

Complement factor

General:

Essential functions of the complement system are their participation in the defense of infectious agents and in preventing autoimmune diseases. To our current knowledge the complement system consists of approx. 20 glycoproteins in inactive forms and receptors on blood cells. As with the coagulation system, the complement system is activated stepwise (cascade): the inactive protein is transferred into the activated one. The classical way of activation starts by binding C1q to antibodies, which must have reacted a priori with a specific antigen on the erythrocyte surface.

The alternative way starts with activation of C3 without activating C1, C2 and C4. Antibody binding shows no effect on the alternative way, but e.g. bacterial endotoxines or cobra poison do. The result of the complete activation is a lysis complex, which leads to cytolysis, bacteriolysis, and hemolysis or to virus neutralization. Common causes of complement increase are systemic infections, non-infectious chronic inflammation conditions as well as physiological conditions (e.g. pregnancy). The hypocomplementemia is an important indicator for the diagnosis of immune-complex disorders.

The following tests are available:

- **C1q Complement binding**

General:

C1q is a 400kDa protein formed from 18 peptide chains in 3 subunits of 6. Each 6-peptide subunit consists of a Y-shaped pair of triple peptide helices joined at the stem and ending in a globular non-helical head. The C1q complex is potentially multivalent for attachment to the complement fixation sites of immunoglobulin. The sites are on the CH2 domain of IgG and probably on the CH4 domain of IgM. The appropriate peptide sequence of the complement fixing site might become exposed following complexing of the immunoglobulin, or the sites might always be available, but might require multiple attachment by C1q with critical geometry in order to achieve the necessary avidity.

Clinical significance are deficiencies of the subunit of the first complement factors C1q, C1r and/or C1s. The most important defect is the C1q deficiency, which often is associated with Systemic Lupus Erythematoses (SLE). Decreased levels are also detected with hypogammaglobulinemia, hypocomplementary urticaria-vasculitis and severe immune deficiency (SCID).

Indication Diseases with complement activation, including the classic way of the complement activation, susp. of C1q deficiency, urticaria vasculitis with complement deficiency

Material: 1 ml serum

TAT: 10-15 days*

Method: NEPH

Units: mg/dl

Ref.- range: 13.0 – 32.0

• C2 Complement

General:

Diseases with classical complement activation, suspicion for C2 deficiency, immunocomplex associated diseases, hereditary angioneurotic oedema

Indication: Diseases with classical complement activation

Material: 1 ml serum

TAT: 10-14 days*

Method: RID

Units: %

Ref.- range: 80 – 120

• C3 Complement

Indication: Suspicion of complement activation, includes the classical as well as the alternative pathway of complement activation

Material: 1 ml serum

Stability: 8 days at 2 to 8°C

TAT: same day, FML

Method: TURB

Units: mg/dl

Ref.- range: see report

- **C3 Complement in Aspirate**

Material: 1 ml aspirate

TAT: 7-10 days*

Method: NEPH

Units: mg/dl

Ref.- range: 90-180

- **C3 Complement in seminal fluid**

Material: 1 ml seminal fluid

TAT: 7-10 days*

Method: TURB

Units: mg/dl

Ref.- range: see report

- **C3 Nephritis factor**

General:

In membrane proliferative glomerulonephritis autoantibodies can occur against C3-convertase of the alternative pathway of the complement activation, the so-called C3-nephritis factor. Blocking of C3-convertase leads to unrestrained transformation of C3, sometimes up to complete consumption of the protein. The resulting decreased humoral immunity increases the infection risk. Effects on kidney transplants must be considered. Simultaneous decrease of the hemolytic total complement activity with severely reduced C3 points to the presence of C3-nephritis factor.

Material: 1 ml serum

TAT: 7-10 days*

Method: IEP

Units: mg/dl

Ref.- range: see report

• C3 Proactivator

Material: 1 ml serum, Frozen

TAT: 7-10 days*

Method: RID

Units: mg/dl

Ref.- range: 17.0 - 42.0

• C3d Complement

Indication: Diseases with complement activation, including the classical as well as alternative pathway of the complement activation

Material: 1 ml serum, Frozen

TAT: 7-10 days*

Method: EIA

Units: U/ml

Ref.- range: 6.3-10.9

Comments: Decreased in glomerulonephritis, liver cell damage, SLE, polyarthritis rheumatica; increased in bacterial infections and non-specific inflammatory processes.

• C4 Complement

Material: 1 ml serum, Frozen

TAT: same day, FML

Stability: 8 days at 2 to 8°C

Method: TURB

Units: mg/dl

Ref.- range: 12.0 - 36.0

Comments: Decreased in angioneurotic edema, hereditary C4 deficiency, glomerulonephritis, SLE, alpha-1-antitrypsin deficiency, vasculitis, liver cell damage, polyarthritis rheumatica

- **C4 Complement in aspirate**

Material: 1 ml aspirate

TAT: 7-10 days*

Method: NEPH

Units: mg/dl

Ref.- range: see report

- **C5 Complement**

Material: 1 ml serum

TAT: 10-14 days*

Method: RID

Units: %

Ref.- range: 80 - 120

- **C6 Complement**

Material: 1 ml serum

TAT: 10-14 days*

Method: RID

Units: %

Ref.- range: 80 - 120

- **C7 Complement**

Material: 1 ml serum

TAT: 10-14 days*

Method: RID

Units: %

Ref.- range: 80 - 120

- **C8 Complement**

Material: 1 ml serum

TAT: 10-14 days*

Method: RID

Units: %

Ref.- range: 80 - 120

- **C9 Complement**

Material: 1 ml serum

TAT: 10-14 days*

Method: RID

Units: %

Ref.- range: 80 - 120

- **Total Hemolytic Complement (CH50)**

General :

Screening test of the total activity of the complement system. If the hemolytic activity is missing or if it is strongly reduced, a complement deficiency has to be considered. This could also occur as a consequence of substantial activation. Increased local activation of the complement system can lead to tissue damage or to anaphylactic reactions.

Indication: Detection of activation of the complement system, monitoring patients at risk (e.g. after polytraumas, burning, sepsis and transplantations);

Material: 1 ml serum, frozen

Preanalytics: After blood collection, allow the blood to coagulate completely at room temperature (Do not cool!). Decant the serum immediately after centrifugation, freeze the serum at minus 20°C (-20°C) and store/transport the sample frozen.

TAT: 7-10 days*

Method: TURB

Units: U/ml

Ref.- range: 41.7 - 95.1

For complete list of laboratory test offered at Freiburg Medical Laboratory, please visit <http://www.fml-dubai.com/parameter-listings/>