

**P06 – Endokrinologija****P06-1 (Usmeno priopćenje)****Kvantitativno određivanje gonadotropina i ovarijskih steroida tijekom menstruacijskog ciklusa na platformi Roche-Ellecsys**

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**Cilj:** Ispitati koncentracije hormona važnih za procjenu funkcije osovine hipofiza-jajnici u žena fertile dobi tijekom menstruacijskog ciklusa.

**Ispitanice i metode:** U studiju je bilo uključeno 35 ispitanica, prosječne dobi  $32 \pm 6$  godina, s redovitim menstrualnim ciklusom ( $30 \pm 2$  dana). Uredni hormonski status smo potvrdili određivanjem koncentracija lutropina (LH), folitropina (FSH), estradiola (E2), ukupnog i slobodnog testosterona (T) te proteinskog nosača spolnih hormona (SHBG) u folikularnoj fazi (3.-5. dan ciklusa). U ovulacijskom periodu (13.-15. dan) određivali smo koncentracije LH, FSH i E2, a u luteinskoj fazi (20.-23. dan) koncentracije progesterona (P). Analize hormona proveli smo elektrokemiluminiscentnom metodom (ECLIA) na autoanalizatoru Roche-Ellecsys. Koncentracije slobodnog T izračunavali smo pomoću izmjerenih koncentracija ukupnog T i SHBG.

**Rezultati:** Normalna distribucija izmjerenih parametara potvrđena je Kolmogorov-Smirnovljevim testom. Prosječne koncentracije hormona u folikularnoj fazi bile su: LH  $5,6 \pm 3,0$  IU/L, FSH  $7,1 \pm 2,0$  IU/L, E2  $174 \pm 65$  pmol/L, ukupni T  $1,03 \pm 0,5$  nmol/L, slobodni T  $11,4 \pm 5,5$  pmol/L te SHBG  $73,9 \pm 28,8$  nmol/L. U ovulacijskoj fazi su dobiveni slijedeći rezultati: LH  $11,9 \pm 7,0$  IU/L, FSH  $6,0 \pm 2,1$  IU/L, odnosno E2  $734 \pm 477$  pmol/L. Prosječna koncentracija progesterona u luteinskoj fazi bila je  $48,4 \pm 19,5$  nmol/L.

**Zaključak:** Određivanje koncentracija hormona na analizatoru Roche-Ellecsys omogućava jednostavno i brzo mjerenje parametara menstruacijskog ciklusa u žena, što je osobito važno zbog pravovremenog isključivanja hormonskih poremećaja, odnosno liječenja stanja i bolesti praćenih ovarijskom disfunkcijom. Također, metoda je prikladna za kontinuirani nadzor ovarijske funkcije, kao i stimulacije ovulacije tijekom postupaka medicinski potpomognute oplodnje.

e-pošta: [ikulas@kbsm.hr](mailto:ikulas@kbsm.hr)**P06 – Endocrinology****P06-1 (Oral presentation)****Quantitative automated measurement of gonadotropins and ovarian steroid hormones during the menstrual cycles on the Roche-Ellecsys analyzer**

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**Objective:** To determine concentrations of hormones relevant for the evaluation of function of pituitary-ovarian axes in fertile women during the menstrual cycle.

**Subjects and methods:** A total of 35 women aged  $32 \pm 6$  years, with regular menstrual cycles ( $30 \pm 2$  days) were selected for the study. Normal hormone concentrations were confirmed by measurement of lutropin (LH), folitropin (FSH), estradiol (E2), total testosterone (T) and sex-hormone binding globulin (SHBG) in follicular phase (cycle day 3-5), LH, FSH and E2 in ovulation (cycle day 13-15) and progesterone (P) in luteal phase (cycle day 20-23). Measurements of hormones were performed by electrochemiluminescence immunoassay (ECLIA) on Roche-Ellecsys analyzer. Concentrations of free testosterone (FT) were calculated on the basis of total T and SHBG concentrations.

**Results:** Normal distributions of measured hormones were confirmed by Kolmogorov-Smirnov test. Mean concentrations of hormones in follicular phase were: LH  $5.6 \pm 3.0$  IU/L, FSH  $7.1 \pm 2.0$  IU/L, E2  $174 \pm 65$  pmol/L, total T  $1.03 \pm 0.5$  nmol/L, free T  $11.4 \pm 5.5$  pmol/L and SHBG  $73.9 \pm 28.8$  nmol/L, respectively. Average concentrations of hormones in ovulatory phase were: LH  $11.9 \pm 7.0$  IU/L, FSH  $6.0 \pm 2.1$  IU/L, odnosno E2  $734 \pm 477$  pmol/L. Mean concentration of P in luteal phase was  $48.4 \pm 19.5$  nmol/L.

**Conclusion:** Determination of hormone levels on automated Roche-Ellecsys platform enables simple and fast measurements of relevant parameters for women's menstrual cycles. This is particularly important when assessment of hormones is needed for appropriate classification and treatment of hormone disorders. Also, this is an appropriate method for monitoring of ovarian function and ovarian stimulation in the procedures of assisted reproduction techniques.

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## P06-2

**Flavonoid miricetin sprječava oksidativno oštećenje izazvano D-glukozom u Hep G2 stanicama**Petlevski R<sup>1</sup>, Frank S<sup>2</sup><sup>1</sup>Farmaceutsko-biokemijski fakultet Sveučilišta u Zagrebu, Zagreb<sup>2</sup>Sveučilište Karl-Franzens, Institut za medicinsku biokemiju i molekularnu biologiju, Graz, Austrija

**Uvod:** Hiperglikemija u šećernoj bolesti može izazvati oksidativni stres pomoću nekoliko mehanizama. To uključuje autooksidaciju glukoze, stvaranje produkata kasne glikacije (AGE) i aktivaciju poliolnog puta. Miricetin je flavonoid prisutan u voću i povrću, uključujući crveno vino, koji djeluje kao snažni antioksidans.

**Materijali i metode:** Cilj istraživanja bio je ispitati učinak flavonoida miricetina (Sigma, Co) u niskim koncentracijama ( $5 \times 10^{-7}$  i  $1 \times 10^{-6}$  M) na koncentraciju ukupnog glutathiona (GSH) u Hep G2 stanicama. Glavna uloga GSH je eliminacija reaktivnih kisikovih spojeva (ROS).

**Rezultati:** U usporedbi s kontrolom, D-glukoza (20 mM) značajno smanjuje sadržaj GSH u Hep G2 stanicama (N = 9). Izlaganje Hep G2 stanica s glukozom niskoj dozi miricetina ( $5 \times 10^{-7}$  M), tijekom četiri sata na 37 stupnjeva, rezultira značajnim porastom koncentracije GSH u usporedbi s Hep G2 stanicama koje nisu izložene djelovanju miricetina.

**Zaključak:** Rezultat pokazuje da u Hep G2 stanicama miricetin u niskim koncentracijama smanjuje oksidativno oštećenje izazvano glukozom.

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## P06-3

**Važnost određivanja Anti-Mullerovog hormona u žena reproduktivne dobi s regularnim menstruacijskim ciklusom**Zec I<sup>1</sup>, Tišlarić-Medenjak D<sup>1</sup>, Posavec Lj<sup>1</sup>, Bukovec Megla Ž<sup>1</sup>, Šimundić AM<sup>2</sup>, Kralik Oguić S<sup>3</sup><sup>1</sup>Endokrinološki laboratorij, Klinika za onkologiju i nuklearnu medicinu,<sup>2</sup>Klinička bolnica Sestre milosrdnice, Zagreb<sup>3</sup>Klinički zavod za kemiju, Klinička bolnica Sestre milosrdnice, Zagreb<sup>4</sup>Klinički zavod za laboratorijsku dijagnostiku, Klinički bolnički centar Zagreb, Zagreb

**Cilj:** Ispitati promjene koncentracija Anti-Mullerovog hormona (AMH) u žena s regularnim menstruacijskim ciklusom u odnosu na dob.

## P06-2

**Myricetin, a naturally occurring flavonoid, prevents D-glucose induced oxidative damage in Hep G2 cells**Petlevski R<sup>1</sup>, Frank S<sup>2</sup><sup>1</sup>University of Zagreb, Faculty of Pharmacy and Biochemistry, Zagreb, Croatia<sup>2</sup>Institut für Medizinische Biochemie und Medizinische Molekularbiologie-Karl-Franzens-Universität, Graz, Austria

**Introduction:** Hyperglycemia in diabetes can induce oxidative stress in Hep G2 cells via several mechanisms. These include glucose autooxidation, the formation of advanced glycation end-products (AGE), and activation of the polyol pathway. Myricetin is a flavonoid compound found in many fruits and vegetables, including red wine, that acts as a powerful antioxidant.

**Materials and methods:** The aim of the present study was to investigate effect of the flavonoid myricetin (Sigma, Co) within a low concentration range ( $5 \times 10^{-7}$  and  $1 \times 10^{-6}$  M) on the concentration of total glutathione (GSH) in Hep G2 cells. The major roles of GSH (gamma-glutamylcysteinylglycine) are to maintain the intracellular redox balance and to eliminate ROS in cells.

**Rezultati:** Compared with control incubation, D-glucose (20 mM) significantly lowering GSH content in Hep G2 cells (N = 9). Exposure the Hep G2 cells plus glucose to low dose myricetin ( $5 \times 10^{-7}$  M) for 4 hours at 37 degrees C resulted in significant increased of the GSH level when compared with control cells.

**Conclusion:** These results demonstrate that myricetin in low concentration attenuates D-glucose induced damage in Hep G2 cells.

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## P06-3

**Importance of measurement of Anti-Mullerian hormone serum concentrations in women of reproductive age with regular menstrual cycles**Zec I<sup>1</sup>, Tišlarić-Medenjak D<sup>1</sup>, Posavec Lj<sup>1</sup>, Bukovec Megla Ž<sup>1</sup>, Šimundić AM<sup>2</sup>, Kralik Oguić S<sup>3</sup><sup>1</sup>Sestre milosrdnice University Hospital, Laboratory of Endocrinology,<sup>2</sup>Clinics of oncology and nuclear medicine, Zagreb, Croatia<sup>3</sup>University Department of Chemistry, Sestre Milosrdnice University Hospital, Zagreb, Croatia<sup>4</sup>Clinical Institute for Laboratory Diagnostics, Clinical Hospital Centre Zagreb, Zagreb, Croatia

**Objective:** To estimate the changes of Anti-Mullerian hormone concentrations in sera of fertile women with regular menstrual cycles.

**Ispitanice i metode:** U studiju je bilo uključeno 35 ispitanica, u dobi od 19 do 44 godine s redovitim menstrualnim ciklusom ( $30 \pm 2$  dana) i normalnim hormonskim statusom. Ispitanice su prema dobi podijeljene u skupinu do 30 godina i skupinu s više od 30 godina starosti. Hormonski status smo potvrdili određivanjem lutropina (LH), folitropina (FSH), estradiola (E2), ukupnog i slobodnog testosterona (T) te proteinskog nosača spolnih hormona (SHBG) u folikularnoj fazi (3.-5. dan). U ovulacijskoj fazi (13.-15. dan) određivali smo koncentracije LH, FSH i E2, odnosno progesterona (P) u luteinskoj fazi (20.-23. dan). Koncentracije AMH smo određivali u prvoj i drugoj fazi ciklusa, imuno-enzimometrijskom metodom (ELISA, DSL Inc.), a koncentracije ostalih parametara metodom elektrokemiluminiscencije (ECLIA) na autoanalizatoru Roche-Ellecsys.

**Rezultati:** U prvoj skupini bilo je 15 ispitanica prosječne dobi od  $26 \pm 3$  godine, a u drugoj skupini 20 ispitanica prosječne starosti od  $36 \pm 4$  godina. Kolmogorov-Smirnov test pokazao je normalnu distribuciju svih izmjerenih parametara. Mann-Whitney test nije pokazao razliku u koncentraciji AMH među skupinama ( $P = 0,0693$ ). U 19 ispitanica odredili smo koncentraciju AMH i u ovulaciji. Wilcoxonovim testom nije utvrđena statistički značajna razlika u koncentracijama AMH na početku ciklusa u odnosu na ovulacijsku fazu ( $P = 0,3124$ ).

**Zaključak:** Preliminarni rezultati ne pokazuju statistički značajnu razliku koncentracija AMH u odnosu na dob u ispitanica s urednim hormonskim statusom i redovitim menstrualnim ciklusima. Daljnja istraživanja na većem broju ispitanica nužna su da bi smo pokazali korisnost određivanja AMH u prognostici slabljenja ovarijske rezerve prije ostalih pokazatelja ovarijske steroidogeneze.

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#### P06-4

### Placentarni čimbenik rasta, plazmatski protein-A povezan s trudnoćom i korionski gonadotropin-beta u idiopatskom intrauterinom zastoju rasta

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**Uvod:** Intrauterini zastoj rasta (IUZR) fetusa česti je poremećaj rasta i razvoja ploda. Osnovni čimbenici fetalnog rasta zasnivaju se na genetskom potencijalu, funkciji organizma majke, sposobnostima posteljice te utjecaju okoline. IUZR bez znakova preeklampsije naziva se još idiopatski ili normotenzivni. Ljudski placentarni čimbenik rasta

**Subjects and methods:** The study included 35 women from 19 to 44 years of age with regular menstrual cycles ( $30 \pm 2$  days) and normal hormonal profile. Women were separated in two groups, according to their age. First group consisted of women younger than 30 years and second, of women of 30 years or older, respectively. Hormone concentrations were examined by measurement of lutropin (LH), folitropin (FSH), estradiol (E2), total testosterone (T) and sex-hormone binding globulin (SHBG) in follicular phase (cycle day 3-5), LH, FSH and E2 in ovulation (cycle day 13-15) and progesterone (P) in luteal phase (cycle day 20-23). Measurements of hormones were performed by electrochemiluminescence immunoassay (ECLIA) on Roche-Ellecsys analyzer. Concentrations of AMH were determined with enzyme immunoassay (ELISA, DSL Inc.) in follicular and ovulatory phase, respectively.

**Results:** The first group comprised 15 women at age  $26 \pm 3$  and the second one included 20 women at age  $36 \pm 4$ . Normal distributions of all measured parameters were confirmed by Kolmogorov-Smirnov test. Mann-Whitney test didn't prove significantly different AMH concentrations between groups ( $P = 0.0693$ ). The measurements of AMH concentrations in both, follicular and ovulatory phase were performed in 19 women. Wilcoxon test did not confirm significant difference of AMH concentrations between follicular phase and ovulation ( $P = 0.3124$ ).

**Conclusion:** Preliminary results didn't show significant difference of AMH levels in relation to woman's age who still having regular menstrual cycles and normal hormonal profile. In order to show usefulness of AMH determination as better indicator than other hormones which are usually measured as parameters of women's fertility, further studies on larger number of patients are necessary.

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#### P06-4

### Human placental growth factor, pregnancy-associated plasma protein A and human chorionic gonadotropin-beta in idiopathic intrauterine growth restriction

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**Introduction:** Complex genetic and environmental mechanisms of maternal, fetal and placental origin regulate fetal growth and may contribute to intrauterine growth restriction (IUGR). Placental growth factor (PGF), a member of the vascular endothelial growth factor family, is produced chiefly by the placenta and is a potent an-

(PGF) je član obitelji vaskularnih endotelijalnih čimbenika rasta i luči ga placenta. Plazmatski protein-A povezan s trudnoćom (PAPP-A) veliki je glikoprotein kojeg također luči placenta i pripada cink-peptidazama. Beta-hCG je sialoglikoprotein i luče ga trofoblastne stanice placente. Cilj ovog rada (kao dio mnogo opsežnije studije) bio je usporediti PGF, PAPP-A i beta-hCG u grupi trudnica sa IUZR i kontrolnom grupom.

**Ispitanice i metode:** 32 trudnice sa IUZR uspoređivane su sa 48 normalnih kontrola na početku poroda. Serumске koncentracije PGF, PAPP-A i beta-hCG određivane su imunoenzimskim testovima ELISA, odnosno CMIA (Total beta-hCG). Za usporedbu rezultata između skupina korišten je Mann-Whitney U test. Analiza korelacije provedena je Pearsonovim koeficijentom korelacije.

**Rezultati:** Koncentracije PGF, PAPP-A i beta-hCG nisu bile statistički značajno različite u trudnica sa IUZR u usporedbi sa kontrolnom skupinom (median; min-max; 84,72, 26,90-626,59 prema 74,83, 8,17-474,04 pg/mL,  $P = 0,885$ ; 410,8, 66,7-2039,3 prema 324,9, 38,9-1469,9 ug/mL,  $P = 0,105$ ; i 16182, 846-42391 prema 16938, 1527-105672 mIU/mL,  $P = 0,960$ ). Pozitivnu korelaciju našli smo između beta-hCG i PAPP-A ( $r = 0,3642$ ;  $P = 0,001$ ).

**Zaključak:** Zaključujemo da nema značajne razlike između koncentracija PGF, PAPP-A i beta-hCG u serumu trudnica sa IUZR u odnosu na kontrolnu skupinu. Ali, dokazali smo postojanje statistički značajne povezanosti između koncentracija beta-hCG i PAPP-A.

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## P06-5

### Metabolizam glukoze i piruvata te morfološka građa predimplantacijskih zametaka čovjeka

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**Cilj:** Cilj rada bio je ustanoviti da li mjerenje potrošene glukoze i piruvata u mediju može imati ulogu u predviđanju razvoja predimplantacijskih zametaka i povećanju uspjeha izvantjelesne oplodnje.

**Materijali i metode:** Izvantjelesna oplodnja primijenjena je kod 80 parova. Ispitanici su bili podijeljeni u grupe prema kvaliteti zametaka i prema razini mjerenih parametara. Trodnevni zametci su klasificirani u pet grupa prema staničnosti, jednakosti blastomera i fragmentiranosti. Ko-

giogenic factor. Pregnancy-associated plasma protein A (PAPP-A) is a large zinc-binding protein produced by the developing placenta. Human chorionic gonadotropin-beta ( $\beta$ -hCG) is a sialoglycoprotein and is initially secreted by the trophoblastic cell of the placenta. The aim of this study (as a part of a large, comprehensive study) was to evaluate PGF, PAPP-A and beta-hCG levels in groups of pregnant women with IUGR and control group as a indicator for diagnosis of IUGR.

**Subjects and methods:** 32 women with IUGR were compared with 48 normal controls at the beginning of labour. PGF and PAPP-A serum level was assayed with an enzyme-linked immunosorbent assay. Serum level of Total beta-hCG was measured by chemiluminiscent microparticle immunoassay. Comparisons were made by using the Mann-Whitney U test for nonparametric data. Also, the Pearson's coefficient of correlations was used for correlation analysis.

**Results:** We found that maternal levels of PGF, PAPP-A and Total beta-hCG were no significantly different in women with IUGR compared to controls (median; min-max; 84.72, 26.90-626.59 vs 74.83, 8.17-474.04 pg/mL,  $P = 0.885$ ; 410.8, 66.7-2039.3 vs 324.9, 38.9-1469.9 ug/mL,  $P = 0.105$ ; and 16182, 846-42391 vs 16938, 1527-105672 mIU/mL,  $P = 0.960$ ; respectively). Between Total beta-hCG and PAPP-A we found positive coefficient of correlation ( $r = 0.3642$ ,  $P = 0.001$ ).

**Conclusion:** We conclude that there was no significant difference in the serum level of PGF, PAPP-A and Total beta-hCG between IUGR and control group. But, statistically significant correlations were found between levels of PAPP-A and Total beta-hCG.

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## P06-5

### Glucose and pyruvate metabolism and morphological structure in preimplantation human embryos

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**Aim:** The aim of the study was to establish whether the measurement of consumed glucose and pyruvate can be helpful in foreseeing development of preimplantation embryos and increasing the success rate of in-vitro fertilisation.

**Materials and methods:** Extracorporeal fertilization was applied in 80 subjects. The study subjects were divided into groups according to the quality of the embryos and the level of parameters measured. Day 3 embryos we-

ličina potrošene glukoze i piruvata mjerena je kod 580 predimplantacijskih zametaka u 15  $\mu$ l medija u kojem su embriji inkubirani i mediju koji je služio kao kontrola mikrofluorometrijskom tehnikom.

**Rezultati:** Potrošnja piruvata znatno je veća od potrošnje glukoze kod ranih predimplantacijskih zametaka prije nego što glukoza postane glavni supstrat u stadiju blastociste. Pad kvalitete trodnevnih zametaka bio je povezan s padom potrošnje piruvata i glukoze. Trodnevni zametci ocijenjeni s 2 i 3 imali su statistički značajnu razliku u potrošnji piruvata ( $P < 0,001$ ). Statistički značajna razlika u potrošnji glukoze ( $P = 0,002$ ) utvrđena je između trodnevnih zametaka s ocjenom 2 i 3.

**Zaključak:** Prisutnost valjanog odnosa između morfološke kvalitete predimplantacijskih zametaka i potrošnje glukoze i piruvata može pomoći u odabiru kvalitetnih zametaka trećeg dana i osiguranju veće stope uspješnosti izvantjelesne oplodnje.

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## P06-6

### Katalitičke koncentracije SOD, GPOD i katalaze kod dijabetičara bez i sa dijabetičkom retinopatijom

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**Uvod:** Superoksid dismutaza (SOD), glutation peroksidaza (GPOD) i katalaza su enzimi antioksidativnog sustava koji štiti organizam od slobodnih radikala i oksidansa. SOD pretvara  $O_2$  u  $H_2O_2$ , GPOD  $H_2O_2$  i lipidne perokside u manje reaktivne molekule, a katalaza uklanja velike količine  $H_2O_2$  nastalog djelovanjem oksidaze u peroksisomima. Reaktivni kisikovi spojevi uključujući i slobodne radikale u šećernoj bolesti rastu zbog autooksidacije glukoze i glikoziliranih proteina kao i uspostave sorbitolskog puta tijekom hiperglikemije. Povećana razina reaktivnih kisikovih spojeva i kompromitirana antioksidativna obrana kod dijabetičara mogla bi utjecati na pojavu dijabetičke retinopatije (DR).

Cilj ovog rada je procijeniti postoji li razlika u katalitičkim koncentracijama antioksidativnih enzima skupine dijabetičara bez DR (grupa A) i skupine dijabetičara s DR (grupa B) te ih usporediti sa vrijednostima kontrolne skupine.

re classified into five groups according to their cellularity, the identity of blastomeres and fragmentation. The quantity of consumed glucose and pyruvate was measured in 580 preimplantation embryos. The level of pyruvate and glucose were determined in 15  $\mu$ l of the medium in which the embryos were incubated and in the control medium by microfluorometric method.

**Results:** The consumption of pyruvate was much higher than the consumption of glucose in early preimplantation embryos before glucose became the main substrate at the blastocyst stage. Deterioration of the quality of day 3 embryos was related to a decrease in the consumption of pyruvate and glucose. The day 3 embryos rated 2 and 3 showed a statistically significant difference in the consumption of pyruvate ( $P < 0.001$ ). A statistically significant difference in the consumption of glucose ( $P = 0.002$ ) was found to exist between the day 3 embryos rated 2 and 3.

**Conclusion:** An appropriate relationship between morphology quality of preimplantation embryos and consumption of glucose and pyruvate in cultivation medium can be helpful in choosing the quality day 3 embryos and ensuring a higher success rate of in-vitro fertilization.

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## P06-6

### Catalitic concentrations of superoxide dismutase, glutathione peroxidase and catalase in diabetic patients with and without diabetic retinopathy

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**Introduction:** Superoxide dismutase (SOD), glutathione peroxidase (GPX) and catalase are the enzymes of antioxidative system. The role of antioxidative system is elimination of free radicals and oxidants. SOD converts  $O_2$  to  $H_2O_2$ , GPX  $H_2O_2$  and lipide peroxide to less reactive molecules and catalase removes  $H_2O_2$  produced by activity of oxidases in peroxisomes. Autooxidation of glucose, glycosilated proteins and setting up of sorbitole pathway during hyperglycemia raise the amount of reactive oxygen species (ROS) and free radicals. The increased level of ROS and compromised antioxidative defence of diabetic could possibly interact with the development of diabetic retinopathy (DR).

This study aims to evaluate whether there is a difference in catalitic concentrations of antioxidative enzymes between two diabetic groups (Group A with DR and Group

**Materijali i metode:** Svaku skupinu činilo je 30 ispitanika. Katalitičke koncentracije SOD i GPOD određivane su u lizatu eritrocita, a katalaza u plazmi.

**Rezultati:** Katalitičke koncentracije sva tri enzima statistički značajno su snižene (Grupa A: SOD,  $P < 0,001$ ; GPOD,  $P = 0,030$ ; katalaza,  $P = 0,001$ ; Grupa B: SOD,  $P < 0,001$ ; GPOD,  $P = 0,005$ ; katalaza,  $P < 0,001$ ) u usporedbi sa skupinom zdravih ispitanika što je u skladu s dosada provedenim studijama i potvrđuje kompromitirani antioksidativni status dijabetičara. Vrijednosti katalitičkih koncentracija enzima u dvjema skupinama dijabetičara obuhvaćenih našim ispitivanjem nisu se statistički značajno razlikovale (SOD,  $P = 0,451$ ; GPOD,  $P = 0,375$ ; katalaza,  $P = 0,546$ ).

**Zaključak:** Do sada provedene studije različitih autora pokazuju oprečne rezultate što se objašnjava različitim brojem ispitanika, različitim metodama mjerenja ili pak razlikama u dobi pacijenata, tipu i trajanju šećerne bolesti.

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## P07 – Koštani metabolizam

### P07-1

#### Status D vitamina u bolesnika na kroničnom liječenju dijalizom i nakon transplantacije bubrega

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**Uvod:** Poremećaj metabolizma minerala u kroničnom bubrežnom zatajenju posljedica je nedostatne sinteza calcitriola zbog hiperfosfatemije i smanjenja bubrežnog parenhima. Sintaza 25-OHD u jetri nije poremećena, a nedostatak je posljedica načina života uslijed bolesti, te nakon transplantacije šteti oporavku poremećaja metabolizma minerala.

Cilj ovog rada je procjene statusa D vitamina mjerenjem 25-OHD u 101 bolesnika na kroničnom liječenju dijalizom (LD, 53 M, 48 Ž) i u 441 bolesnika s transplantiranim bubregom (TB, 250 M, 191 Ž). **Metode:** Koncentracija 25-OHD određena je ELISA kitom (IDS, Velika Britanija).

**Rezultati:** U LD bolesnika nije bilo značajne razlike u koncentraciji 25-OHD između spolova, a manjak ( $< 75$  nmol/L) je nađen u 76% (77/101,  $35,2 \pm 17,7$ ). U 24 bolesnika bez manjka 25-OHD je  $118,8 \pm 49,4$  nmol/L (75-295). Značajno niži 25-OHD u zimskom razdoblju godine (listopad/ožujak) ( $P < 0,001$ )  $27,9 \pm 16,1$  (N = 9) nego u ljetnom (travanj/rujan)  $57,7 \pm 46,7$  (N = 92) je relativan zbog malog broja

B without DR N = 30) and to compare them with the control group (N = 30).

**Materials and methods:** Catalytic concentrations of SOD and GPX were determined in RBC lysate and catalase in plasma.

**Rezultati:** The results for all three enzymes were significantly lower in both diabetic groups (Group A: SOD,  $P < 0.001$ ; GPX,  $P = 0.030$ ; catalase,  $P = 0.001$ ; Group B: SOD,  $P < 0.001$ ; GPX,  $P = 0.005$ ; catalase,  $P < 0.001$ ) compared to the control group, and confirm the compromised antioxidative status of diabetic patients. There was not statistically significant difference of enzymes catalytic activity between the two diabetic group in our study (SOD,  $P = 0.451$ ; GPX,  $P = 0.375$ ; catalase,  $P = 0.546$ ).

**Conclusion:** Inconsistent results obtained in a number of similar studies could be explained by different number of participants, different methods used, or differences in patients' age, type and duration of diabetes.

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## P07 – Bone metabolism

### P07-1

#### Vitamin D in patients on chronic dialysis treatment and kidney transplant recipients

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**Introduction:** Disorder of mineral metabolism in chronic kidney failure results from deficient calcitriol synthesis caused by hyperphosphatemia and kidney tissue loss. 25-OHD synthesis in the liver is not affected, its deficiency is a consequence of life style in sickness, and delays normalisation of mineral metabolism after kidney transplantation. The aim of this investigation was assessment of vitamin D status by measurement of 25-OHD in 101 patient on chronic dialysis (CD, 53 M, 48 F) and in 441 kidney transplant recipients (KT, 250 M, 191 F).

**Methods:** 25-OHD was measured by ELISA kit (IDS, UK).

**Results:** In CD patients no difference in 25-OHD between sexes existed, and deficiency ( $< 75$  nmol/L) was present in 76% (77/101,  $35,2 \pm 17,7$ ). In the remaining 24 patients 25-OH D was  $118,8 \pm 49,4$  (75-295). Significantly lower ( $P < 0,001$ ) 25-OHD in the winter period (October/March;  $27,9 \pm 16,1$ , N = 9) than in summer (April/September;  $57,7 \pm 46,7$ , N = 92) was considered relative due to small sample. In KT patients 25-OHD was lower in women ( $45,9 \pm$