The difference in severity and management between children and adult's cases of COVID-19
Wahyudin Sinoto, Cinta Nurhayati, Ika R. Adriyanto, Akbar Amalia lusanto

The role of gat nutrition in health and disease
Sanny Teturyanto, Andika P. Hartanto, Febri Surya

Kohlihanust: A review of chronic obstructive pulmonary disease (COPD) treatment
Limelvani, Deny Nurul Wicaksono, Ika R. Adriyanto, Sumbita, Endono Hardiyanto, Rosli, Fitria Ayu Nthyana, Rinaldy Setiawan, Febri Surya

Effects of aspirin therapy period towards blood sugar level in type 2 diabetes mellitus patients at Lirujiang outpatient clinic
Aryanto Puti Harlani, Roni Widodo

Infectious and nutritional outcome of medical degenerative disease after operative treatment in 2013-2018 at Dr. Soeharto General Hospital Surabaya
Seruje Oktavia, Tumberdi, Rini S. Widyantoro, Deny Nurul Wicaksono

Association between postpartum age and persistent Pneumonia symptom of the newborn (PHN) severity in western Indonesia at SMAN 1 Regional Hospital Surabaya
Usman Fathoni, Parami, Febri Surya, Susiati, Endono Hardiyanto, Rinaldy Setiawan

Subconjunctival injection of riboflavin plus ultraviolet-A phototherapy in the treatment of keratoconus
Abdurrahman, Febri Surya, Suryo Sumantri, Rinaldy Setiawan, Endono Hardiyanto

Identification of Plasmodium falciparum in blood sample from women at Polokaramat Hospital (PKH)
Vincentus F. Susanto, Febri Surya

Depression, anxiety, and stress levels in Haqipour community during the pandemic of Corona Virus Disease 2019 (COVID-19)
Abdul Fajri, Febri Surya, Rinaldy Setiawan

The association between demographic and attitude factors with the practice of malaria prevention among the urban community in Surabaya city district, Indonesia
A. Suryawan, Febri Surya, Rinaldy Setiawan

Pneumonia in elderly patient in Dwind-dek hospital: the impact an DNA fragmentation index (Swab) of elderly patient with elderly pneumonia
A. F. Kurnia, Febri Surya, Rinaldy Setiawan

Characteristics of complete and functional recovery of conservatively treated colonic suture in St. Sutami general hospital: a case series
Sriharmona, Febri Surya, Rinaldy Setiawan

Role of acamprosate to prevent liver cells damage induced by reactive oxygen species: a literature review
A. Suryawan, Febri Surya, Rinaldy Setiawan

The effectiveness of classic lecture and workshop as instruction to improve primary health care providers knowledge and skill on the management of pediatrics respiratory
Surya Sari, Febri Surya, Rinaldy Setiawan

diterbitkan oleh:
Fakultas Kedokteran
Universitas Muhammadiyah Surabaya
2021

Vol. 05, No. 01 | Hal. 01-139 | January 2021 | pISSN 2461-4373 | eISSN 2461-8538

journal.um-surabaya.ac.id/public/journals/19/covers_issue_462_en_US.jpg
Table of Contents

Literature Review

The difference in severity and management between children and adult’s cases of COVID-19
Mohammad Husin, Gina Noor Djaillah, R A Kaniraras, Afrika Amalia Laitupa

The role of gut microbiota in health and diseases
Deasy Fetarayani, Handoko Hariyono, Gatot Soegiarto

Ruffumilst: A Review of Chronic Obstructive Pulmonary Disease (COPD) Treatment
Ita Octavia, Dwi Octamy Sari, Novi Wulandari, Sandra Annisa, Linda Widyahni Wongkar, Ferdias Kurnia Bahari, Faiz Farikhab, Moh Firmanasih, Erfin Midhiawati, Fauna Herawati

Role of antioxidant to protect Leydig cells induced by reactive oxygen species: a literature review
Anak Agung Istri Dalem Cintya Riris, Reny Istimow, Siti Khaerunnisa

Articles

Effects of acupressure therapy period towards blood sugar level in type 2 diabetes mellitus patients at Lumajang acupressure clinic
Anung Putri Ilahiha, Hien Safira

Clinical and Functional Outcome of Cervical Degenerative Disc Disease after Operative Treatment at Dr. Soetomo General Hospital Surabaya In 2013-2018
Reynier Valiant Tumbelaka, Dwikora Novemtri Utomo, I Ketut Martiana

Association between gestational age and persistent pulmonary hypertension of the newborn (PPHN) severity in preterm babies at Sidoarjo Regional Hospital
Aisyah Faadilah, M. Perdana Airlangga, Nurma Yuliyansari, Gina Noor Djaillah

Solanum betacemum Extract as a Protective on Spermatozoa Morphology of Mice Exposed to Lead Acetate
Rina Wiresvianta, Reny Istimow, Siti Khaerunnisa, Anak Agung Istri Dalem Cintya Riris, Nurul Fatimah Susanti, Nural Jamiatul Wahidah, Abadiyah Zakiyah Kustantina

Identification of Thalassomiasis Carrier in Anemic Pregnant Women at Pus Cosmos Kertapati Palembang: Comparision of Five Erythrocyte Indices
Mitayani Purwoko, Eriko Erenkowet

Depression, anxiety, and stress levels in Denpasar community during the pandemic of Corona Virus Disease 2019 (COVID-19)
I Gusti Ngurah Bagus Rai Mulya Hartawan, I Gede Gita Sastuwad, Rovle Hilari Parastan, Luh Seri Ani

The association between demographic and attitude factors with the practice of malaria prevention among the rural community in Purworejo district, Indonesia
Farindira Vesti Rahmasari, Wolly Setyono, I Ketut Swarjana, Desto Arisandi, Tri Wulandari Kesetyaningsih

In vitro Alpha Lipolic Acid supplementation in freeze-dried human sperm: the impact on DNA fragmentation index
Reza Octania, M. P. B. Dyah Prameswi, Agustinus Agustinus

The effectiveness of classic lecture and workshop as interventions for older healthcare providers knowledge and skill on the management of pediatric emergencies: a case study
Ricky Indra Alfayar, Rahmat Sayyid Zharfan, Yudhistira Pradyardak Louling, Yudith Annisa Ayu Rezkitha, Rahayu Salah Fajrun, Saruuljavkhlan Batsaikhan, Ahmad Siddiq Muhajir; Bestya Presidiana, Umaimah Rosyidah, Khodijah Nidaul Chasanah, Delia Nur Aini, Naufal Fauzi, Kamal Musthohla, Nur Firdosa, Samsuryaningis; Handayani
Case Report
Cardio-vocal Syndrome as a Complication Patient with Severe Mitral Regurgitation and Moderate Aortic Regurgitation with Pulmonary Hypertension
Adityo Basworo, Agus Subagio
Characteristics of complaints and functional outcomes of conservatively treated clavicle fractures in Dr. Soetomo general hospital: A case series
Brilliant Citra Wirashada, Maghrizal Roychan, Teddy Heri Wardhana
Index
Index and Acknowledgement
Vehli Levani
Editor in Chief

- Yelvi Levani, (Scopus ID: 552000360700) (Sinta ID: 6689408) Faculty of Medicine Muhammadiyah University of Surabaya, Indonesia

Editor

- Jan L. Nouwen, (Scopus ID: 70040573322) Erasmus MC University Medical Center Rotterdam, Netherlands
- Abdullah Al Tanque, (Scopus ID: 25960456000) Child Health Research Centre Faculty of Medicine, University of Queensland, Australia
- Prof Takashi Yoshio, (Scopus ID: 7007120815) JICH Medical University School of Medicine, Japan
- Prof Murat Coskun, (Scopus ID: 24079638000) Istanbul University, Istanbul, Turkey, Turkey
- Muhammad Ansar, (Scopus ID: 57192299850) Medical Faculty University Muhammadiyah of Surabaya, Indonesia
- Suhartono Taat Putra, (Scopus ID: 57194008862) Departemen Patobiologi Universitas Airlangga Surabaya, Indonesia
- Azis Alimul Hidayat, (Scopus ID: 57203654137) Universitas Muhammadiyah Surabaya, Indonesia

Section Editor

- Syafarina Akil, Faculty of Medicine, Universitas Muhammadiyah Surabaya, Indonesia
- Ayu Lidya Paramita, Faculty of Medicine Muhammadiyah University of Surabaya, Indonesia

Layout Editor

- Dede Nasrullah, (Scopus ID: 57212390877) Departement Nursing Faculty of Health, University Muhammadiyah Surabaya, Indonesia
Research Article

Solanum betaceum extract give protective effect on spermatozoa morphology of mice exposed to lead acetate

Rima Wirevion1, Reny I’lishom2, Siti Khaerunnisa3, Anak Agung Istri Dalem Cinthya Riris4, Nurul Fatimah Susantia, Nurul Jannatul Wahidah4, Abadiyah Zaklyah Kustantinab

1,4,5,6,7) Master of Reproductive Health, Faculty of Medicine, Airlangga University, Surabaya.
2) Department of Medical Biology, Faculty of Medicine, Airlangga University, Surabaya.
3) Department of Medical Biochemistry, Faculty of Medicine, Airlangga University, Surabaya.

ARTICLE INFO

Submitted : April 2020
Accepted : August 2020
Published : January 2021

Keywords:
Solanum betaceum extract, morphology, spermatozoa, lead acetate

*Correspondence:
ritishom@fk.unair.ac.id

ABSTRACT

Environmental pollution is one of the factors that contribute to the decline in male fertility. Lead is one of six air pollutants harmful to the reproductive system. One parameter of infertility in men is a decrease in reproductive function observed with increasing abnormalities morphology of spermatozoa. The purpose of this study is to analyze the effect of giving various dosages of Solanum betaceum extract on spermatozoa morphology of mice exposed to lead acetate. This study was true experimental using a randomized post-test only control group design. The total sample was 40 male mice Balb/C taken by simple random sampling technique. Treatment and maintenance of experimental animals for 35 days. Statistical tests with one way Anova showed there were significant differences with p-value 0.005. Solanum betaceum extract can be used as a protective agent to improve the normal morphology spermatozoa of mice that exposed to lead acetate.
INTRODUCTION

Environmental pollution is known as one of the factors related to the decline in male fertility (I’ishom, Lubis, Pieters, & Hamdani, 2011). One parameter of infertility in men is a decrease in reproductive function observed with an increase in abnormalities morphology of spermatozoa (Kumar, 2018). Environmental pollutant material that is often found daily, especially in industrial countries and in developing countries is lead (Pb) (Bierkens, Smolders, Holderbeke, & Cornelis, 2011). Indonesia ranks fifth after India, China, Vietnam, and the Philippines as lead polluted countries according to the Political and Economic Risk Consultancy (PERC) (Diana, I’ishom, & Sudjarwo, 2017). Lead acetate given orally in experimental animals can increase levels of Malondialdehyde (MDA) tests and cause changes in the histological features of testicular tissue where interstitial exudation, degeneration, and spermatogenic cell necrosis are seen. This results in impaired spermatozoa quality (Zarghami & Khosrowbeigi, 2005).

Lead can cause fat oxidation in unsaturated fat chains. Lipids that improve oxidation will be repaired chain reactions to make free radical products. Increasing the number of radicals will spend the amount of decomposition of unsaturated fatty acids into lipids peroxide, which is very unstable. Lipid peroxidation will result in damage to the structure of spermatozoa (Acharya, Acharya, & Mishra, 2003). The administration of lead nitrate to male mice for 16 days with concentrations of 120 ppm, 360 ppm, 600 ppm, and 840 ppm, respectively, significantly reduced the process of spermatogenesis in the phases of spermatocytogenesis, meiosis, and spermigenesis. The toxic effects of lead on the male reproductive system result in testicular atrophy, which affects the morphology of spermatozoa (Suryatini & Rai, 2018).

Lipid peroxidation reactions can be inhibited by the addition of antioxidants (Chang & Kim, 2018). One of the natural antioxidants that can be used is Solanum betaceum extract, which is proven to contain relatively high antioxidants such as anthocyanin, flavonoids, carotenoids, tannins, and saponins (Khaerunnisa, Kusumastuti, Mustika, Aminah, & Suhartati, 2019; Rosadi, Warditiani, & Larasanti, 2018). High antioxidants can reduce lead-induced oxidative stress in experimental animals (Diana et al., 2017). Antioxidant performance by inhibiting the formation of Reactive Oxygen Species (ROS), preventing redox reactions that produce new oxidants, protecting lipophilic antioxidants to strengthen endogenous antioxidants (Hardingtys, Purwaningsih, & Handhayani, 2014), and working with testosterone for spermatozoa maturation (Türk et al., 2008). Based on the explanation, Solanum betaceum extract is expected to act as an antioxidant by preventing damage to biological membranes due to free radicals and potentially as a spermatozoa protective agent from the influence of lead acetate.

METHODS

This research was conducted after obtaining permission from the committee of Ethics of Medical Faculty, Airlangga University, with letter number 30/EC/KEPK//FKU/2020. This research is true experimental research using a randomized post-test only control group design to determine the effect of Solanum betaceum extract on the spermatozoa morphology of male mice exposed to lead acetate. This research has been conducted in January-February 2020 by involving 40 mice Balb/C.

The research sample was selected by a simple random sampling technique and divided into five groups, namely K0, K1, P1, P2, and P3. K0 received distilled water only. K1 received a lead acetate dose 75 mg/kg BW. P1, P2, and P3 received ethanol extract of Solanum
betaceum with three different doses, namely 100 mg/kg BW, 200 mg/kg BW, and 400 mg/kg BW, respectively. The inclusion criteria of this research were male mice Balb/C, age ±12 weeks, and initial body weight of 25-30 grams. Research exclusion of experimental animals was sick and died.

After 35 days of treatment, the spermatozoa will be examined to determine its morphology. Spermatozoa suspension was taken using a dissecting kit to remove the epididymis organs. The epididymal fluid was released and suspended with NaCl 0.9% in a microtube. Spermatozoa suspension from cauda epididymis was used for observation. Observation of spermatozoa morphology is done by spermatozoa suspension results dripped on the glass object. Preparations are dried in the air before fixation. The preparation was fixed with methanol for 5 minutes and dried again. Furthermore, the preparation was stained with safranin for 5 minutes and rinsed with phosphate buffer solution, and then stained with violet crystals for 5 minutes. The practices are washed with clean water and dried. The observation is to see the spermatozoa deformity and its percentage, using a 1000x magnification microscope.

The normality and homogeneity of the data are tested first. Data was said to be normal and homogeneous if the p-value >0.05. The normality test used Shapiro-Wilk because of the data <50. After the data is declared normal and homogeneous, it is continued with Anova test. P-value <0.05 is the significance value of the variables analyzed with one way Anova. After an Anova test shows the significant result, then continue with the Post hoc test to know which group is different from the others.

RESULTS