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RESEARCH ARTICLES

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Molecular and Cellular Biomedical Sciences

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Article:

Sandra F, Esposti MD, Ndebele K, Gona P, Knight D, Rosenquist M, et al. Tumor Necrosis Factor-Related Apoptosis-Inducing Ligand Alters Mitochondrial Membrane Lipids. Cancer Res. 2005; 65(18): 8286-97.

Book

Murray PR, Rosenthal KS, Kobayashi GS, Pfaller MA. Medical microbiology. 4th ed. St. Louis: Mosby; 2002.

Chapter in a book:

Rosenberg GA. Matrix metalloproteinase and proteolytic opening of the blood-brain-barrier in neuroinflammation. In: deVries E, Prat A, editors. The Blood-brain Barrier and Its Microenvironment Basic Physiology To Neurological Disease. New York: Taylor and Francis Group; 2005. p.335-58.

Dissertation/Thesis/Essay:

Arlauckas SP. Near infrared fluorescent choline kinase alpha inhibitors for cancer imaging and therapy [Dissertation]. Philadelphia: University of Pennsylvania; 2015.

Part of Website/Monograph:

Medline Plus [Internet]. Bethesda: US National Library of Medicine; ©2009. Diabetic Kidney Problems [update 2015 Nov 2; cited 2015 Nov 16]. Available from: https://www.nlm.nih.gov/medlineplus/diabetickidneyproblems.html/.

Conference Paper:

Fledelius HS. Myopia and significant visual impairment: global aspects. In: Lin LLK, Shin YF, Hung PT, editors. Myopia Updates II: Proceedings of the 7th International Conference on Myopia 1998 Nov 17-20, Taipei. Tokyo: Springer; 2000. p.3-17.

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CONTENT

RESEARCH ARTICLES

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Abstract

DDC 615.321
Kodi GM, Mustafa HA, Idris AAA (School of Health Sciences, Ahfad University for Women, Omdurman, Sudan)
The Effects of *Moringa oleifera* Leaves on Complete Blood Count, Renal and Liver Functions as Potential Therapy for Malnutrition
Mol Cell Biomed Sci. 2022; 6(2): 55-62
Abstract (English)
Background: *Moringa oleifera* which is available in many areas all over the world including Sudan is low-cost and traditionally used in the treatment of many disorders, including malnutrition. This study aimed to determine the effect of aqueous extract of *M. oleifera* leaves in renal, liver functions and complete blood count (CBC) parameters, and its potential as therapy for malnutrition.
Materials and methods: This was an experimental case control study using twenty-five Wistar albino rats. Rats were divided into three groups: normal protein diet group, low protein diet with or without *M. oleifera* extract groups. We determined rats' weight, CBC parameters, blood mineral concentrations, as well as liver and renal functions at day 0, 7, and 14.
Results: Our findings showed that rats' weight were significantly different between the three groups at day 0, 7, and 14. Rats' weight, blood sodium, potassium, calcium, and urea concentration, as well as Hb concentration, TWBCs count, total platelets count, and %lymphocyte showed significant differences between three groups at day 0, 7, and 14.
Conclusion: *M. oleifera* leaves can be used as potential therapy for malnutrition because they have some effects on weight, blood mineral concentrations, renal and liver function, as well as CBC parameters.
Keywords: ALP, AST, ALT, creatinine, *Moringa oleifera*

DDC 616.9940231
Anggriani RAH, Soeroso NN, Tarigan SP, Eyanoer PC, Hidayat (Department of Pulmonology and Respiratory Medicine, Faculty of Medicine, Universitas Sumatera Utara/Adam Malik General Hospital, Medan, Indonesia)
Association of CYP2A6 Genetic Polymorphism and Lung Cancer in Female Never Smokers
Mol Cell Biomed Sci. 2022; 6(2): 63-9
Abstract (English)
Background: The major significant factor that affected lung cancer development among female passive smokers is environmental tobacco smoke. Nicotine can be found in a never smoker population, such as a child whose father is a smoker. Lung carcinogenesis in never smoker populations is affected by nicotine metabolism by CYP2A6 gene, which encodes the main nicotine metabolizing-enzyme. The aim of this study was to assess the genetic polymorphism of CYP2A6 and its association with secondhand smokers among females who have suffered from lung cancer in North Sumatra population.
Materials and methods: This study was a case-control study, composed of 53 case subjects and 46 control subjects that were involved through a purposive sampling technique from two hospitals in Medan. PCR-RFLP was used for the examination of CYP2A6 gene to determine the genotype. The data were analyzed with conditional logistic regression test using Epi Info 7.0 software.
Results: The most common genotype of CYP2A6 detected in this study was *1B/*1B (40.4%), while *1B allele had the highest prevalence (55.5%). There was no significant association between CYP2A6 genotype (*p*-value=0.61) or alleles (*p*-value=0.25) and the incidence of lung cancer.
Conclusion: There was no association between CYP2A6 polymorphism and the incidence of lung cancer in secondhand smoker females.
Keywords: CYP2A6, PCR-RFLP, female secondhand smokers, lung cancer

DDC 599.935
Puspasari A, Enis RN, Herlambang (Department of Medical Biology and Biochemistry, Faculty of Medicine and Health Sciences, Universitas Jambi, Jambi, Indonesia)
Genetic Variant of Vascular Endothelial Growth Factor (VEGF)-A rs699947 is Associated with Preeclampsia
Mol Cell Biomed Sci. 2022; 6(2): 70-6
Abstract (English)
Background: Preeclampsia remains as the leading cause of maternal-neonatal mortality and morbidity worldwide. Vascular endothelial growth factor A (VEGF-A) is a proangiogenic factor related to endothelial dysfunction and plays an important role in the preeclampsia pathophysiology. Genetic variants of VEGF-A are associated with VEGF-A expression and preeclampsia risk, however there are still

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inconsistent results between different populations. The aim of this study was to determine the association of this genetic variant as preeclampsia risk factor.
Materials and methods: A cross-sectional study was performed with 76 pregnant women (29 preeclampsia and 47 normotensive) Jambi-Malay ethnic subjects. Sample DNA was extracted from subject's blood. To determine the genotype, one-step tetra amplification refractory mutation system (ARMS) polymerase chain reaction (PCR) method for VEGF-A rs699947 C/A was used.
Results: We found that pregnant woman with AC genotype (*p*-value=0.045; OR=2.76 ; 95% CI=1.01-7.58) and AA genotype (*p*-value=0.026; OR=12.44; 95% CI=1.23-126.18) had higher risk of preeclampsia than the CC genotype.
Conclusion: Genetic variant VEGF-A rs699947 C/A is associated with preeclampsia. The AC and AA genotype is the risk genotype for preeclampsia in Jambi-Malay ethnics.
Keywords: preeclampsia, VEGF-A, genetic variant, Jambi-Malay, Indonesia

DDC 616.075
Christian JE, Widyaningtyas ST, Bela B (Master Program of Biomedical Science, Faculty of Medicine, Universitas Indonesia, Jakarta, Indonesia)
Development of Recombinant Immunoblot Assay Diagnostic Test Based on HIV-1 in Indonesia
Mol Cell Biomed Sci. 2022; 6(2): 77-84
Abstract (English)
Background: High mutation rates in HIV-1 could affect the accuracy of diagnostic tests. Therefore, recombinant antigen that has an immunodominant and conserved region from HIV-1 need to be developed to detect HIV-1 infection in Indonesia.
Materials and methods: The recombinant antigens comprise of Gag (p24), Pol and Env (gp41). Each antigens was expressed in the *Escherichia coli* expression system and purified using Ni-NTA chromatography. The reactivity of purified antigen against HIV antibodies was tested against a group of 50 HIV-positive plasma samples and 45 HIV-negative plasma samples in a recombinant immunoblot assay (RIBA) platform test. Moreover, 21 of 50 HIV-positive samples and 3 of 45 HIV-negative samples were also tested using HIV blot 2.2 to compare RIBA with a commercial western blot kit. Ten HBV-positive and 10 HCV-positive plasma samples were used to check cross-reactivity with HIV recombinant proteins in RIBA.
Results: All HIV-positive samples (100%) tested with RIBA were reactive towards Gag (p24), Pol, Env (gp41). Otherwise, 3 of 21 HIV-positive samples assayed with HIV blot 2.2 were not reactive to Pol protein. All HIV-negative samples tested with RIBA and 3 HIV-negative samples tested with HIV blot 2.2 did not produce any bands of HIV antigens. Few HBV and HCV samples showed reactivity towards HIV recombinant proteins.
Conclusion: Each recombinant protein, Gag (p24), Pol, Env (gp41), could be expressed and purified, as well as had reactivity to HIV-positive samples in RIBA test. Therefore, RIBA can be used as a diagnostic test to detect HIV-1 infection in Indonesia.
Keywords: diagnostic, HIV-1, immunodominant, recombinant immunoblot assay (RIBA)

DDC 616.343
Yousif EK, Mustafa HA, Idris AAA (School of Health Sciences, Ahfad University for Women, Omdurman, Sudan)
An Experimental Study on the Healing Effect of Water to Traditional Sudanese Liquor (Aragi)-induced Stomach Peptic Ulcers
Mol Cell Biomed Sci. 2022; 6(2): 85-8
Abstract (English)
Background: Peptic ulcer is one of the most common gastrointestinal tract diseases which affect the stomach. This study aimed to determine the effect of aragi on the adult rats' stomach and investigate the effect of water as a therapeutic agent on aragi-induced ulcerations.
Materials and methods: Thirty-five adult Wistar albino rats were used in this experimental study. Five rats were sacrificed on day 0, 5 rats were used as a control group, and 25 rats were treated with aragi. On day 15, all rats in the control group and five aragi-treated rats were sacrificed for histological examination of the stomachs. The remaining 20 rats were stopped from aragi intake and 10 of them were treated with water for 15 days. After 15 day, all rats were sacrificed for histopathological examination of their stomachs. Stomach tissues were stained using hematoxylin and eosin (H&E) and documented under a microscope.
Results: Our research showed that aragi-treated rats had different severity of peptic ulcers after 15 days of continuous aragi intake, while the control group showed normal stomach histology. Nine out of 10 rats treated by water after aragi treatment also showed normal stomach histology.
Conclusion: Aragi is a causative agent for peptic ulcer and water can be used as potential natural therapy for treating ulcerative stomach.
Keywords: aragi, water, stomach, peptic ulcer

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DDC 616.9940231
Ramadhani N, Soeroso NN, Tarigan SP, Eyanoer PC, Hidayat (Department of Pulmonology and Respiratory Medicine, Faculty of Medicine, Universitas Sumatera Utara/Adam Malik General Hospital, Medan, Indonesia)
Correlation between Genetic Polymorphism of CYP2A13 Genotype and Lung Cancer in Female Passive Smokers
Mol Cell Biomed Sci. 2022; 6(2): 89-95
Abstract (English)
Background: Nicotine is metabolized to cotinine by cytochrome P450 enzyme, and this enzyme is involved in the activation of toxic and carcinogenic substances. The aim of this research was to assess the relationship between genetic polymorphism of CYP2A13 and lung cancer incidence in female passive smokers.
Materials and methods: This research was a case-control study that involved 104 research subjects. Subjects were recruited through purposive sampling technique from 2 hospitals in Medan, North Sumatra, Indonesia. The case population consisted of female passive smokers with lung cancer and the control population consisted of female passive smokers without lung cancer. All research subjects underwent blood sampling for genomics DNA extraction and CYP2A13 genotyping by polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP). Data was analyzed by conditional logistic regression by Epi Info 7.0 software.
Results: Among 104 subjects, 26 (25%) individuals were heterozygous, 76 (73%) individuals were wild type, and 2 (2%) were mutant for the 257Cys allele. There was a significant correlation between CYP2A13 genotype and lung cancer incidence (p-value<0.05). Female passive smokers with CT genotype had 2.7 greater risk of developing lung cancer than those with CC genotype (wild type). The C allele had more frequency and 1.6 times higher risk of lung cancer compared to T allele with a wide confidence range (0.73–3.52).
Conclusion: There was a significant correlation between CYP2A13 polymorphism and lung cancer incidence in female passive smokers.
Keywords: polymorphism, CYP2A13, PCR-RFLP, female passive smoker, lung cancer

DDC 616.0277
Mentari D, Pebrina R, Nurpratami D (Faculty of Biology, Universitas Jenderal Soedirman, Purwokerto, Indonesia)
Utilization of Expired Platelet Concentrate for Production of Human Platelet Lysate as a Medium for T47D Cell Propagation
Mol Cell Biomed Sci. 2022; 6(2): 96-103
Abstract (English)
Background: Platelet concentrate (PC) has a short shelf life (5 days). Expired PC cannot be used for clinical purposes. PC is used for human platelet lysate (HPL) production, which was found to be more effective than FBS at increasing T47D cell proliferation. HPL production using expired PC has not been reported. This study aimed to investigate whether the use of HPL produced from expired PC (storage duration >5 days) can increase the proliferation of T47D cells in vitro.
Materials and methods: Expired PC samples with a shelf life of 7 and 11 days were used to produce HPL via freeze/thaw method. pH, total protein content, glucose and albumin levels were measured. The 3-(4,5-dimethylthiazol-2-yl)-2,5-diphenyltetrazolium bromide (MTT) assay was used to measure proliferation rate and doubling time of HPL-treated T47D cells.
Results: After HPL production, the glucose level was influenced by the pH (p=0.003), and albumin level was influenced by total protein content (p=0.030). HPL stored for 7 and 11 days increased cell proliferation rate by 1.41 and 1.80 times higher than 10% FBS, respectively. HPL produced from expired PC did not cause morphological abnormality of the cells. In this study, the glucose levels affected cell proliferation (p=0.030). High glucose levels inhibited T47D cell proliferation.
Conclusion: Expired PC can be used as a potential material for HPL production, since HPL produced from expired PC increases cell proliferation rate and shortens cell doubling time.
Keywords: cell proliferation, human platelet lysate, platelet concentrate, thrombocyte, T47D

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Thank to Reviewers

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