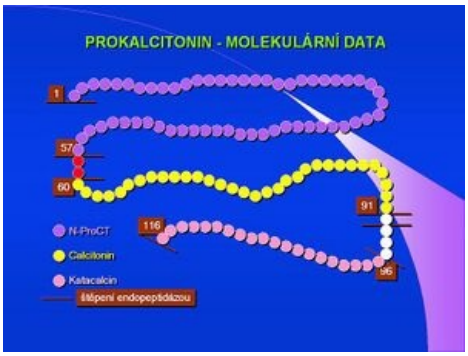
# Procalcitonin



Procalcitonin - molecular data

In recent years, **procalcitonin (PCT)** has been used as an acute phase reactant in research and clinical practice. This 116 amino acid protein, with a molecular weight of 13,000, is physiologically produced by thyroid C cells as a precursor of the hormone calcitonin. However, especially in generalized bacterial infections, other cells, mainly neuroendocrine cells of the lungs and intestines, but also cells of parenchymal organs and in sepsis practically all tissues and cell types begin to produce it. The concentration of this protein in the plasma then rises sharply. PCT released during sepsis is not converted to calcitonin. The exact physiological significance of procalcitonin is far from clear; it is thought to be involved in the regulation of inflammation and to have analgesic effects. The half-life of procalcitonin is 1 day, and after immune stimulation, its serum concentration increases about twenty-fold within 2-3 hours. The increase can be observed only in **generalized bacterial, fungal and protozoal infections**, it does not occur in viral infections. Less significant increases can be found in polytraumas, burns and after extensive abdominal operations.

### PCT determination

It is performed by a highly sensitive immunoluminometric method, PCT-LIA (*Luminescence ImmunoAssay*). It is a method with two monoclonal antibodies, one against the C-terminal sequence of procalcitonin (so-called catacalcin) and the other against the central part of procalcitonin (ie against calcitonin). Anti-catacalcin antibodies are immobilized on the surface of the tube, anti-calcitonin antibodies are labelled with a luminescent probe (acridine derivative). The method requires a luminometer, it requires 20 µl of serum or plasma.

As an accelerated method, an immunochromatographic test for procalcitonin (PCT-Q) in serum and plasma is used. It requires 200 µl of serum or plasma, the result is available in 30 minutes. This test is recommended for rapid diagnosis of acute pancreatitis.

### PCT guide values

Normal values (ng/ml) < 0,5; chronic inflammatory processes < 0,5–1; bacterial infection complicated by systemic reaction 2–10; SIRS 5–20; severe bacterial infections – sepsis, MODS 10–1000. Elevated PCT levels persist during prolonged sepsis, while levels of some other cytokines decrease.

### Non-infectious causes of increased PCT

Postoperative condition, multiple trauma, heat injury, cardiogenic shock, in newborns the first 48 hours after birth. A comparison of PCT, CRP, IL-6 and WBC shows that procalcitonin is the indicator with the highest sensitivity and specificity for the differential diagnosis of infectious and non-infectious etiology of SIRS.

## References

### Related articles

- Blood
- Blood plasma
- Blood draws for testing
- Blood count
- Haemocoagulation ■ Blood clotting test ■ Bleeding test ■ Erythrocyte sedimentation rate
- Biochemical blood analysis ■ Laboratory acid-base balance test
- Hemoculture ■ CRP ■ PCT

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