topak (p=1.077 g/cm^3).The obtained PBMC were resuspended in RPMI medium and planted in round-bottom plates at a concentration of 2*10^5 cells / ml and cultured for 3 days at 37° C without mitogen and with PHA (2.5 μg / ml), LPS (5 μg/ml) or PWM (5 μg/ml). For intracellular cytokine determination using the following monoclonal antibodies: INF-γ-PE, TNF-α-PE, TGF-β-PE. When staining of surface markers were used: PC-7-CD3, PC-5- CD8 and PC-7- CD4.The analysis was carried out on a FC 500 flow cytometer (Beckman Coulter, Germany). For processing the data using a software package «Statistica 8.0» with nonparametric Wilcoxon and Mann-Whitney tests.

When comparing the spontaneous production of cytokines by T-lymphocytes in patients with chronic HCV infection increased production of TNF-α CD8$^+$ T-lymphocytes was found. The medians were 23.2% (5.10 ÷ 41.30) and 44.70% (43.30 ÷ 50.90), respectively, p<0.05. There was also a tendency to increase the production of TNF-α CD4$^+$T-lymphocytes from 21.3% (7.10 ÷ 35.50) to 37.95% (29.30 ÷ 52.60), p>0.05. TGF-β production of both CD4$^+$ and CD8$^+$ T- lymphocytes decreased insignificantly from 16.6% (16.60 ÷ 16.60) to 11.7% (23.20 ÷ 23.20) and from 23.2% (8.40 ÷ 16.50) to 18.70% (5, 70 ÷ 26.70) respectively, p>0.05, and in the production ofINF-γ changes were not detected, (p>0.05). After PHA stimulation, the production of TNF-α by both CD8$^+$ and CD4$^+$ T-lymphocytes were increased, (p<0.05). Themedians were 55.55% (42.60 ÷ 61.70) and 58.50% (52.40 ÷ 60.20), respectively. The production of INF-γby CD8$^+$ T-lymphocytes was also increased from 16.90% (7.10 ÷ 26.60) to 27.55% (22.10 ÷ 50.20), (p <0.05).The production of TGF-β CD4 + T-lymphocytes increased from 11.70% (8.40 ÷ 16.50) to 29.65% (22.40 ÷ 33.00), (p <0.05), and CD8 + T-lymphocytes from 18.70% (5.70 ÷ 26.70) to 34.85% (32.00 ÷ 39.40), (p <0.05). Thus disturbances in the balance of cytokines in patients with chronic HCV infection can be used as diagnostic criteria and criteria for monitoring the course of infection.

BIBLIOGRAPHI

1. *Malkov, P. G.* Vnepechenochnyie oslozhneniya hronicheskogo virusnogo gepatita S (obzor) // P. G. Malkov, N. V. Danilova, L. V. Moskvina // Sovremennyie problemyi nauki i obrazovaniya. – 2009. – № 5. P. 41–46.

2. *Saharova, D. A.* Kletochnyiy immunitet u bolnyih hronicheskim virusnyim gepatitom S / D. A. Saharova Yu. A. Vitkovskiy, P. P. Tereshkov // Dalnevostochnyiy meditsinskiy zhurnal. – 2013. – № 4. – P. 21–24.

3. *Sklyar, L. F.* Sistema tsitokinov i pokazateli oksidativnogo stressa pri hronicheskom gepatite S s uchetom immunokorrigiruyuschey terapii: avtoref. dis. ... d. m. n: 14.00.36 / L. F. Sklyar. – Minsk : VGMU RF, 2006. – 6 p.

EXPANSION OF NATURAL KILLER CELLS IN VITRO WITH IL-2 AND FEEDER CELLS CO-CULTURE

S. Katbah[1], A. Meleshko[1,2]

[1]Belarusian State University, ISEI BSU,
Minsk, Republic of Belarus
[2]Belarusian Research Center for Pediatric Oncology, Hematology and Immunology,
Lesnoy, Republic of Belarus
suzi9396@hotmail.co.uk

Natural killer cells (NK cells) are lymphocytes of the innate immune system, they are able to recognize and kill tumor cells without MHC presentation and priming. NK cell infusion can provide some anti-cancer effect. However, NK cells represent only 10% of the lymphocytes in human peripheral blood, so their quantity is limited for therapy and method of ex vivo expansion is required.

Keywords: Natural killer cells, expansion, cancer.

Natural killer cells recognize tumor cells by the activating receptors (NKG2D, NKp30, NKp44, and NKp46), especially tumor cells which lack MHC class I molecules since it diminishes the inhibitory signals transduced through KIR-MHC interactions. NK cells perform their cytotoxic functions by the secretion of perforin and gransime, through apoptosis induction by FASL (CD95L), and by antibody dependent cellular cytotoxicity (ADCC). NK cells are also known to be highly responsive to many biological agents, including cytokines such as interleukin IL-2 and IL-15 and may be expanded in culture using these cytokines. Advanced method is the use of Feeder cells, which express cytokines and are susceptible to NK cell lysis. The aim of our experiment was the comparison of the ex-vivo expansion of NK cells using IL-2, and feeder cells K562*. We also used genetically modified K562 cells which have membrane-bound IL-21 and 4-1BBL molecules (FD-21). Irradiated feeder cells were unable to divide and lysed by NK cells in 2–3 days.

Mononuclear cells were isolated from peripheral blood of healthy donor by histopaque density centrifugation and cultured in three cell culture flasks with IL-2, IL2+ K562* and IL2+ FD-21*. NK cell proportion was estimated by flow cytometry with CD3 and CD56. The rate of cells expansion was measured three times through two-week culture, on day 7, 10 and 14.After 7 days re-stimulation with feeder cells was repeated. After 14 days culture, the expansion of NK cells was 600 folds in the flask which contain IL-2 and K562* and 2070 folds in the flask which contains IL-2 and FD21*. In the IL-2 only culture no significant expansion was observed. In the initial MNC sample, the lymphocytes were 80% and among them 9.9% NK cells. By the end of the second week 90-95% of all cells in culture were NK cells.

BIBLIOGRAPHY

1. *Cooley, S.* Natural Killer Cells / S. Cooley, J. Miller. – Amsterdam: Elsevier, 2010. – P. 555–570.

2. *Dahlberg, C.* Natural Killer Cell-Based Therapies Targeting Cancer / C. Dahlberg // Frontiers in Immunology. – 2015. – Vol. 6. – P. 1–3.

THE USE OF ULTRASOUND IN THEBRACHYTHERAPY OF CERVICAL CANCER

D. Kazlouski, Yu. Kazlouskaya, E. Titovich, M. Piatkevich

N.N. Alexandrov National Cancer Center of Belarus,
Minsk, Republic of Belarus
dn2007@tut.by

The thesis purpose is to discuss the use of ultrasound in the practice of brachytherapy, the manipulations performed with this apparatus, and the use of ultrasound to plan patients with cervical cancer.

Keywords: brachytherapy, cervical cancer, skin cancer, Ultrasound.

Currently, for the brachytherapy of cervical cancer, MRI or CT images are used to visualize the clinical volume of the target and critical organs for irradiation. However, the calculation of radiation dosimetry plans based on two-dimensional X-ray images is still conducted in a significant number of brachytherapydepartments all over the world. This situation is because of limited availability of X-ray or magnetic resonance tomographs in regional oncology centers and that fact that in some clinical cases it is impossible to conduct an examination on tomographs. However, visualization of soft tissues during brachytherapy increases the accuracy of treatment planning, which in turn leads to improved local control and reduced toxicity for healthy organs. It is required to find a method of obtaining an image of soft tissues, which will be more accessible and will shorten the time necessary to prepare the patient for treatment. Ultrasound meets these requirements and allows to obtain images of the patient's soft tissues in the shortest possible time with the located applicator directly during installation, and also reduces the time of patient preparation because there is no need to transport the patient to the tomograph. Obtaining ultrasound images during the introduction of the applicator allows to reduce the time of patient treatments, as well as to avoid possible complications associated with improper setting of applicators. Low cost, as well as the simplicity and mobility of ultrasound devices allows the use of ultrasound images for each application and brachytherapy treatment planning.

The use of ultrasound in the brachytherapy department of N.N.Alexandrov National Cancer Center of Belarusfrom the beginning of 2016 signifficantly reduced the possibility of complications associated with improper implantation of applicators and to plan treatment with visualization of soft tissues in the absence of the possibility of obtaining tomographic images.

ALLELIC COMBINATIONS OF VDR, COL1A1, COL1A2 GENES IN BELARUSIAN WOMEN WITH POSTMENOPAUSAL OSTEOPOROSIS

K. Kobets, P. Yeuleyeu

Institute of Genetics & Cytology NAS Belarus,
Minsk, Republic of Belarus
kobets.katsyaryna@gmail.com

Postmenopausal osteoporosis (PO) is a common, multifactorial disease with a pronounced genetic predisposition. Identification of allelic combinations and haplotypes of variants of bone metabolism genes will allow to