

# Symposium 10

## Obesity and Cancer

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### Chairpersons

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#### **Hyuk-Sang Kwon**

The Catholic University of Korea, Korea

#### **Elaine Rush**

Auckland University of Technology, New Zealand

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### Speakers

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#### **Emma Fontvieille**

International Agency for Research on Cancer, IARC/WHO, France

#### **Thi Xuan Mai Tran**

Hanyang University, Korea

#### **Wonsock Kim**

Eulji University, Korea

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### Panel Discussion

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#### **Young-Sang Kim**

CHA University, Korea

#### **Dong Wook Shin**

Sungkyunkwan University, Korea



## Emma Fontvieille

International Agency for Research on Cancer, IARC/WHO, France

### • Education

Period	Affiliation	Position
– 2021-2024	Nutrition and Metabolism Branch, International Agency for Research On Cancer	Ph.D.
– 2018-2020	University Lyon 1	M.A

### • Committee Memberships

- International Society of Clinical Densitometry
- International Atomic Energy Agency
- International Body Composition Symposium

### • Publications

- Impact of pre-existing cardiometabolic diseases on metastatic cancer stage at diagnosis: a prospective multinational cohort study
- Tissue-specific genetic variation suggests distinct molecular pathways between body shape phenotypes and colorectal cancer
- Consumption of ultra-processed foods and risk of multimorbidity of cancer and cardiometabolic diseases: a multinational cohort study
- Body mass index and cancer risk among adults with and without cardiometabolic diseases: evidence from the EPIC and UK Biobank prospective cohort studies
- Body mass index and incident cardiometabolic conditions in relation to obesity-related cancer risk: A population-based cohort study in Catalonia, Spain

Symposium 10

## Body Mass Index and Cancer Risk Among Adults With and Without Cardiometabolic Diseases

Emma Fontvieille (International Agency for Research on Cancer, IARC/WHO, France)

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The prevalence of overweight and obesity (body mass index, BMI  $\geq 25$  kg/m<sup>2</sup>) has increased globally in recent decades. Overweight and obesity has been associated with an increased risk of 13 cancer types. Cancer and other cardiometabolic diseases (CMD) (e.g., type 2 diabetes mellitus [T2D], and cardiovascular disease [CVD]), often share common risk factors including adiposity and tend to co-occur within the same individuals. However, whether cancer risk associated with a higher BMI differs among adults with and without CVD and/or T2D is unclear. We aimed to evaluate separate and joint associations of BMI and CVD and/or T2D with the risk of cancer.

In an individual participant data meta-analysis of UK Biobank (UKB) and the European Prospective Investigation into Cancer and nutrition (EPIC), with a total of 577,343 adults, free of cancer, T2D, and CVD at recruitment, BMI (per ~5 kg/m<sup>2</sup>) was positively associated with the risk of obesity-related cancer among participants without CVD or T2D (HR: 1.11, 95%CI: 1.07,1.16), among participants with T2D (HR: 1.11, 95% CI: 1.05,1.18), and among participants with CVD (HR: 1.17, 95% CI: 1.11,1.24). The joint association of obesity (BMI  $\geq 30$  kg/m<sup>2</sup>) and CVD with the risk of overall cancer translated into a meta-analytical relative excess risk due to interaction (RERI) of 0.28 (95% CI: 0.09–0.47). No joint association was observed for T2D (RERI: -0.03; -0.33, 0.28).

These findings are important for cancer risk stratification and to guide public health interventions for overweight/obesity prevention. Our study showed that population sub-groups affected by a CVD are at higher risk of cancer for a given level overweight or obesity as compared to sub-groups without CVD.



## Thi Xuan Mai Tran

Hanyang University, Korea

### • Education

Period	Affiliation	Position
– 2017-2021	National Cancer Center Graduate School of Cancer Science and Policy	Ph.D.
– 2014-2017	National Cancer Center Graduate School of Cancer Science and Policy	M.A.
– 2009-2013	Ho Chi Minh City Medicine and Pharmacy University	B.S.

### • Affiliations / Experience

Period	Affiliation	Position
– 2023-Present	Department of Preventive Medicine, Hanyang University, College of Medicine	Assistant Research Professor
– 2021-2023	Department of Preventive Medicine, Hanyang University, College of Medicine	Post-doctoral Researcher
– 2021	National Cancer Center, Korea	Post-doctoral Researcher

### • Committee Memberships

- Korean Society for Preventive Medicine
- Korean Breast Cancer Society
- Korean Society of Epidemiology

### • Publications

- Tran TXM, Chang Y, Choi HR, Kwon R, Lim GY, Kim EY, Ryu S, Park B. Adiposity, Body Composition Measures, and Breast Cancer Risk in Korean Premenopausal Women. *JAMA Netw Open*. 2024 Apr 1;7(4):e245423. doi: 10.1001/jamanetworkopen.2024.5423. PMID: 38578637; PMCID: PMC10998159
- Tran TXM, Kim S, Park B. Changes in metabolic syndrome and the risk of breast and endometrial cancer according to menopause in Korean women. *Epidemiol Health*. 2023;45:e2023049. doi: 10.4178/epih.e2023049. Epub 2023 May 1. PMID: 37139668; PMCID: PMC10593591
- Tran TXM, Kim S, Song H, Lee E, Park B. Association of Longitudinal Mammographic Breast Density Changes with Subsequent Breast Cancer Risk. *Radiology*. 2023 Feb;306(2):e220291. doi: 10.1148/radiol.220291. Epub 2022 Sep 20. PMID: 36125380
- Tran TXM, Kim S, Song H, Ryu S, Chang Y, Park B. Consecutive gain and loss in body weight and waist circumference with risk of subsequent breast cancer in Korean women. *Int J Obes (Lond)*. 2022 Oct;46(10):1742-1748. doi: 10.1038/s41366-022-01173-5. Epub 2022 Jul 6. PMID: 35794193
- Tran TXM, Moon SG, Kim S, Park B. Association of the Interaction Between Mammographic Breast Density, Body Mass Index, and Menopausal Status With Breast Cancer Risk Among Korean Women. *JAMA Netw Open*. 2021 Dec 1;4(12):e2139161. doi: 10.1001/jamanetworkopen.2021.39161. PMID: 34940866; PMCID: PMC8703253

**Symposium 10**

## **Metabolic Health and Risk of Breast Cancer: A Focus on Impact of Body Composition and Waist Circumference**

Thi Xuan Mai Tran (Hanyang University, Korea)

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In 2020, over 2.3 million women worldwide were diagnosed with breast cancer, and by the end of the year, there were 7.8 million breast cancer survivors, making it the most prevalent cancer globally. While a high body mass index (BMI) has long been recognized as a risk factor for postmenopausal breast cancer, recent evidence highlights the importance of other metabolic health indicators, including excess body weight and composition, as modifiable risk factors. Waist circumference, also serves as an indicator of abdominal obesity or central adiposity, providing additional risk-related information beyond BMI or weight alone. Thus, the assessment of the waist circumference and other body composition measures can provide risk-related information in addition to BMI.

While body composition and waist circumference play a crucial role in breast cancer risk, findings from previous studies indicate that the associations between body composition, waist circumference, and breast cancer risk differ according to menopausal status. In postmenopausal, studies have shown that metabolic syndrome is independently associated with an increased risk of breast, with waist circumference being significant risk factors even after adjusting for BMI. Postmenopausal women exhibited more fat in different body segments, which are associated with increased risk for breast cancer, compared to premenopausal women. Fat mass control throughout the body may be beneficial in mitigating the risk for breast cancer and was not limited to abdominal fat alone among postmenopausal women.

Conversely, an inverse association or null association is observed in premenopausal women. Previous studies found that higher value of waist circumference or body composition is associated with reduced breast cancer risk while some study suggest that there is no association between obesity and premenopausal breast cancer risk. Fat distribution differed between pre- and postmenopausal women. Fat mass and waist circumference were significantly associated with the risk for breast cancer among postmenopausal but not premenopausal women. These findings underscore the different role of metabolic health and body composition in pre- and postmenopausal breast cancer risk.



## Wonsock Kim

Eulji University, Korea

### • Education

Period	Affiliation	Position
– 2024	School of medicine, Korea University	Ph.D.
– 2021	School of medicine, Korea University	M.S.
– 2015	School of medicine Korea University	M.D.
– 2005	College of Law, Seoul National University	L.L.B.

### • Affiliations / Experience

Period	Affiliation	Position
– 2023-Present	Department of Family Medicine, Uijeongbu Eulji Medical Center, Eulji University School of Medicine	Assistant Professor
– 2021-2023	Department of Family Medicine, Uijeongbu Eulji Medical Center	Clinical Professor
– 2019-2021	Department of Family Medicine, University Anam Hospital	Clinical Instructor
– 2016-2019	Korea University Anam Hospital	Residency in Family Medicine

### • Committee Memberships

- Korean Society for the Study of Obesity
- Korean Academy of Family Medicine
- Korean Geriatrics Society

### • Publications

- Park CM, *et al.* Functional status recovery trajectories in hospitalised older adults with pneumonia. *BMJ Open Respir Res.* 2022 May;9(1):e001233
- Park CM, *et al.* Comparison of Frailty Index to Pneumonia Severity Measures in Older Patients With Pneumonia. *J Am Med Dir Assoc.* 2022 Jan;23(1):165-169
- Nam GE, *et al.* Association between living alone and incident type 2 diabetes among middle-aged individuals in Korea: a nationwide cohort study. *Sci Rep.* 2021 Feb 11;11(1):3659
- Kim W, *et al.* Impact of waist circumference on the risk of vertebral fracture: A nationwide cohort study in South Korea. *Bone.* 2021 Apr;145:115870
- Nam GE, *et al.* Body Weight Variability and the Risk of Cardiovascular Outcomes and Mortality in Patients With Type 2 Diabetes: A Nationwide Cohort Study. *Diabetes Care.* 2020 Sep;43(9):2234-2241

## Symposium 10

# Lifestyle, Obesity, and Cancer

Wonsock Kim (Eulji University, Korea)

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Cancer, which is a main cause of mortality, has become a major public health burden worldwide, and its incidence has increased over past decades. In 2020, it is reported that cancer is a worldwide leading cause of mortality with 10 million deaths as well as 19.3 million new cases. Although, cancer is developed due to various causes, recent studies have reported that unhealthy lifestyle is an important risk factor in malignancy. It is reported that unhealthy lifestyle has become a great social burden including development of cancer and premature mortality.

In addition, obesity which is a multifactorial, chronic and complex disease that has increased dramatically in recent decades, is a pandemic disease that increases the risk of type 2 diabetes, cardiovascular diseases, dyslipidemia, osteoarthritis, dementia, depression and various types of cancer. The significant positive association between cancer and obesity which is usually defined by a body mass index (BMI) value  $\geq 30\text{kg/m}^2$  and  $25\text{kg/m}^2$  in Asian population, is reported in many recent studies. In a meta-analysis reported in 2018, 18 types out of 23 cancer types had a causal association with BMI. The moderate association between BMI and overall cancer is repeatably reported in many studies. Moreover, it has been suggested that central adiposity measured by waist circumference may be an independent and possibly more accurate risk factor in cancer and mortality.

Lifestyle is believed to have an important role in the development of obesity and cancer. It seems that healthy lifestyle is an important modifiable factor that could reduce risk of malignancy and obesity. Healthy lifestyle that includes behaviors such as healthy food, reasonable and constant physical activities, stress control and elimination of tobacco and excessive alcohol intake, may influence the development of cancer. The onset of most types of cancer may be preventable through the adoption of a healthy lifestyle such as avoiding smoking, physical activity, eliminating excessive alcohol use, and eating a healthy diet. In addition, preventing obesity which acts as an outcome as well as a factor, is important in reducing the risk of malignancy.

Therefore, in this session, we will discuss how lifestyle, obesity and cancer are linked, and what effort and change should be made for better health outcomes.