allied academies
Journal of Clinical & Experimental Toxicology

Journal of Clinical and Experimental Toxicology
ISSN 2630-4570

2020
Vol.4 No.4

Differential effect of iodine bioorganic molecular complex on host defense in balb/c and c57bl/6 mice

Tamara Bukeyeva[1], Samal Kassymbekova[1], Galina Kon[1], Indira Bishimova[1], Sholpan Tursunova[1], Assima Abekova[1], Sabina Murzageldinova[1], Rinat Islamov[1], Alexander Ilin[1], Tigran Davtyan[2]

[1]Scientific Centre for Anti-infectious Drugs, Kazakhstan, Almaty
[2]Rhea Pharmaceutical LLC, Republic of Armenia, Yerevan

Abstract

Long experience in the use of various iodine preparations has shown that while possessing pronounced antibacterial and antiviral properties, wide-spectrum antimicrobial activity, and lacking mutagenic and teratogenic effects, they are toxic when introduced to the human body, which significantly narrows the scope of their clinical application. The search for alternative ways to solve the problem of high toxicity of inorganic iodine compounds has led to the development of iodine-containing organic complexes. The manifestation of the phagocytic response is a significant indicator of the body reactivity state and level of its immune activity. The coordination compound of iodine with alpha-dextrin and polypeptides was synthesized at the Scientific Center for Anti-Infectious Drugs JSC, the effect of which on the phagocytic activity of granulocytes and monocytes in BALB/c and C57BL/6 mice was studied. Phagocytosis is considered as one of the major host defense function, which is a fundamental component of the innate immune response /1/.

Materials and methods: The animals of each line were divided into 3 groups of 10 mice, including 5 females and 5 males. Two doses of the drug were used in the study: 1/20 of maximum tolerated dose (MTD) is 125 mg/kg and 250 mg/kg (1/10 MTD) of animal weight. Blood was collected on day 14 after the administration of the drug. The analysis was performed by flow cytometry. Findings: It was shown that a new complex of iodine with bioorganic molecules upon repeated oral administration for 14 days in the examined doses did not affect the phagocytosis in BALB/c mice. The findings indicated that a new complex of iodine with bioorganic molecules at a dose of 250 mg/kg increased the phagocytic activity of both granulocytes and monocytes in C57BL/6 mice.

Conclusion & Significance: One of the explanations for the differential effect of a new complex of iodine with bioorganic molecules on different lines of mice may be based on the genetic characteristics of these animals. Macrophages of BALB/c mice are known to be of M-2 type, which inhibits inducible NO synthesis and stimulates cell division. Macrophages of C57BL/6 mice are of M-1 type, which produces NO and inhibit cell division, and increases the cytostatic or cytotoxic activity of phagocytes /2 - 4/. We can therefore conclude that a new complex of iodine with bioorganic molecules enhances the cellular factors of the natural resistance in the prototype mouse strains Th1 (C57BL/6), but not Th2 (BALB/c). This, in turn, fits into the single mechanism of action of the studied complex, namely, the activation of phagocytic cells through the induction of IFN-γ production and the ability of the complex to switch T cells to the Th1-type response path.

Biography:

In 2004 she graduated from Kazakh National University. Al-Farabi, Faculty of Biology, Department of Human and Animal Physiology and Biophysics with a Master of Biology. The total scientific experience is more than 16 years. The main research areas are in the field of cell and molecular biology. She is an experienced specialist in conducting cultural work with tumor cell lines, hematopoietic stem cells, and the isolation and cultivation of immune competent cells.

Speaker Publications:

1. Hirayama D., Iida T., Nakase H. (2018) The Phagocytic Function of Macrophage-Enforcing Innate Immunity and Tissue Homeostasis. Int. J. Mol. Sci. 19:92.
2. Mills C.D. (2015) Anatomy of a discovery: M1 and M2 macrophages. Front. Immunol. 6:212. doi: 10.3389/fimmu.2015.00212.
3. Martinez F.O., Gordon S. (2014) The M1 and M2 paradigm of macrophage activation: time for reassessment. F1000Prime Reports 2014, 6:13 (doi:10.12703/P6-13).
4. Shu-Hui Su, Hsiun-ing Chen and Chauying J. Jen (2001) C57BL/6 and BALB/c Bronchoalveolar Macrophages Respond

Differently to Exercise. J Immunol, 2001, 167 (9) 5084-5091; DOI: https://doi.org/10.4049/jimmunol.167.9.5084.

21st International Conference and Exhibition on Pharmaceutics & Novel Drug Delivery Systems; Rome, Italy- March 11-12, 2020.

Abstract Citation:

Tamara Bukeyeva, Differential effect of iodine bioorganic molecular complex on host defense in balb/c and c57bl/6 mice, Euro Physical Chemistry 2020, Pharmaceutica 2020, 21st International Conference and Exhibition on Pharmaceutics & Novel Drug Delivery System; Rome, Italy- March 11-12, 2020 (https://novel-drugdelivery-systems.pharmaceuticalconferences.com/abstract/2020/differential-effect-of-iodine-bioorganic-molecular-complex-on-host-defense-in-balb-c-and-c57bl-6-mice)