

European science review

№ 3–4 2016
March–April



«East West» Association for Advanced Studies and Higher Education GmbH

Vienna
2016

<i>Ashrapov Jamshid Raufovich</i>	
Signs and surgical tactics in continued growth of gliomas of supratentorial localization in children	59
<i>Ashurova Mukadas Dzhaloldinovna</i>	
Hygienic assessment planning house of mercy of the Republic of Uzbekistan	61
<i>Babakulov Sharaf Hamrokulovich, Tangriberganov Murat Reyimberganovich, Babakulova Shahlo Hamidullaevna</i>	
Specificity of micro-vascular density in superficial bladder cancer	63
<i>Musabaev Erkin Isakovich, Bayjanov Allabergan Kadirovich, Mustafaeva Dildora Asadovna, Mamatkulov Adxam Rustamjonovich, Kazakova Evgenia Ivanovna</i>	
Introduction of the control system for the HIV medicinal resistance to antiretroviral preparations.....	65
<i>Bayjanov Allabergan Kadirovich</i>	
Protective efficiency of “Phosphogliv” at high active antiretroviral therapy in patients with HIV-infection, associated with chronic viral hepatitis C	67
<i>Berkinov Ulugbek Bozorbaevich, Khalikov Sarvar Pulatovich</i>	
Optimization of the surgical treatment for high cicatrice tracheal stenosis.....	69
<i>Bakhriddinova Fazilat Arifovna, Narzikulova Kumri Islamovna, Mirrakhimova Saidakhon Shukhratovna, Khera Akshey</i>	
Biochemical parameters of the effect of laser radiation in the experiment	72
<i>Bakhriddinova Fazilat Arifovna, Mirrakhimova Saidakhon Shukhratovna, Karimov Ulugbek Rasulovich, Narzikulova Kumri Islamovna</i>	
The results of medicated decreasing of intraocular pressure at neovascular glaucoma	74
<i>Berkinov Ulugbek Bozorbaevich, Sakhiboev Dilshod Parpijalilovich, Irnazarov Akmal Abdullaevich</i>	
Results simultaneous operations in patients with adrenal tumors	76
<i>Ashurov Azimjon Mirzajanovich, Boymuradov Shukhrat Abdujalilovich, Khayruddinova Zulfiya Rafikovna, Ibragimov Davron Dastamovich</i>	
Posttraumatic rhinosinusitis in patients with cranio-facial injuries.....	78
<i>Gafarova Feruza Murathodzhaevna</i>	
Dysfunctional state kidney during postnatal adaptation in the newborn	80
<i>Davis Nikolay Aleksandrovich, Toychiev Abdurakhim Khodjiakbarovich, Islamova Jannat Ikramovna, Parpieva Nargiza Nusratovna, Osipova Svetlana Olegovna</i>	
Concomitant intestinal parasitic diseases in pulmonary tuberculosis patients: influence on some immunological indices	82
<i>Davis Nikolay Aleksandrovich, Toychiev Abdurakhim Khodjiakbarovich, Djuraeva Zulfiya Baratovna, Parpieva Nargiza Nusratovna, Osipova Svetlana Olegovna</i>	
Influence of intestinal parasites on cytokine profile of patients with pulmonary tuberculosis, including cases complicated with aspergillosis	85
<i>Ermatova Gulnara Ahmadovna, Hozhimatov Khusnidin Odilovich</i>	
Influence factors of the environment on the state of health of the population at the regional level.....	88
<i>Juraev Rivojiddin</i>	
The role of viral etiology in the development of acute gastroenteritis in children in Uzbekistan	89
<i>Zokirkhonova Shahzoda</i>	
Medical and biological assessment of the fluoride content of bottled water	91
<i>Zakirova Feruza Akildjanovna, Bekbulatova Indira Rinatovna, Eliseeva Marietta Rafaelevna</i>	
The influence of active inflammation on parameters of central hemodynamics in pregnant women with rheumatic heart defects	95
<i>Ismailova Savrinisa Sultanovna</i>	
Efficiency expectant management in women with premature rupture of membranes	97
<i>Israilov Radjab Israilovich, Tursunov Khasan Ziyaevich, Eshbaev Erkin Abdukhalimovich</i>	
Morphological changes of newborns coronary vessels in preeclampsia in mothers.....	99
<i>Kayumov Abdurakhman Abdumavlyanovich, Karimov Khamid Yakubovich, Boboev Kadirzhon Tuhtabaevich</i>	
Role of polymorphism RS1800629 gene proinflammatory cytokine TNF- α in the development and clinical course of leukemia	102

European Sciences review

Scientific journal

№ 3–4 2016 (March–April)

ISSN 2310-5577

Editor-in-chief

Lucas Koenig, Austria, Doctor of Economics

International editorial board

Abdulkasimov Ali, Uzbekistan, Doctor of Geography
Adieva Aynura Abduzhalalovna, Kyrgyzstan, Doctor of Economics
Arabaev Cholponkul Isaevich, Kyrgyzstan, Doctor of Law
Zagir V. Atayev, Russia, Ph.D. of Geographical Sciences
Akhmedova Raziyat Abdullayevna, Russia, Doctor of Philology
Balabiev Kairat Rahimovich, Kazakhstan, Doctor of Law
Barlybaeva Saule Hatiyatovna, Kazakhstan, Doctor of History
Bestugin Alexander Roaldovich, Russia, Doctor of Engineering Sciences
Bogolib Tatiana Maksimovna, Ukraine, Doctor of Economics
Bondarenko Natalia Grigorievna, Russia, Doctor of Philosophy
Bulathbaeva Aygul Abdimazhitovna, Kazakhstan, Doctor of Education
Chiladze George Bidzinovich, Georgia, Doctor of Economics, Doctor of Law
Dalibor M. Elezović, Serbia, Doctor of History
Gurov Valeriy Nikolaevich, Russia, Doctor of Education
Hajiyev Mahammad Shahbaz oglu, Azerbaijan, Doctor of Philosophy
Ibragimova Liliya Ahmatyanovna, Russia, Doctor of Education
Blahun Ivan Semenovich, Ukraine, Doctor of Economics
Ivannikov Ivan Andreevich, Russia, Doctor of Law
Jansarayeva Rima, Kazakhstan, Doctor of Law
Khubaev Georgy Nikolaevich, Russia, Doctor of Economics
Khurtsidze Tamila Shahvovna, Georgia, Doctor of Law
Khoutyz Zaur, Russia, Doctor of Economics
Khoutyz Irina, Russia, Doctor of Philology
Korz Marina Vladimirovna, Russia, Doctor of Economics

Kocherbaeva Aynura Anatolevna, Kyrgyzstan, Doctor of Economics
Kushaliyev Kaisar Zhalitovich, Kazakhstan, Doctor of Veterinary Medicine
Lekerova Gulsim, Kazakhstan, Doctor of Psychology
Melnichuk Marina Vladimirovna, Russia, Doctor of Economics
Meymanov Bakyt Kattoevich, Kyrgyzstan, Doctor of Economics
Moldabek Kulakhmet, Kazakhstan, Doctor of Education
Morozova Natalay Ivanovna, Russia, Doctor of Economics
Moskvin Victor Anatolevich, Russia, Doctor of Psychology
Nagiyev Polad Yusif, Azerbaijan, Ph.D. of Agricultural Sciences
Naletova Natalia Yurevna, Russia, Doctor of Education
Novikov Alexei, Russia, Doctor of Education
Salay Sanatbek Komiljanovich, Uzbekistan, Doctor of Economics
Shadiev Rizamat Davranovich, Uzbekistan, Doctor of Education
Shhahutova Zarema Zorievna, Russia, Ph.D. of Education
Soltanova Nazilya Bagir, Azerbaijan, Doctor of Philosophy (Ph.D. of History)
Spasennikov Boris Aristarkhovich, Russia, Doctor of Law
Spasennikov Boris Aristarkhovich, Russia, Doctor of Medicine
Suleymanov Suleyman Fayzullaevich, Uzbekistan, Ph.D. of Medicine
Tereschenko-Kaidan Liliya Vladimirovna, Ukraine, Doctor of Philosophy
Tsersvadze Mzia Giglaevna, Georgia, Doctor of Philology
Vijaykumar Muley, India, Doctor of Biological Sciences
Yurova Kseniya Igorevna, Russia, Ph.D. of History
Zhaplova Tatiana Mikhaylovna, Russia, Doctor of Philology
Zhdanovich Alexey Igorevich, Ukraine, Doctor of Medicine

Proofreading

Kristin Theissen

Cover design

Andreas Vogel

Additional design

Stephan Friedman

Editorial office

European Science Review "East West" Association for Advanced Studies and Higher Education GmbH, Am Gestade 1 1010 Vienna, Austria

E-mail:

info@ew-a.org

Homepage

www.ew-a.org

European Science Review is an international, German/English/Russian language, peer-reviewed journal. It is published bimonthly with circulation of 1000 copies.

The decisive criterion for accepting a manuscript for publication is scientific quality. All research articles published in this journal have undergone a rigorous peer review. Based on initial screening by the editors, each paper is anonymized and reviewed by at least two anonymous referees. Recommending the articles for publishing, the reviewers confirm that in their opinion the submitted article contains important or new scientific results.

East West Association GmbH is not responsible for the stylistic content of the article. The responsibility for the stylistic content lies on an author of an article.

Instructions for authors

Full instructions for manuscript preparation and submission can be found through the "East West" Association GmbH home page at: <http://www.ew-a.org>.

Material disclaimer

The opinions expressed in the conference proceedings do not necessarily reflect those of the «East West» Association for Advanced Studies and Higher Education GmbH, the editor, the editorial board, or the organization to which the authors are affiliated.

© «East West» Association for Advanced Studies and Higher Education GmbH

All rights reserved; no part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission of the Publisher.

Typeset in Berling by Ziegler Buchdruckerei, Linz, Austria.

Printed by «East West» Association for Advanced Studies and Higher Education GmbH, Vienna, Austria on acid-free paper.

6. Zaykov S. V., Plikanchuk O. V. Efficiency of treatment in destructive pulmonary tuberculosis in application of immunomodulators of mural peptide series//Liki Ukraini – 2009. – № 3(129). – P. 121–122.
7. Islamova J. I., Syrov V. N., Khushbaktova Z. A., Osipova S. O. Comparative efficiency of ecdysten and metronidazole in treatment of giardiasis//Meditsinskaya parazitologiya i parazitarnie bolezni. – Moskva, 2010. – № 2. – P. 14–17.
8. Mashkovsky M. D. Medicinal remedies. – Moskva: "Novaya volna", 2006. – 1206 p.
9. Novitskiy V. V., Strelis A. K., Serebryakova V. A., Urazova O. I., Voronkova O. V., Filinyuk O. V. Immune state of patients with infiltrative drug-resistant pulmonary tuberculosis against the background of antituberculosis therapy//Immunology. – 2007. – № 1. – P. 27–30.
10. Parpieva N., Belotzerkovetz V., Davis N. et al. Intestinal parasitosis in patients with pulmonary tuberculosis//European Resp. J.- Abstracts/20th ERS annual congress. – Barcelona, Spain, 18–22 September, 2010. – P. 3126.
11. Svistunova A. S., Arshinova S. S., Klimova S. V. et al. Clinical and immunological efficiency of likopid in pulmonary tuberculosis//Immunology. – 2000. – № 5. – P. 59–62.
12. Syrov V. N. Phytoecdysteroids: biological effects in organism of higher animals and outlook for application in medicine//Experim. Clin. Pharmacol. – 1994. – № 5. – P. 61–65.
13. Tyulkova T. E., Chugaev Yu. P., Kashuba E. A. Functional peculiarities of immune system in tuberculosis//Probl. Tuberculosis. – 2008. – № 11. – P. 48–55.
14. Cozmei C., Constantinescu D., Carasevici E. et al. Th1 and Th2 cytokine response in patients with pulmonary tuberculosis and health care workers occupationally exposed to M. tuberculosis//Rev. Med. Chir. Soc. Med. Nat. Iasi. – 2007. – V. 111, № 3. – P. 702–709.
15. Murrey C. J., Styblo K., Rouillon A. Tuberculosis in developing countries: burden, intervention and cost//Bull. Int. Union Tuberc. Lung Dis. – 1990. – V. 65. – P. 6–24.
16. Ohrui T., Zayas K., Sato E. et al. Pulmonary tuberculosis and serum IgE//Clin. Exp. Immunol. – 2001 – V. 122, № 1. – P. 13–15.
17. Turner J. D., Faulkner H., Kamgno O., Cormont F., Van Snick J., Else K. J., Grensis R. K., Behnke J. M., Boussinesq M., Bradley J. E. Th2 cytokines are associated with reduced worm burdens in a human intestinal helminths infection//Infect Dis. – 2003. – Vol. 188. – P. 1768–1775.

*Davis Nikolay Aleksandrovich,
Research Institute of Epidemiology,
microbiology and infectious diseases, researcher*

*Toychiev Abdurakhim Khodjiakbarovich,
Research Institute of Epidemiology,
microbiology and infectious diseases, researcher*

*Djuraeva Zulfiya Baratovna,
Tashkent Medical Academy, assistant*

*Parpieva Nargiza Nusratovna,
Republican specialized scientific research medical
center of phthysiology and pulmonology, director*

*Osipova Svetlana Olegovna,
Research Institute of Epidemiology, microbiology
and infectious diseases, head of the department*

E-mail: davisnikolay@gmail.com

Influence of intestinal parasites on cytokine profile of patients with pulmonary tuberculosis, including cases complicated with aspergillosis

Abstract: influence of intestinal parasites on immune imbalance in pulmonary tuberculosis (PT), including cases complicated by pulmonary aspergillosis (PA) was studied. 300 and 111 patients with active PT were examined for intestinal parasites. Group of comparison: 200 residents of Tashkent and Tashkent region. The group of 111 patients was examined for PA (clinical, X-ray, mycological and serological data). Serum IFN- γ and IL-4 were assessed by ELISA. Ascariasis was found in patients with PT and PT with invasive PA respectively 5 and 12 times as frequent as in population. Decrease of IFN- γ and increase of IL-4 level ($P < 0.05$) was observed in these groups in comparison with healthy individuals and patients with PT free of intestinal parasites and PA. Conclusion: Ascariasis as a concomitant disease enhances immune imbalance, typical for PT and PT + invasive PA.

Keywords: Ascariasis, pulmonary tuberculosis, intestinal parasites, aspergillosis, cytokines.

Control of *Mycobacterium tuberculosis* replication is mainly mediated by production of Th1-cytokines IFN- γ and TNF- α and cytotoxicity of CD8⁺-lymphocytes, directed against infected macrophages. Control efficiency is specified by the balance of Th1- and Th2-response (IL4, IL-10, IL-13) [7, 694–701]. Protective immu-

nity in helminthiasis is mediated by Th2-response [6, 459–466]. Protective mechanisms in pulmonary tuberculosis (PT) and aspergillosis are similar and are based on elevated IFN- γ production [5, 403–413]. Our previous study showed that pulmonary aspergillosis (PA) complicates course of the disease in 40% of the

patients with PT and the majority of *Aspergillus* spp. strains were resistant to widely applied antimycotics. Maximal susceptibility was detected to voriconazole [2, 113–118]. It was of interest to study influence of intestinal parasites on immune imbalance specific for active PT, including cases complicated by PA under conditions of the region endemic on intestinal parasitic diseases.

The purpose of the communication is to determine level of serum cytokines IFN- γ and IL-4 in patients with PT including cases with concomitant intestinal parasitic diseases and complicated with PA.

Materials and methods. Two groups of patients with active PT, hospitalized at Republican specialized scientific research medical center of phthisiology and pulmonology of the Ministry of Public Health of the Republic of Uzbekistan (respectively included 300 and 111 patients) were examined, the last group was additionally examined for PA. Patients with infiltrative PT dominated in both groups. Diagnosis of PT was based on clinical, X-ray and bacteriological data. HIV-infected and individuals with viral hepatitis were excluded. All the patients were at the age of 18–64 and received standard antituberculosis therapy: isoniazid, rifampicin, pyrazinamide, ethambutol, streptomycin.

Group of comparison included 200 inhabitants of Tashkent city and Tashkent region. Family where patients with PT, HIV-infected individuals and patients with chronic viral hepatitis were excluded. Control groups for IgG to *Aspergillus* spp. and cytokines detection consisted of 30 and 20 healthy persons respectively. Sexual and age structure of groups of comparison were analogous to the patients with PT and PA.

Intestinal parasites were diagnosed by the triple coproscopy, stool samples were collected with 2–3 days interval.

The cause for examination for PA was sudden aggravation of patients condition against the background of antituberculosis therapy or torpidly current tuberculosis.

Diagnosis of PA was based on clinical, radiological (chest computerized tomography (CT) scan), and laboratory findings: isolation of *Aspergillus* spp. of sputum, bronchoalveolar lavage and blood samples, detection of IgG antibodies to *Aspergillus* spp. by ELISA (kits from LLC Vector-Best, Novosibirsk, Russian Federation).

We used as differential diagnostic sign a rapid improvement of patient's condition on the 3rd–5th day of empiric therapy: decrease of temperature, relief of dyspnea, significant diminution of weakness in the cases without mycological confirmation (absence of sputum and bronchoalveolar lavage refusal) and nonspecific results of CT (progression of infiltrative process) against the background of clinical impairment and positive serology.

Blood samples for mycological study were taken at fever period once a day (5–7 ml.) for 3 days. For prevention of contamination we used flasks of the system HiSafe, Hi-Media, India, with diphasic system Hi-Combi for fungi with CC addition). In 2, 5 and 10 days blood samples from flasks were inoculated on Petri dishes with Sabouraud agar which were incubated at 37°C up to 3 days, Sabouraud agar with glucose (pH 5.0), (Hi-Media, India) was used for inoculation of sputum and bronchoalveolar lavage samples.

IFN- γ and IL-4 in serum samples were assessed using commercially available enzyme-linked immunosorbent assay (ELISA) kits from LLC Vector-Best, Novosibirsk, Russian Federation.

Statistics. Comparison between indices under investigation were made using Student's t-test. The significance was determined at $P < 0.05$.

Results. Results of intestinal parasites diagnosis in patients with PT are represented in table 1. Ascariasis was diagnosed in

10.0 \pm 1.7% of patients with PT but in 2.0 \pm 0.9% of population ($P < 0.001$). This index was even higher in patients with infiltrative PT: in 23 (12.3 \pm 2.4%) of 187 patients.

Table 1. – Prevalence of intestinal parasites in patients with PT (n/M \pm m)

Parasites	Patients with PT (n = 300)	Population of Tashkent city and Tashkent region (n = 200)
<i>Ascaris lumbricoides</i>	30/10.0 \pm 1.7*	4/2.0 \pm 0.9
<i>Enterobius vermicularis</i>	14/4.7 \pm 1.2	9/4.5 \pm 1.4
<i>Giardia lamblia</i>	14/4.7 \pm 1.2*	32/16.0 \pm 2.6
<i>Blastocystis hominis</i>	161/53.7 \pm 2.8*	36/18.0 \pm 2.7

Note: * — significant difference between patients with PT and population ($P < 0.05$).

Prevalence of *Enterobius vermicularis* in patients with PT and population was the same in spite of more efficient mode of transmission in enterobiasis, belonging to contact parasitic diseases.

Morbidity with giardiasis in patients with PT was 4 fold lower, than in population. This phenomenon appears to be stipulated by the influence of antituberculosis therapy. Aminoglycosides are known to possess a limited anti-giardial activity (paromomycin) [9, 8–10], probably other antituberculosis preparations exert analogous effect.

Prevalence of *Blastocystis hominis* was 3 fold higher than in population. It seems to can be connected with an expressed immune imbalance and decrease of activity of local immunity to control the *B. hominis* number. It is confirmed by analogous tendency in HIV-infected individuals, a high intensity of *B. hominis* infection (≥ 5 –6 parasites in a field of view, oc \times 10, ob \times 40) being detected only in patients with PT and HIV-infected individuals, not in healthy persons and patients with various pathology of gastrointestinal tract (gastritis, enterocolitis, cholecystitis) [3, 8–11].

Table 2. – Level of serum IFN- γ and IL-4 in patients with PT, invasive PA and intestinal parasites (pg/ml)

Cohort under study	IFN- γ	IL-4
Healthy individuals (n = 20)	125.7 \pm 6.7	2.6 \pm 0.7
Patients with PT without intestinal parasites and aspergillosis (n = 15)	70.0 \pm 6.1*	8.0 \pm 2.1*
Patients with PT and ascariasis (n = 17)	54.6 \pm 2.8**	18.2 \pm 3.0**
Patients with PT and enterobiasis (n = 14)	69.3 \pm 3.8*	9.3 \pm 1.8*
Patients with PT and invasive PA (n = 12)	41.6 \pm 3.1**	27.6 \pm 4.7**
Patients with PT, ascariasis and invasive PA (n = 4)	22.8 \pm 4.7**	31.7 \pm 4.9**
Patients with PT and giardiasis (n = 12)	58.7 \pm 3.8*	15.4 \pm 2.4*
Patients with PT and blastocytosis (n = 12)	62.8 \pm 3.8*	22.4 \pm 5.7**

Note: * — significant difference with healthy individuals ($P < 0.05$); ** — significant difference in comparison with patients with PT without intestinal parasites and aspergillosis ($P < 0.05$).

PA was diagnosed in 44 (39.6 \pm 4.6%) from 111 patients with PT, 16 of them suffered from invasive PA. *Aspergillus fumigatus* were isolated from blood samples of 2 patients and from sputum and bronchoalveolar lavage samples of 10 patients. Invasive PA was diagnosed in 4 patients on the base of significant impairment of condition and progression infiltrative process against back-

ground of antituberculosis therapy (increase of temperature up to 38.5–39.9 °C, appearance/intensification of dyspnea and appearance of blood streaked sputum, progressing of infiltrative process (CT), high level of IgG to *Aspergillus* spp. and rapid positive effect of voriconazole therapy. Other cases were presented by aspergilloma. We consider positive serology as a test orienting to the disease, because in total positive serology was observed in 4 (20%) from healthy individuals of control group. Positive results were obtained in 1 (5%) from 20 nonsmokers and 3 (15%) from 20 smokers, all three smokers have *A. fumigatus* colonization of upper part of respiratory tract. Diagnostic level of IgG to *A. fumigatus* was determined in 31 (70.4%) patients with PA.

Results of serum cytokines detection are represented in table 2.

Level of serum IFN- γ in patients with PT without intestinal parasites and PA was significantly lower, than in healthy individuals ($P < 0.05$). This index in patients with PT and ascariasis was even lower, and is significantly different from control values as well as values, obtained in patients with PT and without parasites and PA ($P < 0.05$). Enterobiasis didn't induce significant changes in IFN- γ concentration in patients with PT. Invasive PA, diagnosed in 12 patients with PT, was developed against a background of low level of serum IFN- γ : 41.6 ± 3.1 pg/ml; ascariasis diagnosed in 4 patients with PT and invasive PA induced even more expressed decrease of IFN- γ : 22.8 ± 4.7 pg/ml.

Level of serum IL-4 was significantly higher in all groups under study in comparison with control value. The highest IL-4 level was detected in patients with PT + invasive PA + ascariasis and PT + invasive PA and PT + ascariasis, respectively 31.7 ± 4.9 pg/ml; 27.6 ± 4.7 pg/ml и 18.2 ± 3.0 pg/ml. In patients with PT without parasites and PT with enterobiasis IL-4 level was similar and significantly higher than in control group.

Significantly higher prevalence of *A. lumbricoides* in patients with PT can be considered as a factor provoking manifestation or exacerbation of tuberculosis process due to augmentation of IFN- γ and IL-4 imbalance. Larvae migration stage through respiratory tree is of importance due to direct affection of lung tissue and probably activation and spreading of mycobacterial infection. Data of J. Potian et al. [8, 1863–1874] indicate to such possibility.

They showed in experiment with mice, infected with *Nippostrongylus brasiliensis* (model equivalent ascariasis in human) and *M. tuberculosis* that Th2 response can enhance the intracellular persistence of *M. tuberculosis*, in part by mediating the alternative activation of macrophages via the IL-4R α signaling pathway unlike classic one, mediating by IFN- γ . May be ascariasis triggers other mechanisms. Diniz L. M. et al. (2010) [4, 142–150] found *A. lumbricoides* in 12% of patients with tuberculoid lepra and in 2% of individuals who were in contact with patients but were not sick. These numbers are completely in agreement with our data. Although tuberculosis and lepra characterized by different target organs the infection gate (respiratory tract) are similar at these infections. Diniz et al. (2010) received analogous dynamics of IFN- γ and IL-4 in patients with lepra and concomitant ascariasis and without it [4, 142–150]. Thus we can conclude with good grounds that ascariasis influences susceptibility to Mycobacterium and course of mycobacterial infections. Our data are consistent with results of Abate et al. (2012), showed that one third of bacteriological positive PT patients in Ethiopia are infected by helminths and this level is significant higher than in population [1].

Ascariasis seems to influence development of invasive PA in patients with PT. Absence of significant shifts in the level of IFN- γ and IL-4 in patients with PT and concomitant enterobiasis and similar prevalence of *E. vermicularis* in patients with PT and population point to lack of enterobiasis effect on susceptibility to *M. tuberculosis* and course of PT. Influence of concomitant giardiasis and blastocystosis (patients only with high intensity of infection were considered) on the level of serum IFN- γ was essentially weaker: in significant decrease in comparison with control value, differences with patients with PT without parasites and PA were negligible ($P > 0.05$). Some other regularities were elucidated in IL-4 detection: if its values in patients with PT + giardiasis and PT without parasites and PA were similar, blastocystosis resulted in a significant increase of IL-4 level (table 2). Thus influence of protozoan infections on cytokine profile of patients with PT is insignificant.

Conclusion

Ascariasis as a concomitant disease influences development of PA due to worsening immune imbalance typical for PT.

References:

1. Abate E., Belayneh M., Gelaw A. et al. The impact of asymptomatic helminth co-infection in patients with newly diagnosed tuberculosis in North-West Ethiopia//PLOS One. – 2012. – 7(8): e42901.
2. Bektimirov A. M.-T., Rakhmatova Kh. A., Davis N. A., Anvarov J. A., Belotzerkovetz V. G., Usmanova R. R., Parpieva N. N., Osipova S. O. Aspergillosis in patients with pulmonary tuberculosis//Infection, immunity and pharmacology. – Tashken, 2014 – № 3.1 – P. 113–118.
3. Davis N. A., Islamova Zh. I., Giiasov Kh. Z., Badalova N. S., Takhtokhodjaeva G. R., Latipov R. R., Osipova S. O. Blastocystis hominis and nonpathogenic enteric protozoa in patients with pulmonary tuberculosis and those with HIV infection//Medical parasitology and parasitic diseases. – Moscow, 2010. – № 3 – P. 8–11.
4. Diniz L. M., Malgalhaes E. F., Pereira F. E., Dietze R., Ribeiro-Rodrigues R. Presence of intestinal helminthes decreases T helper type response in tuberculoid leprosy patients and may increase the risk for multi-bacillary leprosy//Clin. Exp. Immunol. – 2010. – 161(1): 142–150.
5. Lass-Flörl C., Roilides E., Löffler J. et al. Minireview: host defense in invasive aspergillosis//Mycoses. – 2013 Jul. – 56(4): 403–413. doi: 10.1111/myc.12052.
6. Maizels R. M., Hewitson J. P., Smith K. Susceptibility and immunity to helminth parasites//Current Opinion in Immunology. – 2012. – 24: 459–466.
7. Manca C., Tsenova L., Freeman S. Tovey M., Musser J. M., Barry C. E., Freedman V. H., Kaplan G. Hypervirulent *M. tuberculosis* W/Baijing strains upregulate type 1 IFNs and increase expression of negative regulators of the Jak-Stat pathway//J. Interferon Cytokine Res. – 2005. – 25: 694–701.
8. Potian J., Rafi W., Bhatt K., McBride A., Gause W. C., Salgame P. Preexisting helminth infection induces inhibition of innate pulmonary antituberculosis defense by engaging the IL-4 receptor pathway//J. Exp. Med. – 2011. – 208(9): 1863–1874.
9. Tessier J., Davies G. Giardiasis//Prim. Care Update Ob. Gyns. – 1999. – Vol. 6, № 1. – P. 8–10.