I
SLOBODNE TEME

FREE COMMUNICATIONS

UC 577,1; 61 ISSN 0354-3447

Jugoslov Med Biohem 2004: 23 (Suppl 3) 167–178

Posterske sekcije
Poster sessions

I90

NIVO KONCENTRACIJE MALONDIALDEHIDA U SALIVI KAO INDIKATOR LOKALNIH OKSIDATIVNIH OŠTEĆENJA ĆELIJA U KLINIČKI ZDRAVIH OSOBA I PACIJENATA SA PARADONTOPATIJAMA

G. Žunić[1], D. Daković[2], Z. Brkić[2]

[1]Institut za medicinska istraživanja
[2]Klinika za stomatologiju
Vojnomedicinska akademija, Beograd

Periodontalne bolesti predstavljaju inflamatorne poremećaje, koji dovode do kompleksnih interakcija između bakterija prisutnih u parodoncijumu i odbrambenih sistema organizma. Mada su predmet brojnih istraživanja, mehanizmi ovih poremećaja još uvek nisu dovoljno rasvetljeni. Pošlo se od hipoteze da se kod osoba sa parodontopatijama lokalno intenzivira razvoj oksidativnih oštećenja ćelija, što vodi u produbljivanje oštećenja tkiva i dalje u destrukciju parodoncijuma. U ovom radu analizirani su nivoi koncentracija malondialdehida (MDA) u salivi, kao indikatori oksidativnih oštećenja ćelija indukovanih lokalnim povećenjem procesa lipidne peroksidacije ćelijskih membrana. Cilj je bio da ispita da li se kod pacijenata sa klinički manifestnim paradontopatijama povećava nivo koncentracije MDA u salivi. Ispitivanjima su obuhvaćeni pacijenti sa paradontopatijama u fazi pune kliničke manifestacije (n=7), a kontrolnu grupu su činile klinički zdrave osobe (n=7). Salivarni MDA je analiziran modifikovanom metodom koristeći bojenu reakciju sa tiobarbiturnom kiselinom. Rezultati ispitivanja pokazuju da u grupi pacijenata sa parodontopatijama nivo MDA dostiže vrednosti od 7,730 ± 2,606 μmol/L. To je značajno viši (t=4,669, p<0,0001) nivo od 2,531 ± 1,374 μmol/ L salivarnog MDA dobijenog u kontrolnoj grupi. Dobijeni rezultati navode na zaključak da se kod pacijenata sa paradontopatijama lokalno intenzivaraju oksidativna oštećenja ćelija, koja verovatno leže u osnovi destruktivnih oštećenja tkiva, što bi trebalo imati u vidu i pri izboru terapije.

I90

MALONDIALDEHYDE LEVELS IN WHOLE SALIVA AS INDICATOR OF LOCAL OXIDATIVE CELL DAMAGES IN CLINICALLY HEALTHY AND PERIODONTAL DISEASED INDIVIDUALS

G. Žunić[1], D. Daković[2], Z. Brkić[2]

[1]Institute of Medical Rsearch
[2]Department of Dentistry
Military Medical Academy, Belgrade

Periodontal disease is an inflammatory disorder that damages the tissue by complex interactions between peridontopathic bacteria and host defense systems. Although the mechanisms of these events have been widely examined, they have not yet been completely solved. We hypothesized that intensified development of oxidative cell damages is fundamental disorder leading to further tissue damages and destructions of the parodontium. In the present study we analyzed malondialdehyde (MDA) level in saliva, as an indicator of local oxidative cell damages induced by increased lipid peroxidation of the cell membranes. The aim was to examine whether increase in salivary MDA occurs in periodontal diseased individuals suggesting the existence of locally increased oxidative cell damages. Progressive periodontal diseased individuals (N=7) were examined, while clinically healthy persons (N=7) were controls. Salivary MDA was analyzed by modified colorimetric method with thiobarbituric acid. The obtained results suggested that in patients salivary MDA levels reached 7.730 ± 2.606 μmol/L. They were significantly higher (t=4.669, P<0.0001) in comparison to control limits of 2.531 ± 1.374 μmol/L. In conclusion, increased salivary MDA indicates increased oxidative cell damages at the site of parodontium, which might initiate further tissue destructions that should be taken into account in therapy.

I91

INHIBIRANJE REDUKCIJE NITRATA U NITRITE U USNOJ DUPLJI ČOVEKA SREDSTVOM ZA ISPIRANJE USTA NA BAZI HEKSETIDINA

D. Bojić[1], A. Bojić[1], M. Purenović[1], G. Kocić[2]

[1]Odsek za hemiju,
Prirodno-matematički fakultet u Nišu, Niš
[2]Institut za biohemiju,
Medicinski fakultet u Nišu, Niš

Formiranje nitrita iz oralno unesenih nitrata redukcijom mikroorganizmima u usnoj duplji čoveka može dovesti do pojave methemoglobinemije i endogenog nitrozovanja amina i amida, čime nastaju kancerogena N-nitrozo jedinjenja. U ovom radu je ispitivana mogućnost inhibiranja redukcije nitrata u nitrite u usnoj duplji čoveka, pod uticajem sredstva za ispiranje usta na bazi heksetidina. Redukciona aktivnost usne duplje je praćena primenom originalne *in vivo* metode koja se zasniva na inkubaciji rastvora nitrata u ustima, nakon čega se određuje koncentracija formiranih nitrita Griessovom spektrofotometrijskom metodom. Kao inhibitor redukcione aktivnosti mikroorganizama usne duplje upotrebljen je komercijalni proizvod Heksoral® (Hemofarm, Vršac), koji sadrži 0,1% heksetidina. Subjekti su prema uputstvu proizvođača aplikovali po 15 mL Heksorala® mućkanjem u periodu od 30 s, a zatim ispirali usta vodom. Redukciona aktivnost usne duplje je praćena odmah po aplikaciji sredstva za ispiranje usta i posle: 0.5, 1, 2, 5, 10 i 24 časa, inkubiranjem 15 mL rastvora nitrata koncentracije 10,00 cm^3 u periodu od 120 s. Analize pokazuju da je tokom prva 2 sata od primene Heksorala® redukciona aktivnost usne duplje bila smanjena za oko 30 puta, u odnosu na nativne uslove. Nakon toga se javlja lagani porast redukcione aktivnosti, koja posle 5 sati ima oko 12 puta manju vrednost, a posle 10 sati je oko 6 puta niža od normalne. 24 časa nakon aplikacije Heksorala® redukciona aktivnost usne duplje još uvek ima nešto nižu vrednost od nativne. Rezultati pokazuju da se primenom heksetidina može postići skoro potpuno inhibiranje redukcije nitrata u usnoj duplji čoveka. Očigledno je da ovo sredstvo deluje baktericidno na mikroorganizme usne duplje čoveka koji redukuju nitrate, pri čemu je njegovo delovanje visokog intenziteta i posle 10 sati. Redovnom primenom heksetidina, dva puta dnevno prema uputstvu proizvođača, moguće je značajno smanjiti koncentraciju nitrita u salivi, a time i pojavu methemoglobinemije i produkciju kancerogenih *N*-nitrozo jedinjenja u želucu.

I91

INHIBITION OF NITRATE REDUCTION TO NITRITE IN THE HUMAN ORAL CAVITY BY MOUTHWASH SOLUTION CONTAINING HEXETIDINE

D. Bojić[1], A. Bojić[1], M. Purenović[1], G. Kocić[2]

[1]Department of Chemistry,
University School of Science, Niš
[2]University School of Medicine,
Clinical Centre, Niš, Niš

Formation of nitrite from ingested nitrate by reduction of microorganisms in the human oral cavity can provoice methemoglobinaemia and endogenous nitrosation of amines and amides that contribute to the formation of carcinogenic *N*-nitroso compounds. The paper deals with the possibility of inhibition of nitrate reduction to nitrite in the human oral cavity by mouthwash solution containing hexetidine was investigated. Reduction activity of the oral cavity was monitored by original *in vivo* method, based on incubation of nitrate solution in the mouth, and determination of formed nitrite by spectrophotometric Griess method. Commercial product Heksoral® (Hemofarm, Vršac) with 0.1% hexetidine was used as microorganism activity inhibitor. Subjects gargled 15 mL of Heksoral® during 30 s according to producer instructions, and rinsed the mouth with water. Reduction activity of the oral cavity was monitored immediately after using mouthwash solution, and after 0.5, 1, 2, 5, 10 and 24 hours, by incubation of 15 mL nitrate solution concentration of 10.00 mg-N dm^{-3} during 120 s. During the first 2 h after Heksoral® the reduction activity in the mouth was reduced by about 30 times in comparison to native conditions. Then, reduction activity slowly increased. However, after 5 h its value was lower by 12 times, and after 10 h it was 6 times lower than normal. Twenty four hours after Heksoral® use, reduction activity of the oral cavity was still lower than in native conditions. Results show that almost total inhibition of nitrate reduction to nitrite in the oral cavity can be obtained by hexetidine. This reagent shows bactericidal activity of nitrate reducing microorganisms, and its efficacy is still great after 10 h. By regular use of Heksoral®, two times a day, the concentration of nitrite in saliva as well as methemoglobinemia and production of carcinogenic N-nitroso compounds may be significantly lowered.

I92

VREDNOSTI MOKRAĆNE KISELINE ZAVISNO OD GESTACIONOG PERIODA TOKOM NORMALNE TRUDNOĆE

D. Lutovac, M. Milivojević, R. Obrenović

Institut za medicinsku biohemiju, Klinički centar Srbije, Beograd

Normalnu trudnoću prati niz metaboličkih i funkcionalnih promena. Promene u glomerularnog filtraciji se zapažaju već nakon četiri nedelje trudnoće, a takođe dolazi do promene u sistemskoj hemodinamici što dovodi do promene određenih parametara u odnosu na nivo kod negravidnih žena. Poznato je da u normalnoj trudnoći postoji relativna hipourikemija koja u nedelji pred porođaj dostiže nivo koji je sličan nivou negravidnih žena. Određivanje mokraćne kiseline u serumu trudnica je naročito važno za rano otkrivanje stanja preeklampsije jer je u toj situaciji klirens mokraćne kiseline smanjen a renalna reapsorpcija povećana pa samim tim dolazi do povećanja nivo mokraćne kiseline u serumu. Promene u klirensu mokraćne kiseline se nekada javljaju nedeljama pre pojave ostalih simptoma preeklampsije. Serijsko određivanje mokraćne kiseline u plazmi može da bude od koristi za uočavanje i praćenje stanja preeklampsije. U ovom radu je iz tih razloga ispitivan nivo mokraćne kiseline kod 60 trudnica koje su imale normalan tok trudnoće. Trudnice su razvrstane u tri grupe u svakoj po 20 trudnica prema gestacionom periodu. Mokraćna kiselina je određivana komercijalnim testovima firme Randox na automatskom analizatoru IL Monarch 2000. Za statističku analizu dobijenih podataka korišćeni su Student-ov t-test i Mann Whitney U-test. U prvom trimestru srednja vrednost mokraćne kiseline u plazmi je iznosila 196 μmol/L, u drugom 246 μmol/L i u trećem trimestru 300 μmol/L. Mokraćna kiselina se statistički značajno menja tokom normalne trudnoće zavisno od gestacionog perioda.

I92

VALUES OF URIC ACID DEPENDING ON GESTATION PERIOD IN NORMAL PREGNANCY

D. Lutovac, M. Milivojević, R. Obrenović

Institute of Medical Biochemistry, Clinical Centre of Serbia, Belgrade

Regular pregnancy is associated with a series of metabolic and functional changes. Changes in glomerular filtration are noticed after four weeks of pregnancy. There are also changes in systemic haemodynamics that cause change in some parameters compared to the level with non-pregnant women. It is well-known that in regular pregnancy relative hypouraemia exists which, in the last week of pregnancy reaches the level of that of non pregnant women. Determination of uric acid in plasma of pregnant women is important for early discovery of preeclampsia. Then uric acid clearance is decreased and renal absorption is increased causing increase in the level of plasma uric acid. Changes in uric acid clearans sometimes appear many weeks before other symptoms of preeclampsia. Serial measurings of uric acid in plasma can be useful for detection and follow up of preeclampsia. In this study the level of uric acid is examined in 60 pregnant women with normal pregnancy. Pregnant women are classified in three groups (in each 20) according to the period of pregnancy. Uric acid is evaluated by commercial Randox test on the automatic analyzer IL Monarch 2000. In the first three months the average value of uric acid in plasma was 196 μmol/L, in the second 246 μmol/L and in the third 300 μmol/L. For the statistical analysis of achieved results we used Student's t-test and Mann Whitney U-test. Uric acid was statistically very changed in normal pregnancy, depending on the gestation period.

I93

INCIDENCIJA URAĐENE HIPERBILIBRUBINEMIJE (GILBEROV SINDROM) KOD REGRUTA

P. Radović[1], V. Radonjić[2], G. Brajković[1]

[1]VMC Podgorica
[2]Dom zdravlja, Kotor

Bilirubin je završni proizvod metabolizma porfirina i uklanja se iz organizma putem žuči. Za vrijeme transporta kroz krvotok od retikuloendotelnog tkiva do hepatičhih ćelija bilirubin se nalaze u plazmi vezan

I93

INCIDENCE OF IN BORN HYPERBILIRUBINAEMIA (GILBER'S SYNDROME) IN RECRUITS

P. Radović[1], V. Radonjić[2], G. Brajković[1]

[1]VMC Podgorica
[2]Health Centre, Kotor

Bilirubin is a final product of the metabolism of porfirin and it is removed from the organism through the bile. During the transport via blood circulation from the reticuloendothelial tissue to hepatic cells,

za albumin (nekonjugovani bilirubin). Hepatociti ga preuzimaju iz cirkulacije, konjuguju sa glukuronskom kisjelinom posredstvom estarskih veza sa propionskom kiselinom gradeći mono i diglukoronide, i ekskretuju kao konjugovani bilirubin. Hiperbilirubinemija je znak poremećaja ravnoteze između anabolizma i katabolizma žučnih pigmenata. Etiopatogenski faktori koji dovode do pojave hiperbilirubinemije mogu biti urođeni i stečeni. Urođeni su ređi. Grupi hepatičnih bilirubinemija pripada i Gilbert-ov sindrom. Ovaj sindrom obuhvata heterogene urođene deficite koji dovode do nekonjugovane hiperbilirubinemije. Kod Gilbertovog sindroma ili je narušen transport bilirubina kroz ćelijsku membranu hepatocita ili postoji delimično smanjenje aktivnosti UDP glukoronil transferaze. Prenosi se autosomno dominantno i srijeće se 4 puta češće kod muškaraca. Ispitivanje je sprovedeno u laboratoriji VMC-a Podgorica i obuhvatilo je regrute u periodu od januara 2003. godine do februara 2004. godine. Obrađeno je 1076 regruta. Referentne vrijednosti za bilirubin iznose 9–21 μmol/L. Kod 127 regruta dobijene vrijednosti za koncentraciju bilirubina su bile 22–55,8 μmol/L. Kod ovih 127 regruta rutinski testovi za hepatične funkcije su bili normalni, a ultrazvuk je bio uredan.

bilirubin is connected with albumin (unconjugated) in the plasma. Hepatocytes take it over from the circulation, conjugate it with glucuronic acid by means of ester connections with propionic acid making mono and diglucuronides, and then excrete conjugated bilirubin. Hyperbilirubinaemia is a sign of balance disturbed the between anabolism and catabolism of the bile pigments. Aethiopathogenic factors which cause hyperbilirubinemia could be inborn or acquired. The inborn are uncommon. The group of hepatic hyperbilirubinaemia contains also Gilbert's syndrome. This syndrome includes heterogenic inborn deficits which cause unconjugated hyperbilirubinaemia. In Gilbert's syndrome the transport of bilirubin through the hepatocytes cell membrane can be destructed or a partial reduction of UDP glucuronil tansfer activity can be present. It is autosomally dominated and it is four times more common in males. The study was carried out in the VMC laboratory in Podgorica and it included the recruits from January 2003 to February 2004 (1076 recruits). Reference values of bilirubin ranged from 9–21 μmol/L, and 127 of recruits had values from 22–55.8 μmol/L. In these 127 recruits tests of hepatic functions were normal. Ultrasound findings were normal.

I94

MOGUĆI TERAPIJSKI ASPEKTI ALFA-LIPONSKE KISELINE U PREVENCIJI OŠTEĆENJA JETRE UZROKOVANOG PEROKSINITRITOM

G. Kocić, R. Pavlović, D. Pavlović, I. Stojanović, T. Jevtović

Institut za biohemiju i Institut za hemiju, Medicinski fakultet, Niš

Među reaktivnim radikalima nastalim iz nitro jedinjenja, peroksinitrit (ONOO) predstavlja primarnog pokretača multipnih formi oštećenja proteina, zbog svoje sposobnosti da reaguje sa sulfidrilnim grupama i aromatičnim jezgrima. U stanju je da indukuje inflamaciju i kancerogenezu, pa bi možda mogao da predstavlja terapijski racionalni pokušaj korišćenja »skavendžera« peroksinitrita u tretmanu hroničnog hepatitisa. Cilj ovog rada je bio da se ustanove peroksinitrit-»skavendžer« svojstva supstance bogate sulfidrilnim grupama, kao što je alfa-liponska kiselina. Hepatociti su izolovani uz korišćenje kolagenaze (1 mg/mL RPMI 1640 medijuma). Kolagenaza je inhibirana uz korišćenje 10% FCS, a $ONOO^-$ je sintetisan specijalnom metodom hlađenja (koncentracija je kvantifikovana na 302 nm, molarna apsorptivnost 1670 $L \times mol^{-1} \times cm^{-1}$). Izolovani hepatociti (oko 10^7 ćelija/mL) su bili tretirani sa ONOO ili simultano sa ONOO i alfa-liponskom kiselinom (2,5 mg/mL, što predstavlja maksimalnu

I94

POSSIBLE THERAPEUTIC IMPLICATION OF ALPHA LIPOIC ACID IN PREVENTING PEROXYNITRITE-INDUCED LIVER DAMAGE

G. Kocić, R. Pavlović, D. Pavlović, I. Stojanović, T. Jevtović

Institute of Biochemistry and Institute of Chemistry, University School of Medicine, Niš

Among reactive nitrogen species derived from nitric oxide, peroxynitrite (ONOO) is the primary trigger of multiple forms of protein damage, by reacting with sulphydryl nucleophiles and by nitrating aromatic groups. In that way it is capable of stimulating inflammation and cancerogenesis. It may also provide a therapeutic rationale for the use of peroxynitrite scavengers in treatment of chronic hepatitis. The aim of the study was to establish peroxynitrite-scavenging properties of sulphydryl-rich compound alpha-lipoic acid. Hepatocytes were isolated by collagenase technique (1 mg/mL of RPMI 1640 medium, collagenase was inhibited by 10% FCS), and $OONO^-$ was synthesyzed by a quench-flow technique (the concentration of 20 mmol/mL was quantified at 302 nm, molar absorptivity 1670 $L \times mol^{-1} \times cm^{-1}$). Hepatocytes (approximately 10^7cells/mL) were exposed to either OONO or simultaneously with alpha-lipoic acid (2.5 mg/mL), what was a maximal therapeutic dose. In ONOO–treated hepatocytes

terapijsku dozu). Hepatociti koji su izloženi delovanju peroksinitrita pokazivali su značajan porast koncentarcije nitrata i nitrita (38,4 ± 3,43 μmol/g proteina, u odnosu na kontrolu 3,4 ± 0,12 μmol/g proteina, p<0,001), povećanje koncentracije karbonilnih derivata (12,46 ± 1,42 μmol/g proteina u odnosu na kontrolu 6,28 ± 0,21 μmol/g proteina p<0,01), kao i nitrotirozina (9,6 ± 1,31 μmol/g proteina u odnosu na kontrolu 6,7 ± 1,11, p<0,001 nmol/g proteina). U uzorku hepatocita koji su tretirani alfa-liponskom kiselinom i peroksinitritom istovremeno je bila niža koncentarcija nitrata i nitrita (20,9 ± 5,18 μmol/g proteina, p<0,01), karbonilnih grupa (8,33 ± 2,78 μmol/g proteina, p<0,001) i nitrotirozina (6,9 ± 1,24 μmol/g proteina, p<0,05). Može da se zaključi da povoljni citoprotektivni efekti koji su postignuti sa alfa-liponskom kiselinom ukazuju na njena svojstva »univerzalnog antioksidansa«. Moguća terapijska implikacija u prevenciji oštećenja jetre uzrokovanog peroksinitritom u toku hroničnog hepatitisa predstavlja novi pogled na jedan stari kofaktor.

significant increase in the nitrate/nitrite (NOx) level (38.4 ± 3.43 vs. control 3.4 ± 0.12 μmol/g proteins, P<0.001) was associated with enhanced carbonyls (12.46 ± 1.42 vs control 6.28 ± 0.21 μmol/g proteins, P<0.01) and nitrotyrosine (NTY) (9.6 ± 1.31 vs. control 6.7 ± 1.11 μmol/g proteins, P<0.001) respectively. In the ONOO and alpha-lipoic acid group, concentration of NOx (20.9 ± 5.18 μmol/g proteins, P<0.01), carbonyls (8.33 ± 2.78 μmol/g proteins, P<0.001) or NTY (6.9 ± 1.24, P<0.05) was decreased. We can conclude that a powerful cytoprotective effect achieved by lipoic acid, points to its properties as of a »universal antioxidant«. The possible therapeutic implication in prevention of peroxynitrite-induced liver damage during chronic hepatitis is a new view on an old cofactor.

I95

NITROZATIVNI I OKSIDATIVNI STRES INDUKOVANI AUTENTIČNIM PEROKSINITRITOM

R. Pavlović[1], G. Kocić[2], I. Stojanović[2], T. Cvetković[2], D. Pavlović[2], T. Jevtović[2], G. Nikolić[1]

[1]Institut za hemiju
[2]Institut za biohemiju, Medicinski fakultet, Niš

Peroksinitrit anijon ($ONOO^-$) je, u poslednje vreme, postao predmet intenzivnog proučavanja, tako da su predloženi brojni putevi njegove sinteze i razgradnje. Dokazano je da endogeno nastao peroksinitrit uzrokuje značajne metaboličke poremećaje, ali je procena citotoksičnosti ovog anjona otežana usled izuzetno kratkog poluživota. Bilo da je nastao endogenom produkcijom, ili je davan *in vitro* kao bolus, peroksinitrit se protonuje u peroksinitritnu kiselinu (ONOOH), koja se dalje ili prevodi u nitratni jon, ili se razlaže do reaktivnih intermedijera, sposobnih da posreduju u nastajanju tkivnih oštećenja. Zbog toga je cilj ovog rada bio da se ispitaju direktni efekti administracije peroksinitrita putem sistemske cirkulacije na lipidnu peroksidaciju (nivo malondialdehida) i na oksidativnu modifikaciju proteina (merenu putem sadržaja karbinilnih grupa). Osim toga, ispitana je i moguća inaktivacija regulatornih proteina usled nitracije aromatičnog prstena tirozina (pojava nitrotirozina) i oksidacije tiolnih grupa (sulfhidrilne grupe). Koncentracija nitrata (NO_x), stabilnih krajnjih produkata peroksinitrita, je takođe merena u plazmi. Određivan je i nivo endogene produkcije urata, jer je mokraćna kiselina

I95

NITROSATIVE AND OXIDATIVE STRESS INDUCED BY AUTHENTIC PEROXYNITRITE

R. Pavlović[1], G. Kocić[2], I. Stojanović[2], T. Cvetković[2], D. Pavlović[2], T. Jevtović[2], G. Nikolić[1]

[1]Institute of Chemistry
[2]Institute of Biochemistry, University School of Medicine, Niš

Peroxynitrite anion ($ONOO^-$) has been the major focus of the most recent studies, and numerous pathways of its synthesis and decomposition have been proposed. It is well documented that endogenous formation of peroxynitrite has been implicated in a number of metabolic disorders, but assessment of its cytotoxicity has been obstructed by its extremely short half-life. Peroxynitrite, when formed either endogenously, or added *in vitro* as a bolus, is protonated into peroxynitrous acid (ONOOH), which, in turn, decomposes into either nitrate or reactive toxic intermediates capable of mediating tissue injury. Therefore, this study was preformed in order to establish the direct effect of peroxynitrite administration by systemic circulation on lipid peroxidation (level of malondialdehyde – MDA) and oxidative modification of proteins (measured by the reactive carbonyl groups content). Furthermore, possible inactivation of regulatory proteins through nitration of tyrosine aromatic ring (nitrotyrosine appearance) or thiol group oxidation (sulfhydryl moieties) was estimated. Concentration of nitrate (NO_x), known as stable peroxynitrite end products, was also measured in plasma. In addition, level of endogenous urate

često predstavljana kao potencijalni »skavendžer« peroksinitrita. Autentični peroksinitrit, sintetisan »quench-flow« postupkom (0,1 mL, 30 mmol/L rastvor) davan je intraventikularnom infuzijom Sprague – Dawley pacovima anesteziranim Na-pentobarbitalom. Kontrolna grupa je primala fiziološki rastvor, a sa njom se postupalo na isti način kao i sa predhodnom. Životinje su žrtvovane nakon 24 sata. Tretman peroksinitritom nije izazvao promene u sadržaju karbonilnih grupa plazme, niti je promenio nivo malondialdehida. U poređenju sa kontrolom, administracija peroksinitrita je u cirkulaciji značajno smanjila koncentraciju mokraćne kiseline uz povećanu koncentraciju nitrata. Intenzivirana je i nitracija aromatičnih aminokiselina (praćena putem povećane produkcije nitrotirozina), a potvrđena je i velika sposobnost peroksinitrita da oksiduje sulfhidrilne grupe proteina. Imajući u vidu dobijene rezultate, može se pretpostaviti da se autentični peroksinitrit razlaže na reaktivne azot-dioksid i hidroksil radikale, koji su, svaki ponaosob, moćni aktivatori nitrozativnog i oksidativnog stresa. Čini se da dominira nitrozativni stres zajedno sa visokom aktivnošću mokraćne kiseline kao peroksinitritnog »skavendžera«.

was determined, because uric acid is commonly described as a potent peroxynitrite scavenger. Authentic peroxynitrite, synthesized by quench-flow technique (0.1 mL of 30 mmol/L solution), was infused intraventricularly to Sprague – Dawley male rats under Na-penthobarbital anaesthesia. Physiological saline solution was given to control group, handled at the same manner as previous one. Animals were killed after 24 h. Peroxynitrite treatment caused no alternation in plasma carbonyl group content, or in MDA level. Comparing to controls, peroxynitrite administration led to significant uric acid depletion, followed by an increase in plasma NO_x concentration. Aromatic amino acids nitration (evaluated by nitrotyrosine formation) was intensified, while high ability of peroxynitrite for the oxidation of protein sulfhydryl groups was also confirmed. Considering the obtained results, it can be proposed that authentic peroxynitrite can dissociate to form both the nitrogen dioxide and hydroxyl radical, which are, respectively, powerful activators of nitrosative and oxidative stress. It seems that nitrosative stress is predominant with concomitant high uric acid activity as a peroxynitrite scavenger.

I96

INDUCIRANA LIPIDNA PEROKSIDACIJA U MOŽDANOM HOMOGENATU KOD UMERENO HIPERHOLESTEROLEMIČNIH PACOVA IZLOŽENIH RAZLIČITIM VRSTAMA MASLENE SUPLEMENTACIJE

B. Đošić-Markovska, J. Dimitrova-Šumkovska

Katedra za biohemiju, Institut za biologiju, Prirodno-matematički fakultet, Skopje, Republika Makedonija

Sastav moždanog tkiva je jedinstven u svojoj visokoj koncentraciji lipida, sa izrazito dugim lancem polienoičnih masnih kiselina iz grupa omega-3 i omega-6. Shodno tome, sastav i balans pomenutih molekula u moždanom tkivu je presudan za pravilan razvoj i funkcionisanje nervnog sistema, zato što je poslednji posebno ranjiv na oksidativni insult. Smatra se da alteracija biomolekula izazvana aldehidima iz procesa lipidne peroksidacije, doprinosi formiranju lipofuscina, što je uočljivo kod starenja i kod progresije određenih oblika degenerativnih oboljenja. U ovom radu određivan je stepen lipidne peroksidacije u moždanom homogenatu pacova, merenjem trenutnog, takozvanog »steady-state« nivoa produkcije lipidnih peroksida (TBARS), kao i u uslovima inducirane lipidne peroksidacije. Primenjen je metod Okhawa-e, uključivši modifikacije prema Sawas-u i Gilbert-u. Odrasli laboratorijski pacovi vrste *Wistar*, podeljeni su u 4 grupe: (1) intaktni pacovi koji nisu bili izloženi tretmanu (kontrolna grupa); (2) umereno hiperholesterolemični pacovi (izloženi aterogenoj ishrani u toku 180 dana), bez dodatne prehrane; (3) umereno hiper-

I96

INDUCED BRAIN LIPID PEROXIDATION IN MILDLY HYPERCHOLESTEROLAEMIC RATS WITH DIFFERENT DIETARY SUPPLEMENTATIONS

B. Đošić-Markovska, J. Dimitrova-Šumkovska

Department of Biochemistry, Institute of Biology, University School of Natural Sciences and Mathematics, Skopje, Republic of Macedonia

Composition of the brain is unique in its high concentration of lipids with particularly long-chain polyenic fatty acids of the omega-6 and omega-3 series. Thus, the composition and balance of these molecules in the brain are critical for proper development and functioning of the nervous system, as it is particularly vulnerable to oxidative insult. Modification of biomolecules by aldehyde products of lipid peroxidation is also believed to contribute to lipofuscin formation, as seen in aging and in the progression of some degenerative diseases. This study has examined the degree of lipid peroxidation evaluated in brain homogenates of rats, by measuring both steady-state and stimulated concentrations of thiobarbituric acid reactive substances (TBARS) according to a method described by Okhawa (1979), and modified by Sawas and Gilbert. Adult male *Wistar* strain rats were randomized in 4 dietary groups: (1) intact rats receiving no treatment (control group); (2) mildly hypercholesterolaemic rats (receiving atherogenic diet for 180 days) with no supplementary diet;

holesterolemični pacovi izloženi visoko masnoj ishrani u periodu od 160 dana, nakon čega je usledila kontinuirana intragastralna suplementacija (1,5 mL ribljeg ulja u toku 20 dana) i (4) umereno hiperholesterolemični pacovi sa dodatnom prehranom (1,5 mL sojinog ulja u toku 20 dana). Dobijeni rezultati ukazuju da je suplementacija ribljim uljem povećala otpornost tkiva na proces lipidne peroksidacije izazvan metal-askorbatnim sistemom, uprkos činjenici da je suplementacija istom vrstom ulja inducirala značajno povećanje produkcije lipidnih peroksida u »steady-state« nivou. Utvrđeno je izrazito povećanje procesa lipidne oksi dacije stimulirane fero-askorbatnim sistemom, kod grupe pacova tretiranih visokim dozama sojinog ulja.

(3) mildly hypercholesterolaemic rats receiving high fat diet for 160 days followed by intragastral supplementary diet (1.5 mL fish oil per day for a period of 20 days), and (4) mildly hypercholesterolaemic rats with supplementary diet (1.5 mL soybean oil per day for a period of 20 days). The obtained results suggest that fish oil supplementation increases tissue resistance to lipid peroxidation triggered by metal-ascorbate system despite the fact that the steady-state levels of TBARS production have marked a significant increase in comparison with the attained results for the other groups of examined animals. It has been determined that the oxidation of lipids generated by the iron/ascorbate system is enhanced in the presence of high doses of chronically administrated n-6 fatty acids (soybean oil).

I97

METABOLIZAM POLIAMINA U JETRI PACOVA TRETIRANIH ŽIVINIM HLORIDOM

J. Nikolić, I. Stojanović, G. Bjelaković

Institut za biohemiju,
Medicinski fakultet, Niš

Poliamini, putrescin, spermidin i spermin, predstavljaju grupu ćelijskih konstituenata koji imaju važnu ulogu u regulaciji ćelijske proliferacije i diferencijacije. Živa je teški metal koji postoji u različitim formama u životnoj sredini. Ima je u hrani (morska riba), u proizvodima koji se koriste u agrikulturi (fumgicidi, insekticidi), u preparatima koji se koriste u medicinskoj praksi (dentalni amalgam, vakcine), u industrijskim proizvodima (barometri, termometri, baterije, fluorescenthe lampe). Trovanja živom su vrlo česta i mogu biti slučajna ili nastaju kod radnika koji su profesionalno izloženi živi. Klinički simptomi toksičnosti žive zavise od doze i dužine eksponiranja. Cilj istraživanja je bio ispitivanje značaja poliamina u hepatotoksičnim efektima žive. Eksperiment je vršen na muškim Sprague Dawley pacovima telesne mase oko 250 g. Životinje su žrtvovane 24 časa nakon *i.p.* davanja merkuri hlorida (3 mg/kg). Kontrolna grupa životinja je tretirana fiziološkim rastvorom. Enzimi katabolizma poliamina, poliamino oksidaza (PAO) i diamino oksidaza (DAO), su određivani u jetrinom homogenatu prema metodi Bashrach and Reches (1966). Nivo proteina u tkivu jetre meren je po metodi Lowry i sar. (1951). Rezultati istraživanja pokazuju da primena merkuri hlorida dovodi do pojave akutne bubrežne insuficijencije. Nivo uree i kreatinina, markera bubrežne funkcije, se značajno povećava u odnosu na kontrolnu grupu životinja ($p<0,001$). Diamino oksidaza i poliamino oksidaza se značajno smanjuju u poređenju sa kontrolom ($p<0,01$). Ovi rezultati ukazuju na važnu ulogu poliamina u jetri-

I97

POLYAMINE METABOLISM IN RAT LIVER AFTER MERCURY CHLORIDE ADMINISTRATION

J. Nikolić, I. Stojanović, G. Bjelaković

Departmant of Biochemistry,
University School of Medicine, Niš

Polyamines, putrescine, spermidine and spermine are a group of cell components with important role in regulation of cell proliferation and differentiation. Heavy metal, mercury, in various forms, is widely distributed in environment: in food (fish), in many products in agriculture (fungicides, insecticides), in medical practice (dental amalgam fillings, vaccines), industry (barometers, thermometers, battery, fluorescent lamps), etc. Accidental occupational or environmental intoxication with mercury is very frequent. Clinical signs of toxicity depend on doses and duration exposure to mercury. In evaluation of hepatotoxic effects of mercury chloride we have studied the importance of polyamines in response to acute mercury chloride intoxication. Experiment was performed on male Sprague Dawley rats weighing about 250 g. The animals were killed 24 h after mercury chloride administration (3 mg/kg). Control group of animals was treated with saline. Polyamine oxidase (PAO) and diamine oxidase (DAO), enzymes that catabolise polyamines,were measured in the liver homogenate according to the method of Bashrach and Reches (1966). Tissue protein level was determined according to Lowry et all. (1951). Results of our study show that administration of mercury chloride leads to developing of acute renal failure. Urea and creatinine, the markers of kidney function, were significantly elevated in blood plasma, $P<0.001$. Diamine and polyamine oxidase activities in liver were significantly decreased compared to control group ($P<0.01$). These results indicate that polyami-

noj regeneraciji i reparativnom rastu u ranoj fazi nakon trovanja živom. Smanjenje aktivnosti enzima koji učestvuju u katabolizmu poliamina predstavlja kompentazorni odgovor organizma na toksične efekte živinog hlorida. Rezultati ukazuju na povoljane efekte i moguć hehepatoprotektivni značaj poliamina kod trovanja živom.

nes could be important for liver regeneration and reparative growth in early phase of mercury chloride-induced hepatotoxicity. Depressed activity of polyamine catabolic enzymes may be a compensatory response to mercury chloride toxicity. The obtained results indicate that polyamines have important contribution to mercury toxicity and point to their benefits as possible hepatoprotective compounds.

I98

ZNAČAJ POLIAMINA I GABA U ANTIDEPRESIVNIM EFEKTIMA PREPARATA BIOSENZAL®

I. Stojanović[1], G. Kocić[1], T. Sokolović[2], G. Bjelaković[1], D. Pavlović[1], D. Sokolović[1], M. Mladenović[1]

[1]Institut za biohemiju, Medicinski fakultet, Univerzitet u Nišu, Niš
[2]»Zdravlje«, Leskovac

Biosenzal® je fitopreparat, je ekstrakt kantariona (*Hypericum perforatum*), čija je aktivna supstanca hipericin. Široki spektar delovanja ovog preparata obuhvata i tretman depresija, pa su u ovom radu ispitivani efekti tri različite doze ovog preparata (1, 2,5 i 10 μg/kg), aplikovanog intraperitonealno, na enzime katabolizma poliamina i GABA u mozgu pacova. Hipericin izaziva dozno zavisni porast aktivnosti diamino oksidaze (0,86 ±0,16; 0,66±0,10; 0,47±0,08 U/mg proteina) u mozgu pacova sve tri eksperimentalne grupe, što je statistički značajno u odnosu na vrednosti u kontrolnoj grupi (0,37±0,05). Aktivnost poliamin oksidaze je statistički značajno snižena u sve tri grupe tretirane hipericinom (0,61±0,08; 0,42±0,05; 0,39± 0,12 U/mg proteina) u odnosu na kontrolne vrednosti (0,86±0,05 U/mg proteina). Ovi efekti su takođe dozno zavisni. Tretman etanolom (koji se koristi kao adjuvans u ovom fitopreparatu) ne dovodi do promena aktivnosti diamino oksidaze, ali značajno snižava aktivnost poliamin oksidaze u mozgu pacova (0,39±0,12 U/mg proteina). Porast aktivnosti diamino oksidaze praćen padom aktivnosti poliamin oksidaze ukazuje da jedan od mehanizama dejstva aktivnih supstanci ovog preparata uključuje i neuromodulatorne efekte poliamina. Aplikacija Biosenzal®-a dovodi i do značajnog porasta aktivnosti GABA-transaminaze, što ukazuje da deo svojih antidepresivnih efekata ovaj fitofarmak ostvaruje smanjujući nivo GABA, glavnog inhibitora u CNS-u.

I98

IMPORTANCE OF POLYAMINES AND GABA IN ANTIDEPRESSANT ACTIVITY OF BIOSENZAL®

I. Stojanović[1], G. Kocić[1], T. Sokolović[2], G. Bjelaković[1], D. Pavlović[1], D. Sokolović[1], M. Mladenović[1]

[1]Institute of Biochemistry, University School of Medicine, Niš
[2]Zdravlje, Pharmaceutical Comapny, Leskovac

Biosenzal® is a phytopharmaceutic drug, an extract of *Hypericum perforatum*, containing hypericin as an active substance. It has been widely used in the therapy of depressive states. In this study we examined the effects of three different doses of this herbal drug (1, 2.5 and 10 μg/kg), administered intraperitoneally, on polyamine and GABA catabolism enzymes in rat brain. Biosenzal® induced dose dependent increase in diamino oxidase activity (0.86±0.16; 0.66±0.10; 0.47± 0.08 U/mg protein) in rat brain of all experimental groups, which is statistically significant in comparison to the values in control group of animals (0.37±0.05 U/mg protein). Polyamine oxidase activity was significantly decreased in all groups treated by Biosenzal® (0.61±0.08; 0.42±0.05; 0.39±0.12 U/mg protein) compared to control values (0.86±0.05 U/mg protein). These effects are also dose dependent. Ethanol treatment did not change diamino oxidase activity, but it significantly reduced the activity of polyamine oxidase in rat brain (0.39±0.12 U/mg protein). The increase in diamino oxidase activity followed by decrease in polyamine oxidase activity points to the fact that one of the mechanisms of this drug active substances involves antidepressant effects on neuromodulatory properties of polyamines. The use of Biosenzal® led to a significant increase in GABA-transaminase activity, proving that Biosenzal® effects are also mediated by decrease in the level of GABA, the main inhibitory neurotransmitter in CNS.

I99

LABORATORIJSKO ISPITIVANJE BOLESNIKA SA CELIJAČNOM BOLEŠĆU I PACIJENATA PREOSETLJIVIH NA PROTEINE KRAVLJEG MLEKA

G. Nikolić

Institut za transfuziju krvi Srbije, Beograd

Nepodnošenje proteina kravljeg mleka i celijačna bolest su dva potpuno različita IgE nezavisna tipa preosetljivosti na proteine hrane. Oba tipa preosetljivosti karakteriše prisustvo specifičnih antitela na proteine hrane. Dugogodišnjim proučavanjem oba ova tipa, primećeno je da određeni broj bolesnika produkuje specifična antikazein i antiglijadin antitela istovremeno. S obzirom na veoma visok sadržaj glutaminske kiseline oba proteina, ispitivane su moguće ukrštene reaktivnosti. Ispitivani su serumi pet celijačnih bolesnika sa antiglijadin i antikazein antitelima. Antiglijadinska antitela su uklanjana adsorpcijom 2 sata na sobnoj temperaturi, eluirana 0,2 mol/L glicin/ HCl puferom, a nakon toga uzorci su testirani. SDS elektroforeza je pripremljena postupkom po Laemliju a elektrotransfer Towbinovim postupkom. »Western blotom« je potvrđena uspešnost adsorpcije antiglijadinskih antitela a potom je dokazano prisustvo antitela na kazein u istim uzorcima. Nakon neutralizacije 1 mol/L TRIS-om, u eluatima je dokazano prisustvo antiglijadinskih i odsustvo antikazeinskih antitela. Rezultati jasno pokazuju da ne postoji krosreaktivnost glijadina i kazeina. Mlečni obroci nemaju uticaj na razvoj i tok celijačne bolesti a moguće objašnjenje pojave antikazein antitela leži u činjenici da je kod tek dijagnostikovanih celijačnih bolesnika znatno oštećena mukozna barijera postojećim zapaljenjskim procesom.

I99

LABORATORY STUDIES OF PATIENTS WITH COELIAC DISEASE AND PATIENTS WITH COW MILK PROTEIN INTOLERANCE

G. Nikolić

Blood Transfusion Institute of Serbia, Belgrade

Cow milk protein intolerance (CMPI) and Coeliac disease are two different kinds of non – IgE dependent food intolerance. Their common characteristic is production of specific (anticasein or antigliadin) antibodies. Examination of these two disorders of food tolerance for years, we found that certain patients produce specific antibodies for both proteins at the same time. On the other hand, amino acid analyses of casein and gliadin revealed a very high percent of glutamic acid in both of them making the existence of common epitopes possible. Therefore, we studied the crossreactivity between these two proteins. Sera samples were collected from five coeliac patients with specific antigliadin and anticasein antibodies (previously determined by Western Blot). Antigliadin antibodies were removed from samples by a two hour absorption at room temperature and after three washings they were eluted by 0.2 mol/L Glycine/HCl buffer pH 2.8 and all samples were tested for anticasein and antigliadin antibodies by Western Blot. SDS-PAGE were performed according to Laemli and proteins were transferred to nitrocellulose sheets according to Towbin's electrophoretic transfer procedure. Western Blot analyses confirmed that we successfully removed antigliadin antibodies from samples by adsorption. We also established that anticasein reactivity remained after that adsorption. Antigliadin antibodies from eluates remained active after neutralization by 1 mol/L TRIS, but did not express any anticasein activity. We conclude that very sensitive Western Blot analyses revealed no crossreactivity between specific anticasein and antigliadin antibodies. We also conclude that milk meals could not aggravate coeliac disease. The presence of anticasein antibodies in coeliac patients may most probably result from damaged intestinal mucous membrane and local inflammatory process.

I100

ULTRAFILTRACIJA U PROIZVODNJI LEKOVA IZ HUMANE PLAZME

M. Mitrović, M. Romić, V. Popržen

Institut za transfuziju krvi Republike Srbije, Beograd

U procesu frakcionisanja plazme primenjuje se hladno etanolska metoda po Cohn-u (modifikacija Kist-

I100

ULTRA FILTRATION IN THE PRODUCTION OF DRUGS DERIVED FROM HUMAN PLASMA

M. Mitrović, M. Romić, V. Popržen

National Blood Transfusion Institute, Belgrade

Cold ethanol method according to Cohn, Kittler-Hirschman's modification is used in the process of

ler-Nitschmann). Ovom metodom, koja se koristi i u celom svetu, dobijaju se stabilni, apirogeni, atoksični i sterilni preparati. U procesu frakcionisanja i u proizvodnji lekova iz humane plazme, etanol u standardizovanim uslovima služi kao precipitaciono sredstvo. Za odstranjivanje rezidualnog etanola koristi se postupak ultrafiltracije. U upotrebi su membrane »Millipore«, tip PTGC, »cutoff« 10000 daltona. Rastvori proteina se propuštaju pod pritiskom oko 2 bara, pri odgovarajućoj pH vrednosti kroz ultrafiltracione membrane. Ovim postupkom se eliminiše etanol i elektroliti, a rastvor proteina se vraća u sud uz konstantnu koncentraciju proteina. U ovom radu određivani su koncentracija rezidualnog etanola u proizvodnim serijama albumina i imunoglobulina. U 50 serija 20% albumina i 5% intravenskog imunoglobulina proizvedenih u toku 2002. godine i 2003. godine, srednja vrednost rezidualnog etanola je iznosila 0,153 mg/mL. Postupkom ultrafiltracije se postiže eliminacija etanola, smanjenje koncentracije elektrolita, metalnih jona (Al, Cr, Mn, Ni), acetatnih jona, kao i sniženje stepena polimerizacije molekula proteina. Kvalitet finalnih preparata se ispituje na Odeljenju za kontrolu kvaliteta našeg instituta i u Zavodu za farmaciju Republike Srbije kao referentnoj ustanovi za ispitivanje svake proizvodne serije. Tehnološki postupak koji se primenjuje, uključujući i postupak ultrafiltracije, je metod izbora u pogledu kvaliteta i bezbednosti finalnih preparata.

plasma fractionation. By this method, used worldwide, a sterile, pyrogen free, nontoxic and stable preparation is obtained. In the course of fractionation and production of drugs derived from human plasma, along with other required parameters, ethanol serves as the precipitation medium. Ultrafiltration procedure is used for the elimination of the residual ethanol. »Millipore« membranes, type PTGC, »cutoff« 10.000 Daltons, are used in that procedure. Protein solutions are passed through ultrafiltration membranes under pressure of 2 bars, with the corresponding pH value. This procedure eliminates ethanol and electrolytes, and protein solution is transferred to the initial tank with constant volume and protein concentration. The study concerns the determination of residual ethanol concentration in albumin and immunoglobulin production lots. In 50 butches of 20% albumin and 5% intravenous immunoglobulin prepared in 2002 and 2003, mean residual ethanol value was 0.153 mg/mL. Ultrafiltration procedure eliminates ethanol, reduces electrolyte, metal ions (Al, Cr, Mn, Ni) and acetate ions concentration, and it decreases the degree of protein molecules polymerization. Quality of final preparation is tested in the Quality Control Department of the NBTI and in the Institute of Pharmacy of the Republic of Serbia, the reference institution for the examination of each production lot. Technological procedure used in the production, including ultrafiltration, is the method of choice regarding the quality and safety of the final preparation.

I101

ANALIZA ZADOVOLJSTVA ZAPOSLENIH U INSTITUTU ZA MEDICINSKU BIOHEMIJU KLINIČKOG CENTRA SRBIJE

A. Poštić-Grujin, R. Obrenović, T. Vodnik, N. Majkić-Singh

Institut za medicinsku biohemiju, Klinički centar Srbije, Beograd

Primena i održavanje standarda JUS ISO 9001: 2001 za sertifikaciju podrazumeva stalno unapređenje sistema i proučavanje njegovih performansi. O ovome se detaljnije govori u standardu JUS ISO 9004:2001 koji predstavlja uputstvo za poboljšanje performasi. U standardu JUS ISO 9004:2001 posebna pažnja se poklanja delu koji se odnosi na samoocenjivanje sprovođenja sistema kvaliteta. Jedan od elemenata samoocenjivanja je i sprovođenje ankete među zaposlenima koja se odnosi na njihovo zadovoljstvo vezano za određena pitanja. Institut za medicinsku biohemiju Kliničkog centra Srbije sertifikovao je sistem kvaliteta prema standardu JUS ISO 9001:2001 februara 2001. godinu. Reocenjivanjem januara 2004. godine Institutu je pro-

I101

ANALYZING EMPLOYEES SATISFACTION IN THE INSTITUTE OF MEDICAL BIOCHEMISTRY CINICAL CENTER OF SERBIA

A. Poštić-Grujin, R. Obrenović, T. Vodnik, N. Majkić-Singh

Institute of Medical Biochemistry, Clinical Centre of Serbia, Belgrade

Use and monitoring of the JUS ISO 9001:2001 Standard for certification means constant improvement of system and exploration its performances. We can read in details about that in the JUS ISO 9004:2001 Standard, which is actually an instruction for improvement of performances. In the JUS ISO 9004:2001 Standard special attention is on one part which is about self-evaluation of monitoring of quality system. One part of self-evaluation is polling employees which are about their satisfaction, as far as some questions are concerned. Institute of Medical Biochemistry, Clinical Center of Serbia has certificated the system of quality according to JUS ISO 9001:2001 Standard in February 2001. The certification is exten-

dužena sertifikacija. Shodno navedenom anketa je sprovedena da bi se procenilo koliko organizacija zadovoljava potrebe i očekivanja zaposlenih. Urađena je pilot studija u nekoliko odeljenja Instituta gde je analizirano zadovoljstvo istih struktura zaposlenih. Elementi analiziranja su bili proces rada, međuljudski odnosi i materijalni resursi. Zadovoljstvo je izraženo kroz tri stepena: nezadovoljan, zadovoljan i vrlo zadovoljan. Podaci su statistički obrađeni i prikazani u obliku histograma. Ovaj način je prema standardu prihvaćen kao alat za obradu podataka. Anketa je pokazala da je kod zaposlenih najniže zadovoljstvo bilo u oblasti snabdevanja, što je u vezi sa materijalnim mogućnostima sistema zdravstvene zaštite, dok je najveće zadovoljstvo bilo izraženo u saradnji sa klijentima, pacijentima i lekarima.

ded by re-evaluation in January 2004. Because of that employees are polled in order to be seen if the needs and expectations of employees were satisfact with the organization. The pilot-study has been also carried out in some sections of the Institute where the satisfaction of the same structures of employees has been analyzed. The elements of analyzing were work process, interpersonal relationships and material resources. Satisfaction can be expressed throught three levels: unsatisfied, satisfied and very satisfied. Data were evaluated by histogrammes, method which is accepted as tool for data processing according to standard. The poll showed that the lowest satisfaction was in the supply area, which is connected with material possibility of National Health Service and highest satisfaction were about co-operation with clients, patients and doctors.

I102

SMANJENE VREDNOSTI HDL-HOLESTEROLA KOD PACIJENATA INFICIRANIH SA HELICOBACTER PYLORI

M. Ilić, S. Stanković

Institut za medicinsku biohemiju, Klinički centar Srbije, Beograd

Ateroskleroza je vodeći uzrok nastanka koronarne srčane bolesti i cerebrovaskularnih bolesti, koje su najčešći uzrok mortaliteta u industrijski razvijenim zemljama Uloga infekcija i mehanizama zapaljenskih reakcija u patogenezi koronarne i cerebralne arterijske bolesti bazira se na rezultatima seroepidemioloških studija, kao i nedavnih studija o korišćenju antibiotika u terapiji ateroskleroze. Postavljena je hipoteza: infekcija Helicobacter pylori (HP) može uticati na povećani rizik od dobijanja ateroskleroze inficiranih pacijenata. Cilj ovog ispitivanja bio je da se utvrdi da li je HP infekcija povezana sa tradicionalnim faktorima rizika za nastanak ateroskleroze kao što su poremećaji u vrednostima lipida, hipertenzija, dijabetes i pušenje. Koncentracije ukupnog, HDL- i LDL-holesterola, triglicerida određene su kod 100 pacijenata sa definisanom kliničkom slikom, dok je kontrolnu grupu činilo 100 zdravih ispitanika. Koncentracije lipidnih parametara određene su standardnim laboratorijskim metodama. Koncentracije IgA i IgG antitela na Helicobacter pylori antigen određene su kvantitativno komercijalnim testom Enzignost® Anti-Helicobacter pylori II/IgA (IgG) (DADE-Behring). Na bazi seroloških podataka i nalaza endoskopije, pacijenti su klasifikovani kao negativni i pozitivni na HP. Pol, starosna dob, indeks telesne mase, pušački status, navike u uzimanju alkohola, vrednosti arterijskog krvnog pritiska i lipidni status analizirani su kod obe grupe ispitanika. Statistički značajna razlika ($p<0.01$)

I102

DECREASED HIGH DENSITY LIPOPROTEIN CHOLESTEROL LEVELS IN PATIENTS WITH HELICOBACTER PYLORI INFECTION

M. Ilić, S. Stanković

Institute of Medical Biochemistry, Clinical Centre of Serbia

Atherosclerosis is the main cause of coronary heart and cerebrovascular diseases which, in turn, are the most common causes of death in industrialized countries. New interest in the role of infections and inflammatory mechanisms for the pathogenesis of coronary and cerebral artery diseases is based on the results of seroepidemiologic studies, and recent studies evaluate the role of antibiotic therapy in atherosclerosis. A hypothesis suggests that exposure to Helicobacter pylori (HP) may lead to an increased risk of atherosclerosis. The aim of this study was to examine whether HP infection is associated with traditional risk factors for atherosclerosis such as lipid levels abnormalities, hypertension, diabetes, and smoking. The concentrations of total cholesterol (TC), high density lipoprotein cholesterol (HDL-C), low density lipoprotein cholesterol (LDL-C), triglycerides (TG), were measured in the samples of 100 patients with defined clinical picture and 100 healthy controls. The serum lipid levels were determined by standard laboratory methods. The human IgA and IgG antibodies to Helicobacter pylori antigen were quantitatively determined by Enzignost® Anti-Helicobacter pylori II/IgA (IgG) (DADE-Behring). On the basis of serological data and available endoscopic findings, patients were classed as negative and positive for HP. Gender, age, body mass index, smoking, drinking status, arterial blood pressure, lipid levels were compared in HP positive, HP negative groups

utvrđena je samo u HDL-holesterolu između HP pozitivnih i negativnih ispitanika i HP pozitivnih pacijenata i zdravih kontrola. Nakon uklanjanja uticaja pola, godina, indeksa telesne mase, pušačkog statusa i navika u uzimanju alkohola, vrednosti HDL-holesterola kod HP pacijenata bile su statistički značajno niže nego kod HP negativnih ispitanika ($p<0,01$). Dugotrajna infekcija sa HP može imati značajnu ulogu u smanjenju koncentracije HDL-holesterola.

and healthy controls. The only significant difference ($P<0.01$) was found in HDL-C between HP positive and HP negative, and HP positive and healthy controls. After adjustment for possible confounding factors (gender, age, BMI, smoking and drinking habits) mean HDL-C in HP positive patients was significantly lower than HDL-C in HP negative patients ($P<0.01$). Long-term infection with HP may have an important role in decreasing the serum HDL-C concentration.

I103

SHIZOFRENIJA: DIJAGNOSTIČKI ZNAČAJ LIPIDNIH POREMEĆAJA

S. Bugarinović[1], D. Pap[2]

[1]Specijalna neuropsihijatrijska bolnica, Kovin
[2]Zavod za zdravstvenu zaštitu studenata, Novi Sad

Niske koncentracije lipoproteina velike gustine (HDL-holesterola) su povezane sa povećanim rizikom za nastanak koronarne bolesti. Cilj ovog rada je bio da se ispita klinički značaj lipidnog statusa kod obolelih od shizofrenije na terapiji neuroleptikom Leponex®-om. Dvadeset četiri zdrava ispitanika i 24 pacijenata obolela od shizofrenije (SCH) na terapiji Leponex®-om (oba pola, iste starosne strukture sa kontrolom) je izabrano za ovaj rad. U svim svim uzorcima su određeni: ukupni holesterol (UH), trigliceridi (TG), HDL-holesterol, lipoproteini male gustine (LDL-holesterol), lipoproteini vrlo male gustine (VLDL-holesterol), indeks ateroskleroze (IA) i faktori rizika (FR). Rezultati su pokazali da nije postojala statistički značajna razlika između kontrolne grupe i eksperimentalne grupe u pogledu svih ispitivanih parametara. U odnosu na kontrolnu grupu zdravih ispitanika vrednosti TG i VLDL-holesterol i LDL-holesterol su bile slične u pacijenata sa SCH, dok su u pogledu UH i HDL-holesterol vrednosti nesignifikantno veće u poređenju sa kontrolom. Indeksi ateroskleroze i utvrđeni faktori rizika nisu ukazivali na povećani aterogeni rizik u obolelih od SCH. Dobijeni rezultati ukazuju da oboleli od SCH bez obzira na terapiju Leponex®-om nemaju povećani rizik za nastanak ateroskleroze i koronarne bolesti i da povećani nivo HDL-holesterol je dobar zaštitni faktor protiv nastanka, progresije ateroskleroze i mogućih komplikacija u ovih bolesnika.

I103

SHIZOPHRENIA: DIAGNOSTIC RELEVANCE OF LIPID DISTURBANCES

S. Bugarinović[1], D. Pap[2]

[1]Special Neuropsichiatric Hospital, Kovin
[2]Students Health Protection Institute, Novi Sad

Low concentrations of high density lipoprotein cholesterol (HDL-c), have long been associated with increased risk of atherosclerosis and coronary heart disease (CHD). The purpose of this study was to investigate diagnostic relevance and influence of disturbances in lipid metabolism in schizophrenic patients (SCH) on therapy with neuroleptic subjects (14 males and 10 females, mean age 43,16fl1,33 years) and 24 patients with SCH (16 males and 8 females, mean age 49,46fl1,21 years) were selected for our study. The following determinations are performed on all samples: levels of total cholesterol (TCH, triglycerides (TG), HDL-c, low density lipoprotein cholesterol (LDL-c), very low density lipoprotein cholesterol (VLDL-c), the index of atherosclerosis (IA) and estabiliched risk factors (RF). The results showed that statistically significant differences were not detected between controls and patients with SCH in terms of all examined parameters In comarison to the control group the values of LDL-c, TG and VLDL-c were similar with patients with SCH, while TCH and HDL-c was found to be nonsignificantly higher in comparison to the control. Values of IA and RF were not indicated a high risk of atherosclerosi in patients with SCH. Neither age nor sex influenced these results in both groups. These data suggest that patients with SCH without consideration of therapy with Leponex don't have higher risk for progression of atherosclerosis and coronary heart disease and the increased HDL-c is a protective factor against the development, progression of atherosclerosis and complication of CAD such as AMI.