

External Quality Assessment Scheme

## Lipids and Lipoproteins

### Lp(a)

### Round 1, 2020

#### Specimens

Please find enclosed 2 liquid human serum samples S001 and S002, each minimum 0.5 mL. Sample S003 is a liquid human serum, each 2 mL.

#### Caution

Quality control specimens derived from human blood must be handled with the same care as patient samples, i.e. as potential transmitters of serious diseases. The specimens are found to be HBsAg, HCVAb and HIVAgAb negative when tested with licensed reagents, but no known test method can offer complete assurance that the specimens will not transmit these or other infectious diseases.

#### Examinations

Please see page 2.

#### Storage and use

All samples (S001, S002 and S003) are ready for use and they should be analysed as soon as possible after arrival. Store the samples in a refrigerator, do not freeze. The specimens should be analysed as usual patient samples.

**Note! Sample S003 is only for analyze of Lp(a).**

#### Result reporting

Please enter the results and methods via LabScala. If you can't find your instrument or reagent from the registry, please contact the EQA Coordinator.

S001: LQ735320011



S002: LQ735320012



S003: LQ735320013



2020-02-10

#### INSTRUCTIONS

Product no. 2200, 2202  
LQ73532011-013/FI, DE

Subcontracting: Sample  
preparation, Sample pretesting

If the kit is incomplete or contains  
damaged specimens, please report  
immediately to [info@labquality.fi](mailto:info@labquality.fi).

The results should be  
reported no later than  
**March 5, 2020.**

#### Inquiries

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#### Labquality

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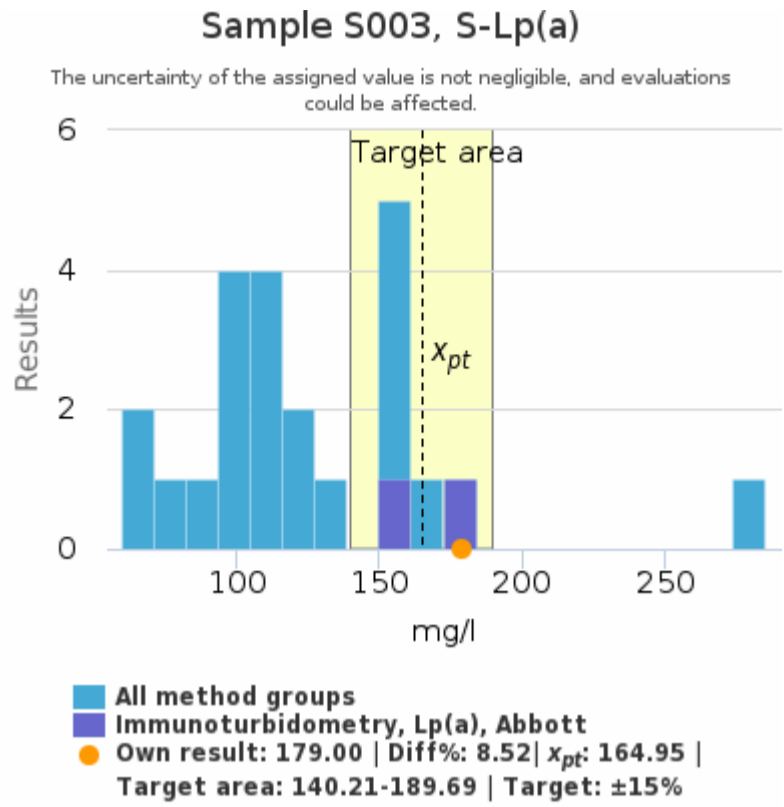
Lipids and lipoproteins  
Lp(a)

**Examinations**

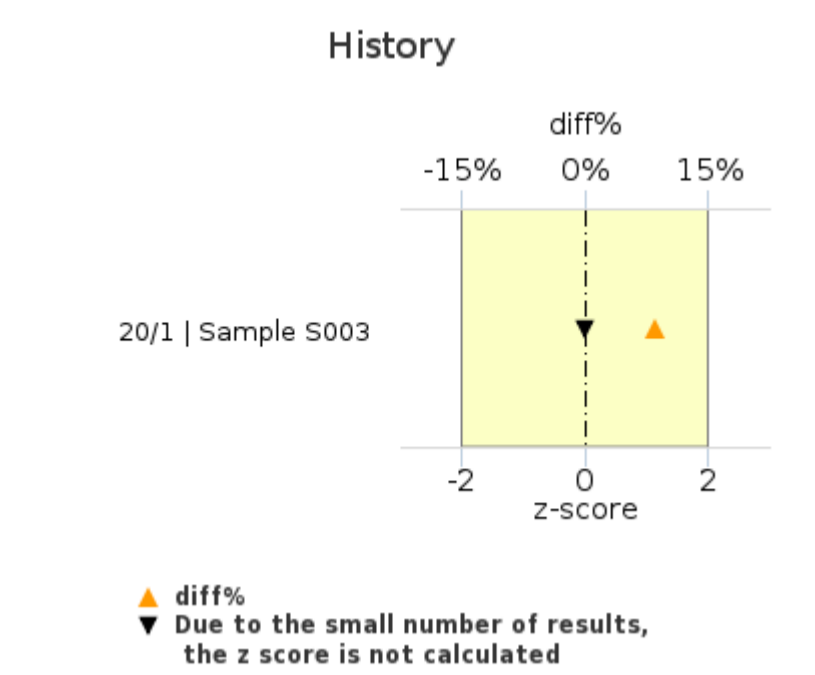
Cholesterol  
HDL cholesterol  
LDL cholesterol  
lipoprotein apo A1  
lipoprotein apo A2  
lipoprotein apo B  
triglycerides

lipoprotein (a)

S-Lp(a) |Architect c8000 (1072)



	$x_{pt}$	sd	SEM	CV%	n
Immunoturbidometry, Lp(a), Abbott	164.95 mg/l	19.87	14.05	12.0	2
All methods	119.10 mg/l	33.25	7.09	27.9	23



Round	Sample	$x_{pt}$	Result	diff%	z-score
20/1	Sample S003	164.95	179.00	8.52%	-

Report info

Participants

75 participants from 14 countries.

Report info

Your own result should be compared to others using the same method.  
Assigned values ( $\bar{x}_p$ , target values) are means of the results where results deviating more than +/- 3\*standard deviation from the median are removed. The standard uncertainty (u) of the assigned value is reported as standard error of the mean (SEM). Additionally, if the measurement uncertainty of the target value is large an automatic text is printed on the report: “The uncertainty of the assigned value is not negligible, and evaluations could be affected.”  
In case the client’s result is the only one in the method group, no assigned value will be calculated, no target area shown, and no statistics calculated. In case there are only a few results in the client’s own method group, the result can be compared to all method mean or to a group that is similar to the own method.  
Results reported with < or > -signs cannot be included in the statistics.

For information on report interpretation and performance evaluation, please see the " EQAS Interpretation guidelines" LabScala User instructions (top right corner ?Help link).

Sample S001 | S-Chol, mmol/l

Methodics	<i>x<sub>pt</sub></i>	Median	sd	CV%	SEM	min	max	Outliers	n
Photometry, enzymatic, Abbott, Chol	6.46	6.47	0.08	1.3	0.02	6.31	6.60	1	12
Photometry, enzymatic, Atellica, Chol	6.16	6.17	0.13	2.1	0.03	5.87	6.40	-	17
Photometry, enzymatic, Roche Chol	6.20	6.20	0.12	1.9	0.02	5.99	6.48	-	30
Photometry, enzymatic, Siemens Kol	6.25	6.24	0.05	0.9	0.02	6.19	6.30	-	6
Photometry, enzymatic, Thermo, Kol	6.53	6.50	0.17	2.6	0.06	6.30	6.80	-	8
Vitros 250-950 Kol	-	-	-	-	-	6.37	6.37	-	1
All	6.27	6.23	0.18	2.8	0.02	5.87	6.80	1	74

Sample S001 | S-Chol, mmol/l| histogram summaries in LabScala

Sample S001 | S-Chol-HDL, mmol/l

Methodics	<i>x<sub>pt</sub></i>	Median	sd	CV%	SEM	min	max	Outliers	n
Direct measurement, HDL-Chol, Abbott	1.49	1.50	0.06	4.1	0.02	1.35	1.57	-	12
Direct measurement, HDL-Chol, BC (AU-devices)	1.10	1.10	<0.01	<0.1	<0.01	1.10	1.10	-	2
Direct measurement, HDL-chol, Roche-systems	1.31	1.31	0.06	4.8	0.01	1.15	1.44	1	31
Direct measurement, HDL-chol, Siemens	1.52	1.52	0.04	2.4	<0.01	1.46	1.60	-	19
Direct measurement, HDL-chol, Siemens Advia	1.56	1.57	0.04	2.8	0.02	1.50	1.60	-	4
Direct measurement, HDL-chol, Thermo Scientific	1.37	1.35	0.10	7.1	0.03	1.29	1.59	-	8
Vitros 5.1; direct measurement Kol-HDL	-	-	-	-	-	1.55	1.55	-	1
All	1.41	1.42	0.12	8.7	0.01	1.10	1.60	1	77

Sample S001 | S-Chol-HDL, mmol/l| histogram summaries in LabScala

Sample S001 | S-Chol-LDL, mmol/l

Methodics	<i>x<sub>pt</sub></i>	Median	sd	CV%	SEM	min	max	Outliers	n
Direct measurement, LDL-chol, Roche-systems	2.99	3.04	0.18	6.0	0.03	2.56	3.21	-	28
Direct measurement, LDL-Chol, Abbott	3.54	3.51	0.10	2.9	0.03	3.40	3.75	-	12
Direct measurement, LDL-Chol, BC (AU-devices)	2.75	2.75	0.07	2.6	0.05	2.70	2.80	-	2
Direct measurement, LDL-chol, Siemens Advia	3.50	3.51	0.18	5.2	0.04	3.15	3.86	-	18
Direct measurement, LDL-chol, Thermo Scientific	2.97	2.94	0.15	5.0	0.06	2.80	3.18	-	6
Direct measurement, LDL-kol, Siemens	3.31	3.31	0.28	8.3	0.20	3.11	3.50	-	2
Vitros 250-950 LDL-kol	-	-	-	-	-	3.61	3.61	-	1
All	3.23	3.18	0.32	9.8	0.04	2.56	3.86	-	69

Sample S001 | S-Chol-LDL, mmol/l| histogram summaries in LabScala

Sample S001 | S-Trigly, mmol/l

Methodics	<i>x<sub>pt</sub></i>	Median	sd	CV%	SEM	min	max	Outliers	n
Fotometria, entsymaattinen, Thermo, Trigl	5.82	5.79	0.09	1.5	0.03	5.75	6.01	-	7
Photometry, enzymatic, Abbott, Trigly	5.63	5.61	0.16	2.9	0.05	5.38	5.91	-	12
Photometry, enzymatic, Atellica, Trigly	5.70	5.70	0.09	1.5	0.02	5.52	5.82	-	17
Photometry, enzymatic, Roche trigly	5.69	5.67	0.12	2.1	0.02	5.49	6.02	1	30
Photometry, enzymatic, Siemens Trigly	5.79	5.78	0.06	1.1	0.03	5.71	5.90	-	6
Vitros 250-950 trigl	-	-	-	-	-	5.60	5.60	-	1
All	5.70	5.70	0.12	2.2	0.01	5.38	6.02	1	73

Sample S001 | S-Trigly, mmol/l| histogram summaries in LabScala

Sample S001 | S-LipoA1, g/l

Methodics	<i>x<sub>pt</sub></i>	Median	sd	CV%	SEM	min	max	Outliers	n
Immunonefelometry, Apo-A1, Siemens	2.03	2.02	0.06	3.1	0.03	1.94	2.10	-	6
Immunonephelometry, Apo-A1, BC	-	-	-	-	-	2.00	2.00	-	1
Immunoturbidimetry, Apo-A1, Abbott	-	-	-	-	-	2.15	2.15	-	1
Immunoturbidimetry, Apo-A1, Roche	2.07	2.05	0.08	3.8	0.03	2.00	2.22	-	7
Immunoturbidimetry, Apo-A1, Thermo Scientific	2.00	1.99	0.02	1.2	0.01	1.99	2.03	-	3
Immunoturbidometry Apo A1 Siemens	2.08	2.11	0.15	7.2	0.06	1.80	2.24	-	7
All	2.05	2.03	0.10	4.7	0.02	1.80	2.24	-	25

Sample S001 | S-LipoA1, g/l| histogram summaries in LabScala

Sample S001 | S-LipoA2, g/l

Methodics	<i>x<sub>pt</sub></i>	Median	sd	CV%	SEM	min	max	Outliers	n
Immunonephelometry Apo-A2, Siemens	-	-	-	-	-	0.53	0.53	-	1
All	-	-	-	-	-	0.53	0.53	-	1

Sample S001 | S-LipoA2, g/l| histogram summaries in LabScala

Sample S001 | S-LipoB, g/l

Methodics	$x_{pt}$	Median	sd	CV%	SEM	min	max	Outliers	n
Immunonefelometry, Apo-B, Siemens	1.09	1.10	0.03	3.0	0.01	1.05	1.13	-	6
Immunonephelometry, Apo-B, BC	-	-	-	-	-	1.20	1.20	-	1
Immunoturbidimetry, Apo-B, Roche	1.15	1.16	0.05	4.7	0.02	1.10	1.22	-	7
Immunoturbidimetry, Apo-B, Thermo Scientific	1.45	1.49	0.10	6.7	0.05	1.30	1.50	-	4
Immunoturbidometry Apo B Siemens	1.08	1.10	0.10	9.1	0.04	0.91	1.16	-	5
All	1.17	1.13	0.15	12.5	0.03	0.91	1.50	-	23

Sample S001 | S-LipoB, g/l | histogram summaries in LabScala

Sample S002 | S-Chol, mmol/l

Methodics	$x_{pt}$	Median	sd	CV%	SEM	min	max	Outliers	n
Photometry, enzymatic, Abbott, Chol	4.70	4.62	0.20	4.2	0.06	4.50	5.10	-	12
Photometry, enzymatic, Atellica, Chol	4.49	4.50	0.10	2.3	0.03	4.28	4.71	-	17
Photometry, enzymatic, Roche Chol	4.41	4.37	0.12	2.8	0.02	4.25	4.70	-	30
Photometry, enzymatic, Siemens Kol	4.60	4.57	0.12	2.7	0.05	4.50	4.80	-	6
Photometry, enzymatic, Thermo, Kol	4.71	4.65	0.13	2.7	0.05	4.60	4.90	-	8
Vitros 250-950 Kol	-	-	-	-	-	5.13	5.13	-	1
All	4.51	4.51	0.17	3.7	0.02	4.25	5.07	2	74

Sample S002 | S-Chol, mmol/l | histogram summaries in LabScala

Sample S002 | S-Chol-HDL, mmol/l

Methodics	$x_{pt}$	Median	sd	CV%	SEM	min	max	Outliers	n
Direct measurement, HDL-Chol, Abbott	1.08	1.16	0.18	16.7	0.05	0.68	1.20	-	12
Direct measurement, HDL-Chol, BC (AU-devices)	1.60	1.60	<0.01	<0.1	<0.01	1.60	1.60	-	2
Direct measurement, HDL-chol, Roche-systems	1.00	1.03	0.13	12.6	0.03	0.72	1.32	-	25
Direct measurement, HDL-chol, Siemens	1.02	1.02	0.03	3.2	<0.01	0.93	1.08	-	18
Direct measurement, HDL-chol, Siemens Advia	0.90	0.91	0.10	10.6	0.05	0.77	1.00	-	4
Direct measurement, HDL-chol, Thermo Scientific	1.16	1.16	0.06	4.9	0.02	1.08	1.23	-	7
Vitros 5.1; direct measurement Kol-HDL	-	-	-	-	-	1.00	1.00	-	1
All	1.03	1.03	0.13	12.2	0.02	0.68	1.32	2	69

Sample S002 | S-Chol-HDL, mmol/l| histogram summaries in LabScala

Sample S002 | S-Chol-LDL, mmol/l

Methodics	<i>x<sub>pt</sub></i>	Median	sd	CV%	SEM	min	max	Outliers	n
Direct measurement, LDL-chol, Roche-systems	2.86	2.79	0.23	8.2	0.04	2.57	3.39	1	28
Direct measurement, LDL-Chol, Abbott	2.92	2.91	0.10	3.3	0.03	2.75	3.10	-	10
Direct measurement, LDL-Chol, BC (AU-devices)	3.50	3.50	<0.01	<0.1	<0.01	3.50	3.50	-	2
Direct measurement, LDL-chol, Siemens Advia	2.84	2.88	0.17	5.8	0.04	2.60	3.12	-	20
Direct measurement, LDL-chol, Thermo Scientific	3.04	2.85	0.49	16.2	0.19	2.67	3.81	-	7
Direct measurement, LDL-kol, Siemens	2.47	2.47	0.33	13.5	0.24	2.23	2.70	-	2
Vitros 250-950 LDL-kol	-	-	-	-	-	2.30	2.30	-	1
All	2.88	2.86	0.28	9.6	0.03	2.23	3.73	1	70

Sample S002 | S-Chol-LDL, mmol/l| histogram summaries in LabScala

Sample S002 | S-Trigly, mmol/l

Methodics	<i>x<sub>pt</sub></i>	Median	sd	CV%	SEM	min	max	Outliers	n
Fotometria, entsymaattinen, Thermo, Trigl	1.62	1.62	0.08	4.8	0.03	1.52	1.74	-	7
Photometry, enzymatic, Abbott, Trigly	1.59	1.61	0.09	5.4	0.02	1.48	1.74	-	12
Photometry, enzymatic, Atellica, Trigly	1.67	1.69	0.04	2.3	<0.01	1.60	1.75	-	17
Photometry, enzymatic, Roche trigly	1.71	1.69	0.14	8.0	0.02	1.42	2.06	-	30
Photometry, enzymatic, Siemens Trigly	1.77	1.71	0.23	13.2	0.09	1.50	2.20	-	6
Vitros 250-950 trigl	-	-	-	-	-	1.35	1.35	-	1
All	1.67	1.67	0.12	7.0	0.01	1.35	2.06	1	73

Sample S002 | S-Trigly, mmol/l| histogram summaries in LabScala

Sample S002 | S-LipoA1, g/l

Methodics	$x_{pt}$	Median	sd	CV%	SEM	min	max	Outliers	n
Immunonefelometry, Apo-A1, Siemens	1.23	1.21	0.08	6.4	0.04	1.13	1.34	-	5
Immunonephelometry, Apo-A1, BC	-	-	-	-	-	1.30	1.30	-	1
Immunoturbidimetry, Apo-A1, Abbott	-	-	-	-	-	1.35	1.35	-	1
Immunoturbidimetry, Apo-A1, Roche	1.11	1.04	0.18	16.0	0.07	0.93	1.36	-	7
Immunoturbidimetry, Apo-A1, Thermo Scientific	1.27	1.29	0.07	5.2	0.04	1.20	1.33	-	3
Immunoturbidometry Apo A1 Siemens	1.38	1.41	0.09	6.9	0.04	1.20	1.51	-	7
All	1.25	1.30	0.16	12.4	0.03	0.93	1.51	-	24

Sample S002 | S-LipoA1, g/l| histogram summaries in LabScala

Sample S002 | S-LipoA2, g/l

Methodics	$x_{pt}$	Median	sd	CV%	SEM	min	max	Outliers	n
Immunonephelometry Apo-A2, Siemens	-	-	-	-	-	0.30	0.30	-	1
All	-	-	-	-	-	0.30	0.30	-	1

Sample S002 | S-LipoA2, g/l| histogram summaries in LabScala

Sample S002 | S-LipoB, g/l

Methodics	$x_{pt}$	Median	sd	CV%	SEM	min	max	Outliers	n
Immunonefelometry, Apo-B, Siemens	0.73	0.72	0.06	7.7	0.03	0.68	0.79	-	3
Immunonephelometry, Apo-B, BC	-	-	-	-	-	0.90	0.90	-	1
Immunoturbidimetry, Apo-B, Roche	0.94	0.91	0.08	8.1	0.03	0.83	1.06	-	7
Immunoturbidimetry, Apo-B, Thermo Scientific	0.91	0.90	0.02	2.4	0.01	0.89	0.94	-	4
Immunoturbidometry Apo B Siemens	0.91	0.90	0.08	8.5	0.03	0.79	0.98	-	5
All	0.89	0.90	0.09	10.3	0.02	0.68	1.06	-	20

Sample S002 | S-LipoB, g/l | histogram summaries in LabScala

Sample S003 | S-Lp(a), mg/l

Methodics	<i>x<sub>pt</sub></i>	Median	sd	CV%	SEM	min	max	Outliers	n
Immunonephelometry, Lp(a), Siemens	68.00	70.30	7.13	10.5	4.12	60.00	73.70	-	3
Immunoturbidometry, Lp(a), Abbott	164.95	164.95	19.87	12.0	14.05	150.90	179.00	-	2
Immunoturbidometry Lp(a) Optilite	-	-	-	-	-	120.43	120.43	-	1
Immunoturbidometry Lp(a) Roche	102.41	104.18	5.15	5.0	1.72	91.67	108.34	-	9
Immunoturbidometry Lp(a) Siemens	149.17	157.00	16.53	11.1	6.25	120.36	162.40	-	7
Immunoturbidometry, Lp(a), Thermo Scientific	-	-	-	-	-	285.00	285.00	-	1
All	119.10	107.17	33.25	27.9	7.09	60.00	179.00	1	23

Sample S003 | S-Lp(a), mg/l| histogram summaries in LabScala

Report info

Participants

75 participants from 14 countries.

Report info

Your own result should be compared to others using the same method.  
Assigned values ( $\bar{x}_p$ , target values) are means of the results where results deviating more than  $\pm 3$  standard deviation from the median are removed. The standard uncertainty (u) of the assigned value is reported as standard error of the mean (SEM). Additionally, if the measurement uncertainty of the target value is large an automatic text is printed on the report: “The uncertainty of the assigned value is not negligible, and evaluations could be affected.”  
In case the client’s result is the only one in the method group, no assigned value will be calculated, no target area shown, and no statistics calculated. In case there are only a few results in the client’s own method group, the result can be compared to all method mean or to a group that is similar to the own method.  
Results reported with < or > -signs cannot be included in the statistics.

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External Quality Assessment Scheme

## Lipids and Lipoproteins

### Lp(a)

### Round 1, 2020

#### Specimens

Sample S001 (LQ735320011) and Sample S002 (LQ735320012) were fresh liquid unprocessed human sera (from single donors). Sample S003 (LQ735320013) was a liquid ready to use human serum intended for Lp(a) measurements.

Based on the results of this round, S001 and S002 (fresh samples) were homogeneous, stable and suitable for the external quality assessment scheme. Sample S003 based on the previous tests and the results of this round, was homogeneous, stable and suitable for the external quality assessment scheme.

The materials were sent without temperature control packaging.

#### Report info

Please see the description of the data analysis on the last page of the laboratory-specific histograms and Numerical Summary reports.

#### Comments

It is important to read the Final report first, because it contains important information of the samples and results in each round.

In the round 1, 2020 the total variations of serum cholesterol from 74 samples S001 and S002 of 6.27 mmol/L and 4.51 mmol/L were as CV% 2.8% and 3.7% as well as the total variations of triglycerides from 73 samples of 5.70 mmol/L and 1.67 mmol/L as CV% 2.2% and 7.0% being quite acceptable.

Variations of serum HDL-cholesterol from 77 and 69 samples of 1.41 mmol/L and 1.03 mmol/L were 8.7% and 12.2%. Also the variations from 69 samples of LDL-cholesterol of 3.23 mmol/L and from 70 samples 2.88 mmol/L 9.8% and 9.6% as previously.

Total variations of Lipo A1 from 25 and 24 samples of 2.05 g/L and 1.25 g/L were 4.7% and 12.4% being also acceptable. Variations of Lipo B with CV% of 12.5% and 10.3% were acceptable at both levels.

Total variation (27.9%) for Lp(a) analyses in sample S003 was higher than those for cholesterol assays in the group of immunoturbidimetry (mean 119,1 mg/L) being high compared to the previous rounds due to the results of Siemens and Thermo. The mean value of Lp(a) from the commercial manufacturer was 110 mg/L. Thus the international standardization is needed to uniform the overall CV% results between the different methods and manufacturers for Lp(a) analyses.

#### End of report

2020-03-31

#### FINAL REPORT

Product no. 2200, 2202

Subcontracting: Sample preparation

Samples sent	2020-02-10
Round closed	2020-03-05
Final report	2020-03-31

#### Request for correction

Typing errors in laboratory's result forms are on laboratory's responsibility. Labquality accepts responsibility only for result processing. Requests must be notified by writing within three weeks from the date of this letter.

#### Authorized by

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#### Expert

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