IFCC EQAS for Reference Laboratories

Lothar Siekmann

Institute of Clinical Biochemistry, Universität Bonn

Reference Institute of Bioanalysis

IFCC International Federation of Clinical Chemistry and Laboratory Medicine

DGKL Deutsche Vereinte Gesellschaft für Klinische Chemie und Laboratoriumsmedizin e.V.

http://www.dgkl-rfb.de

ifcc International Federation of Clinical Chemistry and Laboratory Medicine

DGKL Deutsche Vereinte Gesellschaft für Klinische Chemie und Laboratoriumsmedizin e.V.

eference Institute of Bioanalysis

Reference Laboratories in Laboratory Medicine

Registration Form for Ring Trial RELA 01/2004

Reference Laboratory Address:

Organisation:	Laboratory
Name of person responsible:	Name
Street:	
City:	
Post Code:	
State:	
Country:	
Phone:	
Fax:	
e-mail:	

Please return by August 15, 2004 to:

Dr. R. Kruse,
Dr. W. Geilenkeuser
DGKL
Im Mühlenbach 52 a
D-53127 Bonn - Germany

Fax: +49-228-211529
E-mail: info@dgkl-rfb.de

Please switch to next table (Measurands) !

	A	B	C
11			
12	**Measurand**	**Participation please indicate "X"**	**Number of Vials**
13			
14			
15			
16	**METABOLITES & SUBSTRATES**		
17	Total Cholesterol		
18	Total Glycerol		
19	Creatinine	x	2 x 5
20	Uric Acid		
21	Urea		
22	Glucose		
23	Total Bilirubine		
24			
25	**ELECTROLYTES**		
26	Sodium		
27	Potassium	x	2 x 5
28	Chloride		
29	Calcium		
30	Lithium		
31	Magnesium		
32			
33	**ENZYMES**		
34	ALT		
35	AST		
36	CK		
37	LDH		
38	GGT		
39	Amylase		
40			
41	Total Protein		
42			
43	**HORMONES**		
44	Aldosterone		
45	Cortisol	x	2 x 5
46	Progesterone		
47	Testosterone		
48	Estradiol-17ß		
49	Estriol (non-conjugates)		
50	Total Thyroxine (TT4)		
51	Total Tri-iodothyronine (TT3)		
52	17-Hydroxyprogesterone		
53			
54	**THERAP.DRUGS**		
55	Digoxin	x	2 x 5
56	Digitoxin		
57	Theophyllin		

Reference Laboratories in Laboratory Medicine

RELA 01/2003

	Measurand	Laboratories	
		registered	participated
METABOLITES & SUBSTRATES	Total Cholesterol	9	9
	Total Glycerol	2	2
	Creatinine	5	3
	Uric Acid	6	5
	Urea	3	3
	Glucose	4	3
	Total Bilirubine	2	2
ELECTROLYTES	Sodium	8	6
	Potassium	7	4
	Chloride	4	3
	Calcium	4	1
	Lithium	5	2
	Magnesium	4	1
ENZYMES	ALT	12	10
	AST	8	4
	CK	9	4
	LDH	9	4
	GGT	9	5
	Amylase	6	2
PROTEINS	Total Protein	3	2
	Albumin	4	3
HORMONES	Aldosterone	1	1
	Cortisol	3	3
	Progesterone	3	3
	Testosterone	1	1
	Estradiol-17ß	1	1
	Estriol (non-conjugates)	1	1
	Total Thyroxine (TT4)	1	1
	Total Tri-iodothyronine (TT3)		
	17-Hydroxyprogesterone	1	1
THERAP.DRUGS	Digoxin	1	1
	Digitoxin	3	3
	Theophyllin		
Glyc. Proteins	HbA1c	4	3
	SUM	143	97

Reference Laboratories in Laboratory Medicine

RELA 01/2004

	Measurand	Laboratories	
		registered	participated
METABOLITES & SUBSTRATES	Total Cholesterol	8	
	Total Glycerol	2	
	Creatinine	13	
	Uric Acid	6	
	Urea	3	
	Glucose	6	
	Total Bilirubine	3	
ELECTROLYTES	Sodium	6	
	Potassium	12	
	Chloride	4	
	Calcium	3	
	Lithium	4	
	Magnesium	3	
ENZYMES	ALT	8	
	AST	8	
	CK	5	
	LDH	19	
	GGT	10	
	Amylase	7	
PROTEINS	Total Protein	7	
	Albumin		
HORMONES	Aldosterone	1	
	Cortisol	8	
	Progesterone	2	
	Testosterone	1	
	Estradiol-17ß	1	
	Estriol (non-conjugates)	1	
	Total Thyroxine (TT4)	1	
	Total Tri-iodothyronine (TT3)	1	
	17-Hydroxyprogesterone	1	
THERAP.DRUGS	Digoxin	4	
	Digitoxin	2	
	Theophyllin	1	
	SUM	161	0

RELA 1/2003

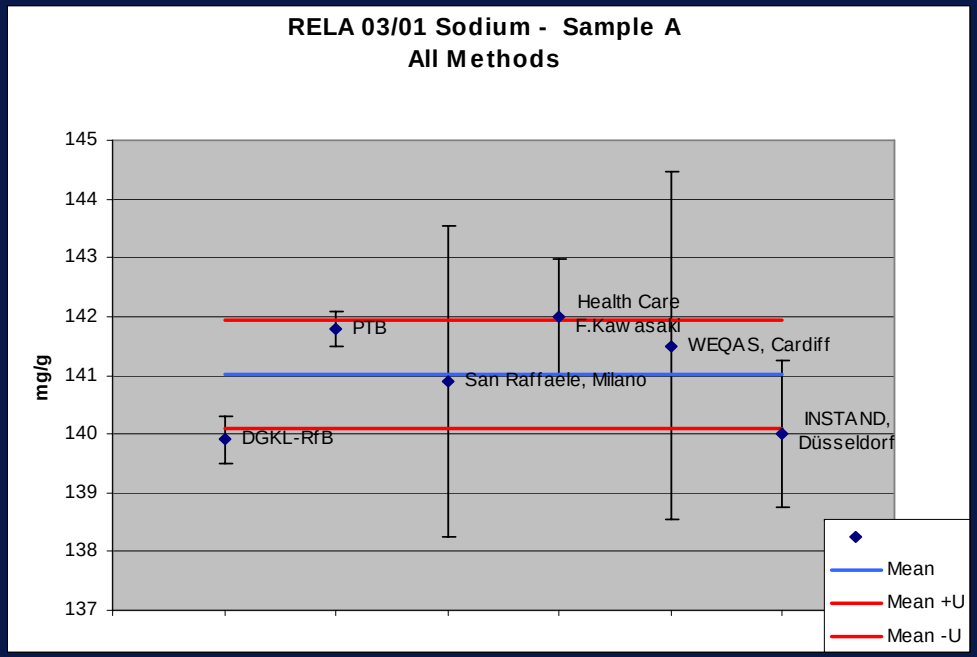
Sodium [mmol/l]

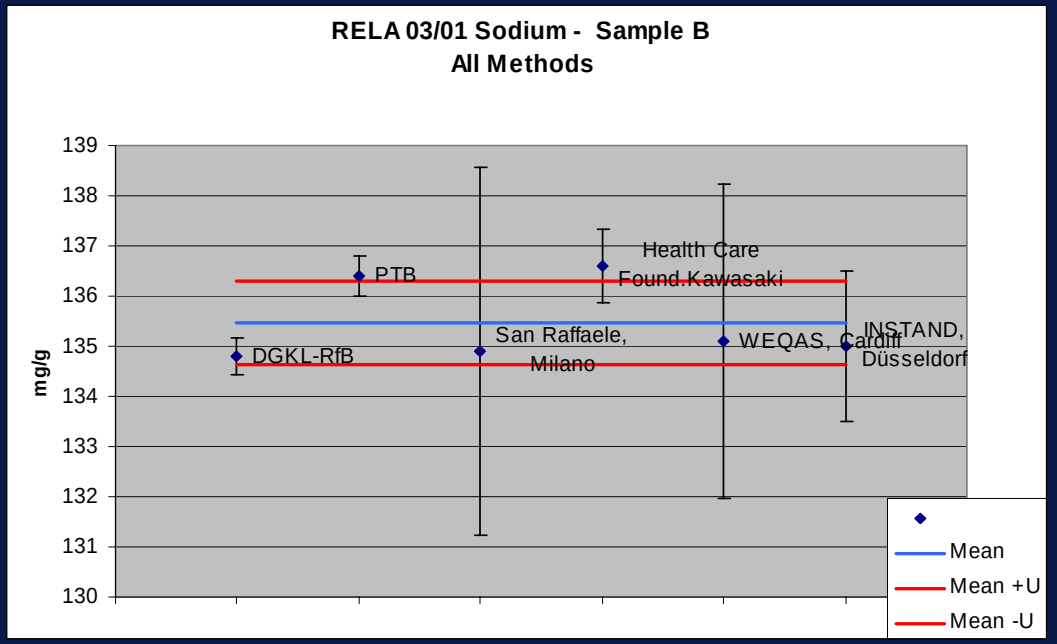
Lab	A	p.e.u.	B	p.e.u.	method
02	139,9	0,4	134,8	0,36	flame atomic emission
08	141,8	0,3	136,4	0,4	ion chromatography
16	140,9	2,64	134,9	3,652	flame atomic emission
19	142,0	0,971	136,6	0,721	flame atomic emission
25	141,513	2,966	135,119	3,130	flame atomic emission
27	140,0	1,254	135,0	1,490	flame atomic emission

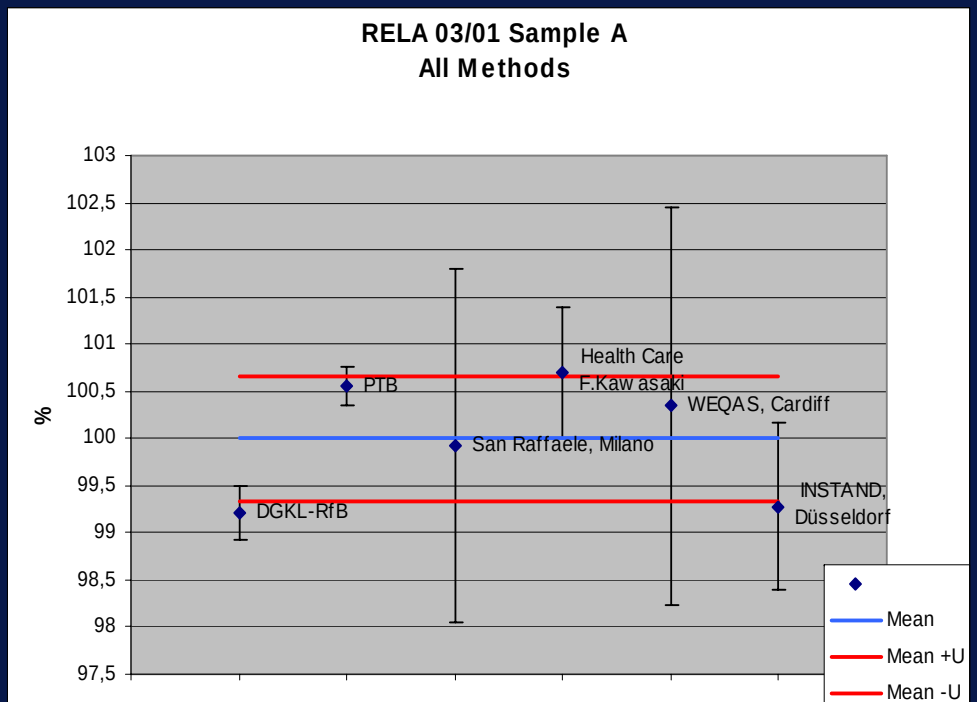
Sodium in Human Serum

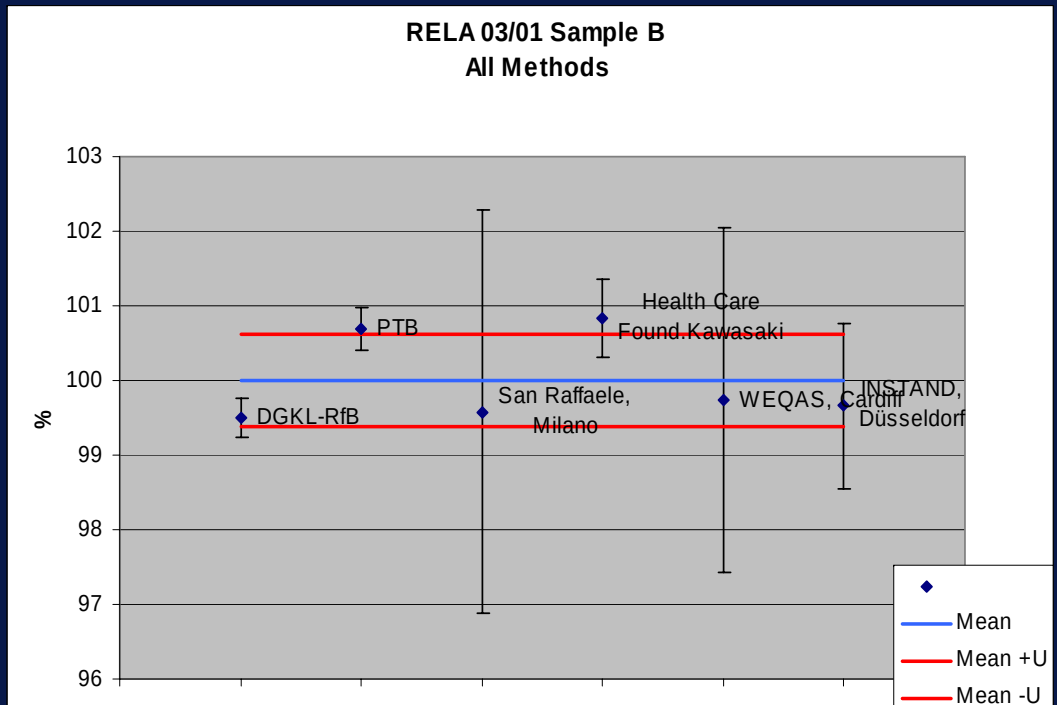
IFCC RELA-1

Meas. Principle	All Results	
	Sample A	**Sample B**
	mmol/l	**mmol/l**
M (all)	**141,24**	**135,60**
n	6	6
SD (all)	0,81	0,83
RSD (%)	**0,57**	**0,61**


RELA 03/01 Sodium - Sample A
All Methods
mg/g
145
144
143
142
141
140
139
138
137
PTB
Health Care
F.Kawasaki
WEQAS, Cardiff
San Raffaele, Milano
DGKL-RfB
INSTAND,
Düsseldorf
Mean
Mean +U
Mean -U

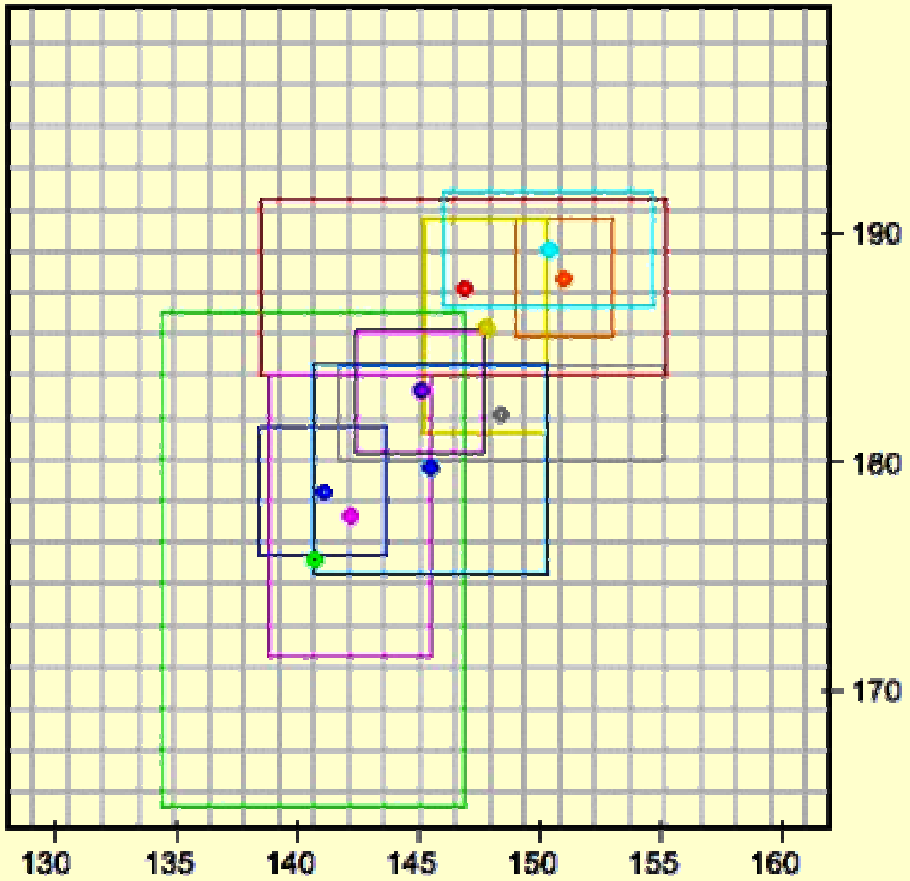

RELA 03/01 Sodium - Sample B
All Methods
mg/g
139
138
137
136
135
134
133
132
131
130
PTB
Health Care
Found.Kawasaki
San Raffaele,
Milano
WEQAS, Cardiff
INSTAND,
Düsseldorf
DGKL-RfB
Mean
Mean +U
Mean -U


RELA 03/01 Sample A
All Methods
%
103
102,5
102
101,5
101
100,5
100
99,5
99
98,5
98
97,5
PTB
Health Care
F.Kawasaki
WEQAS, Cardiff
San Raffaele, Milano
DGKL-RfB
INSTAND,
Düsseldorf
Mean
Mean +U
Mean -U


RELA 03/01 Sample B
All Methods
%
103
102
101
100
99
98
97
96
PTB
Health Care
Found.Kawasaki
San Raffaele,
Milano
WEQAS, Cardiff
INSTAND,
Düsseldorf
DGKL-RfB
Mean
Mean +U
Mean -U

RELA 1/2003

ALT [U/l]

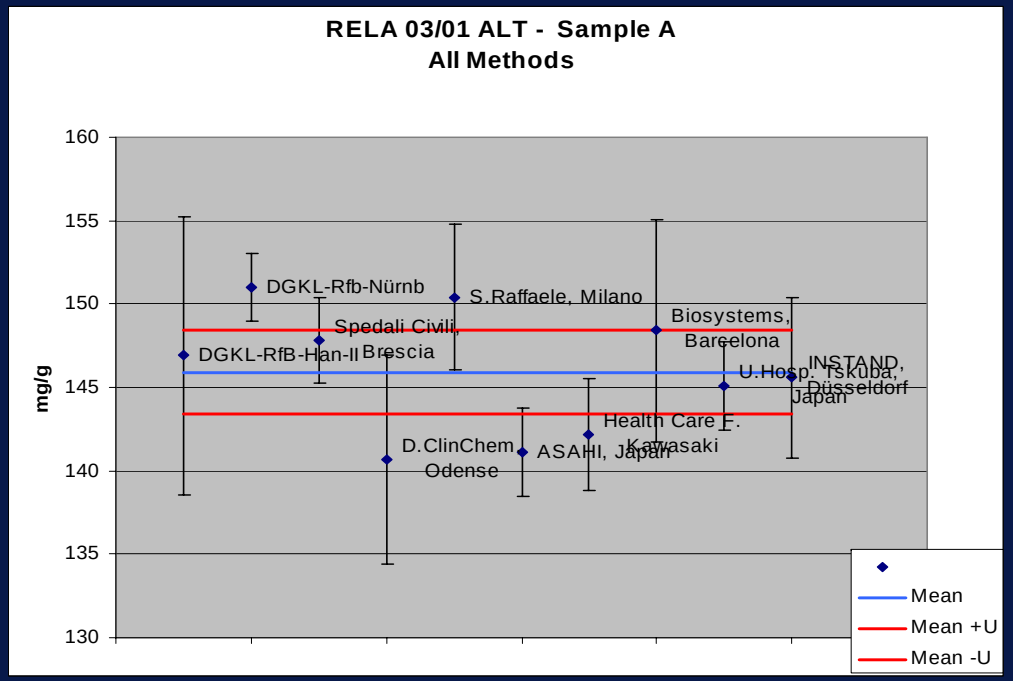


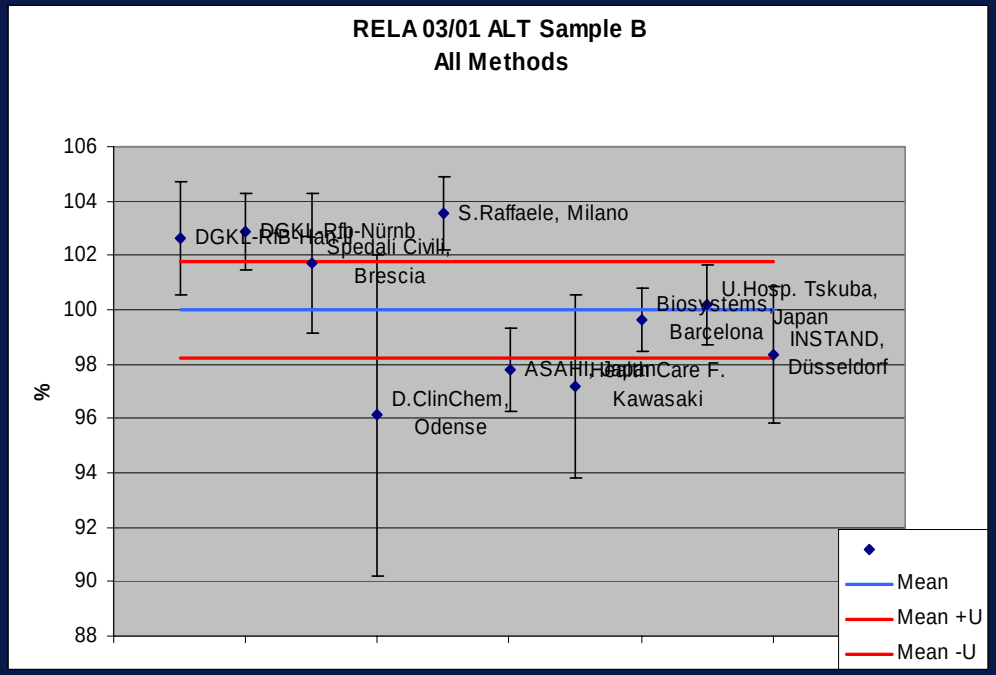
Lab	A	p.e.u.	B	p.e.u.	method
03	146,9	8,32	187,6	3,84	kinetic spectrophotometry (IFCC)
04	151,0	2,024	188,0	2,596	kinetic spectrophotometry (IFCC)
06	147,8	2,552	185,9	4,73	kinetic spectrophotometry (IFCC)
13	140,7	6,255	175,7	10,786	kinetic spectrophotometry (IFCC)
16	150,4	4,369	189,3	2,467	kinetic spectrophotometry (IFCC)
17	141,1	2,664	178,7	2,808	kinetic spectrophotometry (JSCC
19	142,2	3,341	177,6	6,168	kinetic spectrophotometry (IFCC)
23	148,4	6,699	182,1	2,079	kinetic spectrophotometry (IFCC)
26	145,1	2,64	183,1	2,712	kinetic spectrophotometry (JSCC
27	145,56	4,803	179,7	4,587	kinetic spectrophotometry (IFCC)

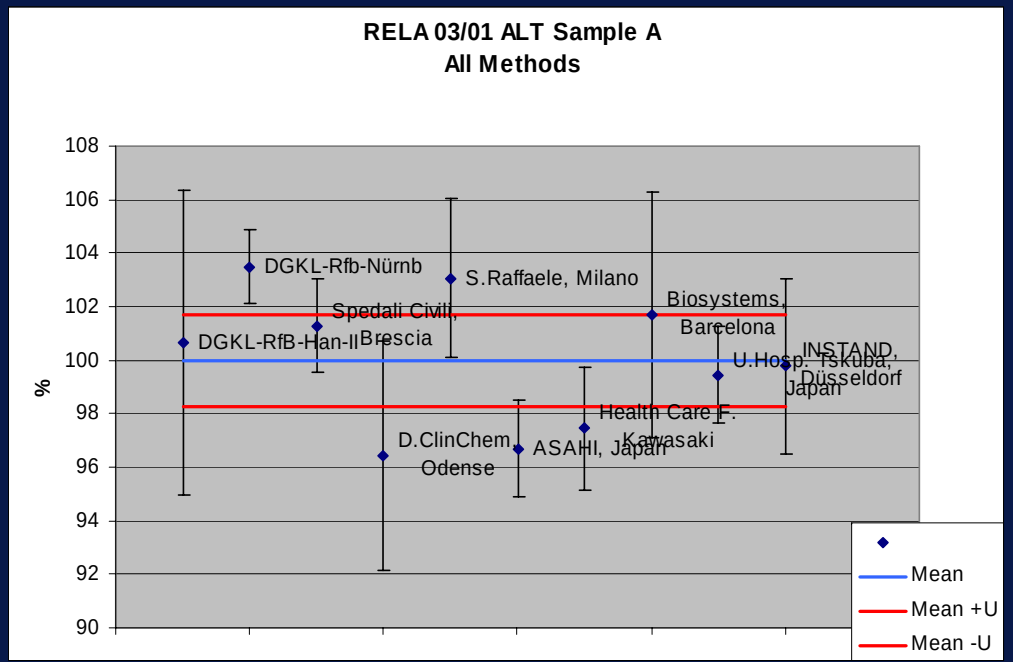
ALT in Human Serum

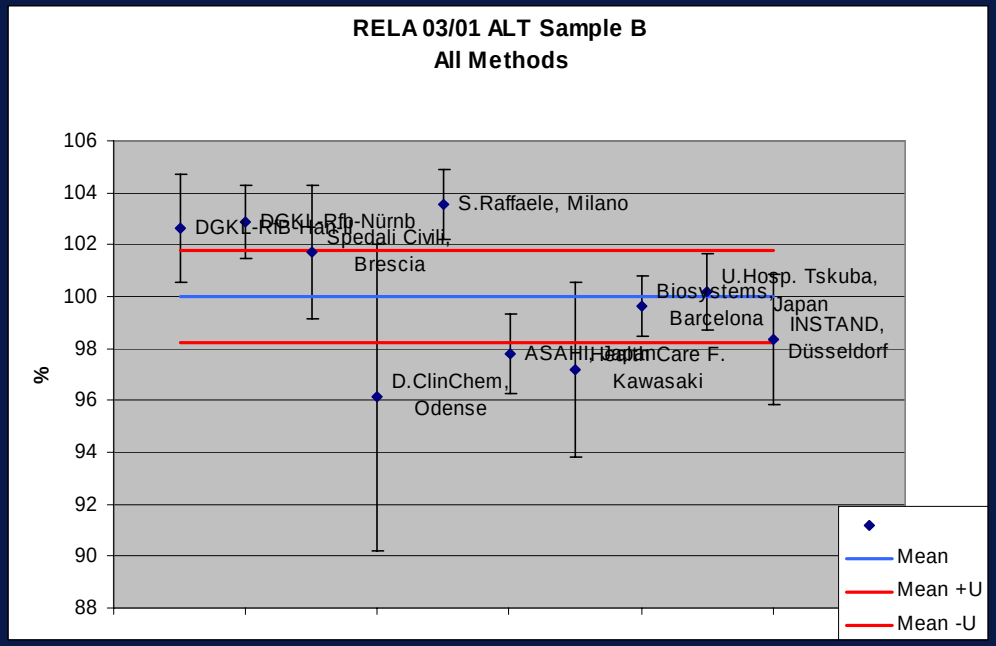
IFCC RELA-1

Meas. Principle	All Results		'Certification Group' Laboratories	
	Sample A	Sample B	Sample A	Sample B
	U/L	U/L	U/L	U/L
M (all)	**145,81**	**182,23**	**146,57**	**183,28**
n	10	10	7	7
SD (all)	3,88	4,75	4,55	5,39
RSD (%)	**2,66**	**2,61**	**3,10**	**2,94**


RELA 03/01 ALT - Sample A
All Methods
mg/g
160
155
150
145
140
135
130
DGKL-Rfb-Nürnb
Spedali Civili, Brescia
DGKL-RfB-Han-II
S.Raffaele, Milano
Biosystems, Barcelona
U.Hosp. Tskuba, Japan
INSTAND, Düsseldorf
D.ClinChem Odense
ASAHI, Japan
Health Care F. Kawasaki
Mean
Mean +U
Mean -U

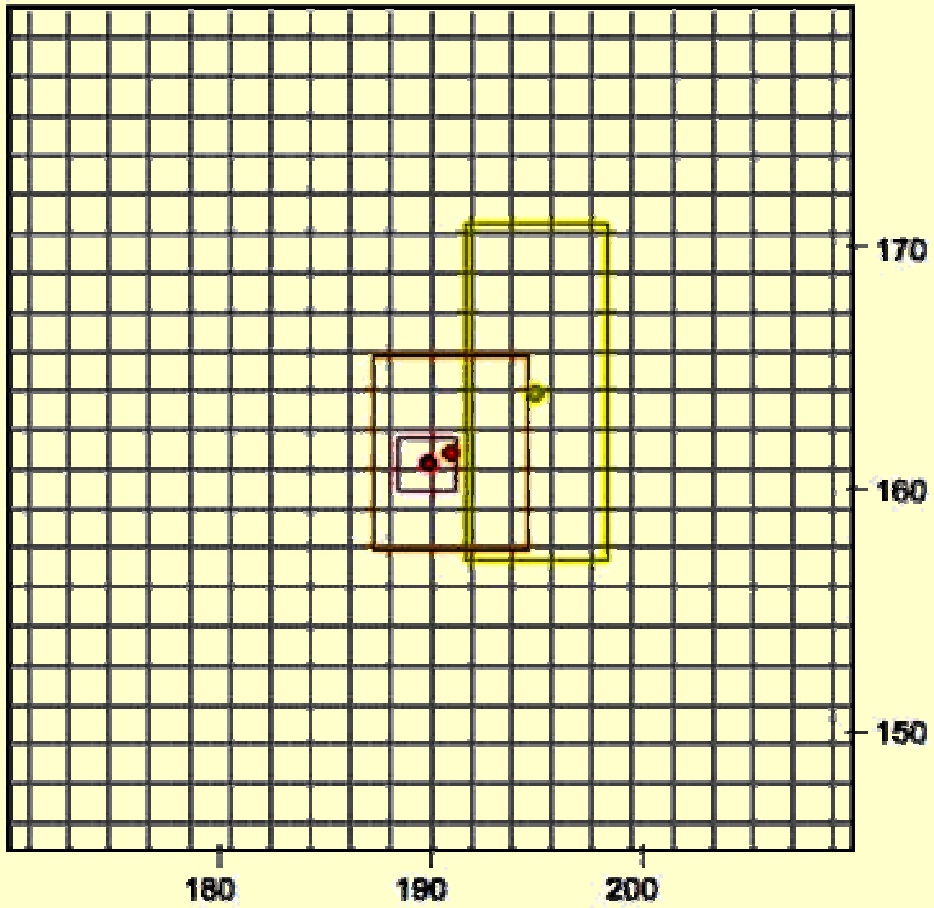

RELA 03/01 ALT Sample B
All Methods
%
106
104
102
100
98
96
94
92
90
88
DGKL-Rfb-Nürnb
Spedali Civili, Brescia
DGKL-RfB-Han-II
S.Raffaele, Milano
Biosystems, Barcelona
U.Hosp. Tskuba, Japan
INSTAND, Düsseldorf
D.ClinChem, Odense
ASAHI, Japan
Health Care F. Kawasaki
Mean
Mean +U
Mean -U


RELA 03/01 ALT Sample A
All Methods
%
108
106
104
102
100
98
96
94
92
90
DGKL-Rfb-Nürnb
Spedali Civili, Brescia
DGKL-RfB-Han-II
S.Raffaele, Milano
Biosystems, Barcelona
U.Hosp. Tskuba, Japan
INSTAND, Düsseldorf
D.ClinChem Odense
ASAHI, Japan
Health Care F. Kawasaki
Mean
Mean +U
Mean -U


RELA 03/01 ALT Sample B
All Methods
%
106
104
102
100
98
96
94
92
90
88
DGKL-Rfb-Nürnb
Spedali Civili, Brescia
DGKL-RfB-Han-II
S.Raffaele, Milano
Biosystems, Barcelona
U.Hosp. Tskuba, Japan
INSTAND, Düsseldorf
D.ClinChem, Odense
ASAHI, Japan
Health Care F. Kawasaki
Mean
Mean +U
Mean -U

RELA 1/2003

Glucose [mg/dl]



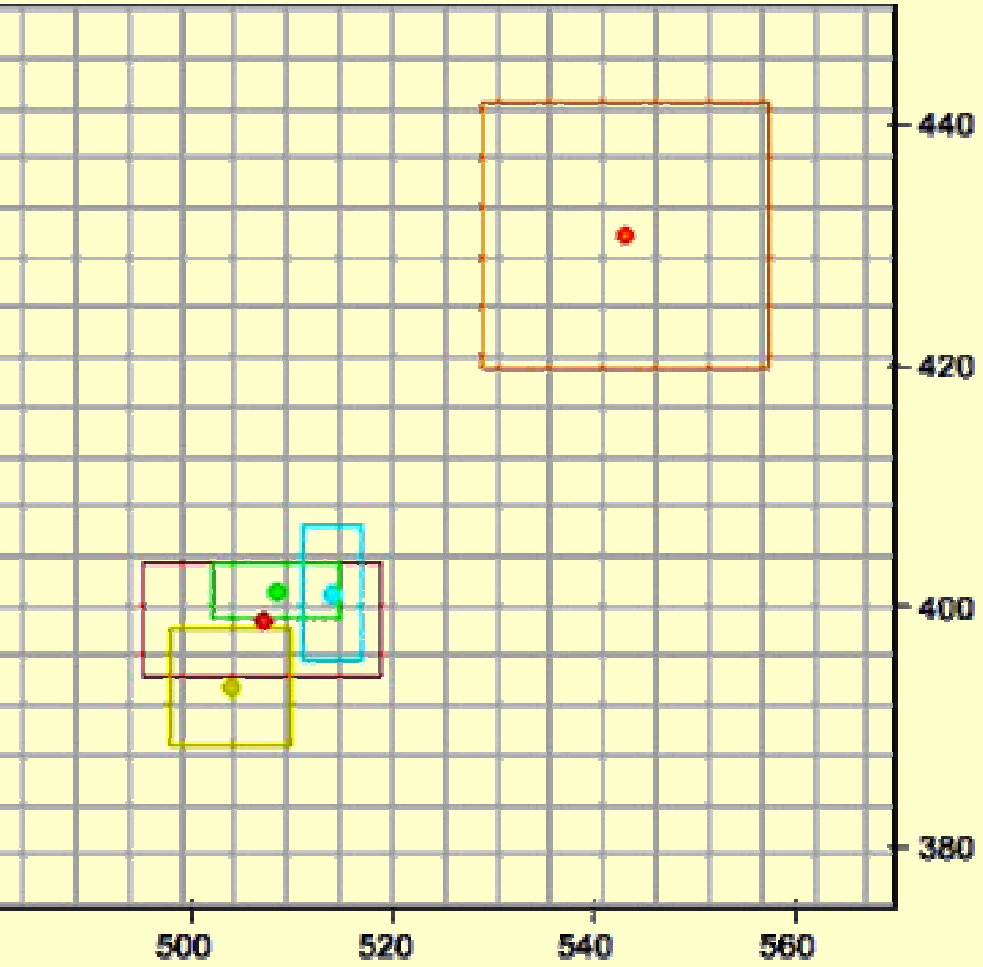
Lab	A	p.e.u.	B	p.e.u.	method
03 ●	189,891	1,377	161,027	1,067	ID-MS
05 ◆	190,96	3,652	161,49	3,982	ID-MS
24 ●	195,0	3,36	164,0	6,96	spectrometry (hexokinase)

Glucose in Human Serum

	CCQM-K11		IFCC RELA-1			
Meas. Principle	**IDMS**		**IDMS**		**Hexokinase**	
	Sample A	**Sample B**	**Sample A**	**Sample B**	**Sample A**	**Sample B**
	mg/g	**mg/g**	**mg/dl**	**mg/dl**	**mg/dl**	**mg/dl**
M (all)	**0,7762**	**1,4816**	**190,43**	**161,26**	**195,00**	**164,00**
n	3	3	2	2	1	1
SD	0,0035	0,0300	0,76	0,33		
RSD (%)	**0,46**	**2,03**	**0,40**	**0,20**		
Range (%)	**0,89**	**3,96**	**0,56**	**0,29**		
				Bias (%):	**2,4**	**1,7**

RELA 1/2003

Uric acid [umol/l]



Lab	A	p.e.u.	B	p.e.u.	method
01	507,0	11,8	398,8	4,781	ID-MS
09	543,1	14,2	430,7	11,0	HPLC
19	503,837	5,944	393,195	4,788	ID-MS
22	508,427	6,268	401,208	2,293	ID-MS
27	514,0	2,981	401,0	5,628	ID-MS

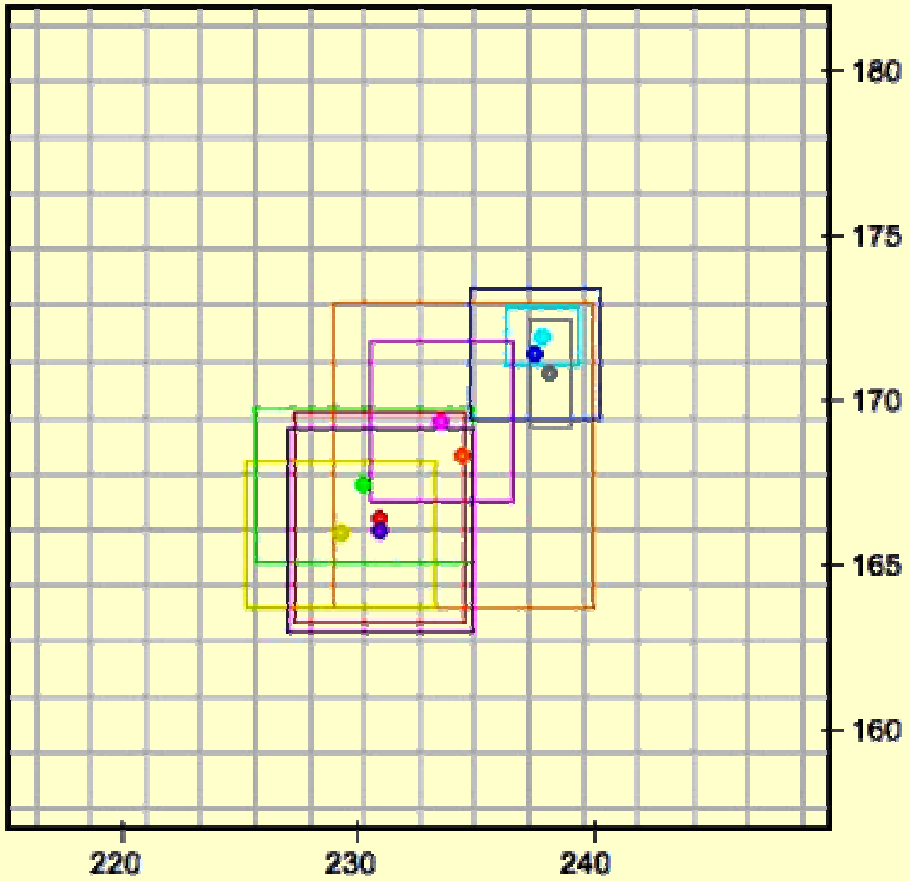
Uric Acid in Human Serum

IFCC RELA-1

Meas. Principle	IDMS		HPLC	
	Sample A	Sample B	Sample A	Sample B
	µmol/l	µmol/l	µmol/l	µmol/l
M (all)	**508,73**	**398,47**	**543,10**	**430,70**
n	4	4	1	1
SD (all)	5,11	4,56		
RSD (%)	**1,00**	**1,14**		
Bias (%):			**6,8**	**8,1**

RELA 1/2003

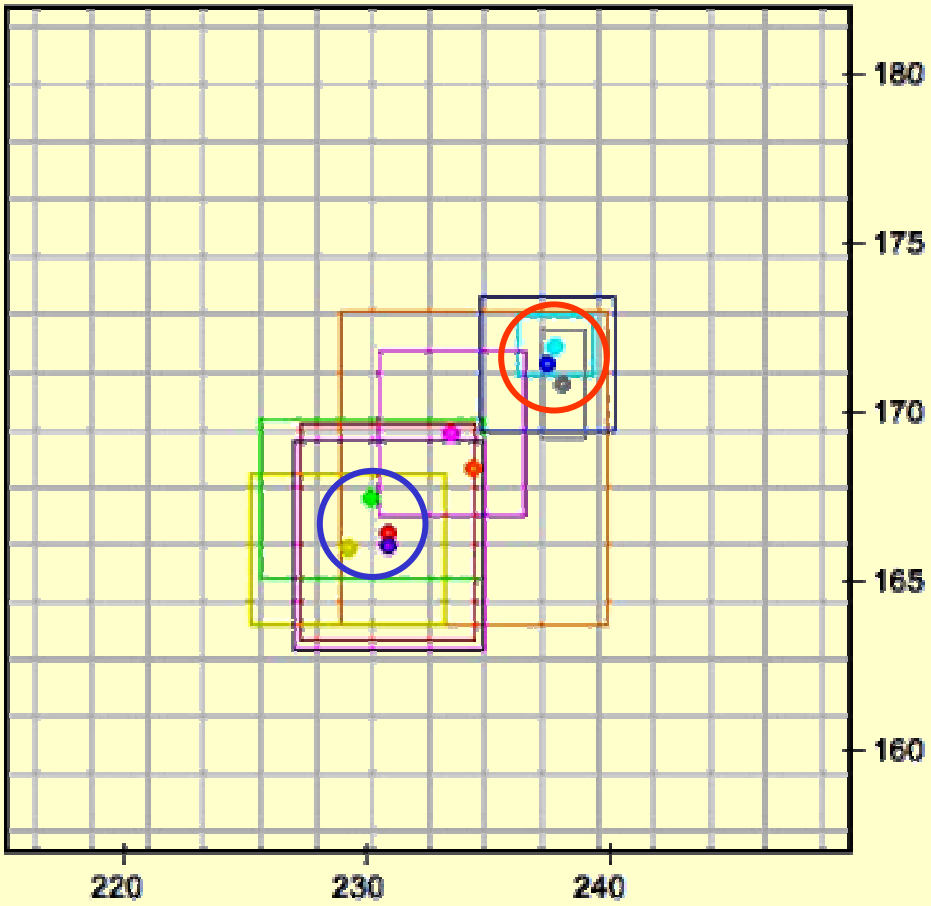
Total cholesterol [mg/dl]



Lab	A	p.e.u.	B	p.e.u.	method
01	230,888	3,572	166,409	3,175	ID-MS
05	234,43	5,523	168,31	4,641	ID-MS
08	229,227	4,028	165,907	2,262	ID-MS
11	230,2	4,613	167,4	2,369	ID-MS
12	237,8	1,558	171,9	0,890	spectrometry (Abell-Kendall)
16	237,490	2,764	171,389	1,962	spectrometry (Abell-Kendall)
18	233,5	3,08	169,3	2,42	HPLC
19	238,1	0,860	170,8	1,610	spectrometry (Abell-Kendall)
27	230,888	3,919	166,023	3,105	ID-MS

RELA 1/2003

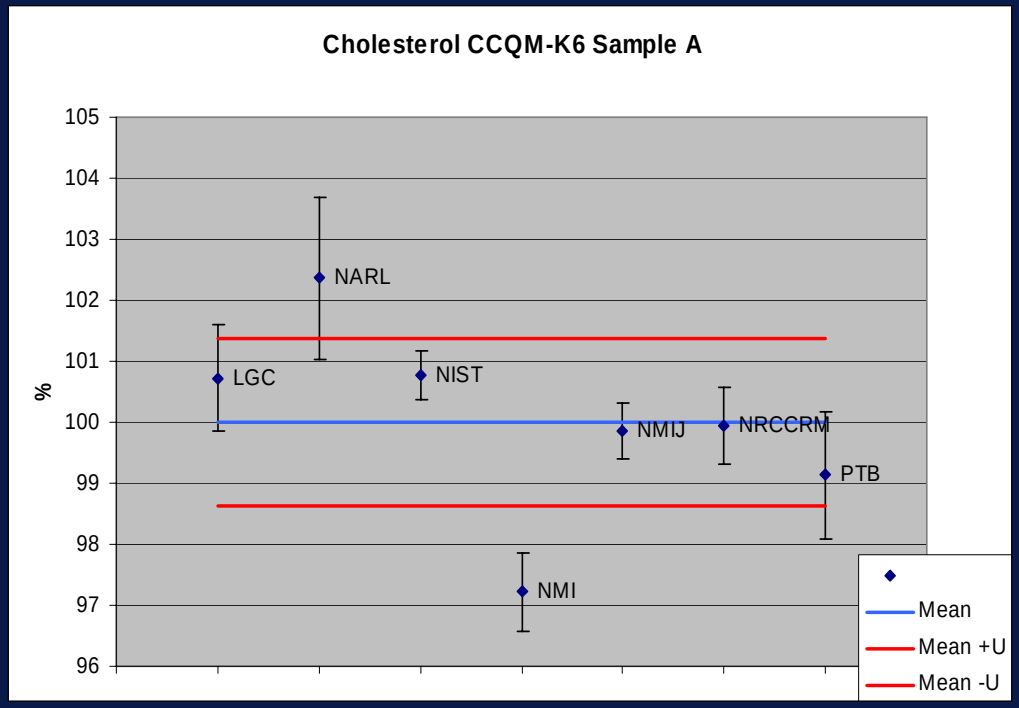
Total cholesterol [mg/dl]

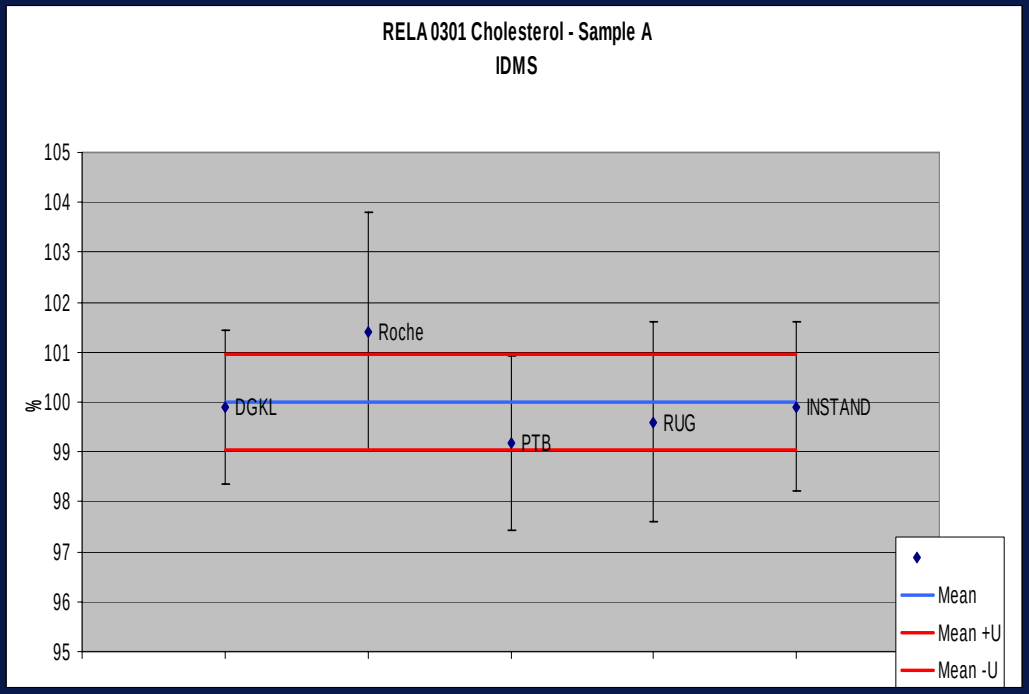


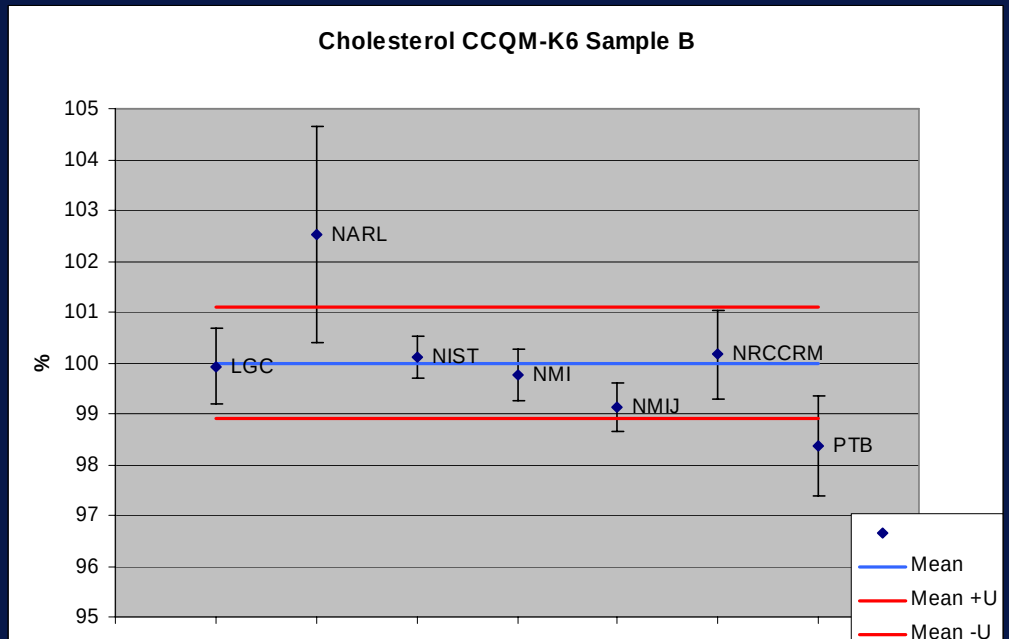
Lab	A	p.e.u.	B	p.e.u.	method
01	230,888	3,572	166,409	3,175	ID-MS
05	234,43	5,523	168,31	4,641	ID-MS
08	229,227	4,028	165,907	2,262	ID-MS
11	230,2	4,613	167,4	2,369	ID-MS
12	237,8	1,558	171,9	0,890	spectrometry (Abell-Kendall)
16	237,490	2,764	171,389	1,962	spectrometry (Abell-Kendall)
18	233,5	3,08	169,3	2,42	HPLC
19	238,1	0,860	170,8	1,610	spectrometry (Abell-Kendall)
27	230,888	3,919	166,023	3,105	ID-MS

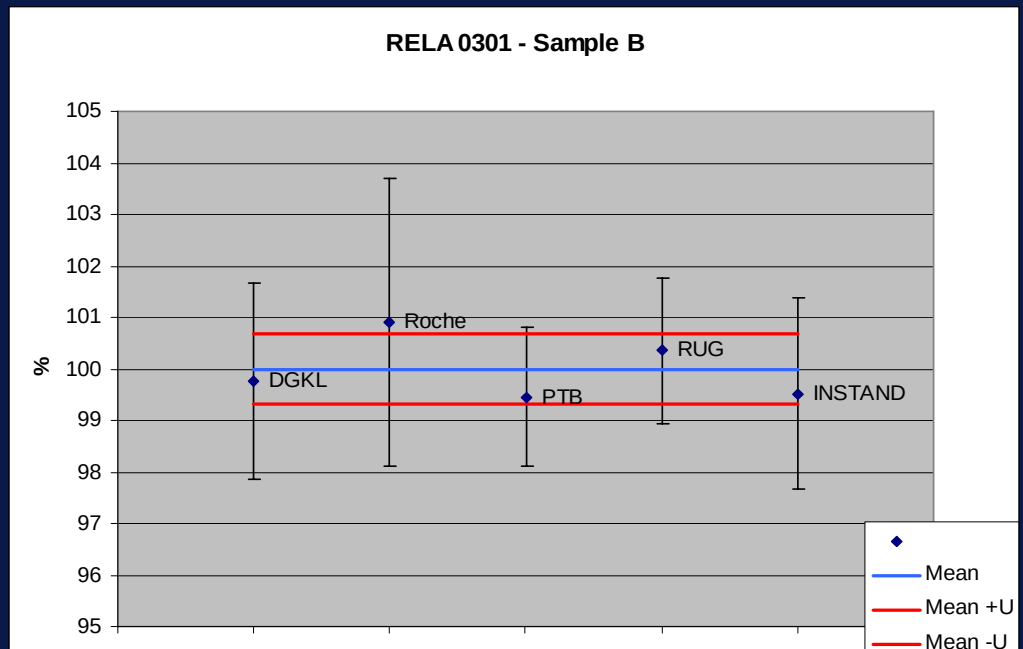
Cholesterol in Human Serum

	CCQM-K6		IFCC RELA-1			
Meas. Principle	IDMS		IDMS		Abell-Kendall	
	Sample A	**Sample B**	**Sample A**	**Sample B**	**Sample A**	**Sample B**
	mg/g	**mg/g**	**mg/dl**	**mg/dl**	**mg/dl**	**mg/dl**
M (all)	**2,1981**	**1,7331**	**231,13**	**166,81**	**237,80**	**171,36**
n	7	7	5	5	3	3
SD	0,0324	0,0206	1,76	0,92	0,25	0,45
RSD (%)	**1,47**	**1,19**	**0,76**	**0,55**	**0,10**	**0,26**
Range (%)	**5,14**	**4,15**	**2,25**	**1,44**	**0,26**	**0,64**
				Bias (%):	**2,9**	**2,7**


Cholesterol CCQM-K6 Sample A
%
105
104
103
102
101
100
99
98
97
96
NARL
LGC
NIST
NMIJ
NRCCRM
PTB
NMI
Mean
Mean +U
Mean -U


RELA 0301 Cholesterol - Sample A
IDMS
%
105
104
103
102
101
100
99
98
97
96
95
Roche
DGKL
PTB
RUG
INSTAND
Mean
Mean +U
Mean -U


Cholesterol CCQM-K6 Sample B
%
105
104
103
102
101
100
99
98
97
96
95
NARL
LGC
NIST
NMI
NMIJ
NRCCRM
PTB
Mean
Mean +U
Mean -U


RELA 0301 - Sample B
%
105
104
103
102
101
100
99
98
97
96
95
Roche
DGKL
PTB
RUG
INSTAND
Mean
Mean +U
Mean -U

RELA 1/2003

Progesterone [nmol/l]

Lab	A	p.e.u.	B	p.e.u.	method
01 ●	12,48	0,294	31,1	1,062	ID-MS
11 ●	12,413	0,357	30,883	0,455	ID-MS
27 ●	11,8	0,254	30,1	0,800	ID-MS

RELA 1/2003

Digitoxine [ug/l]

Lab	A	p.e.u.	B	p.e.u.	method
01 ●	29,328	0,542	15,557	0,235	ID-MS
08 ●	30,099	1,024	15,0	0,578	ID-MS
27 ●	26,488	1,485	14,198	0,792	ID-MS

DGKL Homepage for Ring Trial Results

http:/www.dgkl-rfb.de

Select language (Top right)

For reference laboratory results

click to:

RELA 1/2003 survey