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# The Herbal Porridge Containing the Combined Extract of Mulberry and Vietnamese Coriander Enhances Cognitive Functions and Bone Formation of the Menopausal Women

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## Abstract

**Introduction and Objective:** At present, the novel cheap and effective intervention against menopause related symptoms such as memory impairment and osteoporosis are still required due to the increased breast cancer risk induced by hormone replacement therapy. Based on the role of oxidative stress on cognitive deficit and osteoporosis in menopause and the synergistic effect of herbs in traditional folklore, the cognitive and bone formation

enhancing effect of the functional food containing the combined extract of herbs possessing antioxidant effect has gained attention. Therefore, we aimed to determine the effect of the herbal porridge containing the combined extract of mulberry and Vietnamese coriander (MP) on cognitive function and bone formation of menopausal women.

**Materials and Methods:** Forty-five participants were randomly assigned to receive a placebo or MP (50, 1500 mg) treat-

ments once daily for 8 weeks. The cognitive function and working memory were assessed via the auditory oddball paradigm of event-related potentials and computerized battery tests respectively at baseline, 1 month, 2 month, and delay 1 month of study period. At baseline and 2 month after treatments with MP, subjects were determined the serum acetylcholinesterase (AChE), monoamine oxidase (MAO) activities and bone formation markers comprising of osteocalcin, alkaline phosphatase (ALP) and calcium.

**Results:** It was found that subjects who consumed MP at dose of 1500 mg per day showed the significant reduction of N100 and P300 latency and the increase of N100 and P300 amplitudes. The enhanced working memory was also observed in this group. In addition subjects who consumed MP at dose of 1500 mg per day showed the significant decrease of serum AChE and MAO activities and improved bone formation markers comprising of osteocalcin and alkaline phosphatase (ALP). Therefore, this study is the first study to demonstrate that the MP can improve cognitive function, working memory and bone formation in menopausal women.

**Conclusion:** The cognitive enhancement of MP may occur partly via the decreased acetylcholinesterase (AChE) and monoamine oxidase (MAO) activities. In addition, MP also increased osteocalcin and alkaline phosphatase (ALP). Therefore, the MP is the potential food supplement to prevent impairment of cognitive function and bone disorders in menopause women. However, further researches are essentially required to provide the precise understanding about the detail mechanism.

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**Key words:** mulberry, Vietnamese coriander, menopause, cognitive function, working memory, bone formation

# Asiatic Acid Prevents Memory Deficits and Cell Survival in Rat Hippocampal Dentate Gyrus Caused by 5-Fluorouracil Chemotherapy

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## Abstract

5-fluorouracil (5-FU), a chemotherapy drug, has been reported to cause cognitive impairments in cancer patients. 5-FU also reduces cell proliferation and survival in the brain. Asiatic acid (AA) is a triterpene compound found in *Centella asiatica* which has many pharmacological activities. A previous study has shown that subchronic and chronic administration of AA can increase cell proliferation in the subgranular zone (SGZ) of the hippocampus and promotes memory. The aim of this study was to investigate the preventive effects of AA on spatial memory deficits and cell survival induced by 5-FU in a rat model.

Male Sprague Dawley rats (180-220 g) received 5-FU 5 i.v. injections (25 mg/kg) on day 8, 11, 14, 17 and 20. Some rats were co-administered with AA (30 mg/kg, by oral gavage) 20 days before (preventative), after (recovery) receiving 5-FU or both time periods (throughout). Spatial memory was determined using the novel object location (NOL) test and hippocampal cell survival was quantified using BrdU staining. Rats in the 5-FU and 5-FU+AA (recovery) groups showed memory deficits in the NOL test and a reduction of cell survival in the SGZ of the hippocampal dentate gyrus but did not show in control, AA or co-administration both preventative and throughout groups.

The results demonstrated that 5-FU chemotherapy impaired memory and reduced cell survival. However, these impairments in the animals receiving 5-FU chemotherapy could be prevented by simultaneous administration of AA.

**Keyword:** Asiatic acid, 5-fluorouracil, Spatial memory, hippocampal cell survival

# A Combined Extract of Ginger and Purple Rice on Neuroprotective Effect Following Cerebral Ischemia in Rat

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**Introduction and objective:** Ischemic stroke, disorder regarded as a leading cause of death and disability has been recognized as one of the important health problems worldwide including in Thailand. Nowadays, the successful treatment of acute ischemic stroke is still limited. Many medicinal plants that have neuroprotective effect and antioxidant effects have been reported their benefit in stroke condition. Therefore, this study was set up to determine the neuroprotective effect of a combined extract of ginger and purple rice on cerebral ischemia in rat, in order to find the novel nutraceutical supplement for stroke.

**Methods:** Adult male Wistar rats (250-300 g) used in this study were divided into 3 major groups as followed; group I for determination the infarction volume, group II for determination the possible underlying mechanisms, and group III for determination the functional recovery after ischemic stroke induction. Each main group was divided in various subgroups as followed: vehicle, vehicle plus sham operation, vehicle plus MCAO, a combined extract of ginger and purple rice (doses 1, 10 and 100 mg/kg BW) plus MCAO, vitamin C 250 mg/kg BW plus MCAO, piracetam 250 mg/kg BW plus MCAO, and donepezil 1 mg/kg BW plus MCAO. For determination the

infarction volume and possible underlying mechanisms, rats were orally administered with assigned substances once daily at a period of 14 days. After treatment period, sham or MCAO operation was performed, then, 24 hours later, rats were sacrificed and determined infarction volume, level of malondialdehyde (MDA), and the activities of scavenging enzymes including SOD, GSH-PX and CAT. For determination the functional recovery after MCAO, rats were orally given with substances once daily at a period of 14 days. After sham or MCAO operation, rats were continually feed with assigned substances throughout the 21-day experimental period. Motor, sensory and cognitive functions were determined every 7 days after MCAO for 3 weeks.

**Result:** MCAO rats received a combined extract of ginger and purple rice at doses 1 and 100 mg/kg BW showed the decrease of infarction volume both in cortex and subcortex. Base on the important role of oxidative damage on ischemic stroke pathophysiology, the level of MDA and the activities of scavenging enzymes were also determined in cortex, striatum and hippocampus. MCAO rats received a combined extract of ginger and purple

rice alleviates the increase of MDA level. Moreover, the activities of scavenging enzymes including SOD, GSH-PX and CAT significantly increased especially in hippocampus. In addition, rats received a combined extract of ginger and purple rice improved the sensory, motor, sensorimotor coordination and cognitive function after MCAO induction. Interestingly, a combined extract of ginger and purple rice mitigated the reduction of the survival neuron density in CA1, CA3 and dentate gyrus.

**Discussion and conclusion:** A combined extract of ginger and purple rice at a ratio of 1:1 W/W demonstrated the neuroprotective effects in MCAO animal model. Furthermore, this combined extract improved sensory, motor and cognitive function in MCAO rats. The possible underlying mechanism of the neuroprotective effects might be partly via prevention of the oxidative stress damage. Thus this combined extract of ginger and purple rice has a potential to develop as the novel nutraceutical supplement for stroke. However, acute toxicity and other possible underlying mechanisms for example anti-inflammation are still essential.

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**Key words:** Ischemic stroke, cerebral ischemia, ginger, *Zingiber officinale*, purple rice, *Oryza sativa*, neuroprotection

# Alternative Treatment in Epileptic Clinic at a Tertiary Hospital

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## Abstract

**Introduction:** Epilepsy is a common neurology disease which affects quality of life of patients on physical, mental and social. We have found the increasing of alternative treatments which have been used in epileptic patients from a Tertiary Hospital and many patients have to spend a lot of money for the treatments.

**Objective:** To discover the alternative treatments have been used in patients and to know the kind of alternative treatment, causes, sources and expenses of alternative treatments from the patients.

**Method:** Qualitative descriptive study by using in-depth interviews.

**Results:** 30 patients with average age 46.92±17.07 years old, 60 % were females. The most frequency type of seizure was Generalized tonic-clonic; 50 %, average frequency of seizure was 1.71 times/month. We found that 56.70 % of patients used alternative treatments more than 1 way and 33.30 % of patients still use alternative treatment currently. Alternative treatments which patients used the most were dietary supplement products 20 persons, secondly, herbs and herb products 17 persons, rituals and magic 16 persons. Reasons of using are relating to mental mind 19 persons, physical reasons 10 persons, and beliefs 6 persons. Sources of alternative treatments, 24 persons were recommended by friends

or neighbors, 24 persons were recommended by family members or relatives, and 3 persons were sought by patients themselves. On the average, patient spent 1,346.50±3,214.80 Baht/person/month for an alternative treatment.

**Conclusion:** Most of patients used more than 1 item of alternative treatments. Common reasons were psychological effects. Patients use them without knowing

about there's evidence on efficacy and safety. When health care team recognized causes and understand reasons, we could be counsel patient effectiveness to prevent antiepileptic drug-herb or antiepileptic drug-food supplement interaction and educate patients about the importance of anti-epilepsy drug use.

**Key word:** Alternative treatment, Epilepsy

# The Effect of the Novel Supplement Containing *H.diversicolor* and *M.oleifera* Leaves Extract Improves Behavioral Disorders, Oxidative Stress Status and Neurodegeneration in Hippocampus VPA-rat Model of Autism

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## Abstract

**Introduction and objective:** At present, the effective strategy to improve autism is still required. Based on the crucial role of oxidative stress on the pathogenesis of autism together with the antioxidant and neuroprotection effects of *H.diversicolor* and *M.oleifera* leaves, we aimed to determine the effect of the novel food supplement containing *H.diversicolor* extract and protein hydrolysis of *M.oleifera* leave (KP) on autism-liked behaviors in VPA-rat model of autism. Oxidative stress

and neurodegeneration in hippocampus were also investigated.

**Materials and methods:** VPA rat model of autism were orally given KP at doses of 10, 50 and 250 mg.kg<sup>-1</sup> between PND14-PND40. All rats were subjected to behavioral testing including negative geotaxis, mid air righting, hot plate, rotarod, open-field, elevated plus-maze, Morris water maze and social behavior tests. At the end of study, MDA level and the activities of SOD, CAT and GSH-Px together with the alteration of neuron density in the hippocampus area were also evaluated.

**Results:** All doses of KP significantly improved autistic-like behaviors and decreased MDA level while low and medium dose increased GSH-Px activity. However, only medium dose increased CAT activity in hippocampus. In addition, the increased neuron density in hippocampus was also observed in VPA rats treated with low and medium doses of the KP.

**Conclusion:** KP, the novel food supplement mitigates autistic-like symptoms. The possible underlying mechanism might occur partly via the decreased oxidative stress and the enhanced neuron density in hippocampus. Further researches are necessary to understand the precise underlying mechanism.

**Key words:** Autism, *H.diversicolor*, *M.oleifera*, oxidative stress, neurodegeneration

# Efficacy of Perampanel in Intractable Seizures

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**Objective :** Perampanel (PER) was licensed in Thailand for the adjunctive treatment of focal seizures with or without secondary generalization in adults and children over 12 years of age. This study to determine outcomes with adjunctive PER in patients with focal-onset seizures with or without secondary generalization.

**Method :** Patients with focal-onset seizures with or without secondary generalization who had frequency of seizures and treated with at least 2 antiepileptic drugs. PER was added aiming at a target range of 6-12mg/daily. Seizure count was evaluated every 6-8 weeks. Response rate were classified into 4 groups; seizure freedom for  $\geq 6$  months on a given PER dose, seizure reduction  $\geq 75\%$

(responder), seizure reduction 50-75, and seizure reduction  $< 50\%$ .

**Result :** There were 31 patients (9 males, 22 females), median age (q1-q3) were 30(25-36 years), mean (q1-q3) duration of disease 15(11-19 years). Previous antiepileptic drugs were levetiracetam (6), lamotrigine (12), phenytoin (12), carbamazepine (13), valproate (21), topiramate (4), phenobarbital (13). Seizure free 7 cases, seizure reduction  $> 75\%$ , 50-75%, and  $< 50\%$  were 7,7,4, respectively. Adverse events of PER were reported in 6 patients.

**Conclusion:** This study showed efficacy and safety of PER in patient with intractable seizures.

# Incidence of Seizure-Related Injuries: Traffic Accident, Falling and Drowning in Hospitalized Epileptic Patients in Thailand

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## Abstract

**Introduction:** People with epilepsy (PWE) are high risk of accidents and injuries more than healthy people. There has been no national data study on the traffic accident, falling and drowning in hospitalized epileptic patients in Thailand.

**Objectives:** To determine the incidence of traffic accident, falling and drowning of PWE in Thailand

**Methodology:** We retrospectively explored national data in Thailand for reimbursement of seizure-related injuries (SRI) focus on traffic accident ICD 10 (V20-V99), falling ICD 10 (W00-W19) and drowning ICD 10 (W65-W74) of epilepsy

patients age of 18 or over who admitted in the fiscal year 2004-2012. PWE were diagnosed and searched based on ICD 10 (G40) from the national database with Universal Health Coverage Insurance office.

**Results:** There were 86,531 PWEs in this study; most were males 57,653 cases (66.63%). PWE had traffic accident 312 cases (0.36%). The most of motor vehicle crashes traffic accidents were motorcycles 283 cases (0.32%), followed by cars 15 cases (0.02 %) pick up 11 case (0.01 %), bus 2 cases (0.002%) and truck 1 case (0.001%) respectively. Seizure -related fall were 3,265 cases (3.75%) and drowning were 42 cases (0.05%). At discharge, 90.75% of patients were improved, while 7.31% were not

improved, and in-hospital mortality rate was 1.94%.

**Conclusion:** This finding supports the public policy for consider issue legal driving license for PWE in Thailand. In addition, seizure-related falls especially fall from working on height or construction worker must be considered.

**Keywords:** Seizure-related injuries, Traffic accident, Falling, Drowning, Epilepsy

# Status Epilepticus in the Elderly Patients: A National Data Study in Thailand

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## Abstract

**Introduction:** There are limited data in term of incidence, characterize the demographics, comorbidity, outcome and prognostic factor and in-hospitalized mortality of status epilepticus (SE) in the elderly patients in Thailand.

**Materials and Methods:** We retrospectively explored national data in Thailand for reimbursement of all SE in elderly patients admitted in the fiscal year 2004-2012. SE in elderly patients (age  $\geq$  60 years) were diagnosed and searched based on ICD 10 (G41) from the national database with Universal Health Coverage Insurance.

**Results:** There were 3,326 SE in elderly patients. The national incidence of SE was lowest at 1.83 patients/100,000/year in 2004 and highest at 8.78 patients/100,000 /year in 2012

The average age was 72.02 years and most were males (1,379 patients; 58.8%). At discharge, 66% of patients were improved, while 18.94% were not improved, and in-hospital mortality rate was 14.5%. The first three common co-morbid conditions were hypertension (1,072 patients; 32.2%), diabetes mellitus (543 patients; 16.3%), and previous stroke (423 patients; 12.7%). The common complications were respiratory failure (1,556

patients; 46.8%), pneumonia (569 patients; 17.1%) and septicemia (387 patients; 11.6%). The mean (SD) hospital stay was 7.74 (16.36) days. Predictor of poor outcome were older age > 80 years (odd ratio (OR)= 1.67, 95%CI 1.33-2.10), female (OR= 1.53, 95%CI 1.29-1.80) and hospital level; secondary care (OR=0.30, 95%CI 0.24-0.39) and tertiary care (OR=0.23, 95%CI 0.18-0.29)

Out of 11 co-morbid conditions, three of them including chronic renal failure previous stroke and CNS infection were significantly associated with poor outcomes. Additionally, complications

including respiratory failure, pneumonia, septicemia, shock and procedure intervention by cardiopulmonary resuscitation and retained foley's catheter were significant factors of poor outcomes.

**Conclusions:** SE in elderly patients in Thailand were increasing annually. Factors associated with poor outcome in admitted elderly SE patients were age, gender, hospital level, co-morbid conditions, complications of SE, and procedural interventions by the national data.

**Keywords:** Incidence, Status Epilepticus, Elderly, Outcomes, National

# Traffic Accident in Person with Epilepsy

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## Abstract

**Objectives:** People with epilepsy (PWE) are high risk of traffic accidents. There has been no national study in PWE who had injury on road traffic accident and were admitted in hospital.

To determine the incidence of traffic accident of PWE in Thailand.

**Methodology:** We retrospectively explored national data in Thailand for reimbursement of traffic accident ICD 10 (V20-V99), patient age of 15 or over who admitted in the fiscal year 2010. We search comorbidity of all patients who were diagnosed traffic accident.

**Results:** There were 126, 730 admissions, most of traffic accident was motor-cycle accident (114, 640; 90.64%), followed by car occupant injured (5049;

3.98%), and occupant of pick-up truck or van injured (4559; 3.60%). Alcoholic dependence was the most common comorbidity (3,484 patients), followed by diabetes (1933 patients), cardiovascular diseases (470 patients), epilepsy (430 patients), and psychiatric problem (270 patients).

**Conclusion :** Epilepsy was a common comorbidity in person who had a traffic accident.

**Keywords:** Comorbidity, Traffic accident, Epilepsy

# The Mitigation Effect of *Nelumbo nucifera* Leaves on Metabolic Syndrome in Animal Model of Metabolic Syndrome Induced by High Fat Diet

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## Abstract

**Introduction and Objective:** Metabolic syndrome is the important devastating cause of economic. Therefore, the strategy to prevent and attenuate this condition is essential. Based on the information that phenolic compound and alkaloid could attenuate many metabolic syndrome related disorders, we aimed to determine the mitigation effect of *Nelumbo nucifera* leaves extract on metabolic syndrome

**Materials and Methods:** Female Wistar rats were induced metabolic syndrome by high fat diet and these rats were orally given

the *Nelumbo nucifera* leaves extract at doses of 1, 10 and 100 mg.kg<sup>-1</sup> BW for 4 weeks. Then, they were determined the body weight, fat deposition and the alteration of adipocyte, the level of cholesterol, triglyceride, LDL-C and HDL-C

**Results:** The results showed that *Nelumbo nucifera* leaves extract at all dosage range used in this study significantly decreased body weight and the size of adipocytes in subcutaneous and mesenteric areas. However, only *Nelumbo nucifera* leaves extract at dose of 1 mg.kg<sup>-1</sup> BW significantly decreased the size of adipocytes

in retroperitoneum and urogenital areas. Moreover *Nelumbo nucifera* leaves extract at all dosage decreased the level of cholesterol and triglyceride. Taken all data together, the mechanism to attenuate metabolic syndrome might be associated with the decreased size of adipocyte and decreased the level of cholesterol and triglyceride.

**Conclusion:** The *Nelumbo nucifera* leaves extract shows the high potential to mitigate symptoms of metabolic syndrome.

However, further studies concerning the precise mechanism and about the detail mechanism.

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**Key words:** *Nelumbo nucifera*, Metabolic syndrome, lipid profile

# Pharmacist's Role Regarding Management of Drug Related Problems in Epilepsy Clinic, Tertiary Care Hospital in Thailand

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**Purpose:** To study the pharmacist's roles regarding management of drug-related problems in epilepsy clinic, Srinagarind Hospital.

**Methods:** The study is retrospective descriptive study focusing on drug-related problems and management of drug related problems by pharmacists. The data collection was based on Pharmaceutical Care Program and medical record from January 1, 2009 to December 31, 2013, the period when pharmacists took part in pharmaceutical care. Inclusion epileptic patients aged 15 years old or older who were treated at the epilepsy clinic, Srinagarind Hospital for at least 2 visits.

**Results:** Drug-related problems (DRPs) were 2,630 problems of 6,954 visits in total. Most DRP was adverse drug reactions 1,377 problems (52.36%) followed by non-compliance 1,057 problems (40.19%), medication error 111 problems (4.22%) and other DRPs 85 problems (3.23%), respectively. In accordance with pharmacist's roles on DRPs management, pharmacists had managed by providing intervention 2,514 interventions. Most pharmacist's role taken in the epilepsy clinic was inform DRPs to the patients for comprehension (33.53%), followed by improve compliance (27.92%) and life style modification (22.16%), respectively. The outcomes of DRP management which could be evaluated

were resolved 44.49%, improved 22.22% and the remains were same level of DRP's severity such as adverse drug related were same level.

**Conclusion:** The pharmacists in Epilepsy clinic could be identified DRPs and managed DRPs effectiveness so

pharmacists should be play the role in epilepsy clinic to improve patient's care with multidisciplinary team.

**Key words:** Epilepsy, Antiepileptic drugs, Drug related problem, Pharmaceutical care

# The Sedative Effect of Mulberry (*Morus alba* L.) Extract to Protect Against Neuropsychological Disorders

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## Abstract

**Introduction and objectives:** The prevalence of neuropsychological disorders including insomnia is continually increasing. Based on the crucial roles of oxidative stress, disturbances of neurotransmitters homeostasis and inflammation on the pathophysiology of neuropsychological disorders, this study aimed to investigate antioxidant, anti-inflammation and the suppression effects of mulberry extract on AChE, MAO and GABA-T and to determine sedative effect after single dose of mulberry extract in mice model.

**Materials and methods:** Ripen mulberry fruits were collected from Udon

Thani province, Thailand. They were prepared as 50% hydro-alcoholic extracts by maceration technique. Phenolics and flavonoids contents were assessed using Folin-Ciocalteu and Aluminum chloride methods. The extract were tested for antioxidant activity via DPPH, FRAP and ABTS assays whereas the anti-inflammation activity was tested via the COX-2 inhibitory effect. The suppression effects of extract on AChE, MAO and GABA-T was used as indices for the neurotransmitters balance. Ten-week-old female mice, weighting 25-35g, were orally given the 50% hydro-alcoholic extracts of mulberry fruit at doses of 2, 10 and 50 mg/kg BW. After

single dose, sedative effect was assessed via pentobarbital potentiation test.

**Results:** The total phenolics contents were  $767.18 \pm 0.02$  mg GAE/mg extract whereas flavonoids contents were  $88.89 \pm 0.13$  mg Quercetin/mg extract. The mulberry extract showed the antioxidant activity and suppression activity on AChE, MAO, GABA-T and COX-2. All doses of 50% hydro-alcoholic extracts of mulberry fruit decreased sleep onset but only the low dose of the extract showed the increased sleep time latency.

**Conclusion:** The current results suggest that the 50% hydro-alcoholic extract of mulberry fruit showed the

potential to protect against insomnia. However, further researches concerning the precise underlying mechanism and possible active ingredient are necessary.

**Key words:** Mulberry, *Morus alba* L., neuropsychological disorders, anti-insomnia

**Acknowledgement:** This study was supported by Integrative Complementary Alternative Medicine Research and Development Center, Khon Kaen University, Khon Kaen, Thailand and Thailand Research Fund via RRI project.

# Anti-hyperalgesic Effect of Bilateral ST36 Laser Acupuncture (810 nm) After Repeated Injection of Acidic Saline pH 4.0 in Rat Model

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## Abstract

### Introduction and objective:

Hyperalgesia is one of the abnormal pain sensations which normally occur in muscular-fascial condition such as Myofascial pain syndrome and Fibromyalgia syndrome. The precise mechanism found that it involve the neuro-inflammation both peripheral and central sensitization. Moreover, a hyperalgesia is the common important problem that involves Quality of Life (QoL) and decrease the quality of work. Recently found that ST36 laser acupuncture has

been prove to inhibit acute inflammation in carrageenan induced paw edema model. So, this study set the aim to evaluate the anti-hyperalgesic effect of bilateral ST36 laser acupuncture in hyperalgesic rat model.

**Materials and methods:** 20 female hyperalgesic Wistar rats were randomized and control estrous cycle phase into 4 groups (n/gr=5). Hyperalgesic model of rats were induced by 100 ul repeated injection of acidic saline pH 4.0 at Left lateral gastrocnemius muscle at day 1<sup>st</sup> and five day later after 1<sup>st</sup> injection. The rats that

developed hyperalgesia were selected as the experimental animals using the bilateral mechanical hyperalgesia as the criteria. In detail, 1) Control group is hyperalgesic rats that received no treatment 2) Sham group is hyperalgesic rats that received bilateral 810 nm. laser acupuncture at sham acupoint group for 20s 3) ST36 treated group is hyperalgesic rats treated with bilateral 810 nm. laser acupuncture at ST36 for 20s and 4) Negative control group is hyperalgesic rats treated with 810 nm. laser acupuncture at bilateral ST36 treated group for 20s (Laser off switch). All rats were evaluated mechanical and thermal hyperalgesia via von Frey filaments and hot plate test respectively at baseline, 1<sup>st</sup>, 7<sup>th</sup>, 14<sup>th</sup>, 21<sup>st</sup> and 28<sup>th</sup> day of treatments. All data were analyzed via ANOVA followed by post hoc LSD test. P-value less than 0.05 were regarded as significance.

**Results:** Both short and long term effects of 810 nm bilateral Laser acupuncture at ST36 showed no significant changes of

mechanical and thermal hyperalgesia when compared with control group.

**Discussions:** The effects of bilateral ST36 laser acupuncture in hyperalgesic rats revealed no significant changes of mechanical and thermal hyperalgesia. Therefore, further study may be observed in two or more laser acupoint or prolong the duration of treatment or increase the frequency or intensity of treatment.

**Acknowledgement:** This study was supported by Graduate school of faculty of Medicine, Khon Kaen University and Integrative Complimentary Alternative Medicine (ICAM) Research and Development Center, Khon Kaen University, Khon Kaen, Thailand. Moreover, laser tools and equipment were provided from Dr. Michael Weber who is the president of the International society for Medical Laser applications in Germany.

**Key words:** Hyperalgesia, effects of laser acupuncture, ST36

# Positive Modulation of the Combined Extract of Purple Waxy Corn and Ginger on Kidney Damage, Oxidative Stress and Aldose Reductase in Diabetic Rat Model

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## Abstract

### General description/Objectives:

Based on the crucial roles of oxidative stress and aldose reductase (AR) in diabetic nephropathy, the nephroprotective effect of the combined extract of purple waxy corn and ginger (PWCG), a supplement possessing antioxidant and AR suppression activities, was considered. In this study, we aimed to determine the effect of PWCG on renal histological changes, oxidative stress status and aldose reductase in kidney of streptozotocin (STZ) induced diabetic rat.

**Materials and methods:** Male Wistar rats, weighing 200-250 g, were induced diabetic condition via the single injection of STZ (55 mg/kg.BW<sup>-1</sup>). Diabetic rats with the blood glucose levels >250 mg.dL<sup>-1</sup> were orally given PWCG at doses of 50, 100 and 200 mg/kg.BW<sup>-1</sup> for 10 weeks. At the end of study, renal histopathology (Bowman's capsule area, Glomerulus tuft area and Bowman's space area), malondialdehyde (MDA) level and the activities of catalase (CAT), glutathione peroxidase (GPx) and aldose reductase (AR) enzymes in kidney were determined.

**Results:** It was found that all doses of PWCG used in this study decreased MDA level. The elevated CAT and GPx activities were also observed at high dose treatment. PWCG treated rats also mitigated the degeneration in both glomerular and proximal convoluted tubule and the increased Bowman's space area. Therefore, PWCG showed the nephroprotective in diabetic rats. The possible mechanisms might partly involve the decreased oxidative stress status and increased scavenging enzymes.

**Conclusion:** The PWCG is the potential nephroprotective agent in diabetic condition. However, further researches concerning the renal function and clinical trial are essentially required.

**Acknowledgement:** This study was supported by the Higher Education Research Promotion and National Research University Project of Thailand, Office of the Higher Education Commission, through the Food and Functional Food Research Cluster of Khon Kaen University and Integrative Complimentary Alternative Medicine (ICAM) Research and Development Center, Khon Kaen University, Khon Kaen, Thailand. The great thank was also extended to Assoc.Prof.Kamol Lertrat and Assist Prof.Bhalang Suriarn for providing purple corn.

**Key words:** Diabetic nephropathy, Purple waxy corn, Ginger, Oxidative Stress

# Comorbidity in Adults with Epilepsy; A National Study in Thailand

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## Abstract

**Purpose:** To study co-morbidities of adults with epilepsy in Thailand.

**Materials and methods:** A retrospectively study explored the national data in Thailand for reimbursement of co-morbidities of epilepsy patients age of 15 or over who admitted in the fiscal year 2004-2012. People with epilepsy (PWE) were diagnosed and searched based on ICD 10 (G40) from the national database with Universal Health Coverage Insurance office.

**Result:** There were 139,867 patients. Most were males (92,972 patients; 66.5%). The top five most common co-morbidity

of PWE were hypertensive disease (10%), diabetes mellitus (4.6%), head injury (2.8%), stroke (2.3%) and psychosis (1.9%). Co-morbidities affecting poor outcomes of adults with epilepsy were diabetes mellitus, chronic renal failure, cirrhosis, psychosis, stroke, CNS infection, schizophrenia ( $p < 0.001$ ), alcoholic ( $p = 0.001$ ) and brain tumor ( $p = 0.004$ )

**Conclusion:** Hypertensive disease is the major co-morbidity of PWE in Thailand. In addition, comorbidity associate with poor outcome.

**Key words:** co-morbidity, epilepsy, Thailand

# The Cost Analysis of Electroencephalography in a University Hospital

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## Abstract

**Purpose:** The aims of this study were to determine the cost analysis of routine electroencephalography (EEG) in Srinagarind Hospital, Thailand.

**Method:** This was a retrospective study to analysis the cost analysis of all patients underwent scalp routine EEG. The study period was between January 1, 2014 to December 31, 2014. Collected data from electronic database of the hospital. Descriptive statistics were used to analyze data.

**Results:** During the study period, we performed routine EEG for 644 studies per year, average 2.8 case/day (only official day). Most were performed at EEG room for 395

studies. The service charge of performed EEG at EEG room for 49.63 USD /time while performed EEG at ward or out- site hospital for 68.93 USD/time. The annual costs- of performed EEG at EEG room, at ward and at out- site hospital account for 60.53, 60.77 and 67.88 USD/case respectively, differences cost ; -10.9, 8.16 and 1.05 USD/case respectively. Overall, we loss of 2,435 USD/year, that including employ, supply, equipment decline, building decline and public utility.

**Conclusion:** The information indicated that routine EEG in university hospital currently loss of income.

**Key words:** cost analysis, electroencephalography, university hospital

# Potential of *Oryza sativa* L. (purple color) and *Anethum graveolens* Linn. to Protect Against Metabolic Syndrome and Cerebral Ischemia in Vitro

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## Abstract

### General description/Objectives:

Metabolic syndrome and ischemic stroke are chronic diseases that can greatly impair the quality of life of patients, families and caregivers. Despite the increasing their importance, the effective pharmacological agents which can effectively treated metabolic syndrome with cerebral ischemia are required. Therefore, the potential benefits of *Oryza sativa* L. (purple color) and *Anethum graveolens* Linn., the plants riches in substance possessing anti-oxidant anti-inflammation, anti-diabetic, anti-hypertension, anti-obesity

and cognitive enhancing activities to mitigate the metabolic syndrome and cerebral ischemia have been considered.

**Materials and method:** *Oryza sativa* L. (variation of purple color) and *Anethum graveolens* Linn. were collected from Khon Kean province, Thailand. They were prepared as aqueous and 95% hydro-alcoholic extracts by maceration technique. The extract of *Oryza sativa* L. and *Anethum graveolens* Linn. were combined and vary ratio for potential to protect against metabolic syndrome and cerebral ischemia related biological activities including antioxidant via FRAP and DPPH, anti-inflammation via

COX2 inhibition, anti-diabetic via alpha amylase, alpha glucosidase and aldose reductase inhibition, anti-hypertension via angiotensin converting enzyme inhibition, anti-obesity via pancreatic lipase enzyme inhibition and cognitive enhancing effect were determined.

**Results:** A ratio of the hydro-alcoholic extract of *Oryza sativa* L. (variation of purple color) and *Anethum graveolens* Linn. which provided the highest potential was 1:6. The results showed that IC50 value of DPPH was 1.86 µg/ml, IC50 value of COX2 was 79.00 µg/ml, IC50 value of alpha glucosidase was 10.03 µg/ml and IC50 value of aldose reductase was < 1 µg/ml, IC50 value of

angiotensin converting enzyme was 12.68 µg/ml.

**Conclusion:** The current results suggest that the OA showed the highest potential to protect against metabolic syndrome and cerebral ischemia.

**Acknowledgement:** This study was supported by Integrative Complementary Alternative Medicine Research and Development Center and Targeted Research, Faculty of Medicine, Khon Kaen University, Khon Keen, Thailand.

**Key words:** *Oryza sativa* L. (variation of purple color), *Anethum graveolens* Linn., metabolic syndrome, cerebral ischemia

# Comparisons of Oral Health Status and Oral Impacts on Daily Performances in Stroke Patient and Non Stroke Control

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## Abstract

**Objective:** This study was carried out to compare ischemic stroke cases and controls on oral health status and oral health-related quality of life (OHRQoL).

**Methods:** A 1:2 matched case-control study was conducted on a total of 288 subjects.

Ninety six acute ischemic stroke cases were individuals aged 45 years or older who were first hospitalized at the stroke unit of Srinagarind Hospital, Khon Kaen. There were 2 groups of controls, the first group consisted of community-dwelling people and the second group was hospital controls with nonvascular and noninflammatory neurological diseases

with age- and sex-matched to cases. Each individual was interviewed using the Oral Impact on Daily Performance (OIDP) index to assess the OHRQoL. A calibrated dentist recorded oral health status right after stroke attack. The differences in oral health status, OIDP score and their subscales between cases and controls were explored through Paired-Samples T Test analysis. The differences in the prevalence of OIDP impacts were determined using McNemar Test.

**Results:** The mean number of remaining teeth was fewer in stroke patient (12.4 teeth) compared to non stroke control (16.5 teeth). The prevalence of high caries risk in stroke patient with DMFT >

10 was higher (82.3%) compared to non stroke control (62%), with mean of DMFT score was 19.2 in stroke patient and 15.9 in non stroke control (P value < 0.001). The presence of Clinical attachment loss (CAL) 6 mm was higher in patients (84.4%) compared to controls (69.3%). Percentage of site with CAL  $\geq$  5 mm with severe periodontitis was higher in patients (55.2%) compared to controls (22.5%) (P value < 0.001). There was statistically significant difference in overall OIDP impact scores

(12.1 in cases and 6.8 in controls) and the mean OIDP impact scores for Eating (9.7 in cases and 5.6 in controls), Cleaning (3.4 in cases and 1.4 in controls), Sleeping (5.9 in cases and 3.2 in controls) and Emotion (4.3 in cases and 2.2 in controls) between stroke cases and controls.

**Conclusions:** The oral health status and oral health-related quality of life as assessed by the impacts on performance of daily activities in stroke cases is lower than those in controls.

# Trends of Intravenous Antiepileptic Drugs Used in Patients with Epilepsy at a University Hospital, Thailand

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## Abstract

**Purpose:** To study the trends and costs of intravenous anti-epileptic drugs (AEDs) use in the past 9 years.

**Method:** This study was a descriptive study and conducted at Srinagarind Hospital, Khon Kaen University, Thailand. The study period was between January 1, 2005 and November 30, 2014. Data of intravenous AEDs use were retrospectively retrieved from the electronic database of the hospital. Descriptive statistics were used to analyze data.

**Results:** There were 6,385 patients who received intravenous AEDs during the study period. Of those, 3,421 patients

(53.6%) were male, 1,397 patients (21.9%) had age under 15 years, and 3,812 patients (59.7%) had universal coverage health insurance. Levetiracetam was firstly available in 2010. The proportions of levetiracetam use compared with other intravenous AEDs were increasing from 2010-2014 (2.7% in 2010, 5.6% in 2011, 27.9% in 2012, 31.6% in 2013, and 33.9% in 2014). The costs of levetiracetam were also increasing by years and accounted for 4.9% in 2010, 9.3% in 2011, 37.4% in 2012, 43.9% in 2013, and 49.7% in 2014 compared with other intravenous AEDs. Levetiracetam had the top of increasing prescribed intravenous AED with the total cost of 76,119.5 USD/

year. Phenytoin was the most common use intravenous AED (38.5%) and it was the top of less prescribed intravenous AED (decreasing rate of 23.6%).

**Conclusion:** Levetiracetam, the new intravenous AED, had been used increas-

ingly in epileptic patients at the university hospital with the highest cost.

**Key words:** trends, intravenous antiepileptic drugs, epilepsy

# Trends of Oral Antiepileptic Drug Treatment in a University Hospital

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## Abstract

**Purpose:** This study aimed to evaluate the uses of both new and standard oral antiepileptic drugs (AEDs) in a university hospital. These trends may be baseline data for patient care system.

**Method:** This study was a retrospective study and conducted at Srinagarind Hospital, KhonKaen University, Thailand. The study period was between January 1, 2005 and November 30, 2014. Data of oral AEDs use were retrieved from the electronic database of the hospital. Descriptive statistics were used to analyze data.

**Results:** There were 13 oral AEDs available in our hospital. Of those, five

AEDs were standard group including Carbamazepine, Phenobarbital, Phenytoin, Sodium valproate, and Clonazepam and eight new AEDs group including Gabapentin, Lamotrigine, Levetiracetam, Oxcarbazepine, Pregabalin, Topiramate, Vigabatrin, and Zonisamide. Prescriptions of both group were increasing annually from 2005 to 2014. The new AEDs group had prescriptions of 4,483,832 more tablets in 2014 than 2005. The prescriptions for the new AEDs group were double of standard AED prescription in 2014. The total cost of AEDs prescription in 2014 was higher than in 2005; 222,883.8 USD in the new AEDs group and only 76,733.8 USD in the standard AEDs group, differences drugs cost ;145,149.9 USD.

Gabapentin was the highest prescribed of AEDs (923,723 tablets; 37.0%), while Lamotrigine and Levetiracetam were the two highest prescribed new AEDs (285,941 tablets; 8.3% and 265,306 tablet; 7.7%, respectively).

**Conclusion:** The prescriptions of AEDs were increasing particularly the new AEDs. Gabapentin was the most common use AED.

**Key words:** trends; antiepileptic drugs; epilepsy

# Long-Term Outcome after Thymectomy for Myasthenia Gravis

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## Abstract

**Background:** Myasthenia gravis (MG) is a rare autoimmune disorder in which most of the cases caused by autoantibodies against acetylcholine postsynaptic receptors at the neuromuscular junction of skeletal muscles. There's no clear consensus exists on treatment strategies, main treatment consists of pharmacologic therapy, includes anticholinesterase agents, plasmapheresis, immunosuppressive agents and surgical treatment, thymectomy, which is indicated for all patients with thymoma and for patients without thymoma with generalized MG. Despite receiving recommended therapy, many of them still suffer from weakness which impair quality of life. In Thailand,

there are very limited data available regarding clinical responses to treatment and long term outcomes of MG. Therefore study of this topic may be helpful for better clinical evaluation and plan for future treatment.

**Objectives:** To study about long term outcome and prognostic factors of clinical response after thymectomy in patients with MG.

**Methods:** 124 patients with myasthenia gravis treated by pharmacological treatment and thymectomy between 1997 and 2011 in Srinagarind hospital, Khon Kaen University were retrospectively reviewed. The primary endpoints included improvement of clinical symptoms during follow up time, using the MG Foundation of America (MGFA) criteria.

Secondary endpoints were responses to therapy defined as complete stable remission (CSR), pharmacologic remission (PR), improved, stable or worsen. Also average dosage of pharmacologic treatment before and after the procedure and to evaluate factors influences in the treatment responses.

**Results:** Among 124 patients, there were 94(75.8%) females and 30(24.2%) males, with mean age of 50.19 years and mean age of MG diagnosis was 35.83 years. Mean time periods between a thymectomy and the onset of disease were 1.73 years. Surgical method of thymectomy includes transternal thymectomy and video assisted thoracoscopic thymectomy, 115 and 9 patients respectively. The patients were followed up during a mean period of 4.53 years after thymectomy. The results of histological examination showed thymoma

and non thymoma were 23 and 101 patients respectively. Overall response 95.16% of patients had good response (CSR, PR, improved), 4.84% had poor response (stable, worse). There were 28 patients (22.6%) had CSR, 71 patients (57.3%) had PR and 19 patients (15.3%) had improvement of clinical symptoms, 5 patients (4%) had stable disease and 1 patient (0.8%) had worsening symptom. Comparison of dosage of medication before and after thymectomy showed that most of patients required lower doses of pyridostigmine and prednisolone after surgery.

**Conclusions:** Thymectomy along with pharmacologic therapy for MG patients showed satisfactory results in remission and improvement of clinical responses rates.

**Keywords:** Myasthenia Gravis, Thymectomy, Outcome

# Outcome of Intravenous Recombinant Tissue Plasminogen Activator (rt-PA) for Acute Ischemic Stroke in Thailand

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## Abstract

### Background:

Acute ischemic stroke is the major public health problem of Thailand and many countries. Treatment outcome is vary in each patient. The standard treatment of acute ischemic stroke in Thailand is rt-PA within 4.5 hours in the hospital. There are many factors that affect outcome of treatment ex; sex, age, underlying disease of patient.

### Objectives:

Assess the affected factor of the treatment of rt-PA received patient of acute ischemic stroke within 4.5 hours and explore the prevalent of acute ischemic stroke in each region of Thailand. Furthermore we assess the outcome of treatment of acute ischemic patient with rt-PA such as complication

of treatment, mortality rate, and length of hospital stay.

### Materials and methods:

This study was designed as descriptive retrospective study. Data from the National Health Security Office (NHSO), Thailand. The data were collected from medical records of acute ischemic stroke patients reaching hospital within 4.5 hours after onset and received rt-PA during 2004-2013 (2013; valid to 31th January 2013). The outcome, complication, factor that affect the treatment of acute ischemic stroke were analyzed.

### Results:

The total 244,032 acute ischemic stroke patients in Thailand, received rt-PA 2,102 patients (0.9 %), the mean age 65.2 years. Male gender 128,539 (52.7%) and

female 115,493 (47.3%). Risk factors of acute ischemic stroke are hypertension(45.2%) dyslipidemia(28.9%)and diabetes mellitus (20.9%). In the region of Thailand, the east have the most of the acute ischemic patents (66,455, 27.2%). The 2,102 patients who received rt-PA have been intubation(317,15.1%),craniotomy/ craniectomy (53, 2.5%) and tracheostomy (61, 2.9%). The average of length of hospital stay was7.8 days, death126 patients (6%), improved status1,863 patients (88.7%), complete improved 19 patients (0.9%) and not improved 93 patients(4.4%). The most complications were pneumonia (155,7.4%). The factor that affected of the mortality rate was the underlying of patients such as coronary artery disease(p-value 0.003), dyslipidemia (p-value<0.001), congestive heart failure (p-value<0.001) and atrial fibrillation (p-value 0.021). The complication that affect mortality rate in hospital are decubitus ulcer (p-value0.018), pneumonia (p-value <0.001), status epilepticus (p-value 0.017), septicemia (p-value<0.001), gastrointestinal hemorrhage(p-value 0.007) and intracranial hemorrhage(p-value<0.001). Hemorrhagic transformation in rt-PA received patients found in the comorbidities of coronary artery disease(p-value 0.002),

hypertension(p-value<0.001), congestive heart failure (p-value 0.017) and atrial fibrillation(p-value<0.001). The most of hemorrhagic transformationfound in hypertensive patients(915,46.4%). The factor affected the length of hospital stay were who have underlying disease with hyperthyroidism (p-value0.049), dyslipidemia (p-value0.049), congestive heart failure (p-value<0.001) and atrial fibrillation (p-value0.002).The complications that affected length of hospital stay were decubital ulcer(p-value <0.001), pneumonia (p-value <0.001), urinary tract infection (p-value <0.001), septicemia (p-value <0.001), deep venous thrombosis (p-value <0.001), gastrointestinal hemorrhage (p-value 0.005) and intracranial hemorrhage (p-value 0.002)

### **Conclusions:**

The treatment of acute ischemic stroke with rt-PA was worldwide recommendation and has good outcome. In the part of Thailand, has vary of incidence of acute ischemic stroke patients. Coronary artery disease, dyslipidemia, congestive heart failure and atrial fibrillation are the factors that effect of outcome. The complications of treatment of receiving patients were same as the previous study.

# Outbreak of Peripheral Neuropathy in Beungkan Prison, Beungkan Province, Thailand : December 2014

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**Background:** In December 2014, twenty nine prisoners in Beungkan prison in Beungkan province Thailand, developed lower limb weakness and peripheral neuropathy.

**Objective:** The purpose of the present study was to describe clinical profiles and investigation to identify etiology and source of outbreak, and implement control measures.

**Methods:** A cross sectional study was conducted from 2 Dec 2014 to 25 Dec 2014 in the prison, for active case finding, we used questionnaire to interview prisoners and neurological examination by doctor. Collection laboratory testing and environmental investigation was performed.

**Results:** The prison 1,464 prisoners and guards, 1285 male prisoners and guards 46 persons. Among 88 prisoners who had abnormal symptoms of peripheral

neuropathy and morbidity rate is 6.01%. Symptom at onset is paresthesia 95.45%. 43 prisoners were history taking and physical examination by doctor, lower limb motor weakness 53.49%, paresthesia level 65.12%, reflex decrease or areflexia in upper and lower limb 30.23%, 83.72 respectively. Nerve conduction study 6 prisoners showed axonopathy and more severe in lower limb 83%. Blood and urine samples illustrated vitamin B1 deficiency 80% and urine found

arsenic 57% in patients prisoner. No case was found among the guards and female prisoners. The cases rapidly increased after vaccination on 14 October 2014.

**Conclusion:** This outbreak of peripheral neuropathy possibly resulted from vulnerable thiamine deficiency and precipitating by vaccination or viral infection and heavy meatal. After providing B 1 6 12 treatment clinical weakness and paresthesia was gradually recovered.