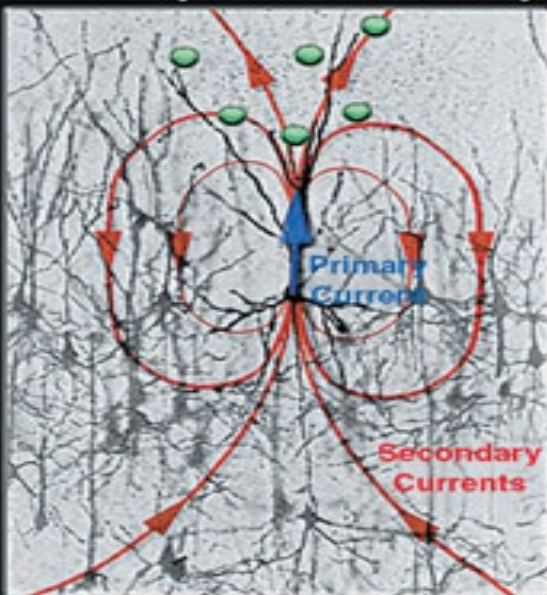


← **Acetylcholinesterase**

Acetate + Choline

MAO deaminates monoamine transmitters.

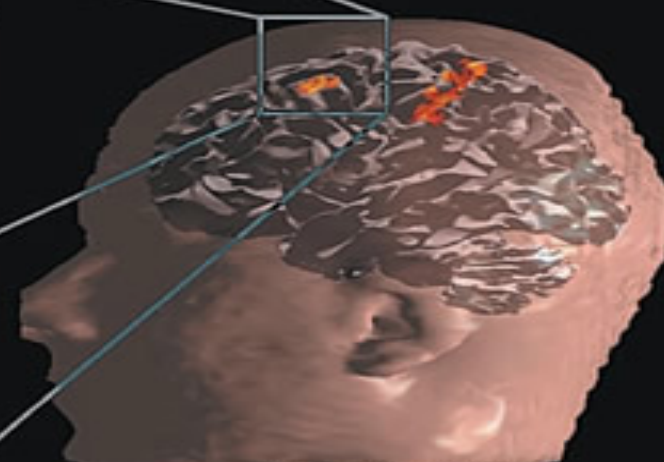
Pyramidal Cell Assembly



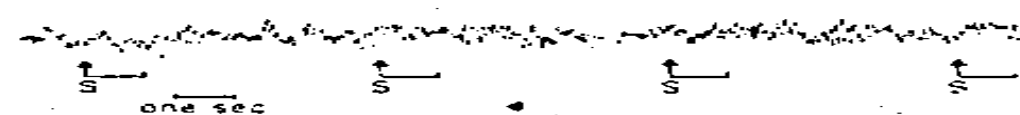
Excitatory Post-Synaptic Potentials

Pyramidal Cell Assembly

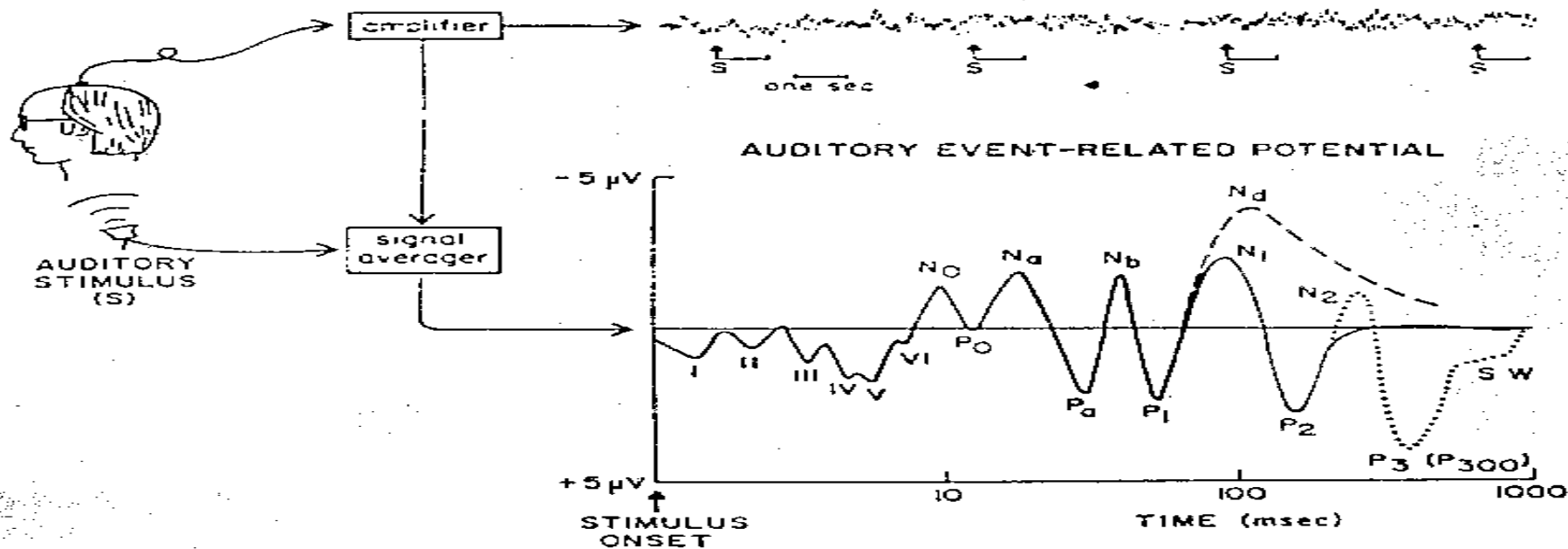
Neural Activation

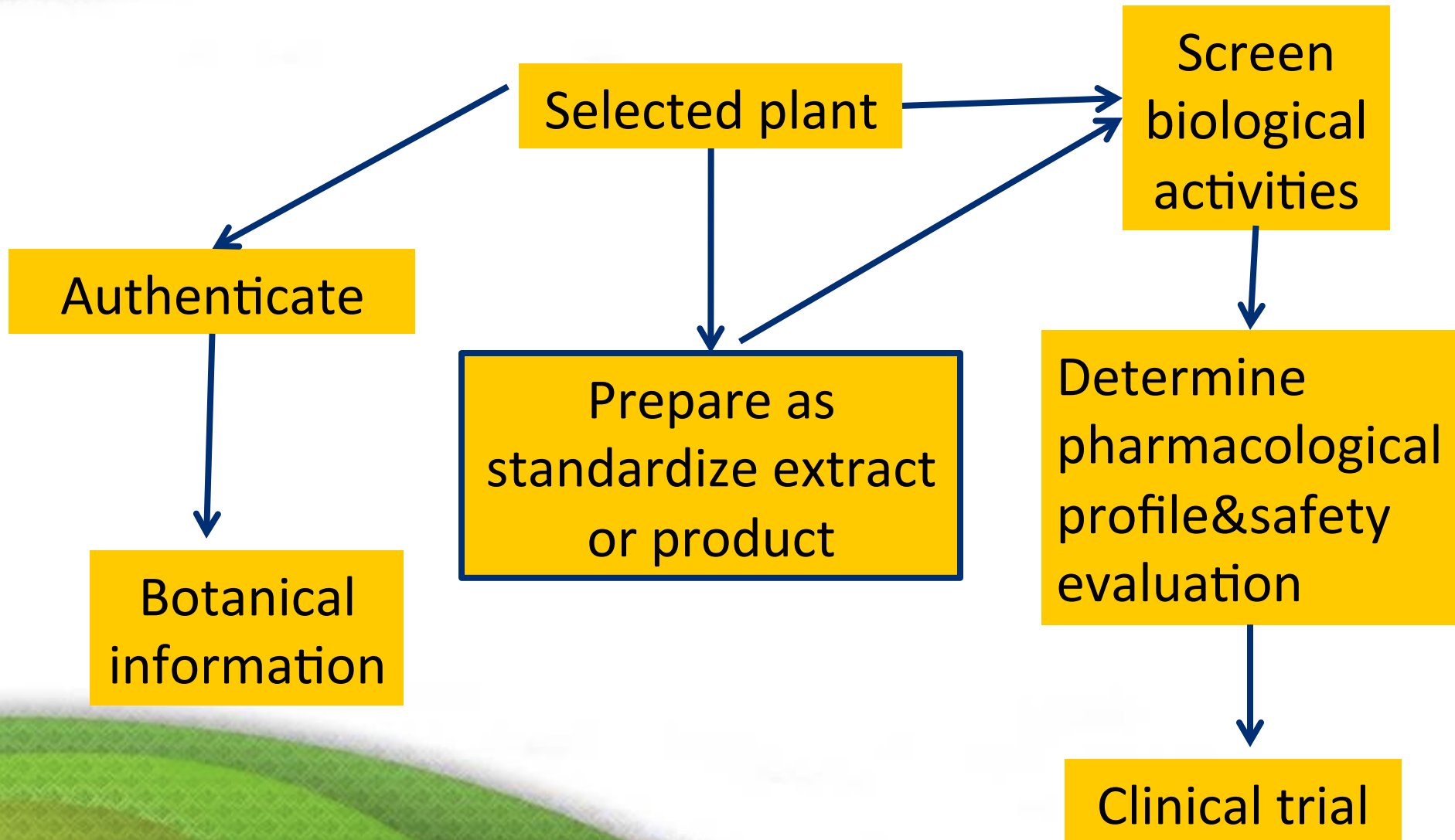


ONGOING EEG



AUDITORY EVENT-RELATED POTENTIAL





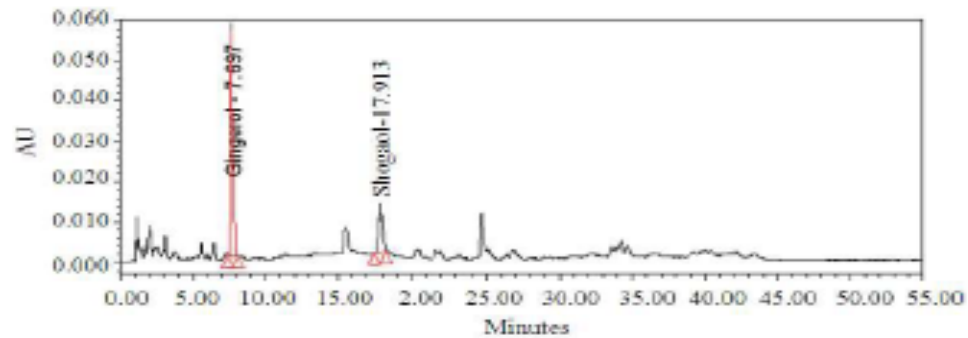
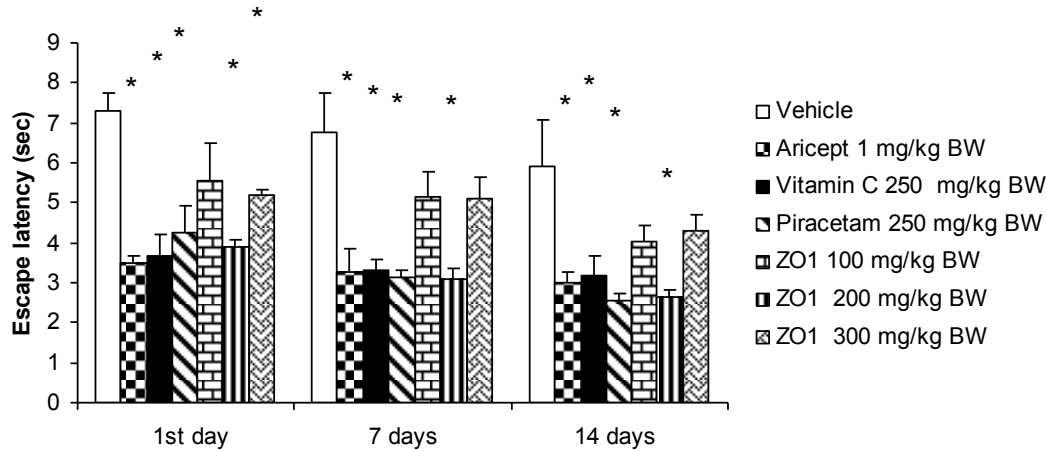


Fig. 1: HPLC Chromatogram (high performance liquid chromatography) of *Zingiber officinale* extract. Column: Luna C₁₈ 4.6×150 mm. Mobile phase: water/acetonitrile (gradeint)

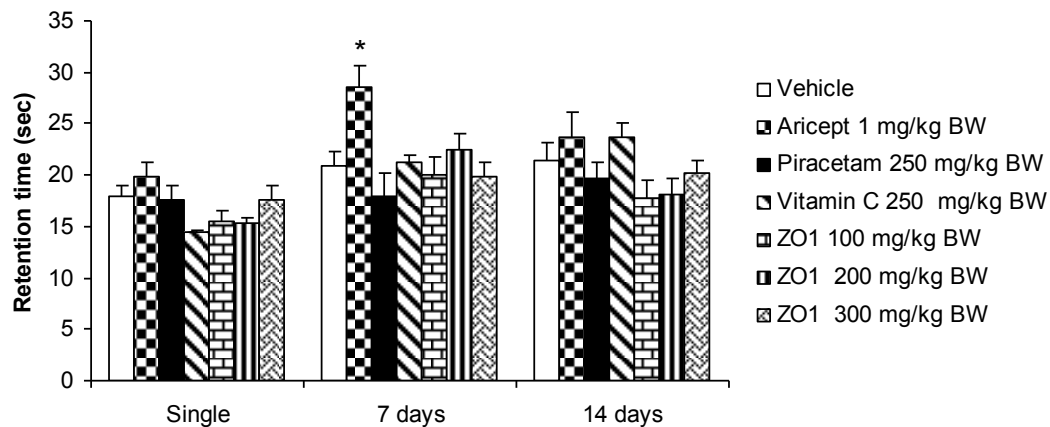
Ginger contains Total phenolic compound 177 ± 0.002 (mg of GAE /100 g of plant)
LD 50 more than 5 gm/kg

Parameter (%inhibition)	Positive control	Ginger extract
DPPH	28.90 ug/ml	63.58 ug/ml
FRAP	101.75 ug/ml	<5 ug/ml
AChE	23.83 ug/ml	10.22 ug/ml
MAO	-	<5 ug/ml

Morris Water Maze Test



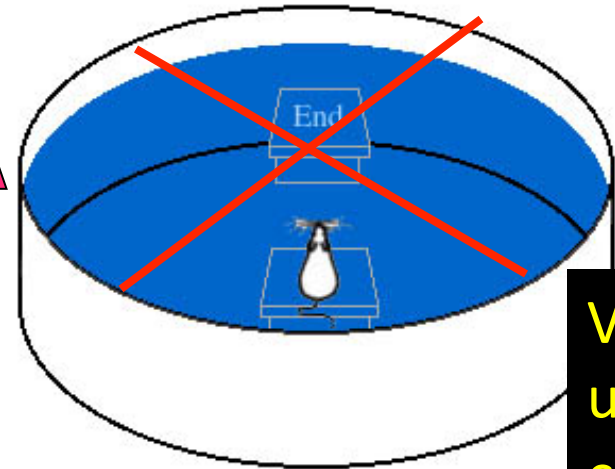
Morris Water Maze Test



Visual cue



Visual cue



Visual cue



Research Article

***Zingiber officinale* Mitigates Brain Damage and Improves Memory Impairment in Focal Cerebral Ischemic Rat**

Jintanaporn Wattanathorn,¹ Jinatta Jittiwat,¹ Terdthai Tongun,¹ Supaporn Muchimapura,¹ and Kornkanok Ingkaninan²

¹ Department of Neuroscience Program, Faculty of Medicine, Khon Kaen University, Khon Kaen 40002, Thailand

² Department of Pharmaceutical Chemistry and Pharmacognosy, Faculty of Pharmaceutical Sciences, Naresuan University, Phitsanulok 65000, Thailand

Correspondence should be addressed to Jintanaporn Wattanathorn, jinwat05@gmail.com

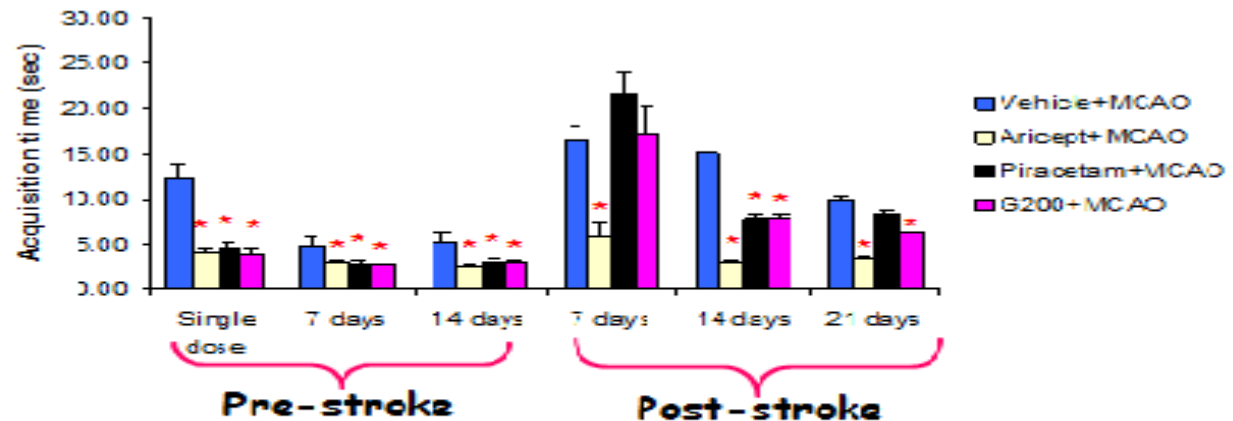
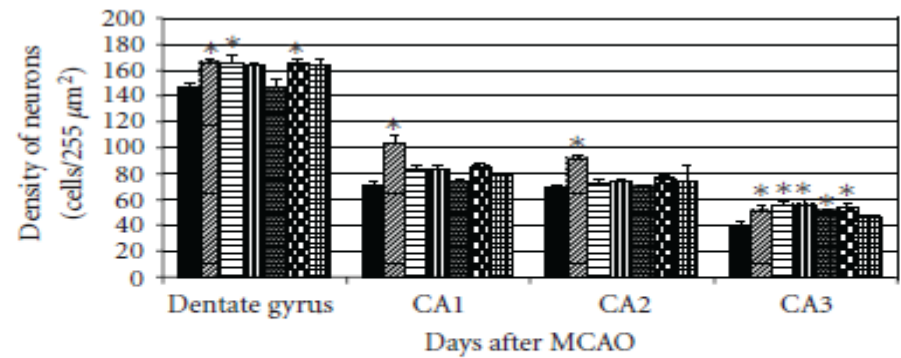
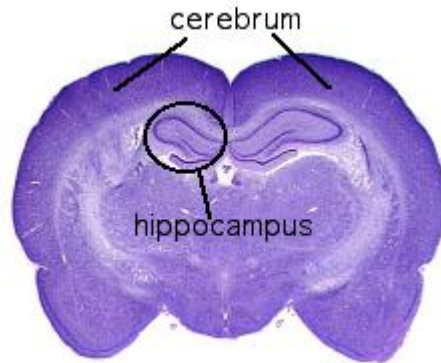
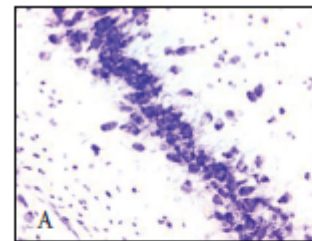
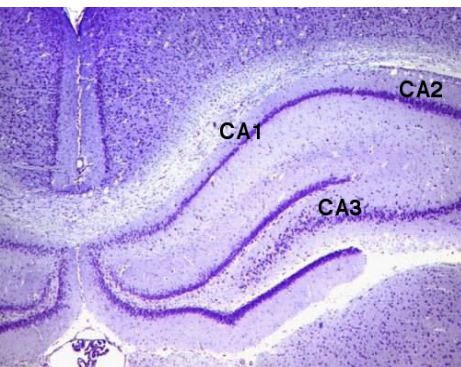


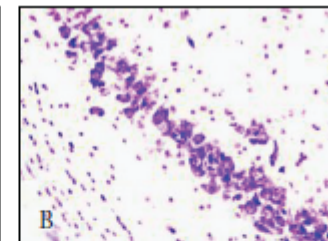
Figure 1. Effect of *Zingiber officinale* extract at dose 200 mg/kg BW on the cognitive enhancing effect.



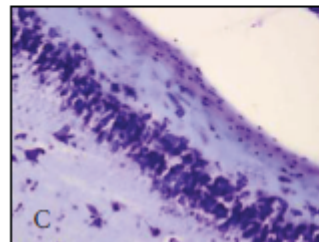
- Vehicle + MCAO
- ▨ Aricept + MCAO
- ▤ Piracetam + MCAO
- ▧ Vitamin C + MCAO
- ▩ ZO1 100 + MCAO
- ZO1 200 + MCAO
- ZO1 300 + MCAO



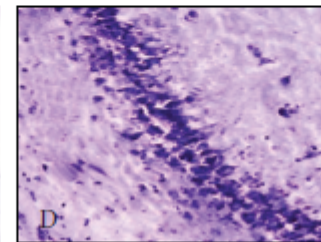
Sham



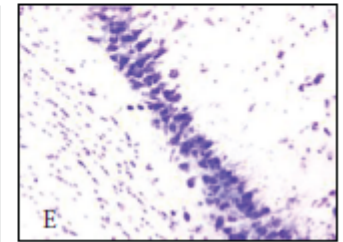
Vehicle + MCAO



ZO1 100 + MCAO



ZO1 200 + MCAO



ZO1 300 + MCAO

Research Article

***Zingiber officinale* Improves Cognitive Function of the Middle-Aged Healthy Women**

Naritsara Saenghong,¹ Jintanaporn Wattanathorn,² Supaporn Muchimapura,² Terdthai Tongun,² Nawanant Piyavhatkul,³ Chuleratana Banchonglikitkul,⁴ and Tanwarat Kajsongkram⁴

¹Neuroscience Program and Graduate School, Faculty of Medicine, Khon Kaen University, Khon Kaen 40002, Thailand

²Neuroscience Laboratory Unit, Department of Physiology, Faculty of Medicine, Khon Kaen University, Khon Kaen 40002, Thailand

³Department of Psychiatry, Faculty of Medicine, Khon Kaen University, Khon Kaen 40002, Thailand

⁴Department of Pharmaceutical and Natural Products, Thailand Institute of Scientific and Technological Research, Pathumthani 12120, Thailand

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Ginger Supplementation Enhances Working Memory of the Post-Menopause Women

¹Naritsara Saenghong, ^{2,3}Jintanaporn Wattanathorn,

^{2,3}Terdthai Tongun, ^{2,3}Supaporn Muchimapura,

⁴Nawanant Piyavhatkul, ⁵Chuleratana Banchonglikitkul
and ⁵Tanwarat Kajsongkram

¹Department of Physiology, (Neuroscience Program) and Graduate School,
Faculty of Medicine, Khon Kaen University, 40002, Thailand

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³Integrative Complimentary Alternative Medicine Research Group,

⁴Department of Psychiatry, Faculty of Medicine,

Khon Kaen University, 40002, Thailand

⁵Thailand Institute of Scientific and Technological Research,
Pathumthani, 12120, Thailand

Inclusion Criteria

- ★ Thai Women Aged Between 45-70 Years
- ★ Should be dwelling in Northeast Region of Thailand

At least 1 month

Nutraceutical compounds

Herbs or Drug

On the day of the study

Felt well

Tea or coffee
smoking more than 10 pieces/day
alcohol at least 12 hours before

Consent

Exclusion Criteria

No record of



Cardiovascular diseases



Diabetes



Respiratory disease



Cancer



Neuropsychological disease



Head injury



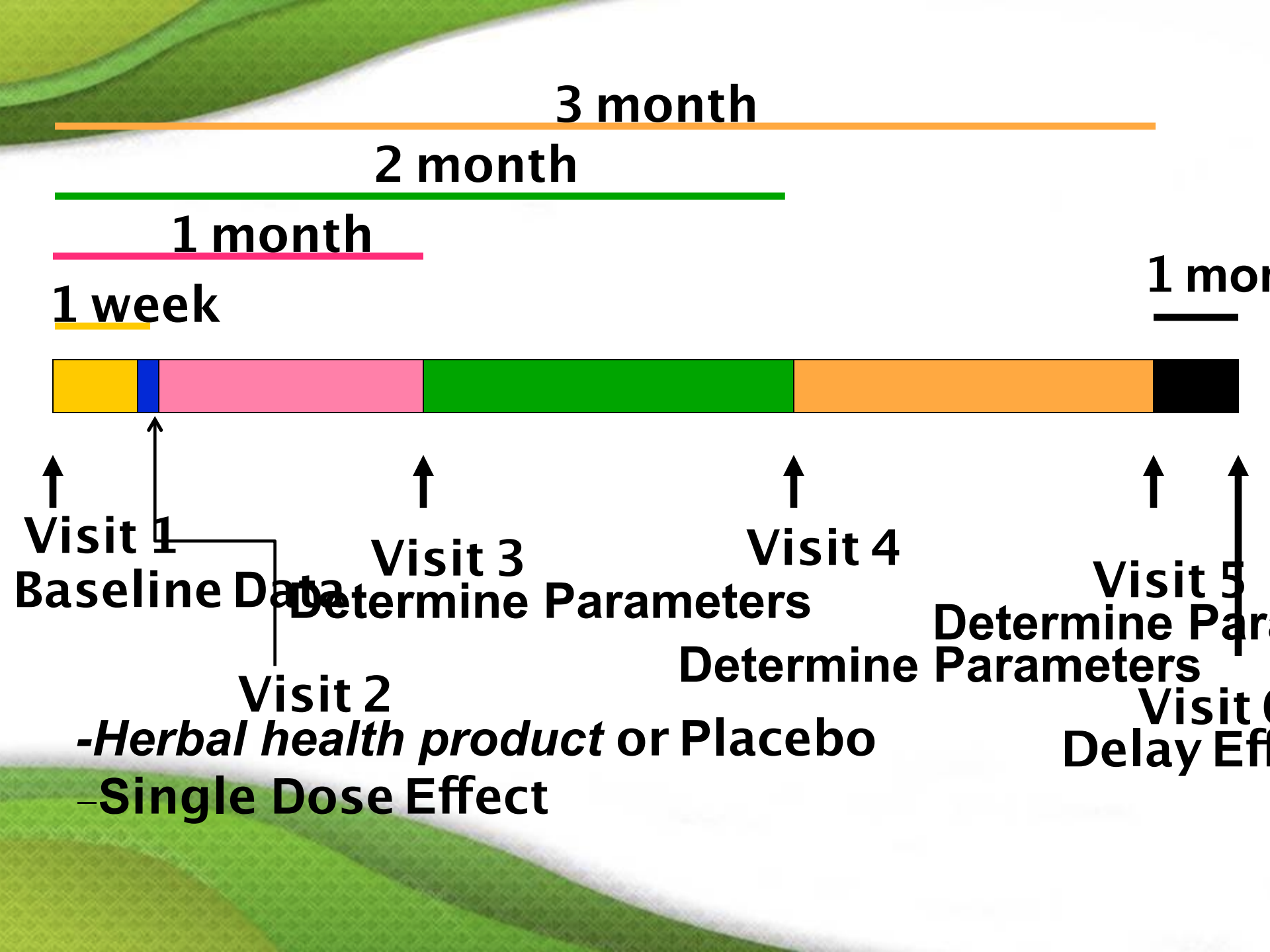
Liver disease



Hematological disorders



Autoimmune disease



Effect of *Z. officinale* on working memory

400 mg

800 mg

1. Power of attention

1.1 Simple reaction time (msec.)

1.2 Digit vigilance reaction time (msec.)

1.3 Choice reaction time (msec.)

2. Continuity of attention

2.1 Digit vigilance (accuracy%)

2.2 Choice reaction (accuracy%)

2.3 Digit False alarms (number)

3. Quality of memory

3.1 Spatial working memory (accuracy%)

3.2 Numeric working memory (accuracy%)

3.3 Delay word recognition (accuracy%)

3.4 Delay picture recognition (accuracy%)

4. Speed of memory

4.1 Spatial working memory reaction time

4.2 Numeric working memory reaction time

4.3 Delay word recognition reaction time

4.4 Delay picture recognition reaction time

1m.	2m.	3m.	Delay
X	X	X	X
X	X	**#	X
X	X	*	X

1m.	2m.	3m.	Delay
X	X	X	X
X	X	**##	X
X	X	*##	X

1m.	2m.	3m.	Delay
X	*	*#	X
X	*	*#	X
X	#	*#	X
X	X	X	X

1m.	2m.	3m.	Delay
X	*	*	X
X	X	X	X
X	*#a	**##aa	X
X	#	##	X

1m.	2m.	3m.	Delay
X	X	X	X
X	X	***###	X
X	*##	**#	X

1m.	2m.	3m.	Delay
X	*#	**##	X
###	*###	***###	X
**#	**#	**##	X

1m.	2m.	3m.	Delay
X	**##	**##	#
*	**##	**##	*
X	**##	***##	X
X	X	***##af	**#

1m.	2m.	3m.	Delay
X	***	***##aa	*
X	X	X	X
#	*##	**###	X
X	##	**##	X

*= p<0.05, **=p<0.01, ***=p<0.001 when compared to placebo,

= p<0.05, ##=p<0.01, ###=p<0.001 when compared to baseline,

a = p<0.05, aa=p<0.01, aaa=p<0.001 when compared to 1 month

Event related potential (ERPs)

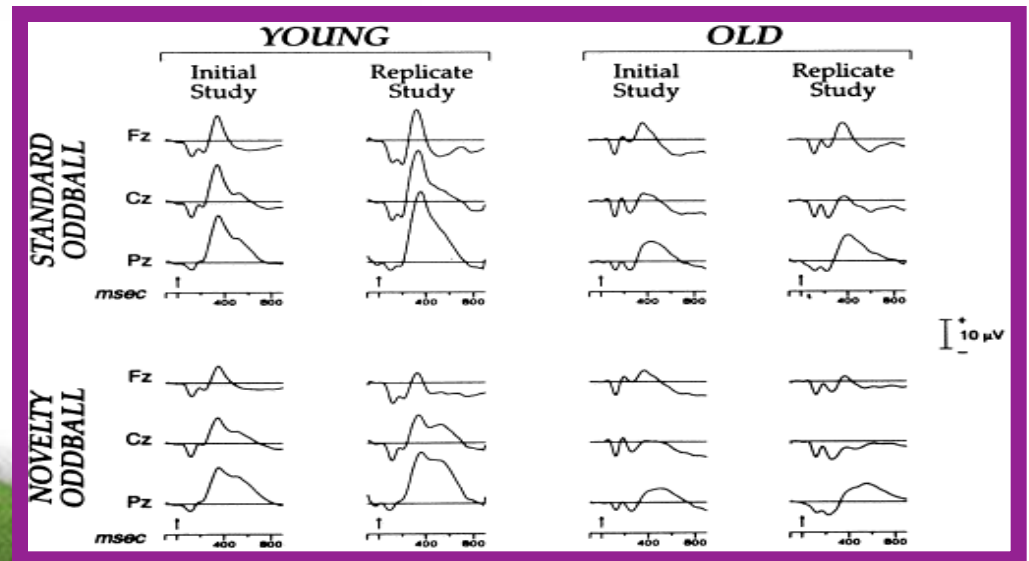
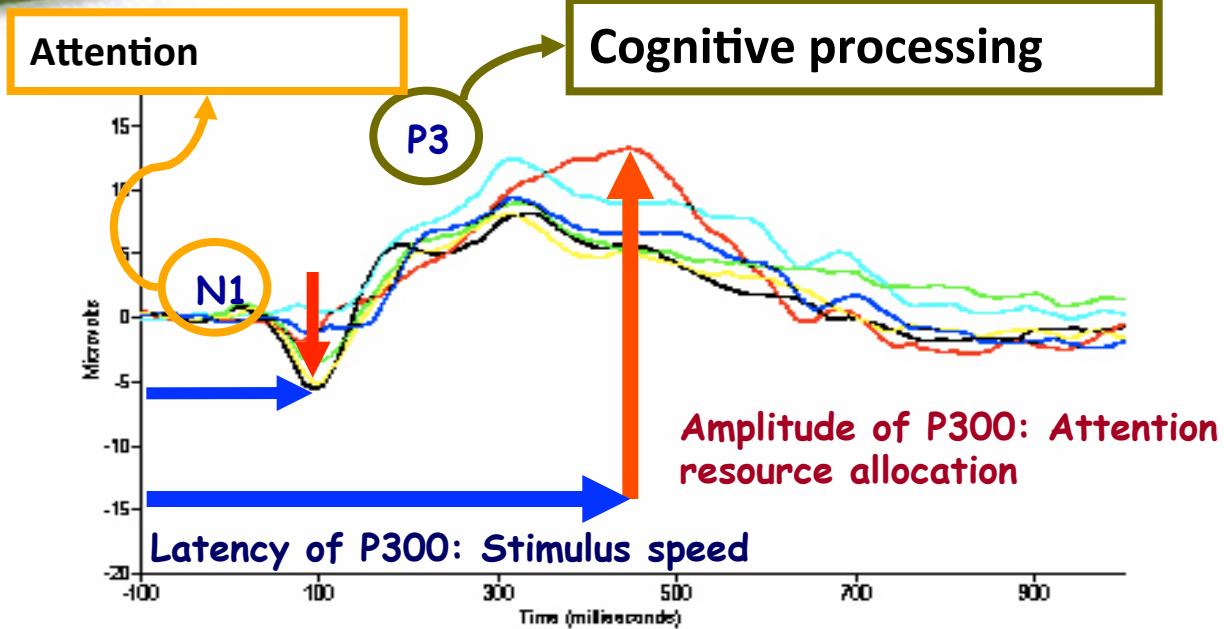
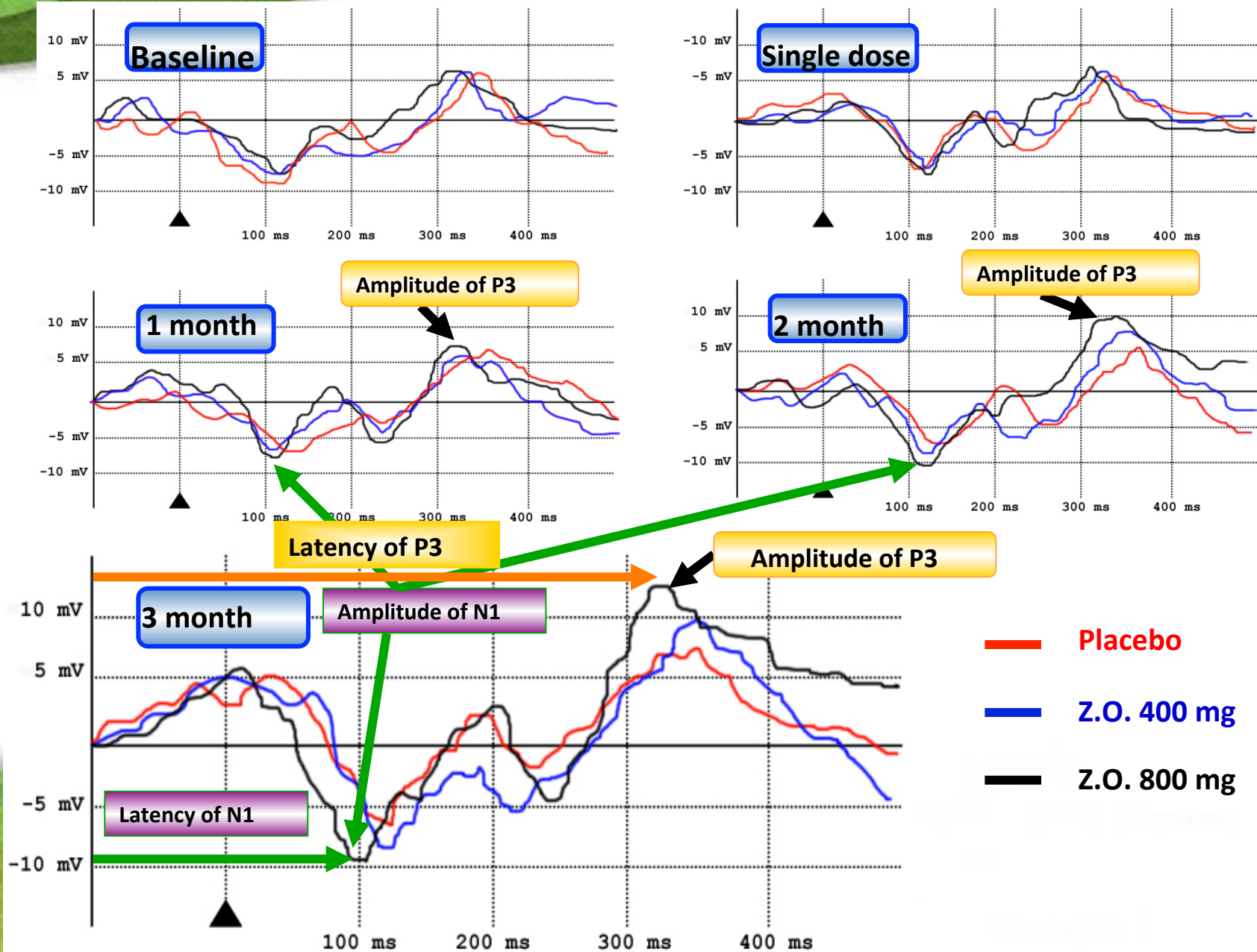


Table 3 Effect of ZO on cognitive AERPs in healthy middle-age and elderly





GINGER

↑
Attention

↑
N1 amplitude
↓
N1 latency

CDR

Encoding
information

**Sensory
memory**

**Short
term
memory**

**Long
term
memory**

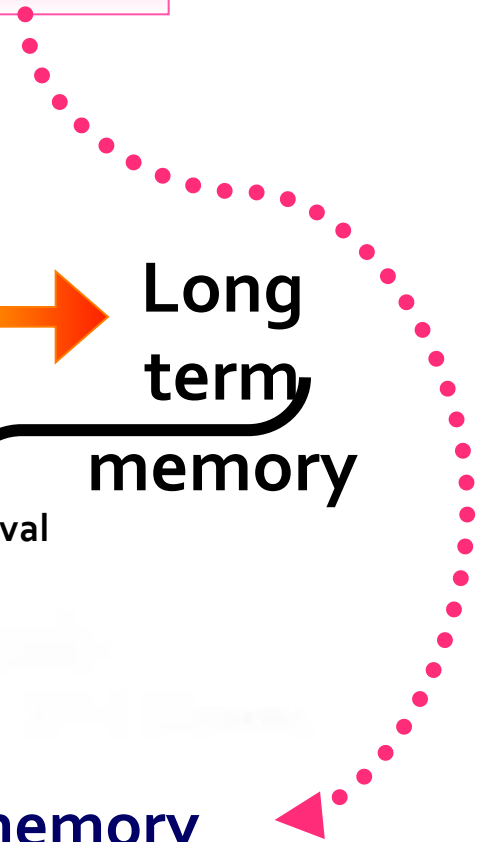
↑ **P3 amplitude**
↓ **P3 latency**

Retrieval

Working memory



Stimulus





พิธีลงนามความร่วมมือทางวิชาการ
วันที่ 16 มิถุนายน 2553 เวลา 15.00-16.00 น.
ห้องประชุม

ศ. เกียรติคุณ ดร.ทมนต์ สดงไชย
อธิการบดี มหาวิทยาลัยขอนแก่น

คุณยุวดี บุญครอง
ประธานกรรมการ บริษัท ไทย ไปรษณีย์ จำกัด

Acknowledgement



- Ms. Wipawee Thukhum-mee
 - Dr.Chureeratna Bunchonglikitkul Muchimapura
 - Assoc.Dr.Bungorn Sripanidkulcha
 - Dr.Jinatta Jittiwat
- Assist.Dr.Terdthai Tong-un
 - Assist.Dr.Supaporn
 - Dr.Narisara Saenghong
 - All students & staffs of ICAM R&D

Thank you



for your attention



Faculty of Medicine