

Federal State Budgetary Institution «N.N.Blokhin  
National Medical Research Center of Oncology»  
of the Ministry of Health of Russia, Moscow

**Antitumor immunity in patients with gastric cancer**

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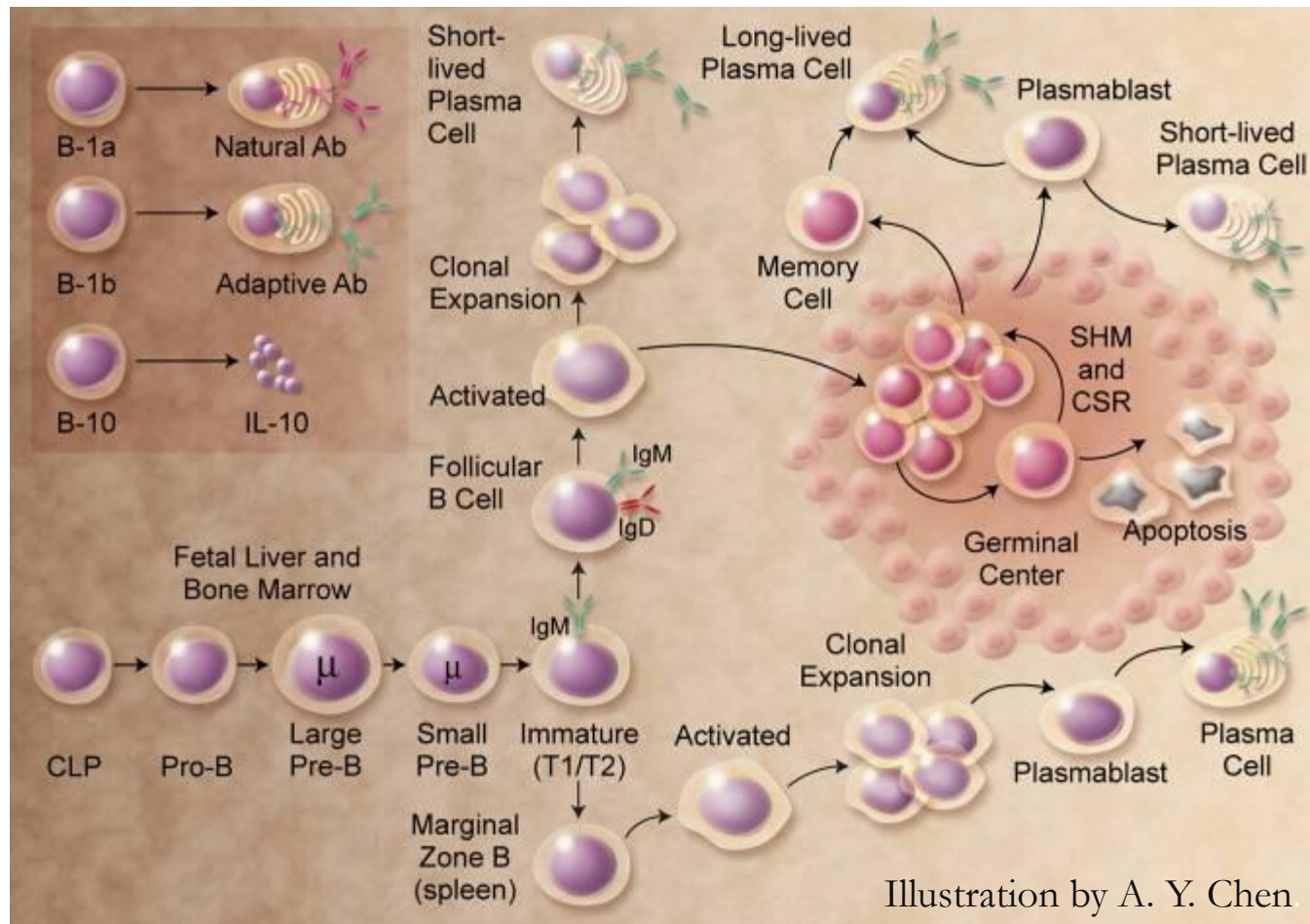
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SEVENTH INTERNATIONAL CONFERENCE  
ON RADIATION IN VARIOUS FIELDS OF RESEARCH

# B-cell development



- B1-lymphocytes are a unique CD5+ B-cell subpopulation;
- Subpopulation first described in 1983 [Lee Herzenberg];
- B1-cells are characterized by an "activated phenotype": expression CD80, CD86;
- The B1-lymphocyte pool is maintained by the activity of progenitor cells through their very slow proliferation.

# Subpopulations of B1-cells

B1a

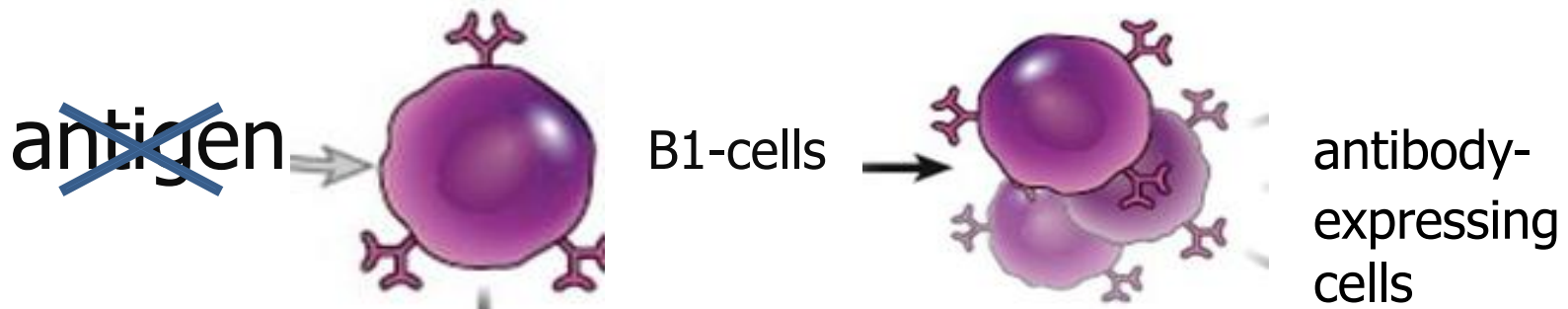
phenotype

CD19+CD21 low CD23-CD5+IgM++

B1b

phenotype

CD19+CD21 low CD23-CD5 - IgM++



- B1-lymphocytes, mainly cells secreting antibodies, are detected in the spleen, where they account for up to 5% of the number of B-cells.
- B1-cells constantly circulate between the spleen and abdominal cavity, but do not enter the follicles.
- Splenectomy for the purpose of adequate lymphodissection in stomach cancer causes pronounced and long-term dysfunction of the various parts of the immune system.

# Patients with gastric cancer

1 group

gastrectomy,  
spleno-protective  
D2-lymphodissection

Stage  
I- 16 patients  
II- 12 patients  
III- 18 patients  
IV - 4 patients

2-nd group

gastrectomy, splenectomy,  
D2-lymphodissection

antigens

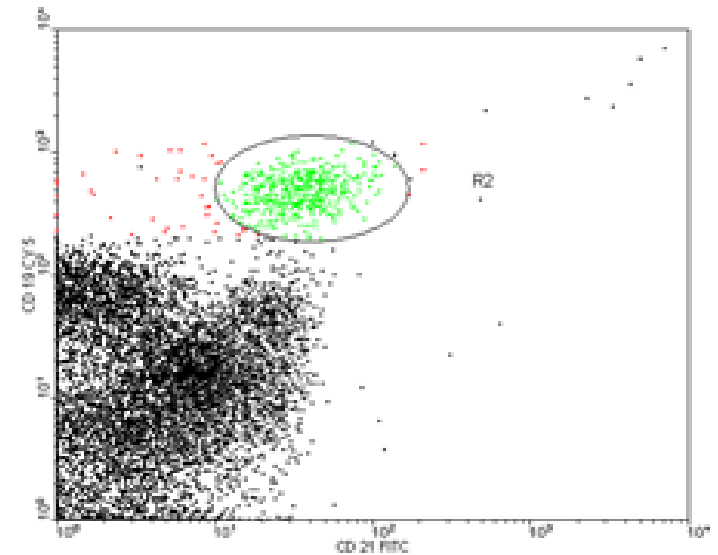
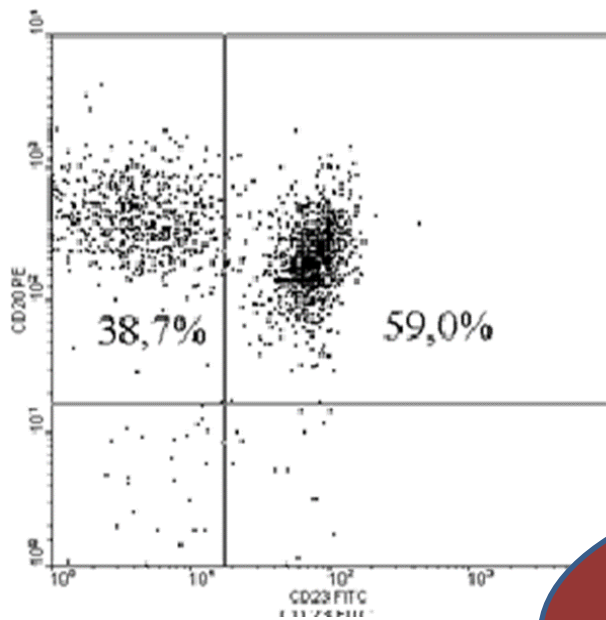
before - 50 samples of peripheral blood  
after 3 months - 29 samples

CD20, CD21, CD23, CD38, HLA-DR,  
CD71, CD10, CD95, CD25, CD5, CD56  
IgG-λ, IgG-κ

## Before surgical treatment

prominent proportion CD23+ B-cells

significant number of B-cells with a low level of CD21+ expression



### Decreased

- relative number of B-cells in 33%
- absolute number B-cells in 38%

## Subpopulation CD19+CD5+B-cells average -17.7%

23% patients  
more than  
20%

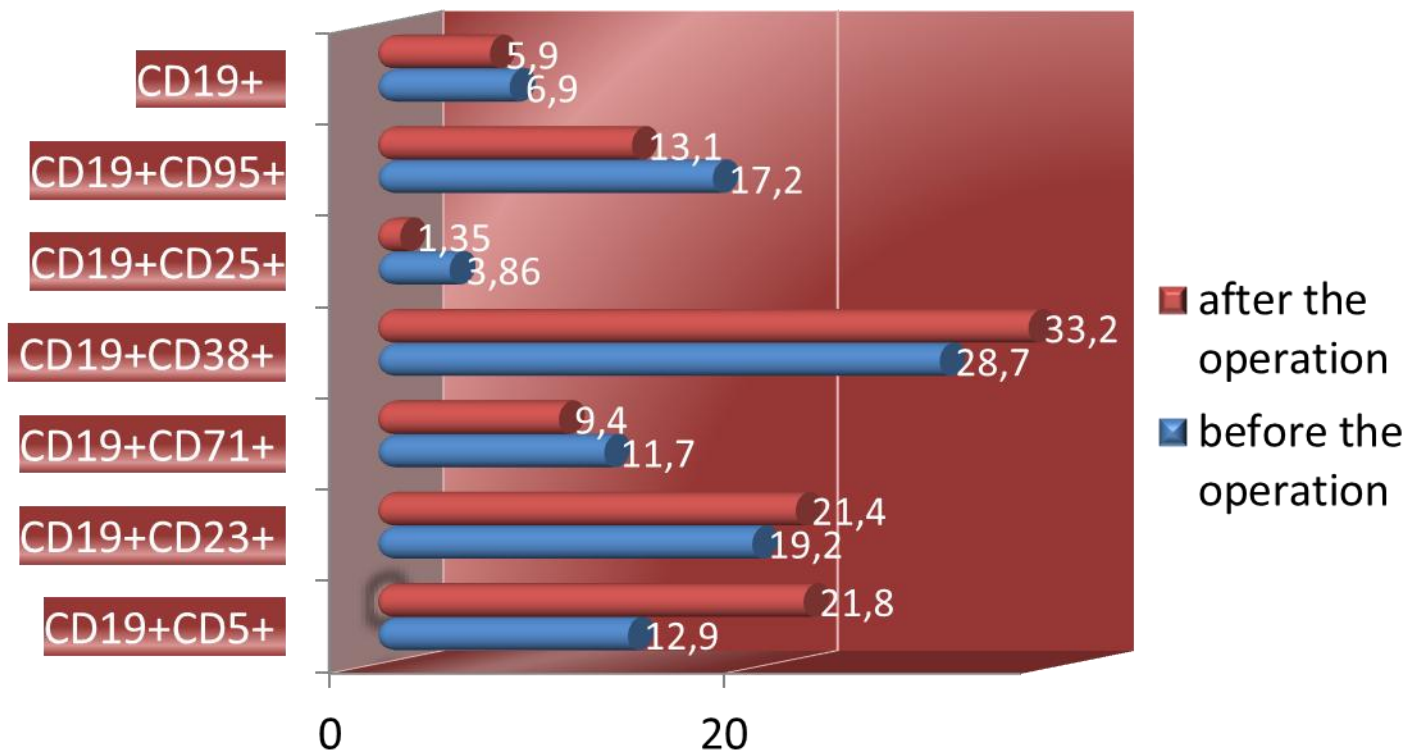
3 patients  
more than  
40%

some of  
these cells  
CD38+ and  
CD25+

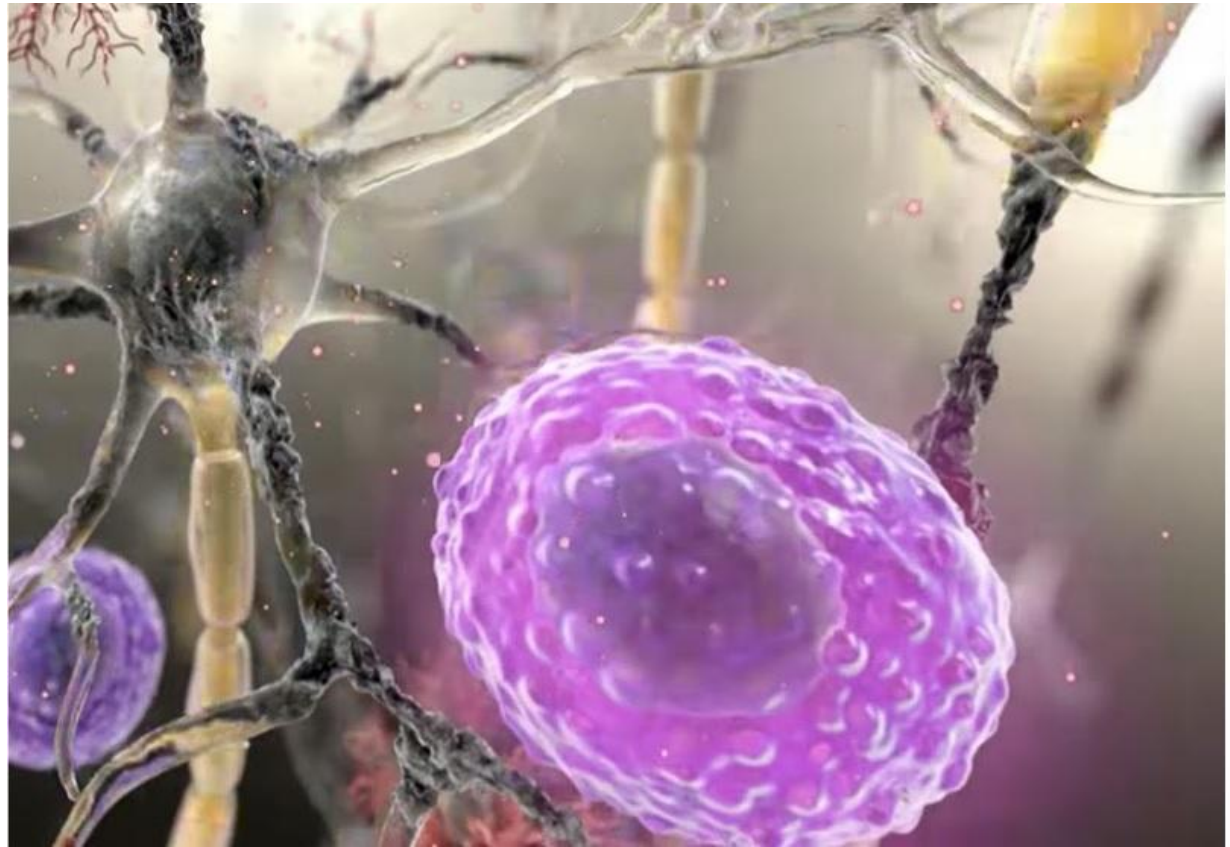
# 1 group

	before the operation	after the operation	n
B-lymphocytes CD19+ %	5,36±0,65	6,1±0,94 (p=0,015)	12
B1-leucocytes CD19+ %	2,41±0,57	2,27±0,57 (p=0,04)	7
CD19 <sup>+</sup> (absolute )	134.3±25,3	121,8±30,4 (p=0,05)	7
CD19 <sup>+</sup> CD5 <sup>+</sup>	11,8±4,56	14,6±2,8	12
CD19 <sup>+</sup> CD23 <sup>+</sup>	21,2±4,62	24,4±6,5	14
CD19 <sup>+</sup> CD20 <sup>+</sup>	96,9±0,8	95,2±1,2	14
CD19 <sup>+</sup> CD71 <sup>+</sup>	11,1±3,1	9,8±1,6	12
CD19 <sup>+</sup> CD10 <sup>+</sup>	0,8±0,32	0,5±0,18	11
CD19 <sup>+</sup> CD38 <sup>+</sup>	16,0±4,4	22,8±6,1	14
CD19 <sup>+</sup> HLA-DR <sup>+</sup>	98,6±0,3	97,6±0,99	14
CD19 <sup>+</sup> CD25 <sup>+</sup>	1,4±0,84	3,84±2,22	12
CD19 <sup>+</sup> CD95 <sup>+</sup>	8,3±2,3	8,0±1,4	10
CD19 <sup>+</sup> CD21 <sup>+</sup>	73,1±3,2	77,3±4,3 (p=0,034)	12
CD19 <sup>+</sup> CD56 <sup>+</sup>	1,0±0,3	1,6±1,2	12

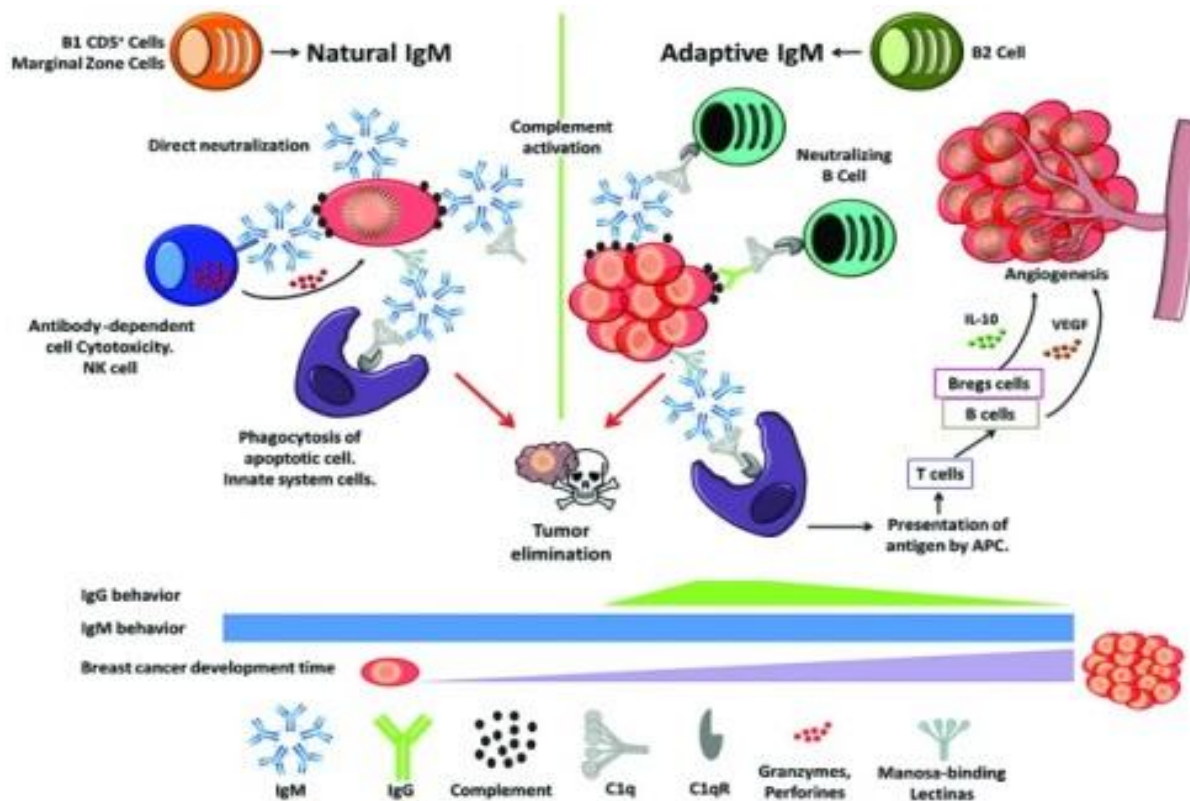
In the 2-nd group, the relative number of B-lymphocytes ( $p=0,018$ ), CD5+B-cells( $p=0,012$ ), CD19+CD38+ ( $p=0,035$ ) cells was reliably correlated.



What is the role of B1 lymphocytes?



The antibodies produced by B1-lymphocytes are almost exclusively IgM.



- The response of B1-cells is mainly thymic independent.
- IgM plays an important role in the induction of apoptosis of tumor cells

[Brandlein S., Lorenz J., Ruoff N.- Human monoclonal IgM antibodies with apoptotic activity isolated from cancer patients. // Hum. Antibodies. 2002. № 11(4);

Varambally S., Bar-Dayyan Y., Bayry J. - Natural human polyreactive IgM induce apoptosis of lymphoid cell lines and human peripheral blood mononuclear cells. // Intern. Immunology. 2004. Vol. 16, No.3;

Piao X., Ozawa T., Hamana H. - TRAIL-receptor 1 IgM antibodies strongly induce apoptosis in human cancer cells in vitro and in vivo. // Oncoimmunology 2016. №5(5)].

- Approximately half of serum IgM is secreted by B1-cells.

- Immunity disorders in patients after splenectomy primarily affect the B-cell immune response, including thymus-independent antigens of the second type, which is provided by the population of B1-lymphocytes.
- Thus, in patients of the experimental group, there may be a decrease in antibody production, a weakening of both general and antitumor immunity.

Thank you for your kind attention!