

Editorial

Lower Level Of Serum Metallothionein I/II in Patients with Atopic Dermatitis

Man-Ling Hsu, Wenhui Wang, Lin-feng Li*

Department of Dermatology, Peking University Third Hospital, China

***Corresponding author:** Lin-feng Li, Department of Dermatology, Peking University Third Hospital, 49 North Garden Road, Haidian District, Beijing 100191, China, Tel: 011861062017691-2660; Fax: 011861062017700; Email: zoonli@sina.com

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Metallothioneins (MT) are a group of soluble cysteine-rich, single-chain polypeptides with low molecular weight. Two isoforms of MT (I and II) have been found in the skin.¹ Studies have shown that MT play important roles in antioxidation, combination of heavy metals, and photo-protection. Both extrinsic factors such as heavy metals exposure, ultraviolet irradiation, infections, trauma and intrinsic factors such as tumors, diabetes and cardiovascular diseases could up-regulate MT in many organs [1]. The potential anti-inflammatory properties of MT in various inflammatory conditions has been also noticed recently [2-7]. MT-I/II protects against chemical-mediated oxidative injury in cortical neuron/astrocyte cultures, prevents from metal- and ultraviolet radiation-induced damage in cultured lens epithelial cells, suppresses collagen-induced autoimmune arthritis, and significantly inhibits human lupus nephritis as well as ovalbumin-induced asthma [2-7].

Atopic dermatitis (AD) is an inflammatory skin disease, in which oxidative stress is also involved [8]. The role of MT in the pathogenesis of AD has not been reported. The purpose of this study was to measure the serum level of MT I/II in patients with AD. Patients with psoriasis vulgaris and healthy volunteers served as controls.

Thirty-two patients with AD were studied. All patients fulfilled Hannifin and Rajka diagnostic criteria for AD. There were 21 males and 11 females, with an average age of 21.2±10.4 years. Eczema Area and Severity Index (EASI) was used to evaluate the severity of AD. Eighty-two healthy volunteers served as normal control. There were 44 males and 38 females, with an average age of 33.5±11.6 years. Compared with healthy controls, patients with AD were younger ($p < 0.001$ Student's t-test), but no significant difference could be found in gender ($p > 0.05$, chi-square test). Twenty patients with psoriasis vulgaris (14 males and 6 females with an average age of 47.6±22.5 years) were also studied. The average age of patients with psoriasis was older than healthy controls ($p < 0.05$ Student's t-test). All participants were Chinese Han ethnics. Local ethics committee approved this study and the participants gave oral consents.

Serum MT I/II level was detected by enzyme-linked immunosorbent assay by using human metallothionein ELISA kits (Ever Systems Biology Laboratory, 1232 Q ST 1ST FLR, Sacramento,

CA 95811 USA). The detection range for MT I/II was 1.56-100.00 ng/ml. As indicated, 100µL standards and samples were added into different wells of 96 well plates, incubated at 37°C for 2 hours. Then 100µL of detection reagent A was added into each well, incubated at 37°C for 1 hour. The wells were aspirated and washed 3 times, and then reagent B was added with same procedure. Finally, 90µL of substrate solution was added into each well, which were incubated for 30 minutes at 37, and then reaction was stopped by adding 50µL stop solution into each well. The optical density of each well was determined within 30 minutes using a microplate reader set to 450 nm.

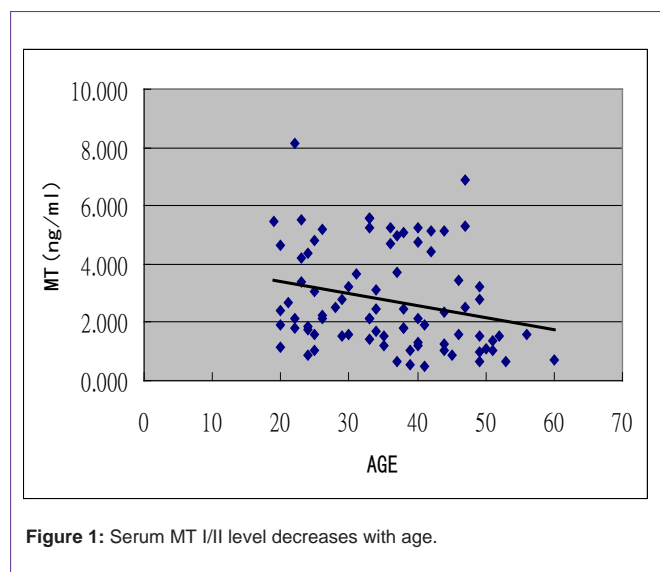
Student's t-test was used to compare serum MT I/II level between different groups. Linear regression was used to identify the correlation between age and serum MT I/II level. Statistical analysis was performed by using SPSS 16.0, (SPSS Inc., Chicago, IL, USA).

Serum MT I/II level was found significantly lower in patients with AD than control (0.63 ± 1.40 ng/ml vs 2.14 ± 1.74 ng/ml, $p < 0.001$, Student's t-test). Age was reversely related to serum MT I/II levels in healthy controls ($r = -0.241$, $p = 0.029$, Linear regression analysis, Figure 1).

Serum MT I/II level showed a tendency of decrease with increasing of EASI but not significant (data not shown).

There was no significant difference in the average serum level of MT I/II between patients with psoriasis and healthy control (3.09 ± 1.95 ng/ml vs 2.14 ± 1.74 ng/ml, $p > 0.05$, Student's t-test).

Serum MT I/II level in patients with AD has not been reported. In this study, we found that serum MT I/II level decreases with age



in healthy control. Although the average age of patients with AD was younger than control, serum MT level was found significantly lower in patients with AD. Although the average age of patients with psoriasis vulgaris was older than control, there was no significant difference in the average serum level of MT I/II between patients with psoriasis and healthy control suggesting that lower serum level of MT I/II might be specific for AD. Because many studies have shown that MT I/II have anti-inflammatory effect in diseases with a Th2 predominant profile, which AD is also involved, [2-7] we hypothesize that lower level of MT I/II in patients with AD might related to the development and persistence of dermatitis. Whether supplement of MT I/II could suppress inflammation of AD is worth to be studied further.

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