Smoking habits found to change the blood serum concentration of aging-related molecules

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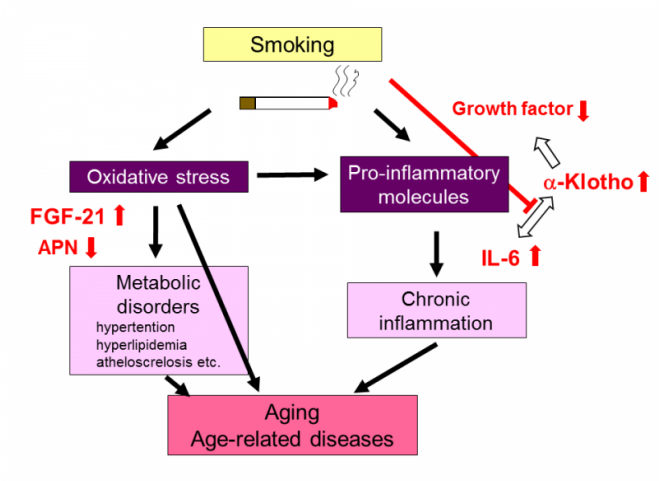

Smoking simultaneously increased two Klotho-related mokecules; ?-Klotho, capable of affecting anti-inflammatory cytokine network and fibroblast growth factor (FGF)-21, a possible indicator of progressing metabolic disorder. Klotho-related molecules might associate with the mechanism of aging accelerated by smoking habit.

The average life span of smokers is more than 10 years shorter than that of non-smoker, and it is said that smoking is a factor which accelerates aging. However, the details of the mechanism which accelerates aging due to smoking was not yet clear.

A research group led by Kaori Nakanishi, assistant professor and Keiko Takihara, professor of the Health Care Center, Osaka University found that smoking habits affected the aging-related molecule ?-klotho (?Kl) in blood serum. In addition, this group also elucidated that smoking causes a rise in blood serum concentration of fibroblast growth factor (FGF)-21, a factor related to metabolism which has gained attention in recent years. It is thought that these research results could serve as a key to clarifying the mechanism which accelerates this aging, and provide new knowledge about aging-related diseases caused by smoking and prevention of smoking-related accelerated aging.

The group focused on the relationship between smoking and aging, examining the involvement of Klotho in the advancement of aging due to smoking. It was found that the levels of FGF-21 related to metabolism, ?-Klotho, and interleukin(IL)-6, a cytokine related to inflammation, were significantly higher in smokers than in never-smokers. In addition, the blood serum concentration of ?-Klotho rose in stressful conditions such as lack and sleep and being under emotional stress outside of smoking.

FGF-21 is negatively-correlated to adiponectin, which is known as a cytokine related to metabolism, and the rise in FGF-21 in smokers is thought to suggest a metabolic disorder.

By contrast, it was shown that in never-smokers, ?-Klotho has a positive correlation with IL-6, but this correlation was not found in smokers. Past reports have stated that ?-Klotho holds anti-inflammatory effects, so it is thought that the lack of this correlation between ?-Klotho and IL-6 in smokers is possible due to the weakening of anti-inflammatory effects of ?-Klotho brought about by smoking stress.

More information: Kaori Nakanishi et al. "Klotho-related Molecules Upregulated by Smoking Habit in Apparently Healthy Men: A Cross-sectional Study," *Scientific Reports* (2015). DOI: 10.1038/srep14230

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