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Relationship between Body Mass Index and Minerals in Male Japanese Adults

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Abstract:
In order to examine possible relationship between minerals and body mass index (BMI), we measured hair concentrations of 24 bio-elements including essential minerals and toxic metals in over 1500 male Japanese adults aged 20-60 years. Several essential minerals were found to be significantly high and positively or inversely correlated to BMI. The best BMI-correlated element was potassium (K) with the highest regression coefficient of r = 0.240, followed by mercury (Hg) (r = 0.207), molybdenum (Mo) (r = 0.202), sodium (Na) (r = 0.170), boron (B) (r = 0.144), selenium (Se) (r = 0.138) and aluminum (Al) (r = 0.131) with the p-value of $p < 0.0000$ for every element. Using the regression line of BMI = 2.23 Log Hg + 14.95 obtained, a 10-fold increase in mercury level was estimated to associate with a 2.2-point increment in BMI. The most inverse-correlated mineral to BMI was magnesium (Mg) (r = -0.264), followed by calcium (Ca) (r = -0.248) and zinc (Zn) (r = -0.166, $p < 0.0000$), which are representative competitive bio-elements against mercury. These findings suggest possibility that some minerals contribute to regulation of BMI, and higher dietary mercury intake is associated with the increase of BMI in male Japanese adults. Dietary intake of the competitive minerals against mercury, such as Mg, Ca and Zn, may be useful for controlling human body weights.

Key words: body mass index, mercury, magnesium, calcium, zinc, mineralomics

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