

Symposium 15

Diet Quality and Weight Regulation

Chairpersons

Doo-Man Kim

Hallym University, Korea

Eun Mi Kim

Sungkyunkwan University, Korea

Speakers

Yuri Kim

Ewha Womans University, Korea

Yang Hu

Harvard T.H. Chan School of Public Health, USA

Hannah Oh

Korea University, Korea

Panel Discussion

SuJin Song

Hannam University, Korea

Hyun Ju You

Seoul National University, Korea



Yuri Kim

Ewha Womans University, Korea

• Education

Period	Affiliation	Position
- 2005	Tufts University Nutritional Biochemistry and Metabolism	Ph.D.
- 1999	The Ohio State University Human Nutrition	M.S.
- 1992	Ewha Womans University Nutritional Science and Food Management	B.S.

• Affiliations / Experience

Period	Affiliation	Position
- 2023-Present	Ewha Womans University Global School of Continuing Education	Dean
- 2023-Present	Ewha Womans University Center for Arts & Culture Education	Dean
- 2023-Present	Ewha Womans University Institute for Leadership Development	Dean
- 2017-2018	Yale University Therapeutic Radiology Department School of Medicine	Visiting Professor
- 2010-Present	Ewha Womans University Nutritional Science and Food Management	Professor

• Committee Memberships

- Korean Nutrition Society
- The International Carotenoid Society
- Journal of Cancer Prevention
- Korean Nutritional Society
- Korean Society of Food and Culture

• Publications

- Y Choi, R Wong, YK Cha, TH Park, S-J Chung, Y Kim. (2024) Sweet-bitter taste interactions in binary mixtures of sweeteners: Relationship of taste receptor activities with sensory perception. Food Chemistry, accepted
- S Jang, H Han, Y Oh, Y Kim (2024) Sex differences in inflammation correlated with estrogen and estrogen receptor- β levels in azoxymethane/dextran sodium sulfate-induced colitis-associated colorectal cancer mice. Heliyon, 10(6):28121
- Y Kim, Y Oh, YS Kim, JH0 Shin, YS Lee, Y Kim. (2024). β -carotene attenuates muscle wasting in cancer cachexia by regulating myogenesis and muscle atrophy. Oncology Reports, 51(1); 1-12
- Y Kim, S Jung, G Park, H Shin, SC Heo, Y Kim (2023). β -Carotene suppresses cancer cachexia by regulating the adipose tissue metabolism and gut microbiota dysregulation. The Journal of Nutritional Biochemistry, 114; 109248
- M Kwon, Y Kim, J Lee, JA Manthey, Y Kim, Y Kim (2022) Neohesperidin dihydrochalcone and neohesperidin dihydrochalcone-O-glycoside attenuate subcutaneous fat and lipid accumulation by regulating PI3K/AKT/mTOR pathway in vivo and in vitro. Nutrients,14:1087

Symposium 15

Functional Supplements: Their Fat Controls and Molecular Mechanisms

Yuri Kim (Ewha Womans University, Korea)

Obesity is a complex disease that is highly associated with metabolic disorders, including hypertension, type 2 diabetes mellitus (T2DM), and nonalcoholic fatty liver disease (NAFLD). The prevalence of obesity is rapidly increasing worldwide. The WHO has declared obesity a global epidemic of the 21st century. Sugar reduction strategies often rely on using alternative sugars designed to substitute sugar and mimic its sensory profile, but also exert beneficial effects on obesity-related metabolic disorders. This lecture aims to discuss the anti-obesity and anti-metabolic disease effects and molecular mechanisms of various alternative sweeteners such as xylobiose, phylloolulcin, and neohesperidin. The level of hepatic triglyceride and serum cholesterol was regulated by these alternative sweeteners. Gene expressions related to lipogenesis, lipolysis, β -oxidation, and inflammation were significantly regulated in the perirenal adipose tissues and the liver. Additionally, fat regulation is crucial not only in obesity but also in cachexia, which is characterized by fat loss due to disease. Our laboratory has been investigating the role of β -carotene, a type of carotenoid, in regulating fat in early cancer cachexia. β -Carotene is well-known for its antioxidant properties, but it has also been reported to regulate fat mass in healthy conditions. Particularly, in cachexia, it has been shown to inhibit fat depletion. These diverse effects are attributed to mechanisms such as increasing adipogenesis and lipogenesis and regulating glycolysis. Results from these studies suggest that various functional supplements could have the potential to prevent obesity-related metabolic disorders and cachexia.



Yang Hu

Harvard T.H. Chan School of Public Health, USA

• Education

Period	Affiliation	Position
– 2014-2019	Harvard T.H. Chan School of Public Health	Ph.D.
– 2011-2013	Harvard T.H. Chan School of Public Health	M.A.
– 2007-2011	Peking University Health Science Center	B.A.

• Affiliations / Experience

Period	Affiliation	Position
– 2023-Present	Harvard T.H. Chan School of Public Health	Research Scientist
– 2019-2023	Harvard T.H. Chan School of Public Health	Research Associate

• Publications

- Hu Y, Li J, Wang B, et al. Interplay between diet, circulating indolepropionate concentrations and cardiometabolic health in US populations. *Gut*. 72: 2260-2271
- Hu Y, Li G, Yu E, et al. Low-Carbohydrate Diet Scores and Mortality Among Adults With Incident Type 2 Diabetes. *Diabetes Care*. 46 (4): 874-884
- Hu Y, Li Y, Sampson L, et al. Lignan Intake and Risk of Coronary Heart Disease. *JACC*. 78(7):666-78
- Hu Y, Ding M, Sampson L, et al. Intake of whole grain foods and risk of type 2 diabetes: results from three prospective cohort studies. *BMJ*. 370:m2206
- Hu Y, Zong G, Liu G, et al. Smoking Cessation, Weight Change, Type 2 Diabetes, and Mortality. *NEJM*. 379 (7):623-32

Symposium 15

Optimal Diets for Body Weight Management

Yang Hu (Harvard T.H. Chan School of Public Health, USA)

This lecture summarizes the current epidemiological evidence regarding effects of a few well-established dietary patterns on body weight in adults. Focusing on both macronutrient- and food-based dietary patterns, this lecture covers key findings from recent landmark dietary weight-loss trials such as POUNDS Lost trial, DIETFITS trial, and PREDIMED-Plus trial. The current evidence shows that not all proposed dietary patterns are effective in weight control and the effectiveness primarily depends on the intervention intensity and reference diets. For instance, a low-fat diet leads to lower weight gain only compared with a usual diet whereas a low-carbohydrate diet and Mediterranean diet on average results in greater weight loss than a low-fat diet. In addition, simply targeting on the restriction of macronutrients per se may not necessarily lead to a healthy dietary pattern as our previous work has shown that only a low-carbohydrate diet that consists of high-quality protein, fat, and carbohydrates is associated with significantly less weight gain in the long-term. To complement the evidence from randomized controlled trials, the lecture presents data from the most recent meta-analysis of prospective cohort studies that are able to examine the long-term effects of healthy dietary patterns on weight change. Accumulating evidence has demonstrated that higher adherence to multiple food-based dietary patterns including alternative healthy eating index (AHEI), healthy plant-based diet (hPDI), Mediterranean diet, and DASH diet is associated with significantly lower weight gain. Finally, the lecture discusses the research frontiers in precision nutrition that aim to understand the biological mechanisms underlying the weight-loss effects of healthy dietary patterns. These novel findings will facilitate the development of individualized diets that most effectively aid in weight management.



Hannah Oh

Korea University, Korea

• Education

Period	Affiliation	Position
– 2010-2015	Harvard T. H. Chan School of Public Health, Boston, MA, USA	Sc.D.
– 2008-2010	Emory Rollins School of Public Health, Atlanta, GA, USA	M.P.H.
– 2004-2008	University of California, Berkeley, USA	B.A.

• Affiliations / Experience

Period	Affiliation	Position
– 2018-2021	Korea University, Korea	Assistant Professor
– 2017-2018	Rutgers Cancer Institute of New Jersey, USA/ Rutgers Robert Wood Johnson Medical School, New Brunswick, NJ, USA	Instructor
– 2015-2017	National Cancer Institute, Bethesda, MD, USA	Postdoctoral Fellowship

• Publications

- Kwon S, Kim R, Lee JT, Kim J, Song S, Kim S, Oh H. Association of smartphone use with body image distortion and weight loss behaviors in Korean adolescents. *JAMA Network Open* 5(5): e2213237
- Jo G, Park D, Lee J, Kim R, Subramania SV, Oh H*, Shin MJ*. Trends in diet quality and cardiometabolic risk factors among Korean adults, *JAMA Network Open* (6): e2218297
- Jang H, ...Giovannucci EL, Oh H. Overall and abdominal obesity and risks of all-cause and cause-specific mortality in Korean adults: a pooled analysis of three population-based prospective cohorts. *Int J Epidemiol*; dyac242
- Cho Y, Jang H, Kwon S, Oh H. Aerobic, muscle-strengthening, and flexibility physical activity and risks of all-cause and cause-specific mortality: a population-based prospective cohort of Korean adults. *BMC Public Health* 23(1): 1148
- Cho Y, Ryu S, Kim R, Shin MJ, Oh H. Ultra-processed Food Intake and Risk of Type 2 Diabetes in Korean Adults. *Journal of Nutrition* 154(1): 243-251

Symposium 15

Trends in Diet Quality and Cardiometabolic Risk Factors Among Korean Adults

Hannah Oh (Korea University, Korea)

Poor diet, such as high intake of sodium and low intake of whole grains and fruits, increases the risks of obesity and various noncommunicable diseases, including cardiovascular disease, type 2 diabetes, and cancer. Few studies to date have investigated the trends in overall diet quality among Korean adults, beyond evaluating consumptions of individual food groups. Because overall diet quality, rather than consumption of individual food groups, better reflects overall health, understanding the nationwide trends in diet quality may provide important evidence for effective strategies and priorities to reduce related disease burdens. In this study, we used large, nationally representative survey data to examine the trends in diet quality and cardiometabolic risk factors (waist circumference and blood pressure, serum cholesterol, triglyceride, and fasting blood glucose levels) among Korean adults (n=65,416; aged 19 to 79 years) in 2007-2022. We used a validated diet quality index, the Korean Healthy Eating Index (KHEI), which indicates the overall adherence to recommended dietary guidelines. In our study population, higher KHEI was associated with lower waist circumference, systolic blood pressure, diastolic blood pressure, and triglyceride levels; and lower risks of all-cause and cardiovascular-specific mortality (all $P \leq .003$ for trend), confirming the validity of the KHEI. We first estimated the age-standardized mean KHEI scores in each survey year from 2007 to 2022, using the 2005 Korean Census population as the reference population. We also performed the age-period-cohort analyses of the KHEI to comprehensively investigate the independent associations of age, period, and birth cohort. The age-standardized mean (SE) KHEI score increased from 2007 to 2013, which was associated with reduced sodium intake and increased whole grain, dairy, and protein-rich food intakes. In 2013-2018, there was a slight decrease in KHEI, which was associated with reduced intakes of fresh fruits, vegetables, and whole grains and increased intake of sugar-sweetened beverages. The mean (SE) KHEI score was lowest at age 39 years (50.1 [0.3]) and increased at older ages (58.0 [0.3] at 79 years). Controlling for age and period effects, the highest KHEI score was observed among the birth cohorts of 1960-1964 (53.6 [0.9]) and decreased in subsequent cohorts (45.5 [1.2] in the 1990-1999 birth cohort). Similar cohort effects in cardiometabolic risk factors were observed, showing the lowest waist circumference, blood pressure, and total cholesterol levels among the birth cohorts of the 1960s and 1970s and higher levels among more recent birth cohorts (1990-1999 vs 1960-1964: waist circumference, 83.8 [0.5] vs 81.4 [0.4] cm; systolic blood pressure, 118.7 [0.7] vs 116.4 [0.4] mm Hg; total cholesterol, 200.2 [0.9] vs 198.9 [0.7] mg/dL). In most age groups, the mean KHEI score was consistently higher in adults living in urban areas and among high-income and educational level. The findings of this study suggest that the overall diet quality of Korean adults modestly improved from 2007 to 2013, followed by a slight decrease in 2013-2022. During the study period, inequalities in diet among socioeconomic subgroups persisted, suggesting that more intense interventions may be needed to target the susceptible groups.