

## Reference laboratory values

*These are the values published for adults by the Central Laboratory of Semmelweis University.  
Students are expected to know the most important values for a successful exam!*

### Hematology

#### Complete blood count: (EDTA-anticoagulated blood)

red blood cell count (RBC)	women: 4.0–5.2 T/L
	men: 4.5–5.9 T/L
hemoglobin (HGB)	women: 120–150 g/L
	men: 135–170 g/L
hematocrit (HCT)	women: 0.34–0.45
	men: 0.39–0.52
mean corpuscular volume (MCV)	80–99 fL
mean corpuscular hemoglobin (MCH)	27–34 pg
mean corpuscular hemoglobin concentration (MCHC)	315–360 g/L
red cell distribution width (RDW)	11.5–15.0 %
reticulocyte ratio (relative to RBCs)	0.5–2.0 %
platelet count (PLT)	150–400 G/L
white blood cell count (WBC)	4–10 G/L
erythrocyte sedimentation rate (ESR, Westergren)	<20 mm/h

#### Differential blood count: (EDTA-anticoagulated blood)

neutrophil, segmented	40–70 %
neutrophil, band form	0–5 %
neutrophil, metamyelocyte (juvenile form)	0–1 %
eosinophil	0–5 %
basophil	0–1 %
monocyte	2–6 %
lymphocyte	20–40 %

#### Hemostatic parameters: (plasma)

bleeding time	4–6 min
prothrombin time (INR)	0.85–1.2
aPTI (activated partial thromboplastin time)	28–40 s
thrombin time	15–22 s
fibrinogen concentration	1.5–4.0 g/L

### **Inorganic components** (in serum/plasma)

sodium		135–146 mmol/L
potassium		3.5–5.1 mmol/L
calcium		2.2–2.65 mmol/L
phosphate		0.81–1.45 mmol/L
chloride		98–107 mmol/L
iron	women:	11–32 $\mu$ mol/L
	men:	13–32 $\mu$ mol/L

### **Metabolites** (in serum/plasma)

bilirubin total		< 20 $\mu$ mol/L
direct reacting		< 3,4 $\mu$ mol/L
glucose (fasting)		4.1–5.9 mmol/L
uric acid		150–400 $\mu$ mol/L
BUN (blood urea nitrogen)		3.5–7.0 mmol/L
creatinine		40–130 $\mu$ mol/L
cholesterol (total)		2.0–5.2 mmol/L
HDL-cholesterol		1.0–1.6 mmol/L
triglycerides		<1.7 mmol/L

### **Proteins** (in serum/plasma)

total protein		66–83 g/L
albumin		35–52 g/L
A/G (albumin/globulin ratio)		1.25–2.5
CRP (C-reactive protein)		<8 mg/L
ferritin	women:	10–120 $\mu$ g/L
	men:	20–250 $\mu$ g/L

### Enzyme activities in serum/plasma (the values depend on the method used!)

$\alpha$ -amylase	28–100 U/L
lipase	< 67 U/L
ALAT (alanin-aminotransferase, GPT)	< 50 U/L
ASAT (aspartate-aminotransferase, GOT)	< 50 U/L
ALP (alkaline phosphatase)	< 120 U/L
GGT (gamma-glutamyl-transpeptidase)	< 55 U/L
LDH (lactate dehydrogenase)	< 170 U/L

### Acid-base parameters and blood gases (arterialized capillary blood)

pH	7.35–7.45
pO <sub>2</sub>	83–108 mmHg
pCO <sub>2</sub>	35–48 mmHg
standard bicarbonate (st HCO <sub>3</sub> <sup>-</sup> )	21–28 mmol/l
BE (base excess)	0±3 mmol/l

### Renal function and urinalysis

creatinine clearance (for 1.73 m <sup>2</sup> body surface)	90–130 mL/min
urine volume	1000–1500 mL/24 h
pH	5.0–8.0
density (“specific gravity”)	1.001–1.030 kg/L
in case of a dilution test:	1.001–1.003 kg/L
in case of a concentration test:	1.025–1.030 kg/L
osmolar concentration	600–1200 mosm/kg
urinary sediment (per high power field, magn: 400x)	<1–3 RBC, <3–5 WBC

## ECG

Usual chart speed	25 mm/s
	1 mm ~ 0,04 s
AV conduction time (PR interval)	0.12–0.2 s
Width of the QRS complex	≤0.11 s
Characteristics of a pathological Q wave:	
width:	≥ 0.04 s
amplitude:	> 0.4 mV or > 25% of the R amplitude

### Table of the most important SI prefixes

Prefix	Read	Value
P	peta	$10^{15}$
T	tera	$10^{12}$
G	giga	$10^9$
M	mega	$10^6$
k	kilo	$10^3$
m	milli	$10^{-3}$
μ	micro	$10^{-6}$
n	nano	$10^{-9}$
p	pico	$10^{-12}$
f	femto	$10^{-15}$