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Kao Corporation

Kirin Holdings Company, Limited

Japan's First Discovery^{*1} on Visceral Fat and Immune Activity in Joint Research by Kao and Kirin Holdings

More visceral fat means lower pDC activity

People with high visceral fat and low pDC activity are at higher risk of contracting novel
coronavirus infection and influenza

Kao Corporation and Kirin Holdings Company, Limited will participate in the Wakayama Health Promotion Study, a cohort study^{*2} led by Wakayama Medical University and organized by the Health Promotion Research Center (HPRC), a non-profit organization. Kao and Kirin Holdings conducted a joint study from November 2022 to investigate the relationship between visceral fat and the plasmacytoid dendritic cells (pDC^{*3}) activity^{*4}, which are the command center for immunity.

In recent years, attention has focused on the relationship between obesity and immunity, as it has been reported that obesity leads to more severe viral infections^{*5}. This study was the first in Japan^{*1} to investigate the relationship between visceral fat and immune activity and confirm that high visceral fat levels are associated with low pDC activity (low immune function) and that high visceral fat levels and low pDC activity are associated with a high risk of contracting novel coronavirus infection and influenza. These findings have not yet been reported in any paper in the world^{*6}. The results will be presented at the 44th Annual Meeting of the Japan Society for the Study of Obesity and the 41st Annual Meeting of the Japanese Society for Treatment of Obesity, which will be held in Miyagi Prefecture, on November 25 (Sat.) and 26 (Sun.), 2023.

^{*1} Based on article and abstract information published in Pubmed and the Journal of Health Care and Society Web (as of November 22, 2023, according to KnowledgeWire)

^{*2} One of the observational research methods in analytical epidemiology. By creating groups involved in specific disease factors and uninvolved groups, and calculating the incidence rate of the target disease within each group, it is possible to examine the relation between the disease factors and the onset.

^{*3} An immune cell that plays an important role as a command post when bacteria or viruses enter the body. Activation of pDC activates various immune cells such as NK cells, T cells, and B cells to protect against viral infection

^{*4} Percentage of pDCs producing antiviral factors upon stimulation that mimics viral infection

^{*5} [Ghilotti F et al. J Epidemiol. 2019; 48\(6\): 1783-1794.](#)
[Popkin BM et al. Obes Rev. 2020; 21\(11\): e13128.](#)

^{*6} Based on article information published in Pubmed and the Journal of Health Care and Society Web (as of November 22, 2023, according to KnowledgeWire)

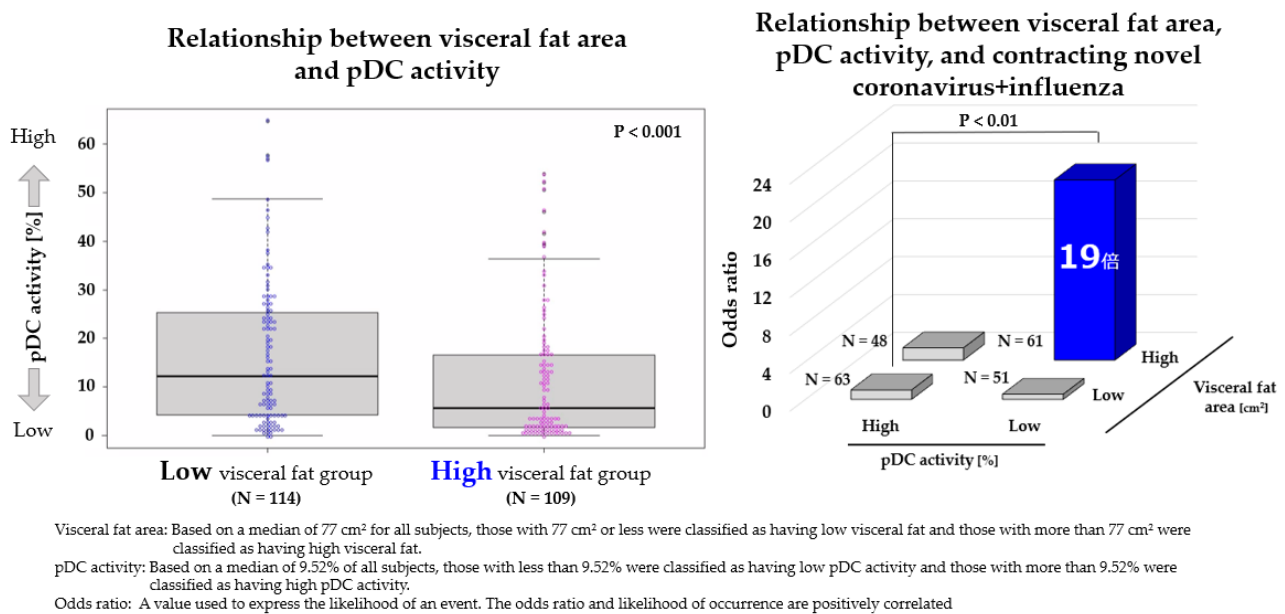
Joint Research Results (Summary)

Japan's First Discovery^{*1}

1. Lower pDC activity was observed in individuals with high visceral fat.
2. A higher percentage of people with high visceral fat and low pDC activity had contracted novel coronavirus infection and influenza compared to those who did not.

Implications Obtained

It is suggested that maintaining low visceral fat mass and high pDC activity is associated with a reduced risk of contracting novel coronavirus infection and influenza.



The Kirin Group has formulated a long-term management plan, Kirin Group Vision 2027, and is promoting the development of the Health Science Business, which contributes to people's health, to create value in areas ranging from Food & Beverages to Pharmaceuticals, and to become a leading global CSV^{*7} company. The Kirin Group will contribute to the realization of a fulfilling society by spreading new joy in food and health through manufacturing that focuses on nature and people.

^{*7} Creating Shared Value: combined added value for consumers as well as for society at large.

Kao established its ESG strategy, the Kirei Lifestyle Plan in April 2019. From 2021, Kao is promoting its Mid-term Plan which declares "protecting future lives" and promoting "sustainability as the only path" as its vision. Kao will continue to integrate ESG perspectives into its company management, aiming to develop its business and provide better products and services to consumers and society, and work toward its purpose, "To Realize a Kirei World in Which All Life Lives in Harmony".

Kao and Kirin Holdings will continue to explore further health values to help people live healthy lives by combining the research capabilities of both companies.