

Cohort study for prevention of atopic dermatitis using hair mineral contents

T.Yamada¹, T. Takatsuji², S. Goto³, K. Sera⁴, T. Nakamura⁵ and Y. Nose⁶

¹ Mie University Graduate School of Medicine
2-174 Edobashi, Tsu, Mie 514-8507, Japan

² Nagasaki University Graduate School of Environmental Studies
1-14 Bunkyo-machi, Nagasaki 852-8521, Japan

³Nishina Memorial Cyclotron Center, Japan Radioisotope Association
348-58 Tomegamori, Takizawa, Iwate 020-0173, Japan

⁴Cyclotron Research Center, Iwate Medical University
348-58 Tomegamori, Takizawa, Iwate 020-0173, Japan

⁵ Chuo University Graduate School of Science and Engineering
1-13-27 Kasuga, Bunkyo-ku, Tokyo 112-8551, Japan

⁶ Kumamoto Health Science University Graduate School
325 Izumimachi, Kitaku, Kumamoto 861-5533, Japan

Abstract

We undertook a cohort study to determine the association between hair mineral content and the onset of atopic dermatitis (AD) in infants. Eight hundred and thirty-four mother–infant pairs, who donated hair samples during one and ten-month health checkups, had their samples analyzed by proton induced X-ray emission (PIXE) for 32 mineral concentrations, and these mineral concentration data together with their AD family history were statistically examined for any relationships between them. Results indicated that of all minerals, only selenium (Se) and strontium (Sr) showed statistically significant associations for infants, while the same two elements were only marginally significant for mothers. Se deficiency in either infant or mother increased the AD risk. A Sr deficiency in infants increased AD risk, while the same deficiency in mothers decreased the risk. To predict the probability of AD development using this data, we performed logistic regression analysis, which provided a sensitivity of 65.9%, a specificity of 70.5%, a positive predictive value (PPV) of 10.3%, a negative predictive value (NPV) of 97.6% and a relative risk (RR) of 4.2, all far better than any corresponding figures explicitly mentioned in previously published papers.