

Università di Camerino



# nutriGenomics summer school UNICAM





# 3<sup>rd</sup> European Summer School on NUTRIGENOMICS June 25-29, 2018 Teatro Pergolesi Jesi Italy

Modulation of the epigenome by nutrition and xenobiotics during early life and across the life span: the key role of life style

## 25

#### Key role of epigenetics in the programming of adult health

14.00 Registration

14.30 Welcome

#### Chairs: Clarissa Gerhäuser and Melita Vidakovic

15.00 Lecture **Torsten Plosch**, Dept. Obstetrics and Gynaecology, University Medical Center Groningen, The Netherlands, Introduction to Epigenetics

15.45 Keynote Lecture Michael Müller, Norwich Medical School, University of East Anglia, Norwich, United Kingdom, Nutri-transcriptomics - impact of nutrition for phenotypic flexibility of the intestine

#### 16.30 Coffee break

17.00 Lecture Alfredo Martinez, University of Navarra, Centre for Nutrition Research, Pamplona, Spain, DNA *Methylation: metabolism and taste interactions with* adiposity

#### 18.45 Take home message

17.45 One minute for you

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#### How nutrition modulates health through nutrigenomics and nutrigenetics

Chairs: Michael Müller and Baukje De Roos

9.00 Keynote Lecture Clarissa Gerhäuser Division Epigenomics and Cancer Risk Factors, German Cancer Research Center (DKFZ), Heidelberg, Germany, Nutriepigenomics as modulator of health

9.45 Lecture Wim Vanden Berghe Laboratory of Protein chemistry, Proteomics and Epigenetic Signaling University, Antwerp (Wilrijk), Belgium, Nutrients, histone modifications and miRNA

#### 10.30 Coffee break

11.00 Keynote Lecture Lorraine Brennan, Institute of Food and Health and Conway Institute, UCD School of Agriculture and Food Science, Science Centre South, Dublin, Ireland, Metabolomic-based identification of clusters that reflect dietary patterns

11.45 Lecture **Raffaele De Caterina**, Cardiology Division, 'G. d'Annunzio' University, Chieti, Italy, *The role* of genetic variations on the individual dietary response: how to use nutrigenetics. Guideline from the ISNN

#### How xenobiotics control gene expression: not just epigenetics

#### Chairs: Rosita Gabbianelli and Josep Antoni Tur Mari

9.00 Lecture Stefano Lorenzetti, Istituto Superiore di Sanità, Department of Food Safety and Veterinary Public Health, Unit of Food and Veterinary Toxicology, Rome, Italy, Endocrine Disruptors and Nuclear Receptors: genomic and non genomic actions.

9.45 Lecture Carlos Guerrero-Bosagna, Avian Behavioral Genomics and Physiology Group, IFM Biology, Linköping University, SE-58 183 Linköping, Sweden, Correlation between Environmental Contaminants and Obesity taking into account transgenerational inheritance

#### 10.30 Coffee break

11.00 Lecture Torsten Plosch, Dept. Obstetrics and Gynaecology, University Medical Center Groningen, The Netherlands, *Trouble in pregnancy - epigenetic consequences* of common pregnancy complications

11.45 Research talk Laura Bordoni, Unit of Molecular Biology, University of Camerino, Italy, Permethrin exposure and neurodegeneration: which mechanism behind the damage?

#### Selected presentations from participants

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#### How life style (diet, physical activity, sleep, leisure-time and sedentary behaviour) modifies gene expression

Chairs: Wim Vanden Berghe and Elisabete Weiderpass Vainio

9.00 Keynote Lecture **Tur Mari Josep Antoni**, Research Group on Community Nutrition and Oxidative Stress (NUCOX), University of the Balearic Islands & CIBEROBN (Spain), *Epigenetics of redox balance* 

9.45 Lecture Marco Malavolta, Advanced Technology Center for Aging Research, Scientific and Technological Pole, Italian National Institute of Health and Science on Aging (INRCA), Ancona, Italy, Relevance of modulation of metallothionein gene expression in the biology of aging

#### 10.30 Coffee break

11.00 Keynote Lecture Marianne Rots, Department of Pathology and Medical Biology, University Medical Center Groningen, The Netherlands, *Mitochondrial* epigenetics: an overlooked layer of regulation?

11.45 Lecture **Torsten Bohn**, Luxemburg Institute of Health, Luxemburg, Host factors Including Genetic Aspects Influencing the Absorption, Distribution, Metabolism and Excretion of Carotenoids

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### Nutrigenomic biomarkers in blood, urine and saliva.

#### Chairs: Marianne Rots and Carlos Guerrero-Bosagna

08.30 Keynote Lecture **Baukje De Roos**, Deputy Director Rowett Institutet, University of Aberdeen, U.K. New insights into nutritional blood biomarkers

09.15 Keynote Lecture Elisabete Weiderpass, Department of Medical Epidemiology and Biostatistics, Karolinska Institute, Stockholm, Sweden, Genome-wide DNA methylation in saliva and body size of adolescent girls

#### 10.00 Coffee break

#### Selected presentations from participants

10.30 Natassia Robinson, Institute of Health & Society, Newcastle University, U.K., *Finding intermediate DNA* methylation biomarkers of early life exposures and later life obesity

10.45 Monika Baranowska, Gdansk University of Technology, Faculty of Chemistry, Gdansk, Poland, The influence of phenolic acids on antioxidant defence system of cells

11.00 Sunniva V. Larsen, Department of Nutrition, Institute for Basic Medical Sciences, University of Oslo, Norway, Plasma fatty acid levels and gene expression related to lipid metabolism in peripheral blood mononuclear cells: a cross-sectional study in healthy subject

19.00 Welcome party at 'Gli Spiazzi' 21.30 Concert, Piazza delle Monichette, Jesi

#### 12.30 Light lunch and poster session

#### Chairs: Michael Müller and Baukje De Roos

15.00 Technical research talk Wim Vanden Berghe Laboratory of Protein chemistry, Proteomics and Epigenetic Signaling University, Antwerp (Wilrijk), Belgium, Technical approaches for epigenetic profiling

15.30 Research talk Clarissa Gerhäuser, Do selected dietary bioactive compounds affect epigenetic mechanisms to reduce the risk of Metabolic Syndrome? *Results from the Pathway27 project* (www.pathway27.eu)

16.00 Coffee break

16.30 Research talk **Mona Mischke**, Danone Nutricia Reseach, Utrecht, the Netherlands, Can synbiotics in early life protect against diet-induced obesity?

17.00 Round table: *Highlights on nutrigenomics and* human health Chairs: Michael Müller, Baukje De Roos and Torsten Plosch

18.00 Take home message

Con il patrocinio di

19.30 Dinner at 'Pecapi' 21.15 City walls walk tour by Archeoclub, Jesi

#### **Scientific Committee**

Chair Rosita Gabbianelli, University of Camerino, Italy Raffaele De Caterina, 'G. d'Annunzio' University, Chieti, Italy Stefano Lorenzetti, Istituto Superiore di Sanità, ISS, Roma, Italy Michael Müller, University of East Anglia, Norwich, United Kingdom Cinzia Nasuti, University of Camerino, Italy Torsten Plosch, Dept. Obstetrics and Gynaecology, Groningen, The Netherland Marianne Rots, University Medical Center Groningen, The Netherland

#### **Local Organizing Committee**

School of Pharmacy, Università of Camerino, Camerino, Italy **Chair Rosita Gabbianelli** Laura Bordoni **Donatella Fedeli Cinzia Nasuti** 

All participants will acquire 6 CFU/ECTS

### S [I] She CONSIGLIO REGIONALE

Comune di Jesi Assemblea legislativa delle Marche Si ringrazia il Comune di Jesi

per la gentile concessione del Teatro Pergolesi

PERGOLESI

SPONTINI







12.15 Beatrice Choi, Institute of Nutraceuticals and Functional Foods, Laval University, Québec, Effect of a prebiotic cranberry extract on weight loss and glucose tolerance in obese mice exposed to persistent organic pollutants 12.30 Sara Diels, Center of Medical Genetics, Department of Biomedical Sciences, University of Antwerp, Antwerp, Belgium, Elucidating the multifactorial causation of metabolic disease; the interplay between environmental epigenetics and obesity-associated genetic PON1 variants

12.45 Light lunch and Poster session

#### Chairs: Rosita Gabbianelli and Tur Mari Josep Antoni

14.00 Research talk Carlos Guerrero-Bosagna, DNA methylation as marker of stressful conditions in farmed animals: implication for nutrition

14.30 Research talk **Torsten Plosch**, Rodent models in epigenomic research: smoking mice, placental damage, maternal diabetes

15.00 Research talk **Stefano Lorenzetti**, Environmental and dietary contaminants as Endocrine Disruptors: different knowledges coming from animal and no animal testing

15.30 Course Photo and Coffee break

#### Selected presentations from participants

16.00 Natália Yumi Noronha, Departments of internal medicine and Genetics, Ribeirao Preto Medical School, University of São Paulo, São Paulo, Brazil, Methylation of SSRP1 gene is correlated with aluminum and arsenic serum concentration in obese women 16.15 Fatchiyah Fatchiyah, Research Center of Smart Molecule of Natural Genetic Resources, Brawijaya University, Malang, East Java, Indonesia, Milk Alpha-S2 Casein Protein provided Different physiological function on Signal Transduction Gene Cascade and tissue microstructure 16.30 I. Melis Durasi Kumcu, Sabanci University, Faculty of Engineering and Natural Sciences, Istanbul, Turkey, Integrated Analysis of Expression Data Using Directed Signalling Network Identifies Regulatory Pathways in Human Obesity 16.45 Archibold Mposhi, Department of Hepatology and Gastroenterology, Epigenetic Editing, Department of Medical Biology and Pathology, University Medical Center Groningen, The Netherlands, Unravelling the effects of mitochondrial DNA methylation on hepatic energy metabolism 17.00 Jovana Rajić, Institute for Biological Research, Department of Molecular Biology, University of Belgrade, Belgrade, Serbia, Evaluation of the DNA Methylation Status of Procalcitonin Gene as a Biomarker of Local and Systemic Inflammation

17.15 Kathleen Wijnant, Department of Public Health, Ghent University, Ghent University, Belgium, Salivary metabolomics as a new tool for unravelling stress obesity pathways in adolescents from a clinical public health perspective

17.30 Ferenc Torma, Research Institute of Sport and Life Sciences, University Physical Education, Budapest, Hungary, *Every other day feeding affects histone K14 acetylation of the* BDNF gene in the hippocampal area in low- and high running capacity rats

17.45 Take home message

12.30 Lecture Carlo Catassi/Elena Lionetti, Department of Pediatrics, Università Politecnica delle Marche, Ancona, Italy, Non-celiac gluten sensitivity

13.15 Light lunch and Poster session

Chairs: Wim Vanden Berghe and Elisabete Weiderpass Vainio

15.30 Research talk Melita Vidakovic, Institute for Biological Research 'Siniša Stanković', University of Belgrad, Serbia, Technical approaches for epigenetic remodelling

16.00 Research talk Tur Mari Josep Antoni, Epigenetics of redox balance through lifestyle: The PREDIMED-PLUS study

16.30 Coffee break

17.00 Research talk **Torsten Bohn**, Bioavailability of Carotenoids - Influence of Dietary Factors with a focus on Mineral Interactions

17.30 Research talk **Melita Vidakovic**, *Identification of* novel DNA demetylating agents using MeFISH method: Potential application in the treatment of diabetes

#### Selected presentations from participants

18.00 Stephanie Andraos, Liggins Institute, The University of Auckland, New Zealand, Quantitative profiling of one-carbon metabolism donors in the blood can dietary methyl donors serve as proxies of cellular DNA *methylation?* 18.15 Chanachai Sae-Lee, Human Nutrition Research Centre, Institute of Cellular Medicine, Newcastle University, Newcastle Upon Tyne, U.K., Dietary intervention modifies DNA methylation age assessed by the epigenetic clock 18.30 Lucia Aronica, Stanford Prevention Research Center, Department of Medicine, Stanford University, Stanford, USA, Epigenetic markers of diet response for personalized weight loss strategies 18.45 **Stella Breininger**, Newcastle University, The Medical School, Framlington Place, U.K., Effect of weight loss on mitochondrial defects in the ageing human colon

#### 19.00 Take home message

#### 20.00 Social Dinner at 'Circolo Cittadino'

11.15 Round table: How to transfer research in nutritional practice: is it time to reconsider current recommendations? Chairs: Baukje De Roos and Michael Müller All speakers of the summer school on nutrigenomics

### 12.15 Poster Award

#### 12.30 Closing remarks

 Understanding the bioactivity of pomegranate ellagitannins in humans: results of a literature review. Rotondo: J. Derlindati<sup>13</sup>, F. Danesi<sup>1</sup>
 <sup>1</sup>Department of Agri-Food Sciences and Technologies (DISTAL), University of Bologna, Cesena, Italy, <sup>2</sup>Department of Medicine and Surgery, University of Parma, Parma, Italy.
 **2. Intake of SFA compared to PUFA induce lower postprandial LDL receptor gene expression in PBMC in subjects with** L. K. L. Øyri<sup>1</sup>, I. Narverud 1<sup>2</sup>, M. P. Bogsrud<sup>2</sup>, P. Hansson<sup>1</sup>, L. Leder<sup>3</sup>, M. G. Byfuglien<sup>3</sup>, M. B. Veierød<sup>4</sup>, S. M. Ulven<sup>1</sup>, K. B. Holven<sup>1,2</sup> L. K. L. byrri, I. Markenda T, M. P. Bogsrub, P. Hansson, L. Leaer, M. G. Byruginer, M. B. Velerad, S. M. Diver, K. B. Holven<sup>4-5</sup> Department of Nutrition, Institute of Basic Medical Sciences, University of Oslo, Norway, "Norwegian National Advisory Unit on Familial Hypercholesterolemia, Department of Endocrinology, Morbid Obesity and Preventive Medicine, Oslo University Hospital, Norway, "Mills AS, Oslo, Norway, "Oslo Centre for Biostatistics and Epidemiology, Department of Biostatistics, Institute of Basic Medical Sciences, University of Oslo, Norway **3. Epigenetic regulation of hibernation: an endogenous switch for safe metabolic suppression?** *M. M. Ossterhof<sup>1,2</sup>, V. A. Reitsema<sup>1</sup>, J. Bruintjes*, H. R. Bouma<sup>2</sup>, R. H. Henning<sup>3</sup>, M. G. Rots<sup>1</sup> 4. Dietary oxidized phospholipids: digestion, absorption and the potential dietary risk factor.
 *K. Parchen, A. Bartoszek* <sup>1</sup>Epigenetic Editing, Medical Biology, University Medical Centre Groningen, Groningen, <sup>2</sup>Clinical Pharmacy and Pharmacolog ment of Food Chemistry, Technology and Biotechnology, Gdansk University of Technology, Gdansk, Poland 5. Nucleic acids as food components - may they have an impact on human epigenome tment of Food Chemistry, Technology and Biotechnology, Gdansk University of Technology, Gdańsk, Poland Department of Food Chemistry, Technology and Biotechnology, Gdansk University of Technology, Gdansk, Poland 6. Catechins as potential epigenetit modulators. P. Jakubek', M. Baranowska', J. Rajić', M. Vidaković', A. Bartoszek', J. Namieśnik<sup>3</sup> <sup>1</sup>Department of Food Chemistry, Technology and Biotechnology, Faculty of Chemistry, Gdańsk University of Technology, Poland, <sup>2</sup>Institute for Biological Research "Siniša Stanković", Molecular Biology Department, University of Belgrade, Serbia, <sup>3</sup>Department of Analytical Chemistry, Faculty of Chemistry, Gdańsk University of Technology 7. Oral L-carnitine supplementation increases trimethylamine-N-Oxide but not markers of atherosclerosis in healthy aged women. R. Olek', J Samulak', A. Sawicka', D. Hartmane', S. Grinberga', O. Pugovics<sup>2</sup> 'Department of Bioenergetics and Nutrition, Gdańsk University Physical Education and Sport, Gdansk, Poland, <sup>2</sup>Latvian Institute of Organic Synthesis, Riga, Latvia 8. Monovalerin and trivalerin increase brain acetic acid, decrease liver succinic acid, and alter gut microbiota in rats fed 8. Monovalerin and trivalerin increase brain acetic acid, decrease liver succinic acid, and alter gut microbiota in rats ted high-fat diets.
7. D. Nguyen, O. Prykhodko, F. Fåk Hållenius, M. Nyman
Food for Health Science Centre Lund University, Department of Food Technology, Engineering and Nutrition, Lund University, PO Box 124, SE-221 00, Lund, Sweden
9. Effects of sulphur-containing mineral water on classical biochemical markers in human interventional study.
TSokrateva, M. Nachar, M. Radanova, B. Hadjiev, D. Ivanova I 'sokrateva, M. Nachar, M. Radanova, B. Hadlev, D. Ivanova Medical University of Varna, Bulgaria 10. Antioxidant effects of milk-derived bioactive peptides on human colorectal adenocarcinoma cells. F. Tonolo', A. Folda', V. Scalcon', A. Bindoli', M.P. Rigobello' 'University of Padova, Department of Biomedical Sciences, Padova, Italy, 'Institute of Neuroscience, CNR, Padova, Italy 11. Evaluation of the antioxidant properties of table olive from "Piantone di Mogliano" cultivar. A. Ariani', R. Gabbianelli', D. Fedell', P. Polidori', N. Cammertoni', S. Vincenzetti' School of Biosciences and Veterinary Medicine. University of Camerino, Camerino, (MC). Italy, <sup>2</sup>School of Pharmacy, University of rino, Camerino (MC), Italy Camenno, Camenno, Wich, Ray 12. 20-Hydroxyecdysone Protects Pancreatic Islets and Liver in Streptozotocin-Induced Diabetic Rats. M. Sinadinović', J. Arambašić-Jovanović', M. Mihailović', A. Uskoković', N. Grdović', S. Dinić', M. Đorđević', A. Tolić', J. Rajić', A. Hunyadi', M. Vidaković'
<sup>1</sup>Department of Molecular Biology, Institute for Biological Research, University of Belgrade, Belgrade, Serbia, <sup>2</sup>Institute of Department of molecular biology, institute for biological nesearch, Oniversity of beigrade, serbia, institute of Pharmacognosy, University of Szeged, Hungary
 13. Centaurium erythraea methanol extract attenuates SNP-induced oxidative stress in pancreatic β-cells.
 M. Dordević, M. Mihailović, J. Arambašić Jovanović, N. Grdović, A. Uskoković, M. Sinadinović, J. Rajić, A. Tolić, G. Poznanović, M. Vidaković, S. Dinić
 Department of Molecular Biology, Institute for Biological Research, University of Belgrade, Bulevar despota Stefana 142, 11060 Belgrade, Serbia Belgrade, Serbia 14. MeFISH: Fluorescent detection of target methylated cytosines within the genome A. Tolić', N.A. Ninkovic NA', J. Rajić', M. Đorđević', M. Sinadinović', A. Uskoković', N. Grdović', M. Mihailović' A. Toilć', N.A. Ninkovic NA', J. Rajić', M. Dordević', M. Sinadinović', A. Uskoković', N. Grdović', M. Mihailović', J. Arambašić-Jovanović', S. Dinić', A. Okamoto', M. Vidaković' 'Department of Molecular Biology, Institute for Biological Research, University of Belgrade, Bulevar despota Stefana 142, 11060 'Belgrade, Serbia, 'Research Center for Advanced Science and Technology (RCAST), The University of Tokyo, 4-6-1 Komaba, Meguro-ku, Tokyo 153-8904 Japan **15. Can Nigella sativa oil control inflammation in human pre-adipocytes?** L. Bordoni'', D. Fedeli', F. Maggi', F. Papa', A. Sawicka', R. Olek', R. De Caterina', M. Wabitsch' and R. Gabbianelli' 'Unit of Molecular Biology and 'Pharmaceutical Botany and Pharmacognosy Unit, School of Pharmacy, University of Camerino, Italy, 'School of Science and Technology, University of Camerino, Italy, 'Department of Bioenergetics and Nutrition, Gdańsk University Physical Education and Sport, Gdansk, Poland, 'Cardiology Division, 'G. d'Annunzi' University, Medical Center Ulm, of Pediatric Endocrinology and Diabetes, Department of Pediatrics and Adolescent Medicine, University, Medical Center Ulm, Or Pediatric Endocrinology and Diabetes, Department of Pediatrics and Adolescent Medicine, University, Medical Center Ulm, of Pediatric Endocrinology and Diabetes, Department of Pediatrics and Adolescent Medicine, University, Medical Center Ulm, of Pediatric Endocrinology and Diabetes, Department of Pediatrics and Adolescent Medicine, University Medical Center Ulm Germany. \*laura.bordoni@unicam.it 16. Long term dietary intake of sulfur containing amino acids are associated with leptin gene expression in adipose 16. Long term dietary intake of sulfur containing amino acids are associated with leptin gene expression in adipose tissues of non-diabetic adults
G. Asghari', E. Yuzbashian', M. Zarkesh', P. Mirmiran', M. Hedayati', A. Khalaj<sup>a</sup>
"Nutrition and Endocrine Research Center, Research Institute for Endocrine Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran, 'ellular and Molecular Endocrine Research Center, Research Institute for Endocrine Sciences, Shahid Beheshti University of Medical Sciences, Tehran, Iran, 'Enhan Obesity Treatment Center, Department of Surgery, Shahed Iniversity, Tehran, Iran

University, Tehran, Iran **17. The role of iron on marathon-induced changes on the EPO-erythroferrone-hepcidin axis.**  *M. Tomczyk J. Kortas<sup>2</sup>, D. Flis<sup>3</sup>, B. Kaczorowska<sup>4</sup>, A. Przybytkowska<sup>1</sup>, E. Lewicka<sup>4</sup>, A. Dabrowska-Kugacka<sup>5</sup>, J. Antosiewicz<sup>1/6</sup>* <sup>1</sup>Department of Biochemistry, Gdansk University of Physical Education and Sport, Gdansk, Poland, <sup>2</sup>Department of Recreation and Qualified Tourism, Gdansk University of Physical Education and Sport, Gdansk, Poland, <sup>3</sup>Department of Bioenergetics and <sup>1</sup>University of Charles and Charles Charles Debug diversity of Physical Education and Sport, Gdansk, Poland, <sup>3</sup>Department of Bioenergetics and <sup>1</sup>University of Charles Debug diversity of Physical Education and Sport, Gdansk, Poland, <sup>1</sup>Department of Bioenergetics and <sup>1</sup>University of Physical Education and Sport, Gdansk, Poland, <sup>1</sup>Department of Bioenergetics and <sup>1</sup>University of Physical Education and Sport, Gdansk, Poland, <sup>1</sup>Department of Bioenergetics and <sup>1</sup>University of Physical Education and Sport, Gdansk, Poland, <sup>1</sup>Department of Bioenergetics and <sup>1</sup>University of Physical Education and Sport, Gdansk, Poland, <sup>1</sup>Department of Bioenergetics and <sup>1</sup>University of Physical Education and Sport, Schwart and <sup>1</sup>Department of Bioenergetics and <sup>1</sup>Department of Sport (Schwart and <sup>1</sup>Department of Sport (Schwart and <sup>1</sup>Department of Bioenergetics and <sup>1</sup>Department of Sport (Schwart and <sup>1</sup>Department of S Nutrition, Gdansk University of Physical Education and Sport, Gdansk, Poland, <sup>4</sup>Department of Occupational Therapy, Gdansk Jniversity of Physical Education and Sport, Gdansk, Poland, <sup>5</sup>Department of Cardiology and Electrotherapy, Medical Universit Gdansk, Poland, "Department of Bioenergetics and Physiology of Exercise, Medical University
 Ischemic preconditioning causes overexpression of genes involved in iron metabolism in young men.
 Przybytkowska', M. Zychowska', K. Anczykowska', I. Bonislawska', M. Kochanowicz', A. Kochanowicz', J. Mieszkowski', J. Antosiewicz<sup>2</sup> PhD student, Department of Biochemistry, Faculty of Physical Education, Gdansk University of Physical Education and Sport,

Gdansk, Poland, <sup>2</sup>Department of Biochemistry, Faculty of Physical Education, Gdansk University of Physical Education and Sport, Gdansk, Poland, <sup>3</sup>Department of Gymnastic, Faculty of Physical Education, Gdansk University of Physical Education and Sport,

Guans, Folani J9. Nutritional and molecular monitoring of pregnant women and the infants from the birth until two years of age. S. Alabduljabbar', A. P. Lakshmanan', S. Zaidan', T. Brummaier', A. K. Marr', B.S. Ahamed Kabeer', T. Kino', S. Murugesan', P. Singh', S. Al Khodor', F. Nosten', R. McGready', D. Chaussabel', A. Terranegra' "translational Medicine Division, Sidra Medicine, Doha, Qatar, 'Shoklo Malaria Research Unit (SMRU), Mahidol-Oxford Tropical Medicine Research Unit, Faculty of Tropical Medicine, Mahidol University, Mae Sot, Thailand

Medicine Research Unit, Faculty of Tropical Medicine, Mahidol University, Mae Sot, Thailand 20. The triple interaction Diet-Microbiome-Epigenome: A novel approach to the non-communicable diseases 5. Zaidan', A. P. Lakshmanan', S. Al Abduljabbar', G. Petrovski<sup>2</sup>, O. Al Nualmi', A. Terranegra' "Department of Immunology, Inflammation and Metabolism, Section of Nutritional Genomics and Metabolism, Sidra Medicine, Doha, Qatar, 'Pediatrics Department, Endocrine and Diabetes Division, Sidra Medicine, Doha, Qatar 21. The Impact on The Human Gut Microbiome's Functional Profile Caused by The Antidiabetic Drug Metformin Imal Diaduce II Intel Menter Medicine II Inter Metabolism, Sidra Medicine, Doha, Datar

Ize I. Dindune', Ilze Elbere', Ineta Kalnina', Ivars Silamikelis', Ilze Konrade', Ilze Radovica-Spalvina', Dita Gudra', Valdis Piraqs

Janis Klovins' 'Latvian Biomedical Research and Study Centre, Riga, Latvia 'Department of Endocrinology, Pauls Stradins Clinical University Hospital, Riga, Latvia **22. Glycoxidative stress and paraoxonase-2 in intestinal cells: effect of apple polyphenols** T. Bacchetti', C. Morresi', D. Sartini', S. Fumarola', M. Emanuelli', G. Ferretti' Construction of Marche Angel Construction of Construction of Marche Angel Construction of Marche Angel Construction of Constructio

nental Sciences (DISVA), Polytechnic University of Marche, Ancona, Italy, <sup>2</sup>Department of al Sciences (DISCO), Polytechnic University of Marche, Ancona, Italy 23. High-Fiber Diet of Pumpkin and Sweet Potatoes Improve Hy



Sunarti<sup>1</sup>, Umar Santoso<sup>2</sup>, Emy Huriyat Department of Biochemistry, Faculty of Medicine, Pubilc Health and Nursing, Universitas Gadjah Mada, Yogyakarta, Indonesia <sup>2</sup>Center for Food and Nutrition Study, Universitas Gadjah Mada, Yogyakarta, Indonesia, <sup>3</sup>Department of Health and Nutrition, Faculty of Medicine, Public Health and Nursing, Universitas Gadiah Mada, Yogyakarta, Indonesia

