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Abstract Book

Organized by

International Society for Nutraceuticals and Functional Foods (ISNFF)

Co-Organized by

- Korea Food Industry Promotion Forum **(KFIPF)**
- Rural Development Administration **(RDA)**
- Korea National Food Cluster **(FOODPOLIS)**
- Korean Society of Food Science and Technology **(KoSFoST)**
- Microbial Institute for Fermentation Industry **(MIFI)**
- Jeonbuk Institute for Food-Bioindustry **(JIF)**
- Clinical Trial Center for Functional Foods **(CTCF2)** of Chonbuk National University Hospital

Session 4-5

Protein/Peptides 2

Room D

October 24 (Tue), 2017 ‖ 13:30~15:30

Chairs : Jianping Wu (University of Alberta, Canada),
Carmen Lammi (University of Milan, Italy)

O124. 13:30~13:45

Hypoallergenic Phosphorylated Buck Wheat Proteins Inducing Oral Tolerance

Shigeru Katayama, Takakazu Mitani, and Soichiro Nakamura (Department of Bioscience and Biotechnology, Faculty of Agriculture, Shinshu University, Japan)

O125. 13:45~14:00 Invited

Detection of Food-Derived Hydroxyproline Peptides in Human Urine After Ingestion of Collagen Hydolysate

Yasutaka Shigemura[1], Kanko Ishiwata[1], Mistuki Orito[1], Risa Aoki[1], Yoshio Sato[1], and Kenji Sato[2] ([1]Tokyo Kasei University, Japan, [2]Kyoto University, Japan)

O126. 14:00~14:15 Invited

Hypotensive Properties of a Porcine Gelatin Enzymatic Hydrolysate

Martina B. O'Keeffe, Roseanne Norris, Monisola A. Alashi, Rotimi E. Aluko, and Richard J. FitzGerald (Department of Biological Sciences, University of Limerick, Ireland)

O127. 14:15~14:30 Invited

Egg White Hydrolysate Shows Insulin-Mimetic and Sensitizing Effects in 3T3-F442A Pre-Adipocytes

Forough Jahandideh[1,4], Subhadeep Chakrabarti[1,4], Sandra T. Davidge[2,3,4,5], and Jianping Wu[1,4] ([1]Dept. of Agricultural, Food and Nutritional Science, [2]Dept. of Obstetrics and Gynecology, [3]Dept. of Physiology, [4]Cardiovascular Research Centre and [5]Women and Children's Health Research Institute, University of Alberta, Canada)

O128. 14:40~14:45

Investigation of Antidiabetic Effect and Bioavailability of a Sodium Caseinate Hydrolysate

Chia-Ling Jao and Kuo-Chiang Hsu (Chung Shan Medical University, Taiwan)

O129. 14:45~15:00 Invited

Identification and Quantification of Food-Derived Collagen Peptide in Human Plasma After Ingestion of Cooked Shark Meat

Tomoko Asai[1], Akira Takakashi[2], Kimie Ito[3], Tatsuo Uetake[4], Yasuki Matsumura[5], Kaori Ikeda[6], Nobuya Inagaki[6], Kenji Sato[1] ([1]Graduate School of Agriculture, Kyoto University, Japan, [2]Chuka Takahashi Inc., Japan, [3]Nihonbashi Sakura Clinic, Japan, [4]CX Medical Japan Co., Ltd., Japan, [5]Graduate School of Agriculture, Kyoto University, Japan, [6]Graduate School of Medicine, Kyoto University, Japan)

O130. 15:00~15:15 Invited

Camel Milk Protein Hydrolysates with Dipeptidyl Peptidase IV (DPP-IV) Inhibitory Properties

Alice B. Nongonierma, Sara Paolella, Priti Mudgil, Sajid Maqsood, and Richard J. FitzGerald (Department of Biological Sciences, University of Limerick, Ireland)

O131. 15:15~15:30 Invited

Lupin Peptides: Novel Bi-Functional Inhibitors of PCSK9, A New Target for the Cardiovascular Disease Risk Reduction

Carmen Lammi, Chiara Zanoni, Gilda Aiello, and Anna Arnoldi (Department of Pharmaceutical Sciences, University of Milan, Italy)

O128

Investigation of Antidiabetic Effect and Bioavailability of a Sodium Caseinate Hydrolysate

Chia-Ling Jao and Kuo-Chiang Hsu

Chung Shan Medical University, Taiwan

In vitro and *in vivo* studies in our laboratory showed that the sodium caseinate hydrolyzed by bromelain had the greatest dipeptidyl peptidase-IV (DPP-IV) inhibitory activity. A further study on the bioavailability, the glucagon-like peptide 1 (GLP-1) secretion and antidiabetic effects on a T2DM animal model of the hydrolysate was needed.

The sodium caseinate hydrolysate could inhibit DPP-IV activity up to 61% and improve glycemic control after 3-week orally administration with db/db mice. Two peptides, GPFPLPD and APDSGNFR, isolated from the hydrolysate, showed up to 68% increase of GLP-1 secretion by STC-1 and NCI-H716 cell lines. The two peptides were fed to SD rats, and blood were collected after 60 min to show 11.3 and 19.1% of the peptides, respectively, passed through gastrointestinal tract and enter into blood circulation. The results of this study demonstrated sodium caseinate hydrolysate had the potential to be a functional food with antidiabetic effect.

O129

Identification and Quantification of Food-Derived Collagen Peptide in Human Plasma After Ingestion of Cooked Shark Meat

Tomoko Asai[1], Akira Takakashi[2], Kimie Ito[3], Tatsuo Uetake[4], Yasuki Matsumura[5], Kaori Ikeda[6], Nobuya Inagaki[6], Kenji Sato[1]

[1]Graduate School of Agriculture, Kyoto University, Japan, [2]Chuka Takahashi Inc., Japan, [3]Nihonbashi Sakura Clinic, Japan, [4]CX Medical Japan Co., Ltd., Japan, [5]Graduate School of Agriculture, Kyoto University, Japan, [6]Graduate School of Medicine, Kyoto University, Japan

It has been demonstrated that ingestion of collagen hydrolysate can improve skin and joint conditions. We have demonstrated presence of short chain collagen peptides (Pro-Hyp etc.) in human blood after ingestion of collagen hydrolysate. However, structure and contents of food-derived collagen peptides in human blood after ingestion of gelatin-rich cooked meat are unknown.

Tail meat of blue shark *(Prionace glauca)* free from skin and spine was boiled with seasonings, which contained 13.5 g gelatin. Six healthy volunteers ingested the cooked shark meat or collagen hydrolysate (13.5 g) after 12 h of fasting. The plasma sample were collected before and 0.5, 1, 2, 3, 4 h after ingestion.

Contents of Hyp-containing peptides (AUC and maximum level) were lower after ingestion of the boiled shark meat compared to those after ingestion of collagen hydrolysate (approximately 30%). However, there was no significant difference in Hyp-Gly content between them. These facts indicate that ingestion of not only collagen hydrolysate but also gelatin in cooked meat also exert some beneficial effect.

O130

Camel Milk Protein Hydrolysates with Dipeptidyl Peptidase IV (DPP-IV) Inhibitory Properties

Alice B. Nongonierma, Sara Paolella, Priti Mudgil, Sajid Maqsood, and Richard J. FitzGerald

Department of Biological Sciences, University of Limerick, Ireland

Consumption of one-humped camel (*Camelus dromedarius*) milk has been linked with a range of therapeutic and bioactive properties. Camel milk has not previously been investigated for the generation of DPP-IV inhibitory peptides/hydrolysates. *In silico* analysis of camel milk proteins revealed the presence of numerous known DPP-IV inhibitory peptides. The enzymatic release of DPP-IV inhibitory peptides from camel milk proteins using trypsin was optimised. Hydrolysates with DPP-IV half maximal inhibitory concentration (IC_{50}) values between 0.52 ± 0.06 and 1.26 ± 0.13 mg mL^{-1} were generated. Potent DPP-IV inhibitory peptides with $IC_{50} < 100$ µM were identified by liquid chromatography-tandem mass spectrometry (LC-MS/MS) in the hydrolysates. Camel milk protein hydrolysates were more potent DPP-IV inhibitors than corresponding bovine milk protein hydrolysates ($p < 0.05$). Camel milk protein peptides/hydrolysates warrant further study as functional food ingredients for the management of type 2 diabetes.

O131

Lupin Peptides: Novel Bi-Functional Inhibitors of PCSK9, A New Target for the Cardiovascular Disease Risk Reduction

Carmen Lammi, Chiara Zanoni, Gilda Aiello, and Anna Arnoldi

Department of Pharmaceutical Sciences, University of Milan, Italy

Proprotein convertase subtilisin/kexin type 9 (PCSK9) has been recently identified as a new target for hypercholesterolemia treatment. We have demonstrated that peptides, deriving from lupin protein hydrolysis and absorbable at intestinal level, are able to modulate the PCSK9 target with a dual mechanism of action. Lupin peptides reduce PCSK9 production and secretion through a decrease of HNF1-alpha in HepG2 cells and an absorbed lupin peptide is able to inhibit the protein-protein interaction between PCSK9 and the LDL receptor with an IC_{50} value equal to 1.6±0.33 µM. Interestingly, in mild hypercholesterolemic subjects, which had consumed lupin protein (30 g/day) for 4 weeks, the final circulating PCSK9 level had been reduced by 8.5% versus baseline value. For the first time, we have provided evidences that lupin peptides may modulate PCSK9, contributing to explain the beneficial effects observed in clinical studies and opening a new area of investigation on plant proteins