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Mehr als nur ein Labor

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Height [ ] cm **Weight** [ ] kg **Body Mass Index** [ ]

Medical History:

Keine Angaben

Interpretation:

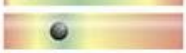
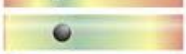
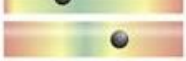
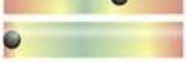
1. No serious deviations are detectable in the blood count.
2. Basal adequate activity (high lysis rate of NK cells), but a stimulation of the NK cells with interleukin 2 is absent, possible evidence of NK call activation. No evidence of a functional NK cell deficiency or hyperactivity of the NK cells.
3. Immunity status: evidence of quantitative immune deficiency: the number of CD8 T cells is reduced (e.g. chronic persist. infections deficiency, prolonged therapeutic immunosuppression, autoimmune diseases, constitutional in about 5% of the population), NK cells are also reduced.
4. Inflammatory markers interleukin 6 and interleukin 1 -beta are elevated, indicating na acute/chronic inflammatory process.

Note: Interleukin 8 is significantly increased, result with reservation: for IL8 determination in serum we recommend sending isolated serum. In whole blood there may be a pre analytical increase of the values.

Kind regards
Dipl. Biol. Barbara Glowacka/ Dipl. Biol. Wolfgang Mayer

Basic Check Ups

Test Name	Result	Ref. Range	Units	Previous	Trend Line /Date
Blood Count					
Erythrocytes	**4.68**	3.9 - 5.15	/pl		
Haemoglobin	**13.6**	12 - 15.4	g/dl		
HCT	**43.7**	35.5 - 45	%		
MCV	**93**	80 - 94	fl		
MCH	**29.1**	27 - 33.5	pg		
MCHC	↓ **31.1**	32 - 36	g/dl		
Platelets	**225**	130 - 450	TSND/µl		
WBC	**4.9**	4 - 10	/nl		
MPV	↑ **12.1**	7.8 - 11.5	fl		
RDW	**13.0**	11.5 - 14.5	%		
Differential					
Lymphocytes	**31.1**	19 - 48	%		
Lymphocyte count	**1.51**	1.1 - 4.5	/nl		
Monocytes	**8.5**	3.4 - 9	%		
Monocyte count	**0.41**	0.1 - 0.9	/nl		
Neutrophils	**58.0**	40 - 74	%		
Granulocyte count	**2.81**	1.5 - 7.7	/nl		

Test Name	Result		Ref. Range	Units	Previous	Trend Line /Date
Blood Count with Differential						
Eosinophils	**1.6**		< 7	%		
Eosinophile count	**0.08**		< 0.7	/nl		
Basophils	**0.8**		< 1.5	%		
Basophil count	**0.04**		< 0.2	/nl		
MEGEMIT DIAGNOSTIC						
Helper Cell Typing (MeGeMIT)						
T4 T-Helper rel	↑ **60**		35 - 45	%Lympho		
T helper (1) cells	**5.1**		5 - 22	%CD4		
T Helper (2) cells	**4.9**		3 - 9	%CD4		
Quotient TH1/TH2	↓ **1.0**		1.1 - 5			
T-helper (17) cells	**5.1**		2 - 9	%CD4		
TH17 cells rel	**11**		5 - 17	%CD4		
T-helper 1 / T-helper 17-cells	**5.70**		2 - 11	%CD4		
T cells regulatory	**8**		5 - 10	%CD4		
Quotient TH17 / Tregul	**0.6**		0.4 - 1			
FERTILITY DISORDERS						
Infertility - Immune Dsybalance						
NK-function						
NK/Ctx: Basal	**44**		> 20	%K562		
NK/Ctx: IL-2 Stimulation	**44**		> 35	%K562		
Cellular immumne status						
Leucocytes	**4.9**		4 - 10	/nl		
Lymphocytes	**1510**		1100 - 4500	/µl		
Lymphocytes %	**31**		19 - 48	%		
Monocytes	**410**		100 - 900	/µl		
Monocytes %	**8.5**		3.4 - 9	%		
Granulocytes	**2810**		1500 - 7700	/µl		
Granulocytes %	**58**		40 - 74	%		
T Cells (CD3)	**1261**		920 - 2580	/µl		
T cells relative	**84**		60 - 84	%Lympho		
CD4 Helper cells	**966**		550 - 1660	/µl		
CD4 Helper cells (relative)	↑ **64**		32 - 60	%Lympho		
CD8 cells	↓ **251**		280 - 930	/µl		
CD8 cells (relative)	**17**		13 - 40	%Lympho		
CD3+/CD4+/CD8+	**1**		< 5	%Lympho		
CD4/CD8 RATIO	↑ **3.80**		1 - 2.8			
CTL (cytotoxic T cells)	**35**		10 - 190	/µl		
CTL %	**3**		1 - 11	%CD3		
B cells (CD19)	**175**		120 - 630	/µl		
B cells (relative)	**12**		7 - 21	%Lympho		
activated T cells (HLADR)	**57**		< 230	/µl		

Test Name	Result	Ref. Range	Units	Previous	Trend Line /Date
activated T cells (HLADR) %	5	< 15	%CD3		
activated T cells (CD38 abs.)	117	102 - 554	/µl		
activated T cells (CD38 rel.)	9	6 - 28	%CD3		
activated T cells (CD25/IL-2)	54	< 400	/µl		
activated T cells (CD25) %	4	< 22	%CD3		
NK cells (absolute)	↓ 50	100 - 600	/µl		
NK Cells (relative)	↓ 3	6 - 29	%Lympho		
Cytototoxic NK cells	↑ 99.0	85 - 95	%NK		
Regulatory NK cells	↓ 1.0	5 - 15	%NK		
Systemic inflammation					
Interleukin 6 (S)	↑ 8.6	< 4	pg/ml		
Interleukin 1ß (S)	↑ 9.2	< 5	pg/ml		
TNF-alpha (S)	7.1	< 9	pg/ml		
Interleukin 8 (S)	↑ 1086	< 62	pg/ml		
Interleukin 10 (S)	<5.0	< 5	pg/ml		

Laboratory diagnostics carried out and validated by MVZ Labor Bavariahaus, in the case of individual parameters by the authorised partner laboratory, where applicable.

General Information:

MCHC
MCHC is the average value of the haemoglobin concentration in the individual erythrocytes.

MPV
MPV is the average thrombocyte volume. There is an inverse relationship between the platelet count and the MPV. The MPV is dependent upon 3 main parameters: the age of the platelets, the heterogenicity and maturity of the megakaryocytes in the bone marrow and the peripheral size dependent sequestration in the storage pool. Generally the lower the thrombocyte count the higher the associated MPV.

Helper Cell Typing
The group of T helper cells can be further differentiated according to effector functions using defined combinations of typical surface markers. Changes in the normal distribution of the different subtypes of helper cells in the blood are described for different clinical pictures, influencing this by immune modulation can be the goal of a therapeutic strategy, e.g. the increase of Treg cells in autoimmune diseases.

Type 1 helper cells (TH1 cells) support the cytotoxic immune response of T8 and NK cells against intracellular pathogens or tumor cells. A reduction is associated with chronic viral infections or is observed in tumor diseases.
Type 2 helper cells (TH2 cells) stimulate antibody formation in B cells and thus trigger the specific humoral immune response against extracellular pathogens. One finds an increase e.g. with antibody -mediated type 1 allergies and autoimmune reactions.
Regulative T cells (Treg or TH3 cells) ensure immune homeostasis through the production of anti -inflammatory messengers and protect against autoimmune reactions and destructive immune processes. A too high proportion weakens the TH1 and TH2 effector function and is described e.g. in chronic viral infections and tumor diseases.
Type 17 helper cells (TH17 cells) are found in large numbers in intestine -associated tissue, where they support the integrity of the intestinal mucosa by releasing messenger substances. In peripheral blood, their proportion of helper cells is rather low, an increase is described in chronic inflammatory diseases, e.g. autoimmune diseases, psoriasis, CED or rheumatic diseases.
In contrast to the TH17 cells, the newly described helper cells of type 1/17 (TH1+17 cells) are able to secrete both IFNgamma and interleukin 17. On the one hand, these cells seem to play an important role in the defence against Candida albicans and Mycobacterium tuberculosis. On the other hand, an increased proportion of rheumatoid diseases is described as well as an increased tolerance for HIV compared to TH1 cells.

NK-Check
Natural killer cells (NK cells) are among the most important cellular immune barriers against viral infections and abnormal (malignant) cells. NK cells by circulating permanently through the whole body function as the bodies

"immune surveillance". On contrary to the antigen -specific T cell compartment they spot altered cells directly killing them immediately b apoptotic mechansims without the need of antigen identification and development of specific T - immunity.
The numer of NK cells in peripheral blood varies from day to day, from morning to evening. Absolutely healthy persons can have high and also low numbers since resting NK cells may adhere to the surface of peripheral blood vessels. Extremely low numbers are not found since persons without or almost without NK cells cannot stay alive. With advancing age the number of circulating NK cells remains unchanged or even slightly increased but their activity progressively goes down. Decresed NK activity correlates strongly with increased risk of infection, recurrence of latent infections (herpes group) and prolonged and more severe infections. Also with increased risk of tumor development and poorer prognosis in active cancer disease.
The NK- CHECK, especially developed by our laboratory, is designed to check the natural cytotoxic activity of the patients cells against model tumor cells (K 562 lymphoma cells) and also the response of his NK cells to physiologic stimulatory signals like IL-2 by measuring the increase in CD69 expression.

The function of NK cells is regarded to be a much more important measure of immune competence than the number of circulating cells. Low NK activity is found in chronic systemic diseases, chronic inflammation, physical inactivity or overtraing syndrome als well (glutamine deficit), chronic stress, hypercortisolism, etc.
The most effective natural NK enhancing method is regular physical activity (preferably aerobic endurance training) and optimal micronutrient/antioxidant support. Growth Hormone (hGH), DHEAS, some amino acids (arginine, ornithine, GABA, glycine, glutamine) by enhancing hGH secretion, antioxidants by activating the cells are very effective means of improving NK cell activity.
Because of the primary importance of NK function in disease prevention it seems also logical in disease states to raise low activity with NK-specific immune modulator substances. Among the most effective modulators are chinese mushrooms like Shiitake, Maitake, Reishi; mushroom specialities like AHCC (active hexose compound) or MGN -3 (Biobran). Vitamin C, antioxidants, glutathione, curcumine, resveratrol can be successful too.

Immune status basis

The Immune status (short version) has been arranged to get an overview of the major components of the cellular immune system and to find indices of immune activation.
The lymphocyte subpopulations have been analysed by flow cytometry; B cells, T cells and NK cells together with the most important subpopulations of T cells:

» the CD4 helper cells and CD8 suppressor/cytotoxic T cells with the CD4/CD8 ratio.
» the natural killer cells (NK cells)
» the cytotoxic T cells (CTL)
» the activated T cells by targeted determination of a lymphocyte markers that are only expressed on the cell surface after prolonged activation – the T cells expressing HLA class II (HLA DR) molecules. HLA -DR+ cells increase markedly only during long term chronic activation of the T cells. Also a slight increase in the HLA -DR+ cells is seen with increasing age as a result of increased immuno -inflammatory activity.

Further informations about the T cell functional state, the degree and duration of activation the NK cell subpopulation and especially the functional state of the T and NK cell fraction can be obtained by odering the more comprehensive flow cytometry panels like IS "plus", IS "acute" or IS "Age" and by studying the lymphocyte function by the ITT (immune target test) or by NK-Check (NK cytotoxic activity against tumour cells).

CD4/CD8- Ratio

A relative increase of the CD4 helper cells over the CD8 suppressor cells can be found in cases with unilateral decrease of the CD8 cells or a corresponding increase of the CD4 cells. More important than the numerical quotient is therefore the observation of altered cell numbers.
In most cases, a decrease in the number of suppressor cells can be seen, which can be an expression of an active autoimmune disease, an allergy or the early phase of a viral infection with usage of CD8 effector cells in the course of the infection.
A massive increase in CD4 helper cells is rare - e.g. in acute infections or in the context of an autoimmune disease (sarcoidosis).

Interleukin 6

IL 6 is a proinflammatory cytokine produced mainly by monocytes and macrophages during activation of the non specific immune system. IL-6, in cooperation with TNF-alpha, stimulates the production of acute phase proteins, especially CRP, in the liver. IL-6 is an earlier and more sensitive marker of inflammation or systemic disease than CRP. After an immune reaction the levels of IL6 drop more rapidly, it is therefore very good for therapy control and monitoring whereas CRP remains in the circulation longer and can therefore be an indication of a recent as opposed to current infection. Several non-immunological cells i.e endothelial/epithelal cells, can also produce IL -6. Increased IL-6 concentrations with a normal TNF-alpha indicate activation of the non-immune cells. The process of "silent inflammation", which acccompanies many chronic diseases like diabetes, arteriosclerosis, Alzheimer's, chronic stress, major depression, is characterized by sublime but significant increases of CRPs and (more sensitive) of IL -6.

Interleukin 1ß

IL-1ß - together with IL-6 and TNF-alpha – is the major proinflammatory cytokine, produced mainly by

monocytes/macrophages but also by many other cells like vascular endothelia, epithelial cells, fat and nerve cells. Most of the time IL-1ß is released in the initial phase of inflammatory reactions together with TNF -alpha and IL-6, with TNF-alpha being the main cytokine of the reaction.
IL-1ß is produced and released together with its analogue IL1 -alpha. The two IL1 variants have a very similar activity profile but IL 1ß is generally the more active and more potent variant. The major functions of IL -1ß are activation of the cellular immune response (T cells), stimulation of TNF -alpha and IL 6 release, increased secretion of stress hormones (CRH, Cortisol) and induction of central reactions like fever, pain, metabolism (insulin secretion), cognitive performance, etc. Its inflammatory signals generate prostaglandins via induction of cyclooxygenase 2, stimulate phospholipid breakdown and increase the production of inflammatory NO. All these effects are mediated by NF -kB.

Interleukin-8

IL-8 is a so-called chemokine that is produced in the course of inflammatory reactions and increases the adherence and activation of leucocytes at the site of inflammation. IL -8 stimulates phagocytosis, formation of superoxide and leucocyte migration. Increased interleukin 8 levels are a marker of prolonged infections/inflammatory processes/trauma.