

# BACKGROUND

Stereotactic ablative radiation therapy (SABR) is actively used for treatment of patients with oligometastatic tumor process. It is assumed, that in addition to the direct effect on the tumor site, SABR can enhance the formation of an antitumor immune response. These phenomena are shown schematically in Figure 1.

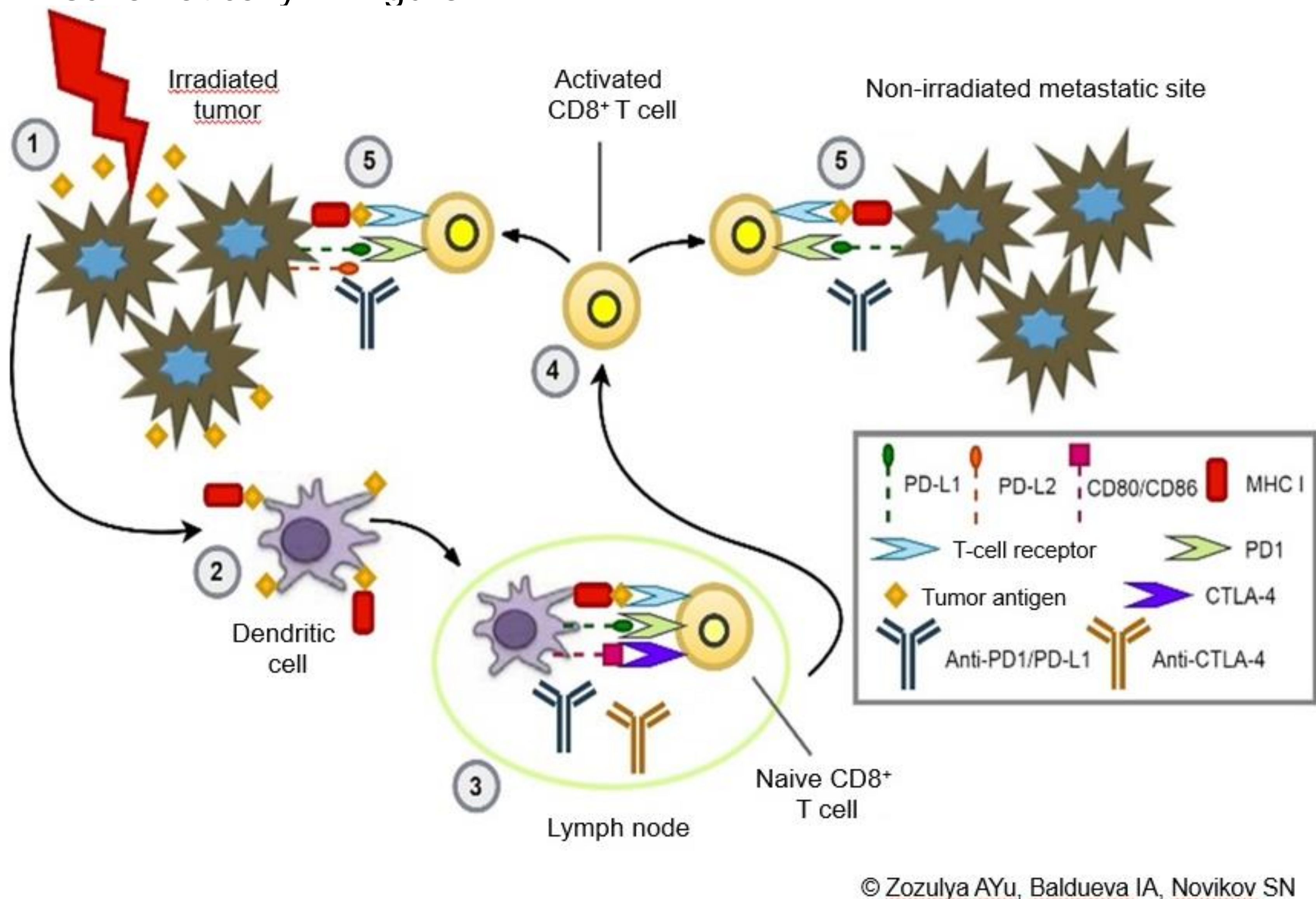


Fig.1. The mechanism of the radiation-induced immune response.

# AIM

In this regard, the aim of our study is investigation of SABR’s influence on indicators of the immune status in patients with metastatic solid tumors.

# METHODS

We performed a preliminary analysis of the immunological parameters of blood before irradiation (point A), via 3-4 weeks (point B) and via 6-8 weeks (point C) after SBRT in 29 patients with malignant tumors with oligometastases in the liver and lungs. Radiotherapy was performed on the linear accelerator "Novalis Tx" EX = 6 MeV, all peripheral blood samples (87) were analyzed by flow cytometry on a FACS Canto™ II cytometer. We used Friedman test for multiple comparison and Nemenyi test for between-group comparison. Data processing and statistical analysis was performed using Microsoft Excel 2010 and R (ver. 4.0.2).

# RESULTS

We observed statistically significant increase of T-lymphocytes (CD3+CD19-),  $\chi^2 = 13,8$ ,  $p = 0,001$ , pairwise  $p(A, B) = 0,002$ ; T-helpers (CD3+CD4+),  $\chi^2 = 8,2$ ,  $p = 0,017$ , pairwise  $p(A, B) = 0,019$ ; activated T-helpers (CD3+CD4+HLA-DR+),  $\chi^2 = 30,1$ ;  $p < 0,001$ ; pairwise  $p(A, B) < 0,001$ ,  $p(A, C) < 0,001$ ; activated cytotoxic T lymphocytes (CD3+CD8+HLA-DR+),  $\chi^2 = 13,3$ ;  $p = 0,001$ ; pairwise  $p(A, B) = 0,003$ ,  $p(A, C) = 0,007$ ; and decrease of B-lymphocytes (CD3-CD19+),  $\chi^2 = 31,5$ ;  $p < 0,001$ , pairwise  $p(A, B) < 0,001$ ,  $p(A, C) = 0,006$ . Interesting, that 6-8 weeks after SABR, in comparison with valued obtained 3-4 weeks after SABR, we detected statistically significant decrease of T-lymphocytes (pairwise  $p(B, C) = 0,01$ ) and increase of B-lymphocytes (pairwise  $p(B, C) = 0,034$ ). We also detected a tendency towards a decrease of T-regulatory lymphocytes, which have a suppressive function for the immune system. However, no statistically significant changes were found in this population (Figure 2).

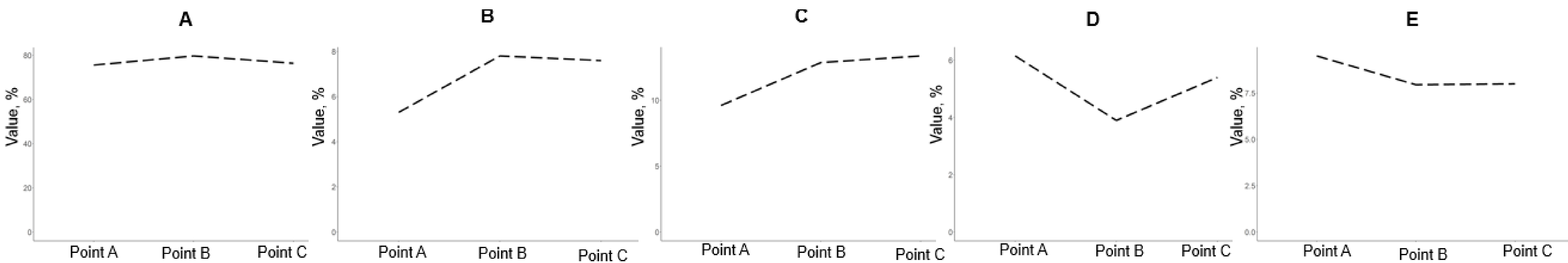


Fig.2. Dynamics (visual series) of T-lymphocytes (A), activated T-helpers (B), activated cytotoxic T-lymphocytes (C), B-lymphocytes (D) and T-regulatory lymphocytes (E) on the background of SABR (the graphs show the values of the medians of the studied parameters of the immune status).

# CONCLUSIONS

Thus, revealed dynamics of immunological parameters indicates the induction of the T-cell link of antitumor immunity against decreasing of indicators of humoral immunity.

# CONTACTS



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The authors declare that they have no conflict of interest.