PRACTICE TIPS:
Protein S100
Stress test (E370)

For the detection of a blood-brain barrier disorder

S100 proteins are a family of calcium-binding regulatory proteins in the nervous system with intra- and extracellular functions.

Protein S100B is a highly specific protein for glial cells in the central nervous system. An intact blood-brain barrier (BBB) usually allows only small amounts of this protein to pass into the blood. If the BBB is damaged, for example by trauma, ischaemia or inflammation, its permeability increases: protein S100B can then pass from the brain into the bloodstream in greater quantities.

Elevated serum protein S100B levels are therefore considered an indirect biomarker for impaired blood-brain barrier integrity and a clinically relevant marker for central nervous system injuries.

Indications for performing a protein S100 stress test:

- Suspected blood-brain barrier disorder
- Multiple sclerosis
- Chronic fatigue syndrome
- Concentration disorders
- Unclear neurological disorders

Assessment

A serum value above **0.07 µg/l** indicates a disrupted blood-brain barrier. In cases of moderate symptoms, this increase often only becomes apparent after physical exertion, whereas in cases of pro-nounced symptoms – such as in multiple sclerosis – the resting value is often already elevated. In such cases, careful consideration should be given to whether a stress test is appropriate, as it may cause the symptoms to worsen.

DID YOU KNOW?

The test is not suitable or only suitable to a limited extent for patients with melanoma or darker skin types. Protein S100 is a commonly used tumour marker for melanoma and is used, among other things, to assess the progression of the disease. People with dark skin type naturally have higher blood concentrations, so their baseline values or reference ranges are higher than those of people with lighter skin types. These differences must be considered when interpreting the results.

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Test procedure:

For the test, you must take blood from the patient twice: once at rest and once after exercise. You will need a serum tube for each blood sample.

1. The first blood sample is taken at rest. The patient should have been sitting **quietly** in the practice for at least **10 minutes**, preferably longer. Label the tube with ‘before’.

>10 min rest

2. Depending on the situation/severity of the symptoms, the patient must then either **walk briskly up and down the stairs for 10 minutes** or, alternatively, **rotate** their **head** for 10 minutes (in the case of more severe symptoms).

10 min

3. The second blood sample is taken immediately afterwards using a serum tube. Label the tube with ‘after’.

10 min
at 3000-4000 rpm

4. Leave the tubes standing upright for 30 to 60 minutes maximum so that the blood can clot. The serum tubes must then be centrifuged → 10 minutes at 3000-4000 rpm.

5. Transfer the supernatants to two centrifuge tubes. Now label the tubes with the sticker ‘Serum’ and a barcode, and label the tubes ‘**before exercise**’ and ‘**after exercise**’. Please make sure that you do not mix up the tubes.

+ ‘before exercise‘ and ‘after exercise‘

6. Fill **out** the **request form legibly and carefully** (digitally or in block letters) and make sure that it is signed by the patient.

7. First place the sample tubes in transport tubes and then put them together with the completed and signed request form in the mailing bag (for postal delivery) or in a safety bag (for transport service).

8. Take the mailing envelope to a post office as soon as possible or give the safety bag to your courier service.

Please do not send on a Friday, at the weekend or on public holidays, and do not put it in the post box.

NOTE:
Please observe the country-specific shipping conditions. These may differ from the procedure described here.

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