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Organized by

CHOSS
Center of Hypoxia and Oxidative Stress Studies
Department of Biochemistry and Molecular Biology
Faculty of Medicine Universitas Indonesia (FMUI)

IDI Accredited

4th Annual Meeting of Hypoxia and Oxidative Stress Studies

Presented :

"Role of Hypoxia and Reactive Oxygen Species in Tissue Regeneration"

SEMINAR & WORKSHOP

Workshop:
November 20th-21st, 2014
at Molecular Biology Lab, Department of Biochemistry and Molecular Biology Faculty of Medicine UI, Jakarta.

Seminar:
November 22nd, 2014
at IASTH Building, 3rd Floor, Jl. Salemba Raya No.4, UI Central Jakarta.

SINE BIOCHIMIA NON EST VITA

ABSTRACT BOOK

4th ANNUAL MEETING OF HYPOXIA AND OXIDATIVE STRESS STUDIES

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Foreword

Dear Friends and Colleagues,

It is my great honor to welcome you all to 4th Annual Meeting of Hypoxia and Oxidative Stress Studies on behalf of the Organizing Committee. This meeting is organized by Center of Hypoxia and Oxidative Stress Studies (CHOSS), Department of Biochemistry and Molecular Biology, Faculty of Medicine Universitas Indonesia, being held in November 20-21st for workshop and in November 22nd for Seminar. This annual meeting has the theme "Role of Hypoxia and Reactive Oxygen Species in Tissue Regeneration". In line with this theme, we would like to understand how cells, tissues or organ response in order to overcome hypoxia and oxidative stress, and whether the implication of the adaptation response to tissues regeneration can be used for theurapeutic and preventive approaches.

This meeting also provides a forum for sharing your insightful research, as well as a great opportunity to create networking with other researchers.

Furthermore, I would like to express my sincere gratitude to all sponsors who have participated and all the members of the committee for their efforts in preparing this meeting.

Thank you very much and let us enjoy this great meeting.

Best Regards,

Dr. dr. Novi Silvia Hardiany, MBiomed
Organizing Committee Chair

Dean of Faculty of Medicine UI
Research Manager of Faculty of Medicine UI
Head of MRU-Faculty of Medicine UI
Head of CME-Faculty of Medicine UI
Head of Department Faculty of Medicine UI
All guests and participants

Assalamu'alaikumWr.Wb.

This 4th *Annual Meeting of Hypoxia & Oxidative Stress Studies* with theme "Role of Hypoxia and Reactive Oxygen Species in Tissue Regeneration" will be carried on by *Center of Hypoxia and Oxidative Stress Studies* (CHOSS) with Biochemistry and Molecular Biology Department, Faculty of Medicine Universitas Indonesia. This Scientific Program is the 4th annual program of CHOSS. CHOSS is start at 4 years ago for researcher that interested in study of hypoxia and oxidative stresses to share their experiences/ study.

This time, we invite several International Speakers from University of Tsukuba and also from Indonesia to share what their scientific experiences and knowledge. It is better for us because UI already have collaboration with Tsukuba, therefore researcher from UI and Tsukuba can do their research in both sides especially in hypoxia scope of study. All researchers can present their study in the Oral Presentation or in Poster. Oral and Poster presentation will be included in competition and will be awarded. We appreciate to all participants that are enthusiast to follow this Conference and Workshop. Furthermore we hope CHOSS can be a place that researchers can share their experiences and ideas especially in hypoxia and oxidative stresses scope of study, in biomedical and translational researches. We hope this program will be useful to progress our researches and scientific activity in Indonesia especially in Universitas Indonesia.

Billahi taufik walhidayah.Wassalamu'alaikum Wr.Wb

Head of Biochemistry & Molecular Biology
Faculty of Medicine Universitas Indonesia

Dr. dr.Ani Retno Prijanti MS.

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POSTER PRESENTATION

P1. Relationship of Hyperglycemia on VEGF Levels in Patients with Type 2 Diabetes Mellitus

*ADI ARIANTO, **ETI YERIZEL, ***NASRUL ZUBIR

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***Department of Internis, Medical Faculty Andalas University Padang

Background: Diabetes mellitus (DM) is a group of metabolic diseases characterized by hyperglycemia that occurs due to abnormal insulin secretion, insulin action function , or both. The mechanism of tissue damage in diabetes mellitus through four main pathways that polyol pathway, formation of AGEs (Advanced glycation end products) , increased activation of PKC (protein kinase C) via an increase in DAG (diacyl glycerol), and hexosamine pathway. Hyperglycemia causes increased intracellular synthesis of DAG which cause the expression of PKC in cells also increased which in turn would alter the expression of a wide variety of genes that overall damage blood vessels . Increased aktivikasi PKC resulted in increased VEGF (vascular endothelial growth factor). Increased VEGF will result in increased vascular permeability and angiogenesis. **Objective:** This study aimed to determine the relationship of hyperglycemia on VEGF levels in patients with type 2 diabetes mellitus. **Research methods**: This is cross-sectional study design. The number of samples are 70 people . Group of 35 people with type 2 diabetes and 35 non- DM as a control group. Examination of the blood glucose levels and HbA1c levels enzymatic methods with techniques hemoglobin variant testing system. The level of HbA1C indicate uncontrolled DM. The level of VEGF by Enzyme-linked Immunosorbent Assay (ELISA).Test data analysis using t - test and correlation regression. **Results:**The mean levels of VEGF in type 2 DM group was 398.35±229.62 pg/ml. In the non-DM group 274.99±197.62 pg/ml. HbA1C levels in patients with type 2 diabetes showed 8.87±1.48%. Test results of t-test analysis to determine differences in the mean levels of VEGF in the group of patients with type 2 diabetes with a mean concentration of VEGF in non-DM group obtained the value of p=0.019(p □0.05). These results indicate that there are significant differences between the levels of VEGF in patients with type 2 DM group with VEGF levels in the non-DM group. Results of Pearson test analysis to determine the relationship off a sting blood sugar levels of VEGF levels obtained with p =0.024(p 10.05). These results indicate that there is a significant relationship between fasting blood sugar levels with increased levels of VEGF. **Conclusion:** The mean levels of VEGF in patients withtype 2 diabetesis higher than averagel evels of VEGF in non-DM. There is a significant difference between the levels of VEGF in patients with type 2 diabetes and non-diabetes. There is a relationship of fasting blood sugar levels increase with increased levels of VEGF in patients with type 2 diabetes mellitus.

Key words: Type 2 diabetes mellitus, hyperglycemia, reactive oxygen species, VEGF

P2. Effect of Roselle Extract on Testosteron Level in Diebetic Mellitus Rat After Induced by Aloxan

Dessy Arisanty, EtyYerizel ,Husnil Kadri

Department of Biochemistry, Medical Faculty.Andalas University

Background: Diabetes mellitus often affects a person's sexual potency of which about 50% of men with diabetes experience on erectile dysfunction and 30% libido decreased, one of which is due to decreased testosterone levels. In order to that it have been done the effect of roselle extracts of diabetic male mouse model which conducted to alloxan induced to make diabetic rats.**Objective:** This study aimed to determine the effect of roselle extract (Hibiscus sabdariffa L.) on serum testosterone levels in diabetic male white rats after induce with alloxan. **Methods:** This study post test experimental design controlled group design only, using 30 white male rats of Sprague Dawley strain, about 3 months of age, weight about 250g, were divided into five groups; negative control (distilled water), positive control (Alloxan: 150 mg / kg), a dose of 1 rosella flower extract (65mg / 200g BW / 2ml), 2 doses (130mg / 200g BW / 2ml), and the third dose (195mg / 200g BB / 2ml). Testosteron were measured after treatment. The data were analyzed by one-way ANOVA test. **Results:** The analysis revealed a significant difference in increasing testosterone levels with $p = 0.034$ ($p \leq 0.05$) in rat with alloxan-induced diabetes mellitus.
Conclusion Research: Conclusions this study there was a significant effect of roselle extracts which increase the levels of testosterone in the blood serum in diabetic mellitus rats model after induced with aloxan

Key words: Diabetes mellitus, blood sugar, testosterone, inhibition of libido, erectile dysfunction

P5. Effect of Hyperglycemia into Activities of Glyceraldehide-3-phosphate Dehydrogenase on the Type 2 Diabetes Mellitus Patients

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*Department of Biochemistry, Medical Faculty Andalas University Padang
** Magister Biomedic Medical Faculty Andalas University Padang
***Department of Biochemistry, Medical Faculty Andalas University Padang

Diabetes mellitus is a group of metabolic disease with characteristic hyperglycemia. Glycosylated hemoglobin (HbA1c) > 7% indicated uncontroled DM. Hyperglycemia causes excessive production of free radical, that is trigger oxidative stress. Oxidative stress in type 2 DM cause increasing superoxyde production in mitochondrial and DNA damage, Poly-ADP Ribose Polymerase activation, Glyceraldehide-3-phosphate dehydrogenase (GAPDH) inhibition. Therefore GAPDH pathway disoders reaction mechanism of complication in type 2 DM such as: Polyol pathway, PKC activation and increasing hexosamin pathway and AGE production, then molecular affect his express such as Intracellular Adhesive molecule-1, NitritOxyde .Finaly this process. will be endotheldisfunction, The aims of the study was to Effect of hyperglycemia into activities of glyceraldehide-3-Phospate Dehidrogenase (GAPDH) on type 2 Diabetes mellitus patients. The observasional was carried out will cross sectional study comparative. the subjects were a type 2 DM patients 30-60 years old, Blood glucose were determined by enzymatic method. HbA1c were examined by variant hemoglobin testing system technique. GAPDH activities by enzyme linked Assay (ELISA), Data were analyzed statistically by using chi square test and regression correlation. The research result are activity GAPDH in type 2 DM (0,64 ±0,39) in lower compared non DM (0,78±0,59), but not siqnificant statistically. Regression correlation analysis between fasting blood sugar with the activity of GAPDH denoted weak correlation,r = 0,179, and the blood glucose levels 2 hours post prandial with activity GAPDH in type 2 DM patients obtained weak correlation, r = 0,039. The conclusion of research is difference GAPDH activity between type 2 DM patients and non DM, there is a weak correlation between hyperglycemia with GAPDH activity.

Key words: type 2 DM, Hyperglicemia, Glyceraldehide Phosphate Dehydrogenase

P6. Analysis of Physiological Adaptation Response in Brain After Intermittent Hypobaric Hypoxia Induction in Sprague dawley Rats

Fanny Septiani Farhan, Wawan Mulyawan, Wardaya

Biomedical Science

Background: Sublethal exposure to hypoxia,known as hypoxia preconditioning is believed to haveneuroprotective effect that can increase the cell resistancy. Hypoxia preconditioning induces changes in gene expression and intracellular signaling pathways that lead to the emergence of intracellular adaptation through the process of erythropoiesis, angiogenesis, glucose transport and anaerobic glycolysis through HIF-1 alpha gene activity. Various studies have shown Hypoxia preconditioning in the brain decrease reactive oxygen species (ROS), inhibition of apoptosis, decrease the number of infarcts, increasing the migration of endothelial cells (angiogenesis) and tubulogenesis, resulting in the improvement / enhancement of cerebral microvascular density significantly. Hipobaric intermittent hypoxic conditions (HHI)which is exposed at an altitude / flight, is a common condition that causes exposure to hypoxia preconditioning. Researcher has proven that HHI induction decreased brain cortical tissue damage, and increased microvascular density. It is necessary to conduct further research on the effect of hypoxic preconditioning on the function of neuronal cells the physiological parameters due to HHIInduction to the central nervous system (CNS). Aims: to analize the effect of hypobaric intermittent hypoxic induction on cerebral function (complex neuromotor function and cognitive function). **Method:** a total of 35 Sprague Dawley rats were studies, divided into 4 groups going through HHI and 1 group as control group. The 4 groups were exposed to intermittent hypobaric hypoxia in Indonesian air force institute of aviation medicine hypobaric chamber, by 1 week interval for 4 times (day-1, 8, 15 and 22). After the induction, the group were tested for physiological parameters using walking beam to measure the complex neuromotor function and Y maze to measure the cognitive function. The result compare to the control group.
Result: the group treated with 1,2,3,4 times exposure to hypobaric hypoxia shows no significant differences in complex neuromotor function and cognitive function compare to control group (p>0.05).
Conclusion: hypobaric intermittent hypoxia induction has no effect on complex neuromotor function and cognitive function compare to control group.

Key words: hypobaric hypoxia intermittent, complex neuromotor function, cognitive function

Effect of Hyperglycemia into Activities of Glyceraldehide-3-phosphate Dehydrogenase on the type 2 Diabetes melliitus Patients

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Abstract

Diabetes mellitus is a group of metabolic disease with characteristic hyperglycemia. Glycosylated hemoglobin (HbA1c) > 7% indicated uncontroled DM. Hyperglycemia causes excessive production of free radical, that is trigger oxidative stress. Oxidative stress in type 2 DM cause increasing superoxyde production in mitochondrial and DNA damage, Poly-ADP Ribose Polymerase activation, Glyceraldehide-3- Phosphat dehydrogenase (GAPDH) inhibition. Therefore GAPDH pathway disoders reaction mechanism of complication in type 2 DM such as: Polyol pathway, PKC activation and increasing hexosamin pathway and AGE production, then molecular affect his express such as Intracellular Adhesive molecule-1, Nitrit Oxyde .Finaly this process will be endothel disfunction, The aims of the study was to Effect of hyperglycemia into activities of glyceraldehide-3-Phospate Dehidrogenase (GAPDH) on type 2 Diabetes mellitus patients.

The observasional was carried out will cross sectional study comparative. the subjects were a type 2 DM patients 30-60 years old, Blood glucose were determined by enzymatic method. HbA1c were examined by variant hemoglobin testing system technique. GAPDH activities by enzyme linked Assay (ELISA), Data were analyzed statistically by using chi square test and regression correlation

The research result are activity GAPDH in type 2 DM (0,64 ±0,39) in lower compared non DM (0,78±0,59), but not siqnificant statistically. Regression correlation analysis between fasting blood sugar with the activity of GAPDH weak correlation,r = 0,179, and the blood glucose levels 2 hours post prandial with activity GAPDH in type 2 DM patients obtained weak correlation, r = 0,039.

The conclusion of research is difference GAPDH activity between type 2 DM patients and non DM, there is a weak correlation between hyperglycemia with GAPDH activity.

Key word : type 2 DM, Hyperglicemia, Glyceraldehide Phosphate Dehydrogenase

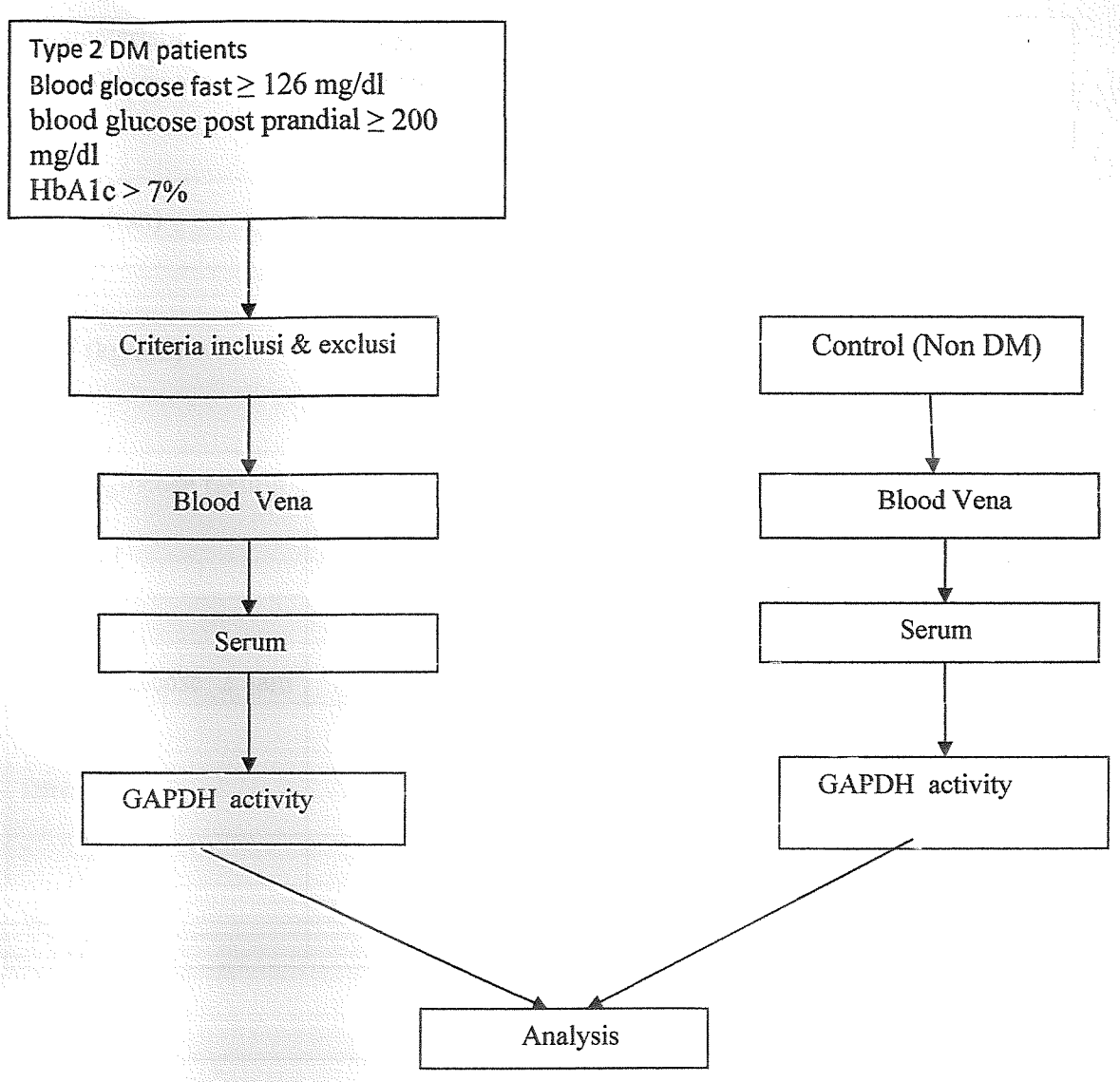
Introduction

Type 2 diabetes mellitus was a degeneration disease which become health problem in Indonesia as well as in the world. because of that type DM cases have increased year by years, There are some risk increasing welfare. change of food habit & less physical activity that factor to predisposition of increase incidence type 2 DM. Laboratory finding of type 2 DM were uncontrolled hyperglycemia as glucotoxicity, Therefore it will cause macro-microvascular disorders. and tissues damage, Insulin Resistance & beta cell dysfunction were as etiology of hyperglycemia in type 2 DM patien. Diabetes mellitus that uncontrolled well can cause oxidative stress, there's increasing reactive oxygen species and hydroxyl radical.

Method

Research design was Observation research with cross sectional study comparative approach to the 30-60 years old patients of type 2 DM have been done. Its population was all patients type 2 DM whose level of blood glucose post prandial $\geq$ 200 mg/dl for in-patient care and out-patient care of Internal Medicine Department RSUP M.Djamil Padang, Sample was part of the population that is patients of type 2 DM who have inclusion and exclusion characteristics. The control aspect was undiagnosed type 2 DM range of age was 30 – 60 years old. Total sample were 70 people, 35 patients were classified as type 2 DM and another 35 people were non type 2 DM (control).

Research Operational



Result & Discussion

Table 1. subject Characteristic

Characteristic of Subject	Type 2 DM mean ± SD	Non DM Mean ± SD	p
Old (tahun)	51,66 ± 5,06	49,77 ± 5,27	0,13
IMT (kg/m2)	25,00 ± 2,31	24,21 ± 2,69	0,19
Blood glucose fasting (mg/dl)	191,60 ± 35,47	93,37 ± 7,18	< 0,001
Blood glucose 2 jam PP (mg/dl)	367,77 ± 70,68	125,06 ± 16,01	< 0,001
HbA1c(%)	11,19 ± 2,04	6,02 ± 0,56	< 0,001

Table 2 GAPDH activity in type 2 DM and Non DM

Variable	Type 2 DM	Non DM	p
	Mean ± SD	Mean ± SD	
GAPDH activity (Unit/mg)	0,64 ± 0,39	0,78 ± 0,59	0,25

Discussion

The research result are activity GAPDH in type 2 DM (0,64 ±0,39) in lower compared non DM (0,78±0,59), but not siqnificant statistically. Regression correlation analysis between fasting blood sugar with the activity of GAPDH weak correlation (r = 0,179) and the blood glucose levels 2 hours post prandial with activity GAPDH in type 2 DM patients obtained weak correlation(r = 0,039)

Then high intracellular glucose and excessive mitochondrial superoxyde production will also cause DNA damage, Poly-ADP Ribose Polymerase (PARP) activation. Glyceraldehide Phosphat dehydrogenase (GAPDH) inhibition. Therefore GAPDH pathway disoders reaction mechanism of complication in DM type 2 such as: Polyol pathway. PKC (via DAG) activation. and increasing hexokinase pathway flux then molecular affect his express such as Nitrit Oxide (NO), Intracellular Adhesive molecule-1 (ICAM-1), gluthation peroxidase (GPX), finally this process will be endothel disfunction.

The conclusion of research is difference GAPDH activity between type 2 DM patients and non DM, there is a weak correlation between hyperglycemia with GAPDH activity.

References

Brownlee M,2005.The Pathology of Diabetic complication.A Unifying mechanism.Diabetes J: 54; 1615-1625

Gilchrest B A, Wilhelm A B,2001. The Role of DNA Damage and Repair in Cell Aging, Advand in Cell Aging and Gerontology,Series editor; Mark P,Mattson,National Institute on Aging,Baltimor,USA, 51-65; 73-129

Halliwell B, Gutterridge,2004., Free radicals in Biology and Medicine. Department of Biochemistry ,Osaka University Medical School,Osaka,Thrird ed ; oxford University Press, 36-95; 267-276; 640-645.

Hayden M.R., Suresh C *et al*,2005 . Tipe 2 Diabetes Mellitus as Conformational Disease," JOP. Pancreas J (On line), Department of family and Community Medicine, University of Missouri, Colombia,Missouri

Nigun .A, Aylin,S.D, Cemile.K, 2006. Diabetes Mellitus Oxidative stress. Turk Biyokimiya Dergesi: 31 (2);55-56

Raffel I Jscheuner MT and Rotter JI ,1997 .Genetic of Diabetes In: Ellenberg & Rifkins Diabetes mellitus. editor.Pote D and Sherwin RS 5 ed. Appleton and lange, Connecticut, 401

Reusch JEB, 2003. Diabetes, Microvascular complication, and cardiovascular complication: what is about glucose ? clin invest J: 112; 986-988