Title

Elevated level of urinary tellurium is a potential risk for increase of blood pressure in humans and mice

## Key Points

• A positive association of urinary tellurium level with Blood pressure was found in humans.

• A positive association between urinary tellurium level and hypertension was also found in humans.

• Intake of cereals/beans was positively associated with the telluriummediated risk of HT

## Summary

People worldwide are routinely exposed to tellurium mainly via dietary ingestion. There has been no study to clarify the contribution of tellurium to blood pressure in humans or animals.

In this cross-sectional study conducted in a general population of 2592 residents in Japan, the associations of urinary tellurium levels with blood pressure and prevalence of hypertension were investigated. The potential sources of tellurium were also investigated. An interventional study in mice confirmed the effect of tellurium exposure on blood pressure.

Linear and logistic regression analyses with consideration of confounders including urinary sodium-potassium ratio showed significant positive associations of urinary tellurium level with prevalence of hypertension and blood pressure. Cereals/beans and vegetables/fruits were determined to be potential dietary sources of tellurium exposure. Intermediary analysis suggested that increased intake of cereals/beans, but not that of vegetables/fruits, is positively associated with the tellurium-mediated risk of hypertension. Correspondingly, the mouse study showed that exposure to a putative human-equivalent dose of tellurium via drinking water increased blood pressure with an elevated level of urinary tellurium. The temporally increased blood pressure was decreased to the normal level by a break of tellurium exposure with a reduced level of urinary tellurium.

The interdisciplinary approach provided the first evidence that tellurium exposure is a potential risk for increase of blood pressure. Since the human urinary tellurium level in this study is comparable with the levels in general populations in other Asian and European countries in previous studies, exposure to tellurium may be a latent universal risk for hypertension.

## Publication

Journal name: Environment International

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DOI: <u>10.1016/j.envint.2024.108735</u>

Japanese ver.

https://www.med.nagoya-u.ac.jp/medical\_J/research/pdf/Env\_240528.pdf