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Systems-based metabolomics of type 2 diabetes mellitus subtypes

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Title: Systems-based metabolomics of type 2 diabetes mellitus subtypes

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List of abbreviations

ACN, acetonitrile
ALT, alanine aminotransferase
ANOVA, analysis of variance
ApoE*3Leiden, Apolipoprotein E3 Leiden
BHT, butylated hydroxytoluene
CB1, cannabinoid 1
CETP, cholesteryl ester transfer protein
CER, ceramide
CH₂Cl₂, dichloromethane
Cho, cholesterol
ChoE / ChE, cholesterol ester
CM, Chinese medicine
CNS, central nervous system
CVD, cardiovascular disease
DCM, dichloromethane
DG, diacylglyceride
DI: direct infusion
FA, fatty acid
FBG, fasting blood glucose
FFA, free fatty acid;
FPLC, fast performance liquid chromatography
FTMS, Fourier transform ion cyclotron resonance mass spectrometry
GC, gas chromatography
GK, Goto-kajizaki
HbA1c , glycated hemoglobin;
HDL, high density lipoprotein;
HPLC, high-performance liquid chromatography
IDL, Intermediate-density lipoprotein
IPA, isopropanol
IPGTT, intraperitoneal glucose tolerance test
IS, internal standard
LC, liquid chromatography
LDL, low density lipoprotein
LLE, liquid–liquid extraction
LPC, lysophosphatidylcholine
MeOH, methanol
MetS, metabolic syndrome

List of abbreviations

Molecular Phenotyping to Accelerate Genomic Epidemiology (MoIPAGE)

MS, mass spectrometry

MTC; multiple test correction

MVDA, multivariate data analysis

NH₄Ac, Ammonium acetate

PAF, platelet-activating factor

PCA, principal component analysis

PC, phosphatidylcholine/ Principal Component

PE, phosphatidylethanolamine

PG, phosphatidylglycerol

PLs, phospholipids

QC, quality control

RSD, relative standard deviation

SD, standard deviation

SPE, solid-phase extraction

SPM, sphingomyelin

T2DM, Type 2 diabetes mellitus

TCA, tricarboxylic acid

TG, triacylglycerol/triglycerides

TNF- α , tumor necrosis factor- α

UFLC, ultra-fast liquid chromatography

(V) LDL, (very) low density lipoprotein

*/ \times , times

WM, Western medicine

List of publications

Wei H, Pasman W, Rubingh C, Wopereis S, Tienstra M, Schroen J, Wang M, Verheij E, Greef Jvd: Urine metabolomics combined with the personalized diagnosis guided by Chinese medicine reveals subtypes of pre-diabetes. *Molecular BioSystems* **2012**, 8(5):1482-1491.

Hu C*, Wei H*, Kong H, Bouwman J, Gonzalez-Covarrubias V, van der Heijden R, Reijmers TH, Bao X, Verheij ER, Hankemeier T *et al*: Linking biological activity with herbal constituents by systems biology-based approaches: effects of Panax ginseng in type 2 diabetic Goto-Kakizaki rats. *Molecular BioSystems* **2011**, 7(11):3094-3103.

Wei H*, Hu C*, Wang M*, van den Hoek AM, Reijmers TH, Wopereis S, Bouwman J, Ramaker R, Korthout HAAJ, Vennik M *et al*: Lipidomics Reveals Multiple Pathway Effects of a Multi-Components Preparation on Lipid Biochemistry in ApoE*3Leiden.CETP Mice. *PLoS ONE* **2012**, 7(1):e30332.

Hu C*, Wei H*, van den Hoek AM, Wang M, van der Heijden R, Spijksma G, Reijmers TH, Bouwman J, Wopereis S, Havekes LM *et al*: Plasma and Liver Lipidomics Response to an Intervention of Rimonabant in ApoE*3Leiden.CETP Transgenic Mice. *PLoS ONE* **2011**, 6(5):e19423.

van Wietmarschen HA, Reijmers TH, van der Kooij AJ, Schroën J, Wei H, Hankemeier T, Meulman JJ, van der Greef J: Sub-Typing of Rheumatic Diseases Based on a Systems Diagnosis Questionnaire. *PLoS ONE* **2011**, 6(9):e24846.

Hu C, Kong H, Zhu C, Wei H, Hankemeier T, van der Greef J, Wang M, Xu G: An ultra performance liquid chromatography-time-of-flight-mass spectrometric method for fast analysis of ginsenosides in Panax ginseng root. *Chinese Journal of Chromatography* **2011**, 29(6):488-494.

van den Berg MG, Rasmussen-Conrad EL, Wei KH, Lintz-Luidens H, Kaanders JH, MA M: Comparison of the effect of individual dietary counselling and of standard nutritional care on weight loss in patients with head and neck cancer undergoing radiotherapy. *British journal of nutrition* **2010**, 104(6):872-877.

* Authors contributed equally to the publication

Curriculum Vitae

Heng Wei , often referred to as Koko, was born on December 30, 1979 in Chengdu, P.R China. After six year study in Chengdu foreign language school, a key middle school with extra training on English and mathematics, she started to study in Chengdu Chinese Medical University, majoring in internal medicine with the combination strategy of Western medicine and Chinese medicine. She got the Bachelor degree of Medicine in China and afterwards went to the Netherlands. She received her MSc degree of Human Nutrition in 2007 from Wageningen University and directly began a four-year PhD in TNO (Zeist, the Netherlands) in the personalized health research project focused on metabolic health using systems biology based technologies. Her PhD was to search for type 2 diabetes diagnostic biomarkers or metabolism phenotypes by metabolomics, with special focus on lipid metabolism. During her PhD, she also coordinated scientific cooperation projects between the Netherlands and China for Sino-Dutch Center of preventive and personalized medicine.

Koko currently works as a research scientist in nutrition clinical studies in Centre for Human Drug Research (CHDR), Leiden.

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Overview of completed training activities

<i>Training institute</i>	<i>Type of training</i>	<i>Year</i>	<i>Certificate</i>
Amsterdam University (UvA)	Biosystem data analysis (6 ECT)	2008	Yes
James Boswell Institute, Utrecht	Nederlands voor vergevorderden	2008	Yes
ThermoFisher,UK	LTQ/LXQ/LCQ Fleet operation training	2008	Yes
Montreux LC/MS symposium	Practical LC/MS course	2008	Yes
Netherlands Metabolomics Center, NuGo and TNO	Hands-on training course in metabolomics	2008	Yes
Leiden University	The course Intellectual Property	2011	Yes
Leiden University	Time management, self-management	2011	Yes
Leiden University	Writing an excellent research grant proposal	2011	Yes
Leiden University	Research Based Business Opportunity (5 ECT)	2011	Yes
Leiden University	Research Based Business Ventures (5 ECT)	2012	Yes
HVCC	ICH GCP training	2012	Yes

