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[Portal Hypertension Assessment Spleen using Stiffness Measurements after Successful DAAs Therapy in Chronic-HCV Patients](#)


 *Khaled Elmola, Mohamed Heiza, Ahmed B. Abd El Salam, Basem M. M. Salama*

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[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.272

Research Article

[Cadmium and Selenium Levels in Blood Smokers of Water Pipe \(Hookah\) in Baghdad](#)

 *Hiba Yousef Saleh, Ghaidaa Neamah Kadhim, Hadeel Ahmed Hasan*

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[Development of an Extended-Release Exenatide Once a Week Depot Formulation](#)


 *Jabar A Faraj, Shaimaa M. Mohammed, Khulood M. Alsaraf, Ihab I. Alkhalifa, Kadum A. Al Shareffi, K. Burton.*

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[FOREST AREA MANAGEMENT WITH SPECIAL PURPOSE \(KHDTK\) UNIVERSITY OF BRAWIJAYA FOREST](#)


 *Harry Susanto, Eko Ganis Sukoharsono, Bambang Hendroyono, Amin Setyo Leksono*

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[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.274

Review Article

[RETHINKING ENGLISH LANGUAGE TEACHING THROUGH TELEGRAM, WHATSAPP, GOOGLE CLASSROOM AND ZOOM](#)

 *Charanjit Kaur Swaran Singh, Tarsame Singh Masa Singh, Nadiah Yan Abdullah, Sasigaran Moneyam, Mohd Ridhuan Ismail, Eng Tek, Ong, Tanalachumi Karupayah, Kalaiselvi Chenderan, Manesha Kaur Rajendra Singh, Jagvinder Kaur Swaran Singh.*

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[Polymerase Chain Reaction Study For Anaplasma Phagocytophilum In Iraqi Cows](#)

 *Basim Kareem Ajel, Alaa kamil Mahmood.*

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[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.275

Research Article

[Assessment of the State of Natural Resources for Organization of Screening of Urothelial Tumors](#)

 *Vladimir Yu. Startsev, Gleb V. Kondratiev, Vasyli I. Oriol, Sergey V. Golubev, Vladimir S. Luchkevich*

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[The Five Major Factors in the Personality and its Relationship to the Attachment Patterns Among the Students of the College of Law, Prince Mohammad Bin Fahd University, AL-KHOBAR](#)

 *Samia Awad Mohamed Hassan*

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[Adding Different Concentrations of Pomegranate Peels Alcoholic Extract and its Effect on Characteristics of Awassi Ram Semen Preserved at Cooling](#)

👤 *Husam Jasim Hussien Banana, Hakem Takleef Abed Alkhazreji, Zainab Adel Mahdi*

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[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.255

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[Characteristic Abnormalities In Serum Biochemistry In Patients With Breast Cancer](#)

👤 *Mahde S. Hamad, Entedhar R. Sarhat, Salim J. Khalaf, Thuraia Rifaat Sarhat, Kasim Sakran Abass*

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Research Article

[Influence of Oocyte Collection Techniques on Oocyte Retrieval and Quality from Ovaries of Iraqi Goats \(Capra Hircus\)](#)

👤 *Ali J. AL-Nuaimi, Hashim M. AL-Rubaei and Fawzea G. AL-Gebouri*

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[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.168

Review Article

[Comprehensive Study For Skin Diseases In Primigravid And Multigravid Pregnant Women](#)

👤 *Asma I Alajeel.*

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[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.277

Research Article

[Quality of Health Services in the Family Planning Program in Donggala Regency, Indonesia](#)

👤 *Sudirman, Rajindra Rajindra, Burhanuddin, Mohamad Andri, Ahmad Yani*

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[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.223

Review Article

[Biological potentials of Hymecromone-based derivatives: A systematic review](#)

👤 *Yasser Fakri Mustafa, Noora Thamer Abdulaziz.*

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Research Article

[Comparison Profile of Quality of Life, Phosphorylated-Tau, and Superoxide Dismutase Plasma in Women Elderly with and without Dementia](#)

👤 *Lisna Anisa Fitriana, Kusnandar Anggadiredja, Irma Darmawati, Lina Anisa Nasution, Linda Amalia, Slamet Rohaedi, Iwan Setiawan, Adang Suherman, I Ketut Adnyana*

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[The Success of Elimination Diet in Indonesian Children with Food Allergy: The Role of Caregiver's](#)[Stress, Family Activities, and Coping](#)

 Azwin Mengindra Putera, Irwanto, Margarita Maria Maramis

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Review Article

[TELEVISION AND LANGUAGE OF COMMUNICATION](#)

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[Electronic Rumors of the Corona 19 Pandemic and its Impact on Psychological Reassurance in a Sample of the Society of Prince Sattam Bin Abdulaziz University](#)

 Mona AbdeLatif Al-Awad Khairallah, Asmaa Ghurmallah Al-Zahrani

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[The Effect of 8 Weeks National Academy of Sports Medicine Exercises Training on Posture, Shoulder Pain, and Functional Disability in Male with Upper Cross Syndrome](#)

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Review Article

[THE RESULTS OF THE RESEARCH OF THE INITIAL STATE OF READINESS OF FUTURE SOCIAL PEDAGOGUES TO WORK IN INCLUSIVE EDUCATION](#)

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[Phytochemical Investigation Of Some Phenolic Compounds In Carthamus Tinctorius That Grown Naturally In Iraq](#)

 Mohammed Abbas Fadhil, Enas Jawad Kadhim

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Review Article

[Hydrothermal Synthesis Of \$\alpha\$ -MnO₂ Nanostructures With Different Morphologies Using Different Mn²⁺ Precursors](#)

 Zahraa Hasan Raheem, Abdulkareem Mohammed Ali Al-Sammarraie

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👤 Hanadi A. Abdul-Razzaq, Bafreen M. Raza

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👤 Vu Thu Trang

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Review Article[Psychological Detection Of Stress And Shbg \(Sex Hormone Binding Globulin\) In Insulin Resistant Of Polycystic Ovarium Syndrome \(Pcos\) In Women, Indonesia](#)

👤 Zakkuyatus Zainiyah, Muhammad Suhron

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[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.263

Review Article[THE EFFECTIVENESS OF USING ANIMATION ON SCIENCES ACADEMIC ACHIEVEMENT OF THE THIRD GRADE STUDENTS IN AL-JEEZAH DISTRICT SCHOOLS](#)

👤 Foza Al-Zaben, Manal A. Altawalbeh.

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👤 Aida Hussain Ibrahim and Marwa Shaker Mahmood

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[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.228

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👤 Maslichah Mafruchati

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👤 Suad A Al-Hilu, Wisam H Al-Shujairi

SRP. 2020; 11(11): 464 - 475

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👤 *Wathib S S Alnuaymy, Ali M S Alalusi*

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👤 *Indriati Paskarini, Dani Nasirul Haqi, Shintia Yunita Arini, Endang Dwiyantri, Putri Ayuni Alayyannur*

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👤 *Kaharuddin, Djuwairiah Ahmad, Mardiana, Rusni.*

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👤 *Meeri Kadhim Mubasher Al-Fatlawi, Alaa Hussin Abed, Mohammed sahib abed, Ahmed A. AL nuaimy*

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Review Article[How Does Team Performance Management Influence The Knowledge In Implementing Patient Safety Programs In Hospital Work Unit, Indonesia?](#)

👤 *Mirrah samiyah, Usman Hadi, Widodo J. Pudjiraharjo, Nyoman Anita Damayanti, Djazuly Chalidyanto, ThinniNurul Rochmah.*

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👤 *Sanaa A. M. AL-Hameed, Abbas. S.H. AL- Machi and Jassim K.M. Al-Gharawi*

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👤 *Nur Baharia Marasabessy, Muhammad Suhron*

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[Role of Hyaluronic Acid in Modulating Wound Healing Progression](#)

👤 *Maha Adil Hameed, Majid Kadhim Abbas, Kaiser N. Madlum*

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[A Comparison between Anteroposterior Colporrhaphy and Erbium YAG Laser Interventions in the Treatment of Postpartum Stress Urinary Incontinence: Promising Win for the Erbium YAG laser](#)

👤 *Taghreed Salah Alquzwini*

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[Does Contraception Used Better In Urban Areas?: An Analysis Of The 2017 Idhs \(Indonesia Demographic And Health Survey\)](#)

👤 *Agustina Abuk Seran, Agung Agung Laksono, Anita Dewi Prahastuti Sujoso, Masruroh, Ilyas Ibrahim, Nurmah Baharia Marasabessy, Nikmatur Roharia, Nasrun Pakaya, Retno adriyani*

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[Effect of Silymarin and/or Bone Marrow-Derived Mesenchymal Stem Cells on Carbon Tetrachloride-Induced Hepatotoxicity in Rats](#)

👤 *Tariq I Almundarij, Abdel Kader A Zaki, Yousef M. Alharbi, Saleh M. Albarrak, Tamim S Alqarawi and Faten A M Abo-Aziza*

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[CROSS LEVEL ANALYSIS OF ORGANIZATIONAL JUSTICE CLIMATE TO COUNTERPRODUCTIVE WORK BEHAVIOR: LEADER-MEMBER EXCHANGE AS MEDIATION](#)

👤 *Yuni Siswanti, Heru Kurnianto Tjahjono, Arif Hartono, Wisnu Prajogo*

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[Effect of Oxytocin Injection on Some Biochemical Parameters and Morphological of Some Organs Trails in Holstein Crossbreed Cows](#)

👤 *Khalaf A. H. Al-Rishdy, Waleed Y. Kassim and Murthda F. AL-Hellou*

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[Medication safety issues in Four Lower Middle-Income Countries of Northern and Eastern Africa: Challenges and Recommendations](#)

👤 *Mansour Adam Mahmoud, Alnada Abdalla Mohamed Ibrahim, Sultan O Alolayan*

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[Effect Of Evisect On Organo-Somatic Index And Pathohistological Changes Of Some Vital Organs In White Mice.](#)

👤 *Radhiah Najm Abd, and Azhar Lateef Jebur*

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[THE INFLUENCE OF BRAND SATISFACTION, BRAND TRUST, BRAND PREFERENCE ON BRAND LOYALTY TO LAPTOP BRANDS](#)

👤 *Dam Tri Cuong*

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[What Factors that Cause the High Numbers of Unwanted Pregnancy in Indonesia?](#)

👤 *Muthmainnah, Indah Lutfiya, Mursyidul Ibad, Afif Kurniawan, Nuke Amalia, Diyah Herowati, Lutfi Agus Salim, Diah Puspita Sari, Chairunnisa Murniati*

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[Study Of Removing Of The Hexavalent Chromium Ion From Aqueous Solutions Using Coal And Ficus Modified](#)

👤 *Marwa Sabbar Falih, Suhair Abdulhadi Mahdi, Mudeer Mubarak Merza*

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[Fabrication and Evaluation of Oral Multi-Particulate Tablets of Proton Pump Inhibitors: Esomeprazole as a Model](#)

👤 *Radhwan N. Al-Zidan, Saad M. Majeed, and Mohammed K. Al-Shaheen*

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[The Role and Significance of Tools of Decentralization of the Healthcare System in Ukraine and the Republic of Poland: Medical and Legal Analysis](#)

👤 *Olena Artemenko, Lubov Krupnova, L& 1110;udmyla Kurylo, Svitlana Kovalova, Liliia Kniazka.*

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👤 *Pasinringi A. Syahrir, Rivai Fridawati, Irwandy, Sari, Nurmalia*

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👤 *Tobroni, Nur Chanifah, Saiful Akhyar Lubis*

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👤 *Awani, K.J., Rajaa, S. Abbas, Ziad Tareq Naman*

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👤 *Chnar Najmaddin, Mosleh M. Saeed*

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👤 *Zulfa Nurfitri Ramadhani, Maftuchah Rochmanti, Pungky Mulawardhana*

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👤 *Baqer Abdulameer Hassan, Falah Abdulhasan Deli, Asaad Hasan Noaman, Salam Jasim Mohammed*

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👤 *Muaiad H.I. Al- Ani, Omar I. M. Al-Dulaimi, Ghazwan H. T. Mahmood, Ahmed R. M. Al-Rawi, Saleh E. Seadh*

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[SIRTUIN 1, a novel approach in the treatment of type 2 diabetes mellitus](#)

👤 *Rusul Ahmed Tariq, Inam Sameh Arif, Basma Talib Al-Sudani*

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[Shape and Size Effect of Surface Plasmons on Gold Nanoparticles](#)

👤 *Ahmed M. K. Al bayati, Rafea. A. Munef, Raad M.S. Al haddad*

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[Expression of HLA-DR, GM-CSF, CD38, and IFN- \$\gamma\$ CD4 Lymphocytes Isolated from Patients Pre- and Post-intensive Phase of Tuberculosis Treatment](#)

👤 *Herry Priyanto, Muhammad Amin, Jusak Nugraha, Paul Edward Hutchinson*

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[Study The Effect Of Chemerin Level In Type II Diabetic Patients With And Without Retinopathy](#)

👤 *Noor T. Tahir, Israa Q. Falih, Faten Khudhair AL_Husaini, Sali Abed Zeghair*

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[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.260

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[Assessment of Faculty Students' Awareness about ?Pediculosis? in Najaf Province, Iraq](#)

👤 *Malak Majid Al-musawi, Kifah Fadhil Hasson Al-shabaa, Widad Hashim Yahya Al-muhana.*

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[Bioanalytical Method Validation of Acrylamide and Glycidamide in Dried Blood Spot Using Ultra High Performance Liquid Chromatography Tandem Mass Spectrometry](#)

👤 *Yahdiana Harahap, Amiral Hafidz, and Fadlina Chany Saputri*

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[In Vitro Antimicrobial Activity of Aqueous, Ethanolic and Methanolic Leaves Extracts from *Salvia argentea*](#)

👤 *Yasmina Benabdesslem, Kadda Hachem*

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[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.236

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[An Integrative Review of Discharge Planning Interventions with Thai Stroke Patients](#)

👤 *Wanich Suksatan, Vachira Posai*

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[Learning Style Role in Varieties of Blended Learning](#)

👤 *Hamonangan Tambunan, Marsangkap Silitonga, Uli Basa Sidabutar.*

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[Sustainable Budget Planning in Green Campus Implementation at Universitas Muhammadiyah Riau](#)

👤 *Bakaruddin, Agus Irianto, Idris, Hasdi Aimon, M. Yahya*

SRP. 2020; 11(11): 1701 - 1705

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[Study of Some Hematological, and Biochemical Parameters in Patients with SARS-CoV-2 in Kirkuk City/Iraq](#)

👤 *Abdulla Kamil Abdulla, Omar A Salman, Ahlam Ahmed Mahmood*

SRP. 2020; 11(11): 515 - 522

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[Comparative Study Depending on Immune and Body Status with Anemia in Sheep](#)

👤 *Inam A. Nayyef*

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[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.239

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[Trace Elements Levels In Iraqi Immunocompetent Patients With Toxoplasmosis](#)

👤 *Maysoon Abdul-zahra Merdaw, Najwan Kaisar Fakree, Hala Hussain Hadi, Shahad Wisam Ahmed, Sonia Emad Naser*

SRP. 2020; 11(11): 1864 - 1868

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[The Effect of Work Discipline and Compensation on Employee Performance in the Government Office](#)

👤 *Maya Rezeki Angriani, Anis Eliyana*

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👤 *Fatin Fadhilah Hasib, Anis Eliyana, Zainal Arief, Anisa Army Pratiwi*

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👤 *Sushardi, Adi Ruswanto, Sri Gunawan, Idum Satia Santi, Mohamed Nor Azhari Azman, Nuraeni Dwi Dharmawati, Bambang Heri Isnawan*

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👤 *Zainal Arief, Anis Eliyana, Rachmawati Dewi Anggraini, Putri Atika Sari*

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👤 *Haryadi Sarjono, Oranis Seik, Juliasco Defan and Bachtiar H. Simamora.*

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👤 *Dini Widianingrum, Tuti Widjastuti, Asep Anang, Iwan Setiawan*

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[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.12.85

Review Article[A Review of Antimicrobial Resistance \(AMR\) of Escherichia coli on Livestock and Animal Products: Public Health Importance](#)

👤 *Hayyun Durrotul Faridah, Erna Kristiana Dewi, Fatimah, Mustofa Helmi Effendi, Hani Plumeriastuti*

SRP. 2020; 11(11): 1210 - 1218

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.174



Review Article[How to Optimize Surgical Treatment of Chronic Anal Fissure Combined With Rectocele In Women](#)

👤 V.F. Kulik & 1086;vsky, N.V. & 1054;leynik, A.P. Kriv & 1089;hik & 1086;va, M.S. Aleni & 1089;heva, Yarosh A.L..

SRP. 2020; 11(11): 171 - 176

» Abstract » PDF DOI: 10.31838/srp.2020.11.24

Review Article[Current State and Perspectives of Criminalization of Violations of Labor Rights in the New Criminal Code of Ukraine](#)

👤 Tetiana Zanfirova, Anzhela Aidynian, Yurii Pokhodzilo, Iryna Kravchuk, Hlib Rybalko

SRP. 2020; 11(11): 529 - 532

» Abstract » PDF DOI: 10.31838/srp.2020.11.76

Review Article[Synergistic and antimicrobial effects of leaves oil \(phoenix dactylifera\) agonist gram negative bacteria](#)

👤 Shatha Mousa mlaghee Al-safi, Kefah fadhil hasson Al-Shabaa, Saadia S. Mehdy AL-Zeiny, Aiman Mohammed Baqir Al-Dhalimy.

SRP. 2020; 11(11): 177 - 181

» Abstract » PDF DOI: 10.31838/srp.2020.11.25

Review Article[Legal Nature of Invalid Transactions](#)

👤 Oleksii Zaitsev, Volodymyr kroitor, Arsen Isaiev, Marianna Bilenko, Arina Savchenko

SRP. 2020; 11(11): 533 - 536

» Abstract » PDF DOI: 10.31838/srp.2020.11.77

Review Article[The differences of T2RS expression as a sensitivity marker of bitter taste on consumed coffee](#)

👤 Intan Nadzirah, Ari Triwardhani, Hans Lesmana, Aqsa Syuhada Okky, Hendrik Setia Budi, Jenny Sunariani.

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» Abstract » PDF DOI: 10.31838/srp.2020.11.26

Research Article[Histopathological Studies on Leucocytozoon Caulleryi Infection on Broiler in Endemic Area of Indonesia](#)

👤 Endang Suprihati, Kusnoto Kusnoto, Nusdianto Triakoso, Wiwik Misaco Yuniarti

SRP. 2020; 11(11): 1219 - 1223

» Abstract » PDF DOI: 10.31838/srp.2020.11.175

Review Article[Exploring Indonesian Midwife's Experience of Preeclampsia Screening and Community Health Volunteer's Role to Prevent Maternal and Fetal Complications: A Qualitative Study at the Community Level](#)

👤 Johariyah, Widyawati, Nurdianti DS.

SRP. 2020; 11(11): 1224 - 1232



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[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.27**Review Article**[Health Promotion Model Of Parent Caretaking Pattern Through Integrative Holistic Early Age Children Education](#)✎ *Tri Sunarsih, Djauhari Ismail, Endah Puji Astuti, Elvika Fit Ari Shanti.*

SRP. 2020; 11(11): 194 - 202

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.28**Review Article**[Leaders' Change Promoting Behaviors, Leader Charisma, And Commitment to Change as the Antecedent of Employee Performance](#)✎ *Ferdic Sukma Wahyudin, Anis Eliyana, Agung Dharmawan Buchdadi, Wahyu Saputro*

SRP. 2020; 11(11): 1224 - 1233

[» Abstract](#) [» PDF](#) DOI: doi: 10.31838/srp.2020.11.176**Review Article**[New Trichoderma harzianum Rifai F-180 - L-lysine--oxidase antitumor enzyme producer - culture liquid-based substance biotechnology](#)✎ *I.P. Smirnova, I.V. Podoprigora, V.I. Kuznetsov, T.I. Mansur, G.I. Miandina, N.V. Iashina*

SRP. 2020; 11(11): 203 - 207

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.29**Review Article**[Effects of Coconut oil and fusidic acid extract in alternative traumatic wound healing in RATS model](#)✎ *Hassan H.K. AL Bayati, Firas A. Husseinb, Idris K. Thamer, Buthina A. Abdullah.*

SRP. 2020; 11(11): 208 - 213


[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.30**Review Article**[Comparison of The Effects Of Deferasirox And Deferoxamine On Uric Acid And Renal Function In Patients with Beta Thalassemia](#)✎ *Zeina A. Althanoon, Nasih A. Alkazzaz.*

SRP. 2020; 11(11): 214 - 222

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.31**Review Article**[Effects of Sleep Quality Towards Blood Glucose Levels As At Type II Diabetes Mellitus Patients](#)✎ *Janu Purwono, Ludiana, Nury Lutfiatil Fitri, Uswatun Hasanah, Sapti Ayubbana*

SRP. 2020; 11(11): 223 - 226

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.32**Research Article**[The Effect of Participatory Leadership on Performance through Psychological Empowerment and Trust-in-Supervisors](#)

 *Helmi Buyung Aulia Safrizal, Anis Eliyana, Muhammad Firdaus, Pinky Dwi Rachmawati*

SRP. 2020; 11(11): 1234 - 1246

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.177

Research Article

[Effect of Curcumin on sFlt-1 and PlGF Concentration in Preeclampsia Induced HUVEC Cell Line](#)

 *Cut Meurah Yeni, Prima Nanda Fauziah, Ani Melani Maskoen, Rovina Ruslami, Johannes Mose*

SRP. 2020; 11(11): 1247 - 1251

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.178

Review Article

[Double-Blind Placebo Controlled Effectiveness of Cholecalciferol \(Vitamin D3\) Plus Magnesium and Zinc in Management of Type 1 Diabetes \(T1d\) In Pediatric Age Group](#)


 *Luay Farhood Jumaah, Baha D. Moohy Alosy, Hind Mutar Ibrahim, Emad Maarooif Thskir*

SRP. 2020; 11(11): 543 - 548

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.79

Review Article

[Protocol for a Systematic Review and Meta-Analysis on Randomized Clinical Trials on the Efficacy and Safety of Sphingosine-1-Phosphatase Receptor Modulators](#)

 *Asim Ahmed Elnour, Adel Sadeq, Farah Hamad Farah, Noor Alhouda Kassem, Haia Abdulsamad, N Al Mazrouei, Israa Yousif Khidir, Doaa Nassar, Abubakar B. Abubakar, Abdelgadir Elamin, Abdulla Al Amoodi, Sasha Mohammed Elamin Suliman, Mohamed Elamin Hassan, Noora Alhajri, Ekrima Elmoeiz Gaffar Osman, Salma Mohamed Magboul, Judit Don; Jamila Alaryani, Islam Moahammed Abd Alla, Warda Salah Mohammed Elkhalfifa, Nadeen T Ali, Hanan Siddig Ali Alamin, Hagar Awad Abdelrahim, Sahar Asim Ahmed Elnour, Asil Adel, Wadah Mohamed Ali Khogali, Haya Hamed Ahmed Lulu*

SRP. 2020; 11(11): 1253 - 1262

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.179

Review Article

[Maternal Characteristics and Perinatal Outcomes in Women with Severe Preeclampsia](#)

 *Cipta Pramana, Kartika Budi Peranawengrum, Velisa Juliani, Citramas Laras, Ni Nyoman Harini Luxzi, Agus Supinganto, Nur Aini Staryo, Nurhidayah, Kholis Ernawati, Selasih Putri Isnawati Hadi, Giri Respati*

SRP. 2020; 11(11): 549 - 553

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.80

Review Article

[COPING STRATEGIES POTENTIALLY REDUCE BURNOUT SYNDROME IN ANESTHESIOLOGISTS](#)

 *Kusuma Dewi Sugiharto, Hartono, Purwoko, Ari Probandari*

SRP. 2020; 11(11): 554 - 558

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.81

Review Article

[The Effect of Transactional and Transformational Leadership on Lecturer Performance with Job Satisfaction as the Mediation](#)

 *Maya Rezeki Angriani, Anis Eliyana, Hastirullah Fitrah, Priyo Sembodo*

SRP. 2020; 11(11): 1263 - 1272

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.180



Review Article[Does Pain Catastrophizing among Pregnant Women affect their beliefs about Epidural Analgesia](#)

Manal Kassaba, Ala" A Alhowary, Shereen Hamadneh, Ahmad Smadi, Hadeel Malaabeh, Anit N Roy

SRP. 2020; 11(11): 559 - 563

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.82

Review Article[The Role of Job Insecurity Mediation on The Effect of Workplace Bullying on Work Engagement and Health Problems](#)

Ratih Indriyani, Anis Eliyana, Juniati Panjaitan

SRP. 2020; 11(11): 1273 - 1281

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.181

Review Article[A Development of Adjustable Standing and Automatic Stop Electric Wheelchair Prototype Operated with A Smartphone](#)

Nutdanai Singkhleewon, Teeravit Asawasilapakul.

SRP. 2020; 11(11): 571 - 578

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.83

Review Article[Effect of Workplace Spirituality on Pro-Environmental Behaviour Mediated by Environmental Passion](#)

Murpin Josua Sembiring, Anis Eliyana, Lara Santi Wibawa Ningrum

SRP. 2020; 11(11): 1282 - 1290

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.182

Review Article[Topical Indocyanine Green Nanosystem For Photodynamic Therapy of Cutaneous Warts](#)

Nevien Samy, Maha Fadel, Doaa Abdelfadeel, Mohammed Al-Daraji

SRP. 2020; 11(11): 571 - 578

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.84

Review Article[Effect of Employee Engagement on Non-Financial Performance in Jordanian Insurance Companies](#)

Abdallah Abdallah, Marsaa Haaj Ahmad

SRP. 2020; 11(11): 579 - 590

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.85

Review Article[Funny Moments of Friendship Lead to Medicine Brand Recall Recommendation \(Evidence in Indonesian Humor\)](#)

Lissa Rosdiana Noer, Syaifurrizal Wijaya Putra, Sri Hartini

SRP. 2020; 11(11): 1298 - 1308

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.184



Review Article[A Study of The Effect of Aqueous and Alcoholic Extract of Saliva on The Reduction of Induced Hepatotoxicity in Laboratory Animals with Carbon Tetrachloride CCL4](#)

 Nuha Ali Hadi, Rabeah T.Mahmood.

SRP. 2020; 11(11): 591 - 595

[» Abstract](#) DOI: 10.31838/srp.2020.11.86

Review Article[Features of the Advanced Vocational Training of Medical Workers under Modern Conditions](#)

 Alina Maksymenko, Oksana Domina, Zhanna Davydova, Elvira Stupina

SRP. 2020; 11(11): 1309 - 1315

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.185

Review Article[Biochemical Effects of Anti-Diabetic Therapies on Obesity and Insulin Resistance Induced by Monosodium Glutamate in Male Rats](#)

 Sherin M. Khodier, Ibrahim A. Ibrahim, Sherif Y. Saleh, Marwa A. El-Beltagy.

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[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.33

Review Article[A Study of The Effect of Aqueous and Alcoholic Extract of Saliva on The Reduction of Induced Hepatotoxicity in](#)

 Nuha Ali Hadi, Rabeah T.Mahmood.

SRP. 2020; 11(11): 591 - 595

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.86

Review Article[Formulation and Optimization of Lyophilized Selexipag Nanocrystals to Improve the Saturation Solubility and Dissolution Rate](#)

 Rusul M. Alwan, Nawal A. Raja, Areej W. Alhagies

SRP. 2020; 11(11): 596 - 605

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.87

Review Article[Modern Types of Psychological Correction and their Practical Application](#)

 Olha Lazorko, Victoria Overchuk, Mykhailo Zhylin, Kseniia Bereziak, Iryna Savelchuk

SRP. 2020; 11(11): 1316 - 1322

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.186

Review Article[How maternal and neonatal services at the community level during the COVID-19 pandemic in Indonesia?](#)

 Johariyah, Detty Siti Nurdianti Zubaedah, Widayawati, Sumarti EndahPurnamaningsih, Maria Margaretha.

SRP. 2020; 11(11): 237 - 242

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.34



Review Article[Reoccurrence of Old-World Screwworm in Coexisting with First Record of Lumpy Skin Disease in Cattle in Babel /Iraq: Clinical and Therapeutic Trial](#)

👤 *Ayad N.D. Alhakim, Ahmed Kassem, Ibrheem Eryan Ibrhim*

SRP. 2020; 11(11): 606 - 608

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.88

Review Article[Changes in the Pharmaceutical Market in Terms of COVID-19](#)

👤 *Viktor Lukianchuk, Yevheniia Redkina, Halyna Prozorova, Larysa Vysotska, Tatyana Ihnatova*

SRP. 2020; 11(11): 1323 - 1327

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.187

Review Article[Antidiabetic effect of the virgin coconut oil and the virgin coconut oil emulsions](#)

👤 *Rahmawati, Lastri Wiyani, Andi Aladin, Bayu Putra, Muliani.*

SRP. 2020; 11(11): 243 - 246

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.35

Review Article[Virulence and Antimicrobial Resistance Genes of E. Coli Isolated from Diarrheic Sheep in The North-West Coast of Egypt](#)

👤 *Amani A. Hafez*

SRP. 2020; 11(11): 609 - 617

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.89

Review Article[Effect of Equisetum Arvense Phenolic Extract in Treatment of Entamoeba Histolytica Infection](#)

👤 *Torken Ahmed Hama Hasan, Zainb Sulaiman Erzaig, Thabet Mudheher Khalaf, Mohammed Ahmed Mustafa.*

SRP. 2020; 11(11): 618 - 620

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.90

Review Article[Grafted Hyaluronic Acid Nanogel for the Incorporation of Poly\(I:C\) as an Immunostimulatory Adjuvant](#)

👤 *Nararat Kotcharat, Penpimol Charoenkanburkang, Jittima Amie Luckanagul.*

SRP. 2020; 11(11): 247 - 253

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.36

Review Article[Transformation of the Social and Medical Spheres under the Conditions of COVID-19](#)

👤 *Anastasiia Barzylowych, Yuliia Oliinyk, Iryna Kostitska, Nataliia Shakhman Zoriana Buryk*

SRP. 2020; 11(11): 1328 - 1337

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.188



Review Article[Peculiar Properties of Pregnancy and Childbirth in Women with Gestational Diabetes Mellitus Depending on Body Weight](#)

👤 *Orazmuradov A.A., Papyшева O.V., Soyunov M.A., Bekbaeva I.V., Arakelyan G.A., Haddad Kh., Lopatin A.M., Kyrtikov S.I., Zokirova N.M., Mukovnikova E.V.*

SRP. 2020; 11(11): 1338 - 1340

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.189

Review Article[Identification of Moniezia, Sp in Goat Intestines in Indonesia which Can Impede Goat Productivity](#)

👤 *Maslichah Mafruchati*

SRP. 2020; 11(11): 1341 - 1345

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.190

Review Article[An Insight into Pyrazolo scaffold as anticancer](#)

👤 *Mazin A.A. Najm, Khulood H. Oudah, Wassan Nori Mohammed Hassan and Ali B. Roomi.*

SRP. 2020; 11(11): 254 - 263

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.37

Review Article[Protective effect of adsorbent complex on morphofunctional state of liver during chicken polymycotoxicosis](#)

👤 *Evgenya Yu. Tarasova, Lilia E. Matrosova, Svetlana A. Tanaseva, Nailya N. Mishina, Ramziya M. Potekhina, Olga K. Ermolaeva, Sergey Yu. Smolentsev2, Anna M. Tremasova1, Ilnur R. Kadikov, Vladislav I. Egorov, Rashid M. Aslanov, Eduard I. Semenov.*

SRP. 2020; 11(11): 264 - 268

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.38

Review Article[The Effect Of Compress Therapy With Yellow Ginger \(Zingiber Officinale\) On The Reduction Of Pain Intensity In Elderly Suffering With Gout Arthritis](#)

👤 *Rita Sari, Yosi Handayani, Nurwinda Saputri, Rani Ardina, Herna Nurul Atika*

SRP. 2020; 11(11): 269 - 272

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.39

Review Article[Moniezia, Sp is found inside Cow Intestines Slowing down the Growth of the Cattle](#)

👤 *Maslichah Mafruchati*

SRP. 2020; 11(11): 1346 - 1350

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.191

Review Article[The use of ferrous succinate in combination with vitamins A and E for the prevention of toxic dystrophy in piglets](#)

👤 *Sergey Yu. Smolentsev, Andrey V. Onegov, Lyudmila V. Holodova, Alexey L. Rozhentsov, Evgeny V. Mikhalev,*


Eduard I. Semenov, Lilia E. Matrosova, Vladislav I. Egorov, Gulnara G. Galyautdinova, Anna M. Tremasova, Gulnaz Sh. Zakirova, Ilnur R. Kadikov, Nailya N. Mishina.

SRP. 2020; 11(11): 273 - 280

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.40

Review Article

[Protective Impact of Vitamin C Against Some Fetal and Neonatal Congenital Malformations and Anti-Inflammatory Non-Steroidal ?Induced Hepatotoxicity of White Rats](#)


 *Dalal Abdel-Hussein Kadhim AL¹ Essawi, Ashwaq K. Abed, Wadad Yahya Hashem, Assel Said Ismael Alhadad, Zainb Majid Mohammd*

SRP. 2020; 11(11): 621 - 631

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.91

Review Article

[Virus-Reproducing Ability of Growth Media Containing Immunogenesis Mediators](#)


 *Edie M. Plotnikova, Irina A. Nesterova, Ramzi N. Nizamov, Zoya G. Churina, Andrey I. Samsonov, Elena L. Matveeva, Gennady N. Spiridonov, Aidar F. Makhmutov, Konstantin N. Vagin, Ruslan R. Gainullin*

SRP. 2020; 11(11): 281 - 284

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.41

Review Article

[Effect of Servant, Digital and Green Leadership toward Business Performance: Evidence from Indonesian Manufacturing](#)

 *Milawati Lusiani, Zaenal Abidin, Dwi Fitriyaningsih, Erny Yusnita, Djaka Adiwinata, Dini Rachmaniah, Mukhlisin, Anis Fauzi, Agus Purwanto*

SRP. 2020; 11(11): 1351 - 1361

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.192

Review Article

[Revealing A Traditional Nutritious Cuisine Mangholat, An SFL Approach \(A Case Study of Angkola Language Transitivity in Cooking Verb\)](#)

 *Husniah Ramadhani Pulungan, Riyadi Santosa, Djatmika Djatmika, Tri Wiratno*

SRP. 2020; 11(11): 632 - 642

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.92

Review Article

[Screening the frequency of panton-valentine leukocidin \(pvl\) gene between methicillin resistant Staphylococcus aureus isolated from diabetic foot patients in Al-Basrah governorate, south of Iraq](#)

 *Tahrir H. Gadban, Saad S. Al-Amara, Hanadi A. Jasim.*

SRP. 2020; 11(11): 285 - 290

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.42

Review Article

[A Systematic Review Protocol of the Antiviral Activity of Chloroquine and Hydroxychloroquine against COVID-19](#)

 *Kofi Boamah Mensah, Adwoa Bemah Boamah Mensah, Joseph Attakorah, Varsha Bangaloree, Frasia Oosthuizen*

SRP. 2020; 11(11): 1362 - 1365

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.193



Review Article[Combined Fractional Erbuim-YAG Laser With Botulinum Toxin-A Versus Botulinum Toxin-A Alone For The Treatment Of Hypertrophic Scars And Keloids](#)

👤 *Seif -Allah Mohamed Elfiky, Hisham Shokeir, Mahmoud S Elbasiouny, Nevien Samy.*

SRP. 2020; 11(11): 1976 - 1981

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2021.3.20

Review Article[Comparative Study Between Dexmedetomidine and Dexamethasone as Adjuvants to Bupivacaine in Supraclavicular Brachial Plexus Block](#)

👤 *Basim Herez Ali, Mohamed Fadhil Hussain, Raad Jasim Isa*

SRP. 2020; 11(11): 643 - 649

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.93

Review Report[Overview of The Pharmacy Management System in a Hospital](#)

👤 *Mahyuddin K. M. Nasution, Shahrul Azman Mohd Noah, Urip Harahap*

SRP. 2020; 11(11): 650 - 655

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.94

Review Article[PARAPHRASING TECHNIQUE TO DEVELOP SKILL FOR ENGLISH WRITING AMONG INDONESIAN COLLEGE STUDENTS OF ENGLISH](#)

👤 *Ismail, Abdul Haris Sunubi, Ali Halidin, Amzah, Nanning, Kaharuddin.*

SRP. 2020; 11(11): 291 - 297

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.43

Research Article[The Importance Of Spirituality, Physical Activity and Sleep Duration to Prevent Hypertension among Elderly in Aceh-Indonesia](#)

👤 *Sufyan Anwar, Loh Su Peng, Trias Mahmudiono*

SRP. 2020; 11(11): 1366 - 1370

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.194

Review Article[Evaluation of pharmacodynamics of ginger \(Zingiber officinale\) compared with gliclazide in diabetic rats](#)

👤 *TAHA AM, TAYEE EM, Abdelkareem E and Taha Azouz*

SRP. 2020; 11(11): 970 - 974

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.139

Review Article[The Effect of Market Orientation on innovation Capacity through Entrepreneurial Orientation at Business Start-up Coffee Shop in Indonesia](#)


👤 *Roy Setiawan, Anis Eliyana, Tatik Suryani, Hendro Prayitto*

SRP. 2020; 11(11): 298 - 305

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.44

Review Article

[Assessment of Possibility of Integration of Experience of Leading Countries Of The World in Training of Public Administration Specialists](#)

 *Lyudmila Kotliar, Oleksandr Akimov, Orest Krasivsky& 1091;, Vasyl Shykerynets, Ilona Kurovska, Alla Hrusheva.*

SRP. 2020; 11(11): 656 - 662

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.95

Research Article

[Electrochemical Bacillus licheniformis Whole-Cell-Based Sensor and its Potential Application in Detecting Urea Concentration in Urine](#)

 *D. Ariyanti, D. Iswanti, Purwantiningsih, N. Nurhidayat, and H. Effendi*

SRP. 2020; 11(11): 1371 - 1377

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.195

Review Article

[The Roles of Work Climate and Knowledge Sharing: The Effect of Leader Creative Behavior to Organizational Creativity at Furniture Industries in Indonesia](#)

 *Roy Setiawan, Anis Eliyana, Tatik Suryani, Enrico Oktavian Sugiharto*

SRP. 2020; 11(11): 306 - 314

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.45

Review Article

[Study of some of Novel Selena-Diazole Derivative activities on Hematological Parameters, Differentiate lymphocytes cells in addition to thyroid hormones levels in Female Rats \(One of the series of studies on the impact of the new compound\)](#)

 *Nadheerah F. Neamah, Shaker.A.N.Al-Jadaan, Asmaa M. Al_Ali*

SRP. 2020; 11(11): 975 - 980

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.140

Research Article

[The Effect of Folic Acid as Anti Fibrosis in Peritoneum of Rat](#)

 *Wachid Putranto, Bambang Purwanto, Ambar Mudigdo, Brian Washita, Ari Natali Probandari*

SRP. 2020; 11(11): 1378 - 1383

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.196

Review Article

[Design and Synthesis of Possible Mutual Prodrugs of \(Nsaid\) Etodolac and Tolmetin with \(Cytotoxic\) Gemcitabine](#)

 *Ammar Abdul Aziz Alibeg, Abbas H. Abdulsada, Noor H. Nasser, Karrar Abdil Aziz Ali beg.*

SRP. 2020; 11(11): 315 - 318

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.46

Research Article

[Effectiveness of not Quarantining Passengers after Having a Negative COVID-19 PCR Test at Arrival](#)



[to Dubai Airports](#)

Manal Taryam, Dhoha Alawadhi, Ahmad Aburayya, Ala' Albaqa'een, Alanood Alfarsi, Ibtehal Makki, Najma Rahmani, Muhammad Alshurideh, Said A. Salloum

SRP. 2020; 11(11): 1384 - 1395

[» Abstract](#) [» PDF](#) DOI: 10.31838/srp.2020.11.197

Review Article[THE EFFECT ANALYSIS TOWARD LIQUIDITY, LEVERAGE ON THE COST EFFICIENCY OF CHEMICAL COMPANIES AND THE IMPACT ON THE FINANCIAL PERFORMANCE OF THE COMPANY](#)

Masno Marjohan, Arsid, Nurminingsih.

SRP. 2020; 11(11): 318 - 327

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Review Article[Study some immunological parameters of dietary supplementation turmeric powder in healthy common carp *Cyprinus carpio* L.](#)

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Histopathological Studies on *Leucocytozoon Caulleryi* Infection on Broiler in Endemic Area of Indonesia

Endang Suprihati*¹, Kusnoto Kusnoto¹, Nusdianto Triakoso², Wiwik Misaco Yuniarti²

¹Department of Parasitology, Faculty of Veterinary Medicine, Universitas Airlangga, Jl.Mulyorejo, Kampus C Unair, Surabaya, Indonesia

² Department of Clinical Science, Faculty of Veterinary Medicine, Universitas Airlangga, Jl.Mulyorejo, Kampus C Unair, Surabaya, Indonesia

*Corresponding Author: Endang Suprihati E-mail: esuprihati@yahoo.co.id

ABSTRACT

Objective: This study aimed to observe the characteristic histopathological lesion of internal organ of broiler chicken infected by *Leucocytozoon caulleryi*.
Material and Method: This study conducted in several locations in two island of Indonesia which recorded as endemic area. Clinical symptom was observed to determine the suspected animal. Subsequently, blood smear was conducted to confirm the parasitemia stage and observed the gross lesion of whole body related to pathological symptom of *leucocytozoonosis*. Every internal organ which was suspected affected, performed for histopathological preparation and examined under light microscope. The data analysis presented descriptively.

Results: Clinical symptom was observed from the sample population. Blood smear result confirmed that suspected chicken was due to the parasitemia of *leucocytozoonosis*. Most pathological finding showed petechiae spread in muscle tissue. Spleen, liver, lung and heart microscopic lesion showed megalozchizont. Several inflammation findings were showed in infected organ and alteration tissue order was shown in spleen.

Conclusion: *Leucocytozoon caulleryi* could impact the histological aspect and affect the several organs specifically with high vascularization.

Keywords: Chicken; Histopathology; *Leucocytozoon caulleryi*

Correspondence:

Endang Suprihati

Department of Parasitology, Faculty of Veterinary Medicine, Universitas Airlangga, Jl.Mulyorejo, Kampus C Unair, Surabaya, Indonesia

E-mail: esuprihati@yahoo.co.id

INTRODUCTION

Leucocytozoon caulleryi one of Apicomplexa [1] species was blood protozoan which could impact on economic due to the decreased of chicken population [2]. The host of this parasite was only domestic chicken. The infection of this parasite was brought by the vector *Culicoides arakawae* midges [3] by invasion of vascular endothelium [4]. *Leucocytozoonosis* was endemic in Southeast Asian region. In Indonesia, there are positive correlation between seasonal and farm location with *leucocytozoonosis* incidence [5]. It is due to, the rise of vector population around the farm when the transition of season [6]. This phenomenon was similar with the incidence of several viruses, arbovirus and other pathogen, carried by *Culicoides sp* [7]

The histopathological and blood smear examination was needed to determine the infection. The infection of the parasite could be confirmed by the examination technique due to the different stage. It was explained that early stadium, the parasite performed schizont formation in the organ. Subsequently, the merozoite will invade the blood cell. Histopathology can define the infectious species beside the parasite stadium. *Leucocytozoon caulleryi* was the only species which found with megalozchizont inside the tissue. This study was to observe the histopathological finding due to the infection of *Leucocytozoon caulleryi* in broiler chicken.

MATERIALS AND METHODS

All samples (n=53) were obtained from suspected chicken with clinical symptom in two islands in Indonesia that were Kalimantan and Java. These areas consist of seven areas in Pasuruan, Lamongan, Blitar, Lumajang, Boyolali, Purwokerto and Banjarmasin city.

Suspected chicken was observed the clinical symptom subsequent, performed necropsy and observed the gross lesions of the organ. The internal organ such as heart, liver, spleen, and lung were taken and fixed in the 10% buffer formalin. The histological technique was undertaken with Hematoxylin and Eosin staining. The preparation was observed under light microscope.

RESULT

Chickens were obtained from 7 city in Kalimantan and Java island. In **Figure-1**, infected broiler chicken showed several clinical symptoms such as pale in the comb, and body weakness. In the cage, metallic green feces were found. Blood smear preparation showed the existence of *Leucocytozoon* parasite as seen in **Figure-2**. Parasite was seen infects the white blood cell. From all chicken that have clinical signs, *L caulleryi* was found from the sample examined **Figure-2**.



Figure-1 Clinical finding related to *Leucocytozoonosis* infection in broiler chicken.

(A) Weakness and albescent pale in the comb

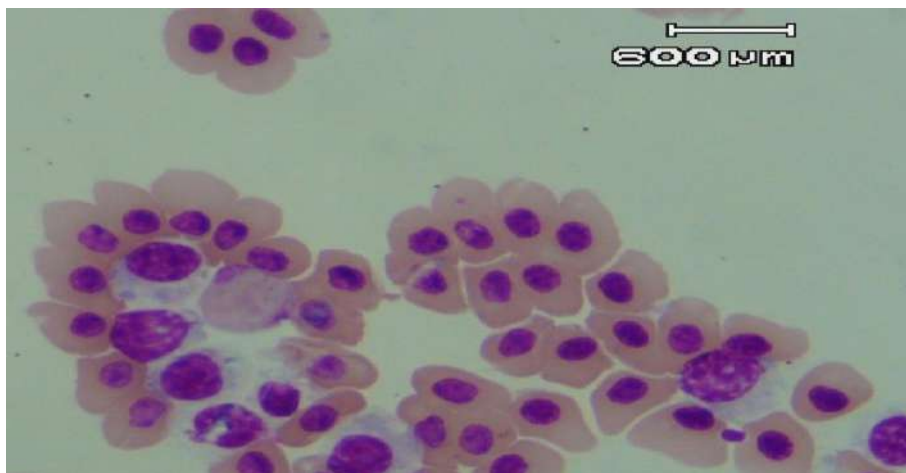


Figure-2 *Leucocytozoon caulleryi* appearance in the blood smear of infected chicken under light microscope (HE, 1000) Gross lesions were assessed with necropsy technique. Some pathological findings were found with Leucocytozoonosis indication. Petechiae were found in the musce tissue of ventral thorac and hind leg muscle as shown in **Figure-3**. Another lesion, such as hemorrhage also found in pericardial between heart and pericardium. Blood clot was found fulfill the pericardial space.



Figure-3 Pathological anatomy of broiler chicken which suspected of being infected with *Leucocytozoonosis* infection. (A) Petechiae on the breast muscle of infected broiler. (B) Hemorrhage in pericardial space.

Histological lesion was assessed in four organs among other: heart, liver, spleen, and lung. Lesion in liver tissue was found as necrotic area in perilobular. Necrosis was followed with some congestion in the hepatic sinusoid. Hepatocyte showed lipid vacuole with HE is staining under 1000x magnification of light microscope as seen in **Figure-7**. Schizont was found in pulmonary, spleen and myocardium. In the alveolar interseptum, schizont is

categorized as megaloschizont, a huge size of schizont in the tissue. Schizont in the liver, spleen and myocardium, as seen in **Figure-4**, **Figure-7** and **Figure-8**, are accumulated schizont, several schizont in the adjacent area inside the tissue. Congestion seen in both **Figure-5** and **Figure-6** represent the liver and pulmonary organ. Giant cell was found near the accumulated schizonts in myocardium.



Figure-4 Accumulation of *Leucocytozoon caulleryi*schizont in hepatic tissue. Accumulated are indicated with black arrow and seems mild congestion with white arrow.

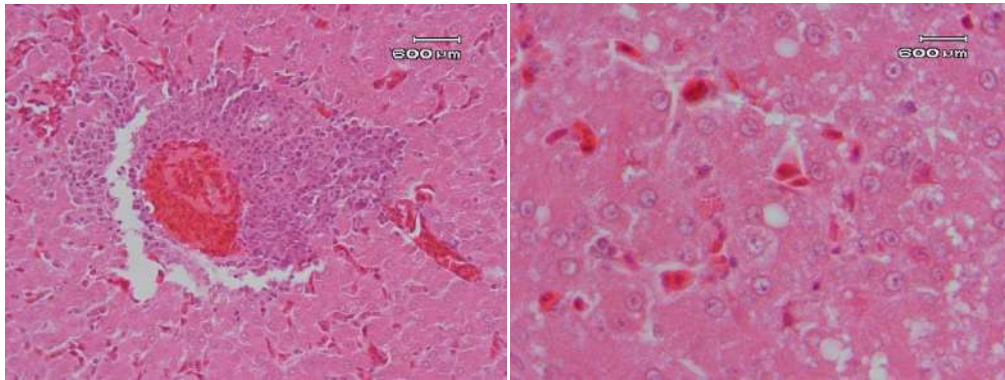


Figure-5 Histological changes in hepatic tissue. (A) Necrotic of hepatocyte in perilobular one under 400x magnification of light microscope and (B) shown lipid vacuole in the hepatocyte under 1000x magnification of light microscope

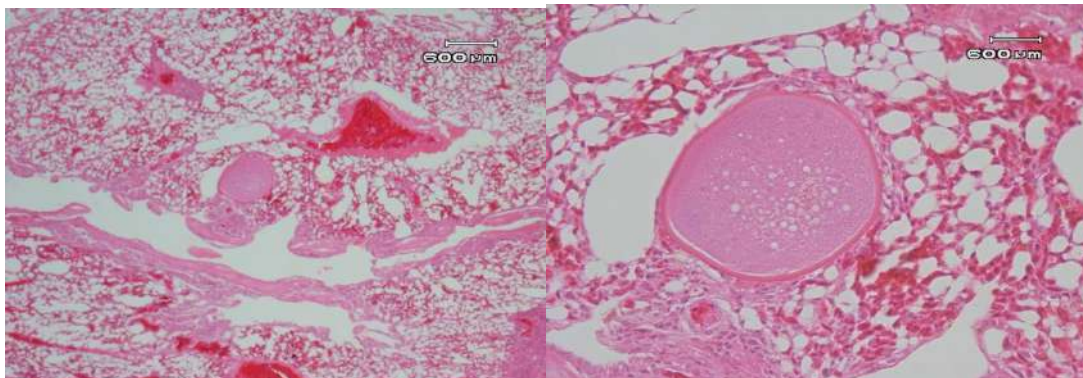


Figure-6 Histopathological finding in pulmonary tissue of infected broiler chicken. A Megalosphizont of *Leucocytozoon caulleryi* in septum interalveolaris. (A) Schizont under 100x magnification and (B) under 1000x magnification of light microscope.

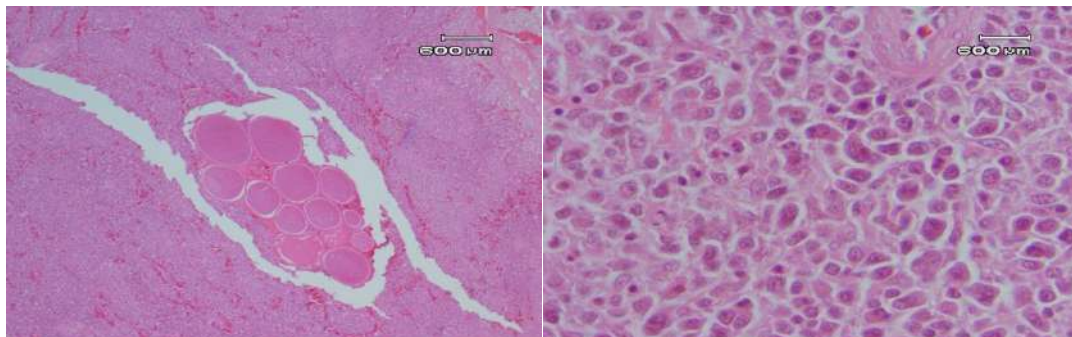


Figure-7 Histopathology of infected broiler chicken's spleen. (A) Schizont and the enhancement of red blood cell is found in the interstitial of spleen tissue under 100x magnification and (B) 1000x magnification of light microscope with heterophile infiltration.

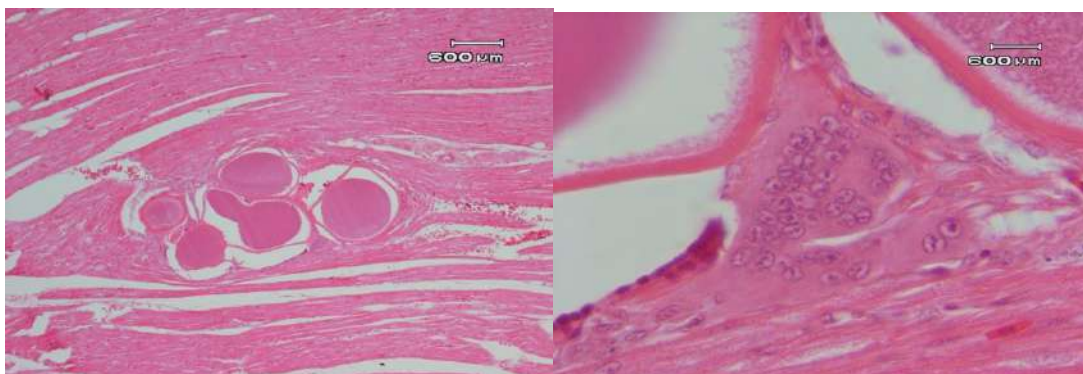


Figure-8 Cardiac histopathology of infected broiler chicken with *Leucocytozoonos caulleryi*. (A) Accumulated schizont are found in myocardial tissue under (A) 100x magnification of light microscope and (B) 1000x magnification accompanied with Giant cell.

DISCUSSION

Leucocytozoonosis was a strategic disease in Indonesia agriculture. It is due to its economic impact on chicken farm. It aggravated that *Leucocytozoon caulleryi* was only invade commercial chicken. An outbreak of *Leucocytozoon caulleryi* infection in farming area was related to the vector population that is *Culicoides* species [3]. *Culicoides arakawe*, vector of *Leucocytozoon caulleryi*, naturally was preferred host and seasonal dependent [7]. The dynamic of *Culicoides* midges dispersal and population are influenced by several factors including temperature, climate change, rainfall and wind speed. Wind might distribute the *Culicoides* as aerial plankton due to its ability and size to fly [8].

In Indonesia, tropical region of Southeast Asia under the equator line might contribute to the population and survival of *Culicoides* species. Thus, it influences the number and infection especially in endemic area. It was in line with the study that the succession of *Culicoides* species might impact the *Leucocytozoonosis* prevalence [9]. Endemic status in research area remain affected by seasonal change period from dried to rainy season indicating the enhancement of prevalence [5, 10]. It has correlated that the farm environments were appropriate for the habitat of *Culicoides sp.* which preferred on dirty sanitation and grassy.

The incidence of leucocytozoonosis caused several symptoms like weakness and pale [11] as seen in **Figure-2**. Leucocytozoonosis were confirmed with the metallic green of fecal found under the opened cage of flock. The symptom might misdiagnose to other disease such as malaria, chicken anemia virus, infectious bursal disease, sulfonamide intoxication, which shown the gross lesion of petechiae under the wing integument. The petechiae were present caused of the destruction of endothelial cell. It has characteristic pitted hemorrhage with cleared boundary because the leak of vascular. The destruction of erythrocyte was not severe as malaria. Although, that explained the comb pallor. The metallic green fecal is accompanied with the destruction of reticulocyte and erythrocyte [12] which makes the enhancement of excreted of blood in bile.

Evidence that strengthened the Leucocytozoonosis infection was based on the blood smear result. Blood smear result showed a positive infected leukocyte with Leucocytozoon protozoa as seen in **Figure-1**. This parasitemia phase clearly confirm the illness is due to the infection of blood parasite. In addition, histopathology result confirms the infection by the schizonts in the tissue. Accumulated schizonts indicate the stage of *Leucocytozoon* life cycle. Schizont was formed in the schizogony stadium. The similar result is found in studies reporting the *leucocytozoonosis* infection [3,4]. Megalochizont could be found in spleen, liver and cardiopulmonary with basophilic imaging and the eosinophilic wall as seen in **Figure-4,6,7,8** indicates the characteristic of *Leucocytozoon caulleryi* infection.

Leucocytozoon caulleryi has similarity to *Plasmodium* species rather than other *Leucocytozoon* species due to similar life cycle [3] and its closed phylogenicity [5]. *Leucocytozoon caulleryi* has three stadiums in life cycle named, schizogony and gametogony in host and sporogony inside the vector that is *Culicoides sp.* [3]. The schizont formation was due to the invasion of sporozoite in the endothelial cell of the chicken. The invasion of sporozoite would become first schizont subsequent, released merozoite. The second schizont was made by the

invasion of merozoite and subsequent, become microgametocyte and macrogametocyte [13]. Spleen, liver, heart and lung are the organ which has high vascularization thus it might enrich the schizonts to be survived by nutrition and oxygen supply. Spleen was the largest lymphoid organ with diverse population of immune cells [14]. This environment might support the enhancement of *Leucocytozoon* infection invading the leukocyte [15], thrombocyte [16], erythrocyte and reticulocyte [12].

The existence schizont in spleen might confirm the infection of parasite was not in early stage. Parasite of this species underwent schizogony in the endothelial and parenchymatous liver and other organ [15]. The pathological finding of spleen from microscopic lesion shows inflammation indication. Heterophile infiltration as mononuclear cell indicates the chronic inflammation. Unclear boundary between pulps distinguishes with the normal organ as seen in **Figure-7**. It might be due to the merozoites invasion to the blood cells in the spleen tissue, which a lot of blood cell. Most of young gametocyte was observed in polychrome erythrocyte and polychrome erythroblast. The second generation merozoite was infect not only the erythrocyte but also immature erythrocyte and erythroblast [12]. The merozoite also induced the inflammation process in the spleen attracting the lymphocyte, heterophyle, foreign-body giant cells, macrophage [4]

Several congestions were found in sinusoid of the liver. The leucocytozoonosis infection resulted hepatocyte necrosis and fatty degeneration with lipid vacuole remarkable as seen in **Figure-5**. Similar result found that liver tissue showed multifocal necrotic [4]. The lipid vacuole was due to the fatty liver degeneration mechanism. Whereas the decreased of hepatocyte made function of the necrotic cell was replaced to the normal cell. The liver cell was processing the lipid metabolism. The accumulation of lipid in the liver due to the decreased of the liver capacity made lipid vacuole.

In addition to liver and spleen, cardiopulmonary were impacted due to the height of vascular endothelial tissue and enriched with nutritious blood and oxygen. The host cell of *Leucocytozoon caulleryi* in the endothelial cell to multiply the merozoite induce the broken of vascularization. Subsequently, blood could get into the pericardial space as seen in **Figure-3**. It was in line, with the petechiae in muscular tissue with cleared boundary hemorrhage on the whole muscle. The invasion of merozoite into the endothelial cell was confirmed by the presence of the schizont in the heart tissue. It is found giant cell accompany near closed the schizont.

L. caulleryi infection can be distinguished from other diseases through organ histopathological examination. In the examined organ samples, it will usually be marked by the finding of a schizont and rupture of endothelial cells. Histopathological examination should also perform on all infected organs, not only on one organ [17].

Environmental factors have a role in the emergence of *L. caulleryi* infection. The right environment can be a good breeding place for *L.caulleryi* vectors, *Culicoides sp.* For example, there is a lot of standing water around the cage that is contaminated with chicken feces, open house system of cage, and a lot plants around the cage that are used for resting *Culicoides sp.* as a vector at daytime.

A better understanding of the ecological requirements of the immature developmental stages of potential *Culicoides* vectors and, consequently, of distribution areas

and barriers which are caused by the presence or absence of breeding habitats were very important. Such information could help predict the occurrence of biting midges in selected biotopes and improve risk assessments of culicoid-borne diseases [18].

CONCLUSION

Leucocytozoonosis in broiler chicken was rise in endemic area when the transition season. The histopathological finding appearance showed accumulation of megaloschizont in the tissue. The histopathological showed remarkable alteration. *Leucocytozoon caulleryi* could affect the internal organ by invasion into endothelial cell.

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NIP : 195810211983112001
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