

Dear Colleagues,

The elderly and patients with underlying medical problems such as high blood pressure, cardiac issues, diabetes, cancer, another active infection and/or those with immunosuppression are more likely to suffer from more severe symptoms from COVID-19<sup>1,2,3,4</sup>.

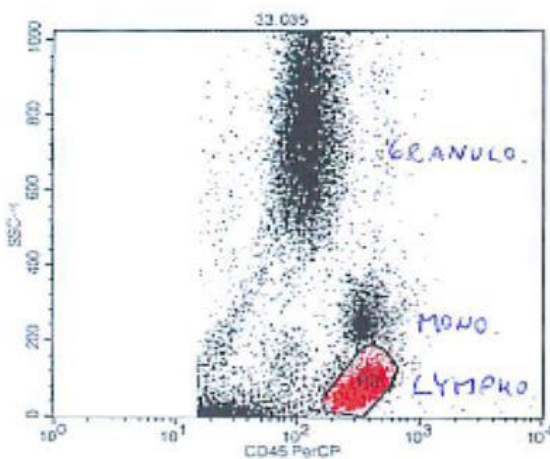
In suspected cases we therefore recommend additional **testing** of the innate (CD3+) and natural killer cells (CD56+/CD57+).

The determination of CD3 + / CD56 + / CD57 + NK cells can help to determine:

- Acute viral infections
- Chronic viral infections
- Bacterial infections
- Immunodeficiencies
- Immune stimulation

### Required material: 1 x EDTA blood tube + 1 x heparin tube

Lymphocytes develop from precursor cells located in the bone marrow. B-cells (bone



marrow) and natural killer cells (NK) migrate from there directly to the periphery. T cells (thymus), on the other hand, migrate from the bone marrow into the thymus, where they undergo positive and negative selection. They develop into naive T cells that have not yet had antigen contact and patrol between blood and lymphatic tissues. Natural killer T-cells are another T-cell line that develops in the thymus and has another receptor besides the T-cell receptor that recognises glycolipid antigens of bacterial origin.

T cells (CD3+ lymphocytes) recognize antigens by means of their T cell receptor and the cofactor CD3 and induce or regulate the innate immune defense. T cells are increased in viral (e.g. rubella) and bacterial (in the overcoming phase) infections as well as fungal infections (e.g. pneumocystis, candida), typhoid, T-cell leukemia and lymphomas and in smokers. **Reduced T-cells are found** in congenital (DiGeorge syndrome, SCID, Wiskott-Aldrich syndrome, Ataxia teleangiectasia/LouisBar syndrome) and acquired (malignant diseases, **infectious diseases, e.g. AIDS, tuberculosis**), **immune defects**, after radiation and medication with immunosuppressants (e.g. e.g. glucocorticoids), cytostatics or steroids, in chronic liver diseases (e.g. liver cirrhosis, alcohol-related and non-alcohol-related steatohepatitis, hepatitis C), burns, SLE and other autoimmune diseases, Cushing's syndrome, renal failure and iron deficiency anemia.

**Natural killer cells (NK cells, CD3+/CD16+/CD56+/CD57+)** are effector cells of the innate immune system. They kill tumour cells and virus-infected body cells by triggering their apoptosis. Elevated NK cells are found in viral infections, mycoplasma infections or after drug-related immune stimulation as well as in NK cell leukaemia (rare). Decreased NK cells are found in progressive tumour growth, in smokers, during physical exercise and during a low-calorie diet.

**CD57+ cells** as a subset of NK cells can be increased in chronic viral infections with e.g. CMV, HIV, Hepatitis C, Epstein Barr virus.

My team and I would be pleased to answer any queries you may have.

Yours sincerely

Armin Schwarzbach

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