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## Immunomodulation

### Study on the Effects of Humic Acid on Immunity of Mice

*Y. Zhao, J. Huang, J. Zhao, et al.*

*Heilongjiang Xumu Shouyi* 2008, (1), 62-63

Kunming mice were used to model the effects of humic acid on immunity. The swelling degree of the foot pads of the mice, the E-rosette formation ratio, the phagocytosis capacity, the lymphocyte transformation ratio and the EAC rosette formation ratio were increased significantly by humic acid. The results establish that humic acid can significantly increase immunity.

### A Chinese Medicinal Composition for Enhancing Immunity of Animals

*W. Zhang, Z. Qian, and F. Yi*

CN 1,935,182 (March, 2007)

The title medicinal composition is comprised in part of 0.1-2.0% w/w humic acid. It can be used for enhancing the immunity of animals such as pigs, ducks, milk cows and chickens. It has the advantages of no residue, no drug resistance and no pollution.

### Anti-Inflammatory Ointment Containing Potassium Humate and Birch Tar

*A. I. Kosolapova and E. I. Smyshlyayev*

RU 2,280,458 (July, 2006)

The ointment is comprised in part of a liquid solution of not less than 4.5 g/L potassium humate. The ointment shows enhanced storage time, stability, high effectiveness and a broad spectrum of efficacy.

### Composition Comprising Extract or Fraction Isolated from Russian Mumie to Activate Immunity

*B. S. Kwon*

KR 2004/085,226 (October, 2004)

The composition increases immunity, and prevents or treats infectious diseases. It increases the production of ROS (reactive oxygen species), such as superoxide anion and hydrogen peroxide, and nitric oxide in macrophages. It also increases the propagation of splenocytes.

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## Anti-Inflammation

### An In Vitro Investigation of the Anti-Inflammatory Properties of Potassium Humate

*G. K. Joone and C. E. J. van Rensburg*

*Inflammation* 2004, 28(3), 169-174

Exposure of resting and phorbol-12-myristate-13-acetate (PMA) -stimulated human neutrophils to potassium humate resulted in a decreased expression of CR3 by activated, but not resting cells, in a dose-related way. Humate also inhibited the adhesion of PMA-stimulated neutrophils to a baby hamster kidney cell line expressing ICAM1 (the CR3 ligand) (BHK331-7). Similar results were obtained using normal BHK cells, indicating that this inhibition not only targets specific adhesion molecules on neutrophil and eosinophil membranes by activated phagocytes, but also affects other mechanisms involved as well. Opsonised Sephadex or FMLP/Cyto B-induced degranulation of neutrophils and eosinophils was also decreased by humate treatment. Because humate is well tolerated with an excellent safety profile it merits further evaluation in patients suffering from inflammatory conditions.

### Anti-Inflammatory Humate Compositions and Methods of Use Thereof

*J. F. Lown, K. Gill, S. J. Cutler, et al.*

US 2004/131,705 (July, 2004)

The invention relates to a novel anti-inflammatory composition containing humate; and also includes other anti-inflammatory compositions containing humate and at least one additional anti-inflammatory agent such as indomethacin or other nonsteroidal anti-inflammatory drug. Included is a method of treating acute or chronic inflammation in animals, including humans, by administering one of these compositions. A method of facilitating the therapeutic effect of a therapeutic drug in animals by co-administering humate is also provided. Rats receiving 0.1% or 0.5% humate exhibited significant inhibition of inflammation (approximately 30%). Animals receiving only 0.05% humate exhibited only around a 10% inhibition of inflammation. Animals that received both indomethacin and 0.1% humate exhibited a 66.8% inhibition of carrageenan-induced edema, a 28% increase in anti-inflammatory activity as compared to indomethacin alone.