Immunotoxicology of Asbestos: Asbestos enhances regulatory T cell function

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Immunological Effects of Asbestos and Silica

Asbestos (Silicate) chronic and recurrent long-term exposure

Amosite
Crocidolite
Silica
Fibrotic Pulmonary disease
Malignant Mesothelioma
Lung cancer

MT-2 Cells May Have Originated from Treg Cells

was established from normal human cord leukocytes of a male infant by co-culturing with leukemic T-cells from a female patient with adult T-cell leukemia.

Miyoshi, I. et al., Gann, 72, 978-981 (1981)

is human T cell leukemia virus type 1 (HTLV-1)-infected and immortalized CD4+ T cell line.

expresses CD25 and Foxp3 at high level and is harbored the Treg-cell-like suppressive function.

Chen, S. et al., International Immunology, 18, 269-277 (2005)

Establishment of an Asbestos-induced Apoptosis-Resistant Sublines (MT-2Rsts)

Asbestos (Chrysotile-A or Chrysotile-B)
Low-dose (10 μg/ml)
Long-term (more than 8 month)

MT-2 original cells (MT-2org)

MT-2Rsts; C1, C2, C3, B1, B2, B3

Suppressive Activity of MT-2 Cells on the Cell Division of TCR-stimulated Naive CD4+CD25- T Cell

Responder T cells (Tresp)
CD4+CD25- T cells (1 x 10^6)

MT-2Rst; C1, C2, C3

Tresp alone

Tresp:MT2 ratio

C1
43% 83% 96% 95%

C2
47% 88% 96% 95%

C3
52% 90% 96% 95%

MT-2

MT-2

Tresp:MT2

Ratio Tresp/MT2

1:1/16
1:1/64
1:1/256
1:1/1024

CFSE assay
Western Blotting

**Cell Contact-dependent Suppressive Function by MT-2 Cells**

- plate-coated anti-CD3 mAb (1 μg/mL)
- irradiated autologous monocyte-derived dendritic cells (DCs, 1 x 10^6)

**Expression of FoxP3 in MT-2 Cells**

**Summary**

Inhibition by soluble factors

- Chronic exposure to asbestos may enhance suppressive activity of regulatory T cells and lead to decrease in anti-tumor immunity.
Acknowledgements

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"Comprehensive approach on asbestos-related diseases" supported by the "Special Coordination funds for Promoting Science and Technology (H18-1-3-3-1)" 2006 to 2010 in Japan

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