1. Daily consumption of banana marginally improves blood glucose and lipid profile in hypercholesterolemic subjects and increases serum adiponectin in type 2 diabetic patients

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26. Detection of alpha(0)-thalassemia South-East Asian-type deletion by droplet digital PCR

27. Rapid diagnosis of tuberculosis by identification of Antigen 85 in mycobacterial culture system

28. Smart magnetic nanoparticle-aptamer probe for targeted imaging and treatment of
hepatocellular carcinoma
Daily consumption of banana marginally improves blood glucose and lipid profile in hypercholesterolemic subjects and increases serum adiponectin in type 2 diabetic patients

1Cressey R., 1Kumsaiyai W., 2Mangklabruks A., 3Cressey, R.,

1 Department of Medical Technology, Chiang Mai University, Chiang Mai, Thailand
2 Department of Internal Medicine, Chiang Mai University, Chiang Mai, Thailand
3 Department of Medical Technology, Chiang Mai University Thailand

ABSTRACT

In this study, we explored the effects of consumption of banana in thirty hypercholesterolemic and fifteen type 2 diabetic subjects. They were given a daily dose of 250 or 500 grams of banana for breakfast for 12 weeks. Fasting serum lipid, glucose and insulin levels were measured initially as well as every 4 weeks. Daily consumption of banana significantly lowered fasting blood glucose (from 99±7.7 to 92±6.9 and 102±7.3 to 92±5.7 mg·dL−1 (p
Red cell indices and formulas used in differentiation of ?-thalassemia trait from iron deficiency in Thai school children

Pornprasert S., Panya A., Punyamung M., Yanola J., Kongpan C., Pornprasert, S.,

ABSTRACT

Red cell indices and formulas have been established as simple, fast, and inexpensive means for discrimination between the ?-thalassemia (?-thal) trait and iron deficiency. However, there were no reports of the diagnostic reliability of different red cell indices and formulas in discrimination of ?-thal trait from iron deficiency in the Thai population. The aim of this study was to examine the diagnostic accuracy of five red cell indices (red blood cell (RBC) count, mean corpuscular volume (MCV), mean corpuscular hemoglobin (Hb) (MCH), mean corpuscular Hb concentration (MCHC), and red cell distribution width (RDW)) and eight formulas (Sirdah, Green & King, RDW Index, Menzler, England & Fraser, Ehsani, Srivastava, and Shine & Lal). Their sensitivity, specificity, positive and negative prognostic value and efficiency, were analyzed in 77 Thai school children, 21 with the ?-thal trait and 56 with iron deficiency. The Sirdah and Srivastava formulas proved to be the most reliable indexes as they had 100.0% sensitivity and negative predictive value, the highest efficiency (97.4%), and the highest Youden\'s Index value (96.4%). Therefore, these formulas could be used in initial discrimination of the ?-thal trait from iron deficiency in Thai school children. © 2014 Informa Healthcare USA, Inc. All rights reserved: reproduction in whole or part not permitted.
The associations of SEA-? thalassemia 1, XmnI-G? polymorphism and ?-globin gene mutations with the clinical severity of ?-thalassemia syndrome in Northern Thailand

1Tatu T., 1Sritong W., 3Sa-Nguansermsri T., 4Tatu, T.,

1Division of Clinical Microscopy, Department of Medical Technology, Chiang Mai University, Chiang Mai, Thailand
2Biomedical Technology Research Center, Chiang Mai University, Chiang Mai, Thailand
3Thalassemia Research Center, Chiang Mai University, Chiang Mai, Thailand
4Division of Clinical Microscopy, Department of Medical Technology, Chiang Mai University, Chiang Mai 50200, Thailand

ABSTRACT

At least three genetic factors including ?-thalassemia mutations, ?-thalassemia, and XmnI-G? polymorphism were shown to modify clinical symptoms in ?-thalassemia disease. Objective: To determine associations of ?-thalassemia mutations, SEA-? thalassemia 1, and XmnI-G? polymorphism, and clinical severity of ?-thalassemia in northern Thailand. Material and Method: Thirty-two ?-thalassemia major and 28 ?-thalassemia intermedia attending the Thalassemia Clinic at Maharaj Nakorn Chiang Mai Hospital, Chiang Mai, Thailand were recruited. The ?-globin gene mutations and SEA-? thalassemia 1 were determined by MS-PCR and Gap-PCR, respectively. The XmnI-G? polymorphism was identified by RFLP analysis. Odds ratio was calculated to evaluate the associations of these three genetic factors and clinical symptoms. Results: Eight ?-globin gene mutations (both ?Oand ?+) were found. Twenty-nine point one percent of the patients had at least one XmnI-G? site (XmnI-G?: +) and 4.1% of the patients were heterozygote for the SEA-? thalassemia 1. The ?-globin gene mutations showed maximal impact and the XmnI-G? polymorphism had minimal influence on clinical severity in this cohort. The SEA-? thalassemia 1 had the least effect on the clinical severity due to its low prevalence in these patients. Conclusion: Although these three genetic factors play roles in modifying clinical symptoms of ?-thalassemia, the ?-thalassemia mutations should be considered first, followed respectively by the XmnI-G? polymorphism and the SEA-? thalassemia 1, in management and prenatal diagnosis of ?-thalassemia in northern Thailand.
Clinical evaluation of the anterior translation of glenohumeral joint using ultrasonography: An intra- and inter-rater reliability study

Joseph L.H., Hussain R.I., Pirunsan U., Naicker A.S., Htwe O., Paungmali A.

Department of Physical Therapy, Faculty of Associated Medical Sciences, Chiang Mai University, Chiang Mai 50200, Thailand
Physiotherapy Program, School of Rehabilitation Sciences, Faculty of Allied Health Sciences, Universiti Kebangsaan Malaysia
Kuala Lumpur, Malaysia
Department of Radiology, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Kuala Lumpur, Malaysia
Department of Orthopedics, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Kuala Lumpur, Malaysia

ABSTRACT

Objective: The aim of this study was to investigate the intra- and inter-rater reliability of ultrasonography (US) to measure anterior translation of the humeral head (ATHH) among healthy subjects and patients with sacroiliac joint dysfunction. Methods: The study included a total of 22 shoulder joints from 11 subjects. Six subjects were healthy and 5 had sacroiliac joint dysfunction. Anterior translation of the humeral head was measured twice using US by two different investigators. Intraclass correlation coefficient (ICC3,1), standard error of measurements (SEMs), coefficient of variations (CVs) and Bland-Altman plot were used as analytical tests to investigate intra- and inter-rater reliability, amount of error and agreeability of the measurements between investigators. Results: Intraclass correlation coefficient was 0.94, showing a high level of intra-rater reliability of the first investigator with SEMs (0.01 cm) and CV (5.1%) in measuring ATHH. Intra-rater reliability of the second investigator was 0.84 with SEMs (0.03 cms) and CV (9.6%), indicating a high level of reliability. Inter-rater reliability was high, with an ICC value of 0.92 with SEMs (0.02 cms) and CV (5.9%). Conclusion: The use of US as a measurement of ATHH has good levels of intra- and inter-rater reliability in clinical practice. © 2014 Turkish Association of Orthopaedics and Traumatology.

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Hematological parameters in combination with HbF levels are appropriate for screening of ?-thalassemia/HbE disease with HbF varying from 5 to 15%

¹Pornprasert S., ¹Pornprasert, S.,

¹Department of Medical Technology, Faculty of Assoc. Medical Sciences, Chiang-Mai University, Chiang-Mai, Thailand

ABSTRACT

[No abstract available]
Measurement of HbA2 by capillary electrophoresis for diagnosing \(\beta\)-thalassemia/HbE disease in patients with low hbf

Prasing W., Pornprasert S., Pornprasert, S.,

Department of Medical Technology, Faculty of Assoc. Medical Sciences, Chiang Mai University, Chiang Mai, Thailand

ABSTRACT

Objective: Capillary electrophoresis (CE) has the ability to detect hemoglobin (Hb) A2 in the presence of HbE. The aim of this study was to compare levels of HbA2 measured by CE between \(\beta\)-thalassemia/HbE and homozygous HbE patients. Methods: Molecular analysis for diagnosing of \(\beta\)-thalassemia gene mutations and HbE was performed in 28 blood samples containing of HbE >75% and HbF levels varying from 5% to 15% quantified by highperformance liquid chromatography (HPLC). Levels of HbA2, HbE, and HbF were then measured using CE. Results: Nine patients were diagnosed with \(\beta\)-thalassemia/HbE disease and 19 with homozygous HbE. All patients with \(\beta\)-thalassemia/HbE disease and only one patient (5%) with homozygous HbE had HbA2 higher than 6.0%. Conclusions: The analysis of HbA2 level (>6.0%) by CE may be an alternative method for preliminary diagnosis of \(\beta\)-thalassemia/HbE with uncertain \(\beta\)-thalassemia/HbE disease and homozygous HbE.
EMMPRIN reduction via scFv-M6-1B9 intrabody affects \( \alpha 3\beta 1\)-integrin and MCT1 functions and results in suppression of progressive phenotype in the colorectal cancer cell line Caco-2

Sangboonruang S., Thammasit P., Intasai N., Kasinrerk W., Tayapiwatana C., Tragoolpua K., Tragoolpua, K.

Division of Clinical Microbiology, Department of Medical Technology, Chiang Mai University, Chiang Mai 50200, Thailand
Division of Clinical Microscopy, Department of Medical Technology, Chiang Mai University, Chiang Mai, Thailand
Clinical Immunology, Department of Medical Technology, Chiang Mai University, Chiang Mai, Thailand
Biomedical Technology Research Unit, National Center for Genetic Engineering and Biotechnology, Chiang Mai University, Chiang Mai, Thailand
BioMedical Engineering Center, Chiang Mai University, Chiang Mai, Thailand

ABSTRACT

Extracellular matrix metalloproteinase inducer (EMMPRIN) exhibits overexpression in various cancers and promotes cancer progression and metastasis via the interaction with its associated molecules. The scFv-M6-1B9 intrabody has a potential ability to reduce EMMPRIN cell surface expression. However, the subsequent effect of scFv-M6-1B9 intrabody-mediated EMMPRIN abatement on its related molecules, \( \alpha 3\beta 1\)-integrin, MCT1, MMP-2 and MMP-9, is undefined. Our results demonstrated that the scFv-M6-1B9 intrabody efficiently decreased \( \alpha 3\beta 1\)-integrin cell surface expression levels. In addition, intracellular accumulation of MCT1 and lactate were increased. These results lead to suppression of features characteristic for tumor progression, including cell migration, proliferation and invasion, in a colorectal cancer cell line (Caco-2) although there was no difference in MMP expression. Thus, EMMPRIN represents an attractive target molecule for the disruption of cancer proliferation and metastasis. An scFv-M6-1B9 intrabody-based approach could be relevant for cancer gene therapy. © 2014 Nature America, Inc. All rights reserved.
Clusterin as a blood biomarker for diagnosis of mild cognitive impairment and Alzheimer's disease

Panachamnong N., Methapatara P., Sungkarat S., Taneyhill K., Intasai N., Intasai N.,

Department of Medical Technology, Faculty of Associated Medical Sciences, Chiang Mai University, Chiang Mai, Thailand
2 Suanprung Psychiatric Hospital, Chiang Mai, Thailand
3 Department of Physical Therapy, Faculty of Associated Medical Sciences, Chiang Mai University, Chiang Mai, Thailand
4 Department of Medical Technology, Faculty of Associated Medical Sciences, Chiang Mai University, Thailand

ABSTRACT

With increasing global life expectancy, Alzheimer's disease will become an increasingly prevalent health problem. The development of biomarkers that predict risk for both Alzheimer's disease and mild cognitive impairment will be useful for early diagnosis of dementia. To date, no surrogate blood biomarker exists to classify between Alzheimer's disease/mild cognitive impairment and normal controls or Alzheimer's disease and mild cognitive impairment/normal control as a diagnostic parameter. In this study, we analyzed serum levels of amyloid-β 40 (Aβ40), amyloid-β 42 (Aβ42), clusterin (CLU) and p97 using ELISA kits from 157 subjects with normal cognition, mild cognitive impairment and Alzheimer's disease. We found a significant increase in serum levels of Aβ42 (P<0.05) and serum clusterin (P<0.001) between normal and Alzheimer's disease subjects and between normal and mild cognitively impaired subjects. In contrast, serum Aβ40 and p97 levels did not differ significantly between all groups. We also used receiver operating characteristic curves to determine the cut-off point of Aβ42 and clusterin to differentiate either cognitively normal from cognitively impaired subjects (both Alzheimer's disease and mild cognitive impairment) or cognitively normal and mild cognitively impaired subjects from those with Alzheimer's disease. Only clusterin with 84% sensitivity, 75% specificity and good accuracy of diagnosis showed promise for diagnosing patients with cognitive impairment (Alzheimer's disease and mild cognitive impairment).

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Factors influencing the impact force of the taekwondo roundhouse kick

Thibordeeand S., Prasartwuth O., Prasartwuth, O.,

Department of Physical Therapy, Faculty of Associated Medical Sciences, Chiang Mai University, Chiang Mai 50200, Thailand

ABSTRACT

The roundhouse kick is a powerful taekwondo move, commonly used in sparring matches. The kick's power could be derived from the angular position and activation of muscles controlling the ankle joint. The aim of this study was to investigate the ankle joint angle and activation of the lower leg muscles at different levels of impact force. Twenty Thai, black-belt, male, Taekwondo athletes performed roundhouse kicks with their maximal effort. Ankle joint motion was recorded using an electrogoniometer sensor. Activations of gastrocnemius and tibialis anterior muscles were monitored using surface electromyography. The athletes were divided into two groups based on their maximal impact forces: high (HI; 172.03 ± 19.36 N) and low (LO; 110.14 ± 20.20 N). Comparisons between the two groups showed that the HI group demonstrated significantly less plantarflexion angle and gastrocnemius activation than the LO group (P
Effect of Swiss-type heterocellular HPFH from XmnI-G? and HBBP1 polymorphisms on HbF, HbE, MCV and MCH levels in Thai HbE carriers

Kerdpu S., Limweeraprajak E., Tatu T., Tatu, T.,

Division of Clinical Microscopy, Department of Medical Technology, Chiang Mai University, Chiang Mai 50200, Thailand
Division of Hematology, Department of Medical Technology, Sawan Pracharak Hospital, Nakorn Sawan 60000, Thailand
Biomedical Technology Research Center, National Center for Genetic Engineering and Biotechnology, Chiang Mai University, Chiang Mai 50200, Thailand

ABSTRACT

Relationships of Swiss-type heterocellular HPFH as functions of XmnI- G? and HBBP1:rs2071348 polymorphisms and HbF, HbE, MCV and MCH in HbE carriers were evaluated in 52 non-anemic and ?-thalassemia-free Thai HbE carriers. HbF and HbE levels were measured using cation-exchange HPLC. MCV and MCH were determined using an automated blood counter. The XmnI- G? polymorphism was identified by XmnI digestion of amplified products, and the HBBP1:rs2071348 polymorphism by tetra-ARMS-PCR. HbF levels in HbE carriers were higher than those in normal individuals. HbF levels >0.8 % indicated the Swiss-type heterocellular HPFH in these subjects, rendering a prevalence of 40.4 %. The XmnI-G? (+) and HBBP1:rs2071348 (C) alleles were modestly positively correlated with elevated HbF, elevated MCH and lowered HbE values. This study thus confirms the influence of the XmnI-G? and HBBP1:rs2071348 polymorphisms on HbF production. The present study demonstrates the association of XmnI-G? and HBBP1:rs2071348 with HbF, HbE, MCV and MCH in HbE carriers for the first time, and highlights the effect of elevated HbF production on HbE levels. © 2014 The Japanese Society of Hematology.
Preventive antiretroviral therapy in non-thalassemia carrier infants exposed to mother-to-child transmission of hiv decreases cord and after delivery red blood production without altering the development of hemoglobin

pornprasert s., wongnoi r., oberdorfer p., sirivatanapa p., pornprasert, s.,

1 Department of Medical Technology, Chiang Mai University, Chiang Mai, Thailand
2 Department of Pediatrics, Chiang Mai University, Chiang Mai, Thailand
3 Department of Obstetrics and Gynecology, Chiang Mai University, Chiang Mai, Thailand
4 Department of Medical Technology, Chiang Mai University, 110 Intawaroros Road, Chiang Mai, 50200, Thailand

abstract

Antiretroviral (ARV) prophylaxis for prevention of mother to child transmission (MTCT) of HIV could affect hemoglobin (Hb) development of infants. A cross-sectional descriptive study was conducted in 24 HIV-infected and 21 HIV-uninfected pregnancies. ARV drugs were administered to HIV-infected pregnancies at 21 weeks of gestational age and at labor. Their infants received zidovudine (ZDV) until 4 weeks of age. Blood samples of ARV-exposed and - unexposed infants were collected at delivery, 1, 2 and 4 months of age. Molecular analyses for β-thalassemia-1 Southeast Asian (SEA) type deletion, β-thalassemia mutations and Hb E were performed for excluding the thalassemia carrier infants. Hemoglobinopathy and Hb A, Hb F and Hb A2 were analyzed by using capillary electrophoresis (CE) while hematological parameters were measured using an automated blood counter. At delivery, 1 and 2 months of age, ARVexposed infants had significantly lower levels of RBC counts than ARV-unexposed infants (3.56 vs 4.90, 2.66 vs 4.62 and 3.01 vs 4.05 x1012/L; P
Myofascial force transmission in sacroiliac joint dysfunction increases anterior translation of humeral head in contralateral glenohumeral joint

Joseph L.H., Hussain R.I., Naicker A.S., Htwe O., Pirunsan U., Paungmali A., Paungmali, A.,

1 Department of Physical Therapy, Faculty of Associated Medical Sciences, Chiang Mai University, 110 Intaworos Road, Chiang Mai, Thailand
2 Physiotherapy Program, School of Rehabilitation Sciences, Universiti Kebangsaan Malaysia
3 Malaysia
4 Department of Radiology, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Kuala Lumpur, Malaysia
5 Department of Orthopaedics, Faculty of Medicine, Universiti Kebangsaan Malaysia Medical Centre, Kuala Lumpur, Malaysia
6 Department of Physical Therapy, Faculty of Associated Medical Sciences, Chiang Mai University, 110 Intaworos Road, Thailand

ABSTRACT

Introduction Posterior and anterior oblique muscle slings contribute to the force closure mechanisms that provide stability to sacroiliac joint. These global muscle slings consist of myofascial network of fascia, muscles and tendons from global muscles. It links the lumbopelvic region to other joints of musculoskeletal system especially the contralateral glenohumeral joint (GHJ). Any sacroiliac joint dysfunction (SJD) may likely disrupt the force transmission across the oblique slings and it can affect the contralateral GHJ. Aim The current study aims to investigate the effects of SJD on the contralateral GHJ. Material and methods An experimental study is designed recruiting 20 participants with SJD and 20 healthy participants as matched controls to test the hypothesis that SJD may cause excessive anterior translation of humeral head (ATHH) in contralateral GHJ. Using real time ultrasonography, resting position of humeral head (RPHH), ATHH and posttranslation distance of humeral head (PDHH) are compared between the GHJs among participants with SJD and the matched controls. Paired sample t-test and independent sample t-test are used to analyze the data. Results and discussion The paired sample t-test result showed statistically significant increase in ATHH (P = 0.03) and PDHH (P = 0.01) in contralateral GHJs among participants with SJD. The independent sample t-test showed a significant increase in RPHH (P = 0.01) and PDHH (P = 0.01) in SJD participants when compared to matched controls. Conclusion SJD contributes to excessive ATHH in the contralateral GHJ. This may occur due to altered myofascial force transmission across oblique sling muscles. © 2014 Warminska-Mazurska Izba Lekarska w Olsztynie. Published by Elsevier Urban and Partner Sp. z o.o. All rights reserved.
Blood transfusion from a Hb e trait donor can affect -thalassemia diagnosis

1Pornprasert, S., 2Jaiping K., 1Pornprasert S.,

1 Department of Medical Technology, Faculty of Assoc. Medical Sciences, Chiang Mai University, 110 Intawaroros Road, Chiang Mai 50200, Thailand
2 Lamphun Hospital, Lamphun, Thailand

ABSTRACT

A subject with Hb E (HBB: c.79G > A) trait is asymptomatic and can become a blood donor. However, a blood transfusion from a Hb E trait donor can affect -thalassemia (-thal) diagnosis. Blood samples from three Thai women were sent to the Associated Medical Sciences (AMS) Clinical Service Center, Chiang Mai, Thailand, for thalassemia diagnosis. Their Hb A2 levels, analyzed by high performance liquid chromatography (HPLC), were higher than 4.0%, thus they were diagnosed to have -thal. However, elevated Hb A2 levels in these patients were not certain because the Hb A2 levels analyzed at the initial hospitalization and follow-up were controversial. In addition, there were some cases shown to have controversy between the increased Hb A2 level and red cell indices. The blood transfusion history was confirmed and hemoglobin (Hb) analysis was reanalyzed by capillary electrophoresis (CE). On the CE electrophoregram, Hb A2 levels were observed to be normal and Hb E peaks were present. Therefore, to rule out misdiagnosis and unnecessary genetic counseling, Hb analysis should be performed on the recipient prior to blood transfusions. Moreover, CE has a high efficiency to prevent the misinterpretation of Hb analysis in patients who receive blood transfusions from a donor carrying Hb E. © 2014 Informa Healthcare USA, Inc. All rights reserved: reproduction in whole or part not permitted.
NIR and upconversion luminescence properties of Nd3+doped in Gd2O3-CaO-SiO2-B2O3 glass system

Insiripong S., Kaewjeang S., Maghanemi U., Kim H.J., Chanthima N., Kaewkhao J.,

1 Muban Chombueng Rajabhat University, Ratchaburi 70150, Thailand
2 Department of Radiologic Technology, Chiang Mai University, Chiang Mai, 50200, Thailand
3 Department of Physics, Kyungpook National University, Daegu 702-701, South Korea
4 Center of Excellence in Glass Technology and Materials Science (CEGM), Nakhon Pathom Rajabhat University, Nakhon Pathom, 73000, Thailand

ABSTRACT

In this work, properties of Nd3+ in Gd2O3-CaO-SiO2-B2O3 glass systems with composition 25Gd2O3-10CaO-10SiO2-(55-x)B2O3-xNd2O3 where x = 0.0, 0.5, 1.0, 1.5, 2.0 and 2.5 mol% were investigated. The optical absorption spectra show peaks at 4F3/2 (877 nm), 4F5/2+2H9/2 (802 nm), 4F7/2+4S3/2 (743 nm), 4F9/2 (682 nm), 2H11/2 (627 nm), 2G7/2 +4G5/2 (582 nm), 4G7/2 +2K13/2 (527 nm), 4G11/2 (481 nm), 2P1/2 (427 nm) and 2L15/2 + 4D1/2 + 1I11/2+ 4D5/2+ 4D3/2 (355 nm) reflecting the Nd3+ ions in glass matrices. The densities were increased with increasing of Nd2O3 concentration. This indicates the increase of the molecular weight by the replacement of B2O3 with a heavier Nd2O3 oxide in the glass. The upconversion luminescence spectra show bands at 393 nm for all Nd2O3 concentration and the strongest intensity from 2.5% mol of Nd2O3 was obtained. For NIR luminescence, the intensity of Nd3+ emission spectra increases with increasing concentrations of Nd3+ up to 1.5 mol% and beyond 1.5 mol% the concentration quenching is observed. © (2014) Trans Tech Publications, Switzerland.
Respiratory muscle strength explained by age and weight in female and male

Jalayondeja W., Verner O., Jarungjitaree S., Tscheikuna J., Jalayondeja, W., Mahidol University, Nakhon Pathom, Thailand

ABSTRACT

Objective: To determine the relationship between respiratory muscle strength and age, sex, height and weight. Material and Method: Maximal inspiratory mouth pressure (MIP) and maximal expiratory mouth pressure (MEP) were assessed in 249 subjects aged 30-70 years using a mouth pressure meter. MIP was performed 10 times at residual volume, whereas MEP was performed 12 times at total lung capacity. Pearson’s correlation was used to assess the association between respiratory muscle strength and characteristics data. Multiple linear regressions were used to establish the prediction equation of respiratory muscle strength. Results: MIP decreased at ages beyond 60 years (p
Hemoglobin Q-Thailand and its combinations with other forms of thalassemia or hemoglobinopathies in Northern Thailand

Panyasai S., Pornprasert S., Pornprasert, S.,

1 Faculty of Allied Health Sciences, Phayao University, Phayao, Thailand
2 Department of Medical Technology, Faculty of Associated Medical Sciences, Chiang Mai University, 110 Intawaroros Road, Chiang Mai, 50200, Thailand

ABSTRACT

Background: There have been no reports for the frequency of Hb Q-Thailand [? 74(EF3)Asp?His, GAC > CAC] and its combinations either with other forms of thalassemia or hemoglobinopathies in Northern Thailand. The aims of this study were to search for Hb Q-Thailand and its combinations in Northern Thai population and to analyze fractions of hemoglobin in Hb Q-Thailand and its combinations on high performance liquid chromatography (HPLC) chromatograms and/or capillary electrophoresis (CE) electrophoregrams. Methods: Blood samples from public and private hospitals in 7 northern provinces of Thailand were analyzed for thalassemia and hemoglobinopathy diagnoses using HPLC and/or CE and DNA analysis techniques at the Thalassemia Laboratory, Associated Medical Sciences Clinical Service Center, Chiang Mai, Thailand. Results: Hb Q-Thailand was found in 13 of 13,596 (0.10%) samples; 6 were heterozygous Hb Q-Thailand, 4 were compound Hb Q-Thailand/?-thalassemia-1 Southeast Asian (SEA) type deletion and 3 with combinations of Hb Q-Thailand/?0- thalassemia, Hb Q-Thailand/Hb E and Hb Q-Thailand/Hb E/?-thalassemia-1 SEA type deletion. The fractions of hemoglobin on HPLC chromatograms and CE electrophoregrams were observed based on types of combinations. Conclusions: Hb Q-Thailand and its combinations could be found in northern Thai population with the frequency of 0.10%. Thus, the better understanding of HPLC chromatogram and/or CE electrophoregram patterns of Hb Q-Thailand and its combination is essential for diagnosis and genetic counseling of thalassemia and hemoglobinopathies in this area.

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**Enhanced doxorubicin delivery and cytotoxicity in multidrug resistant cancer cells using multifunctional magnetic nanoparticles**

1Pilapong C., 2Keereeta Y., 1Munkhetkorn S., 2Thongtem S., 3Thongtem T., 1Pilapong, C.,

1 Center of Excellence for Molecular Imaging (CEMI), Department of Radiologic Technology, Faculty of Associated Medical Sciences, Chiang Mai University, Chiang Mai 50200, Thailand
2 Department of Physics and Material Science, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand
3 Department of Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand

**ABSTRACT**

Carboxymethyl modified magnetic nanoparticles (CMC-MNPs) have been designed as a vehicle for drug delivery in both drug-sensitive and drug-resistant cancer cells. We have demonstrated that the CMC-MNPs were able to load doxorubicin (DOX) with a high loading efficiency while also maintaining a good colloidal stability in an aqueous solution. According to a drug release study, DOX-loaded CMC-MNPs showed that the pH-dependent drug release property had a much higher release rate in acidic pH. Compared to free DOX, the DOX-loaded CMC-MNPs showed higher DOX accumulation in drug-sensitive cancer cells and much higher accumulation in drug-resistant cancer cells. These results indicate that our nanoplatform is highly efficient as a drug delivery system in both normal cancer cells and MDR cancer cells. In addition, the DOX-loaded CMC-MNPs can also enhance cytotoxicity against drug-resistant cancer cells in comparison to free DOX. The results obtained in this research demonstrate that our nanoplatform may be a promising approach in cancer chemotherapy and for overcoming multidrug-resistant cancer cells. © 2013 Elsevier B.V.
Spatial variability during gait initiation while dual tasking is increased in individuals with mild cognitive impairment

1Boripuntakul S., 23Lord S.R., 23Brodie M.A.D., 23Smith S.T., 4Methapatara P., 5Wongpakaran N., 1Sungkarat S., 1Sungkarat, S.

1 Faculty of Associated Medical Sciences, Chiang Mai University, Chiang Mai, Thailand
2 Neuroscience Research Australia
3 University of New South Wales, NSW, Australia
4 Suanprung Hospital, Chiang Mai, Thailand
5 Department of Psychiatry, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand

ABSTRACT

Background: Gait initiation (GI) is a complex transition phase of gait that can induce postural instability. Gait impairment has been well documented in people with Alzheimer’s disease, but it is still inconclusive in individuals with Mild Cognitive Impairment (MCI). Previous studies have usually investigated gait performance of cognitive impaired persons under steady state walking. Objective: This study aimed to examine spatiotemporal variability during GI under single- and dual-task conditions in people with and without MCI. Methods: Spatiotemporal stepping characteristics and variability under single- and dual-task conditions (counting backwards by 3s) were assessed in 30 older adults with MCI and 30 cognitively intact controls. Mean and coefficients of variation (COV) of swing time, step time, step length and step width were compared between the two groups. Results: Mixed-model repeated measures ANOVA revealed a significant Group x Walking condition interaction for COV of step length and step width (P

Effectiveness of roundhouse kick in elite Taekwondo athletes

1Prasartwuth, O., 2Prasartwuth O., 2Thibordee S.,

1 Department of Physical Therapy, Faculty of Associated Medical Sciences, Chiang Mai University, 110 Intawaroroj Rd, Sripoom Chiangmai 50200, Thailand
2 Department of Physical Therapy, Faculty of Associated Medical Sciences, Chiang Mai University, Chiangmai, Thailand

ABSTRACT

The roundhouse kick is a powerful attack in Taekwondo. Most athletes intently perform this kick for scoring in competition. Therefore, kinematic and kinetic analyzes of this kick were the topics of interest; however, they were separately investigated and rarely recorded for impact force. Our objectives were to investigate knee and ankle joint kinematics and electromyographic (EMG) activity of leg muscle and compare them between high-impact (HI) and low-impact (LO) kicks. Sixteen male black-belt Taekwondo athletes performed five roundhouse kicks at their maximal effort. Electrogoniometer sensors measured angular motions of ankle and knee joints. Surface EMG activities were recorded for tibialis anterior, gastrocnemius medialis, rectus femoris, and biceps femoris muscles. Based on maximal impact forces, the athletes were classified into HI and LO groups. All athletes in both groups showed greater activation of rectus femoris than other muscles. The HI group only showed significantly less plantarflexion angles than the LO group during preimpact and impact phases (P
Recombinant expression of novel protegrin-1 dimer and LL-37-linker-histatin-5 hybrid peptide mediated biotin carboxyl carrier protein fusion partner

Orrapin S., Intorasoot S., Intorasoot, S.,

Department of Medical Technology, Faculty of Associated Medical Sciences, Chiang Mai University, Chiang Mai 50200, Thailand

ABSTRACT

Antimicrobial peptides (AMPs) hold great promise as potential therapeutic approach for curing of infectious diseases. Prokaryotic protein expression renders high scalability with an effective purification of several heterogeneous proteins. However, it might be inappropriate for recombinant AMPs expression thereby its antimicrobial activity against the host cells. Several fusion partners demonstrated antimicrobial activity neutralization of AMPs expression and purification in Escherichia coli. In order to improve the antimicrobial effect, several hybrid AMPs have been designed and developed. As expected to increase the antimicrobial activity, a dimeric form of porcine protegrin-1 (PG-1) and human LL-37-linker-histatin-5 (LL-37-linker-Hst-5) hybrid peptide were alternatively constructed in this study. Hydroxylamine hydrochloride and thrombin cleavage sites were designed for releasing of hybrid peptide and PG-1 dimer from biotin carboxyl carrier protein (BCCP) fusion partner. The full-length AMPs gene was connected downstream of BCCP gene using the overlap extension-PCR, cloned into pET-28a vector and expressed in E. coli BL21(DE3)pLysS. After IPTG induction, approximately 20% of BCCP-AMPs was expressed as intracytoplasmic inclusion bodies with an expected molecular weight of 24.5 kDa. The mean of purified and refolded BCCP-AMPs was 1.5 mg/L with 76% purity. The presence of expressed protein was subsequently determined by Western blotting analysis. Finally, radial diffusion assay supported that these peptides displayed functional antimicrobial activity against E. coli and Staphylococcus aureus standard strains. Two novel AMPs established in this study would be potentially developed as extensive intervention for treating of infectious diseases. © 2013 Published by Elsevier Inc. All rights reserved.
An insight into the plantar pressure distribution of the foot in clinical practice: Narrative review

Deepashini H., Omar B., Paungmali A., Amaramalar N., Ohnmar H., Leonard J.,

ABSTRACT

Introduction: In clinical practice and within the scope of research studies, foot pressure distribution as measured by plantar pressure analysis is widely used to diagnose foot pathologies. Although plantar pressure data have been recognized as an important element in the assessment of patients with various foot problems, an in-depth knowledge of the plantar pressure distribution of the foot is lacking in literatures. Aim: This article presents a review of literature on plantar pressure distribution and factors that may affect plantar pressure among patients with foot pathologies and healthy population. Material and methods: A literature search was conducted in Science Direct and PubMed databases for articles published from January 2000 to August 2012. Medical Subject Headings (MeSH) and other keywords for search were plantar pressure, age, body weight, gender, reliability, instrument and healthy subjects. Results and discussion: This paper reviews on the factors influencing plantar pressure distribution. Factors such as the gender, age, body weight, foot type and footwear proved to have a significant effect on plantar pressure distribution of the foot. The paper also reports on the plantar pressure distribution of the foot and the reliability of the measurement. Studies were excluded from this narrative review if they did not meet the above criteria. Conclusions: This review has added sufficient knowledge on plantar pressure distribution of the foot in clinical practice. Data obtained from a plantar pressure distribution can be used by the physical therapist in the evaluation and management of patients with a wide variety of foot and lower extremity disorders. © 2014 Warmi?sko-Mazurska Izba Lekarska w Olsztynie. Published by Elsevier Urban & Partner Sp. z o.o. All rights reserved.
Chitosan-triphosphate nanoparticles for encapsulation of super-paramagnetic iron oxide as an MRI contrast agent

Sanjai C., Kothan S., Gonil P., Saesoo S., Sajomsang W., Kothan, S.,

Department of Radiologic Technology, Faculty of Associated Medical Sciences, Chiang Mai University, Chiang Mai 50200, Thailand
Nanodelivery System Laboratory, National Nanotechnology Center, National Science and Technology Development Agency, Pathumthani, 10120, Thailand

ABSTRACT

Super-paramagnetic iron oxide nanoparticles (SPIONPs) were encapsulated at various concentrations within chitosan-triphosphate (SPIONPs-CS) nanoparticles using an ionotropic gelation method. The encapsulation of SPIONPs within CS nanoparticles enhanced their dispersion ability in aqueous solution, with all particles being lower than 130 nm in size and having highly positive surface charge. The SPIONPs-CS nanoparticles exhibited crystalline structure and super-paramagnetic behavior, as seen in non-encapsulated SPIONPs. The morphology of SPIONPs-CS nanoparticles showed that they almost spherical in shape. The effect of phantom environments (culture medium and 3% agar solution) on either T1 or T2 weighted MRI was investigated using a clinical 1.5 T MRI scanner. The results revealed that 3% agar solution showed relaxation values higher than the culture medium, leading to a significant decrease in the MR image intensity. Our results demonstrated that the SPIONPs-CS nanoparticles can be applied as tissue-specific MRI contrast agents. © 2014 Elsevier Ltd. All rights reserved.
Estimating the timing of mother-to-child transmission of the human immunodeficiency virus type 1 using a viral molecular evolution model


ABSTRACT

Background: Mother-to-child transmission (MTCT) is responsible for most pediatric HIV-1 infections worldwide. It can occur during pregnancy, labor, or breastfeeding. Numerous studies have used coalescent and molecular clock methods to understand the epidemic history of HIV-1, but the timing of vertical transmission has not been studied using these methods. Taking advantage of the constant accumulation of HIV genetic variation over time and using longitudinally sampled viral sequences, we used a coalescent approach to investigate the timing of MTCT. Materials and Methods: Six-hundred and twenty-two clonal env sequences from the RNA and DNA viral population were longitudinally sampled from nine HIV-1 infected mother-and-child pairs [range: 277-1034 days]. For each transmission pair, timing of MTCT was determined using a coalescent-based model within a Bayesian statistical framework. Results were compared with available estimates of MTCT timing obtained with the classic biomedical approach based on serial HIV DNA detection by PCR assays. Results: Four children were infected during pregnancy, whereas the remaining five children were infected at time of delivery. For eight out of nine pairs, results were consistent with the transmission periods assessed by standard PCR-based assay. The discordance in the remaining case was likely confused by co-infection, with simultaneous introduction of multiple maternal viral variants at the time of delivery. Conclusions: The study provided the opportunity to validate the Bayesian coalescent approach that determines the timing of MTCT of HIV-1. It illustrates the power of population genetics approaches to reliably estimate the timing of transmission events and deepens our knowledge about the dynamics of viral evolution in HIV-infected children, accounting for the complexity of multiple transmission events. © 2014 Chaillon et al.
A simple and highly sensitive elisa for screening of the ?-thalassemia-1 southeast asian-type deletion

Pata S., Khummuang S., Pornprasert S., Tatu T., Kasinrerk W., Kasinrerk, W.

1 Biomedical Technology Research Center, Faculty of Associated Medical Sciences, Chiang Mai University, Chiang Mai, Thailand
2 Department of Medical Technology, Faculty of Associated Medical Sciences, Chiang Mai University, Chiang Mai 50200, Thailand
3 Division of Clinical Microscopy, Department of Medical Technology, Chiang Mai University, Chiang Mai, Thailand

ABSTRACT

Couples in which both partners carry the ?-thalassemia-1 trait have a 25% risk of hemoglobin Bart’s hydrops fetalis in each pregnancy. Identification of ?-thalassemia-1 trait is, therefore, necessary in order to control this severe form of ?-thalassemia. We have generated monoclonal antibodies specific to the ?-globin chain without cross reaction with other globin chains. A simple and sensitive ELISA was developed by using poly-l-lysine to increase the protein binding to the ELISA plate. The developed poly-l-lysine pre-coated ELISA has a very high sensitivity (100%) and specificity (97%) for detection of carriers of ?-thalassemia-1 with Southeast Asian-type deletion. © 2014 Copyright Taylor and Francis Group, LLC.
Cost-effectiveness of early infant HIV diagnosis of HIV-exposed infants and immediate antiretroviral therapy in HIV-infected children under 24 months in Thailand


ABSTRACT

Background: HIV-infected infants have high risk of death in the first two years of life if untreated. WHO guidelines recommend early infant HIV diagnosis (EID) of all HIV-exposed infants and immediate antiretroviral therapy (ART) in HIV-infected children under 24-months. We assessed the cost-effectiveness of this strategy in HIV-exposed non-breastfed children in Thailand. Methods: A decision analytic model of HIV diagnosis and disease progression compared: EID using DNA PCR with immediate ART (Early-Early); or EID with deferred ART based on immune/clinical criteria (Early-Late); vs. clinical/serology based diagnosis and deferred ART (Reference). The model was populated with survival and cost data from a Thai observational cohort and the literature. Incremental cost-effectiveness ratio per life-year gained (LYG) was compared against the Reference strategy. Costs and outcomes were discounted at 3%. Results: Mean discounted life expectancy of HIV-infected children increased from 13.3 years in the Reference strategy to 14.3 in the Early-Late and 17.8 years in Early-Early strategies. The mean discounted lifetime cost was $17,335, $22,583 and $29,108, respectively. The cost-effectiveness ratio of Early-Late and Early-Early strategies was $5,149 and $2,615 per LYG, respectively as compared to the Reference strategy. The Early-Early strategy was most cost-effective at approximately half the domestic product per capita per LYG ($ 4,420 in Thailand 2011). The results were robust in deterministic and probabilistic sensitivity analyses including varying perinatal transmission rates. Conclusion: In Thailand, EID and immediate ART would lead to major survival benefits and is cost-effective. These findings strongly support the adoption of WHO recommendations as routine care. © 2014 Collins et al.
Detection of alpha(0)-thalassemia South-East Asian-type deletion by droplet digital PCR

1Pornprasert S., 1Prasing W., 2Pornprasert, S.,

1 Department of Medical Technology, Faculty of Associated Medical Sciences, Chiang Mai University, Chiang Mai, Thailand
2 Department of Medical Technology, Faculty of Associated Medical Sciences, Chiang Mai University, 110 Intawaroros Road, Chiang Mai 50200, Thailand

ABSTRACT

Background: The alpha(0)-thalassemia South-East Asian (SEA)-type deletion is the most common genetic disorder in the Asian population. Couples who are both carriers have a 25% chance of conceiving Bart's hydrops fetalis. Therefore, results from carrier screening and prenatal diagnosis frequently need to be available rapidly. The aim of this study was to implement a droplet digital polymerase chain reaction (ddPCR) for diagnosis of alpha(0)-thalassemia SEA-type deletion. Methods: The wild-type alpha-globin gene allele and alpha(0)-thalassemia SEA allele were quantified in DNA samples of 20 normal individuals, 15 samples with alpha(0)-thalassemia SEA trait, and 8 samples with Bart's hydrops fetalis using the ddPCR. The DNA copy number of wild-type alpha-globin gene allele and alpha(0)-thalassemia SEA allele was then calculated using the Quantasoft analysis software. Results: The mean ± standard deviation (SD) ratio of wild-type alpha-globin gene allele and alpha(0)-thalassemia SEA allele among normal individuals, samples with alpha(0)-thalassemia SEA trait, and Bart's hydrops fetalis were clearly distinguished with levels of 1.78 ± 0.49, 0.85 ± 0.14, and 0.03 ± 0.03, respectively. Conclusion: The ddPCR may be one alternative technology available for routine clinical diagnosis of alpha(0)-thalassemia SEA-type deletion and prenatal diagnosis of Bart's hydrops fetalis. © 2013 John Wiley & Sons A/S. Published by John Wiley & Sons Ltd.
Rapid diagnosis of tuberculosis by identification of Antigen 85 in mycobacterial culture system

1Phunpae P., 2Chanwong S., 3-4Tayapiwatana C., 5Apiratmateekul N., 4Makeudom A., 3-4Kasinrerk W., 3Kasinrerk, W.,

1Division of Clinical Microbiology, Department of Medical Technology, Faculty of Associated Medical Sciences, Chiang Mai University, Chiang Mai 50200, Thailand
2Office of Prevention Disease Control Region 10, Chiang Mai 50000, Thailand
3Division of Clinical Immunology, Department of Medical Technology, Faculty of Associated Medical Sciences, Chiang Mai University, Chiang Mai 50200, Thailand
4Biomedical Technology Research Center, National Center for Genetic Engineering and Biotechnology, National Science and Technology Development Agency at the Faculty of Associated Medical Sciences, Chiang Mai University, Chiang Mai 50200, Thailand
5School of Medicine, Mae Fah Luang University, Chiang Rai 57100, Thailand

ABSTRACT

The standard culture for identification of Mycobacterium tuberculosis takes a long time to perform. We introduce here a method for fast identification of M. tuberculosis in mycobacterial culture system. Antibodies to Antigen (Ag) 85 of M. tuberculosis were produced and subsequently used to develop enzyme-linked immunosorbent assay (ELISA) for detecting Ag85 in the culture filtrate. By this detection, rapid tuberculosis (TB) diagnosis was achieved in comparison to the standard culture system with 89.6% sensitivity and 94% specificity. We thus suggest a new TB diagnosis strategy in which clinical samples are cultured in mycobacteria liquid culture medium. The culture filtrates are taken for detection of the Ag85 by ELISA. Using this strategy, 25%, 50%, 80%, and 90% of TB patients will be detected within day 3, week 1, 2, and 4, respectively. The established assay will enable a faster diagnosis of TB, leading to more efficient treatment of TB patients and control of disease transmission. © 2014 Elsevier Inc.
Smart magnetic nanoparticle-aptamer probe for targeted imaging and treatment of hepatocellular carcinoma

Pilapong C., Sitthichai S., Thongtem S., Thongtem T., Pilapong, C.,

1Department of Radiologic Technology, Chiang Mai University, Chiang Mai 50200, Thailand
2Department of Physics and Material Science, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand
3Department of Chemistry, Faculty of Science, Chiang Mai University, Chiang Mai 50200, Thailand

ABSTRACT

We report herein the development of a smart magnetic nanoparticle-aptamer probe, or theranostic nanoprobe, which can be used for targeted imaging and as a drug carrier for hepatocellular carcinoma treatment. The theranostic nanoprobe combines the delivery potential of a non-toxic cellulose derivative polymer, specific capability of cancer-specific molecule (DNA-based EpCAM aptamer) and the imaging capability of magnetic iron oxide nanoparticles. Our proof-of-concept design demonstrates efficient in vitro MR imaging of the cancer cells, and enhanced delivery of an anticancer drug into the cancer cells with comparable treatment efficacy. © 2014 Elsevier B.V.