
Wadsworth Center

New York State Department of Health

ERYTHROCYTE PROTOPORPHYRIN

Proficiency Test Report

Event #1, 2010

June 7, 2010

STATE OF NEW YORK DEPARTMENT OF HEALTH

Wadsworth Center The Governor Nelson A. Rockefeller Empire State Plaza P.O. Box 509 Albany, New York 12201-0509

Richard F. Daines, M.D.
Commissioner

James W. Clyne, Jr.,
Executive Deputy Commissioner

June 7, 2010

TOXICOLOGY - ERYTHROCYTE PROTOPORPHYRIN Event #1, 2010

"2010 Educational Quality Assurance Program"

We continue our temporary suspension of the regulatory grading process for erythrocyte protoporphyrin (EP) by extraction and hematofluorometry (HF) methods.

Dear Laboratory Director:

Test materials were prepared from whole goat blood. Five animals were dosed with lead acetate prior to the test to generate elevated erythrocyte protoporphyrin (EP) levels. On February 23rd, 2010, 400-500 mL of blood were drawn from each animal into separate plastic blood bags containing 750 mg K₂EDTA. Each animal yielded a separate blood pool. Aliquots of whole blood were transferred into additive-free evacuated glass tubes and shipped to extraction participants on February 24th, 2010. The remaining blood was prepared for HF participants. To eliminate fluorescent artifacts, erythrocytes were separated from plasma, washed with normal saline and resuspended in a citrate-glycerol solution. Aliquots of the blood-product were transferred to labeled additive-free evacuated glass tubes and shipped to all HF participants on March 24th, 2010.

Extraction and Hematofluorometry Methods

Overall mean values were calculated using results from all participants (peer group) after outlier deletion for both the reference extraction method and the Helena ProtoFluor-Z instruments (reported as $\mu\text{mol ZPP/mol heme}$). Upward and downward indicator arrows next to individual results should be used as part of a laboratory's on-going internal quality assessment scheme.

Note to Aviv Participants

An evaluation of the results submitted by participants using Aviv Biomedical Inc. hematofluorometers will be issued separately.

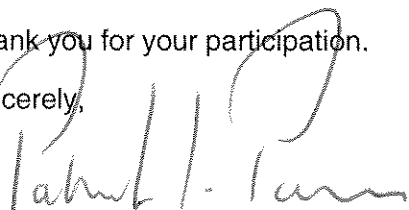
TOXIERPR 2010 Event #2

The next Educational Event for EP will be shipped June 9th, 2010 for extraction methods and July 7th, 2010 for HF methods. Contact Wadsworth laboratory staff at (518) 474-4484 if the PT materials have not arrived within five days of the scheduled mail out date.

Should you have any questions, feel free to contact us at trcl@wadsworth.org. Thank you once again for your patience as we attempt to resolve this difficult issue.

Thank you for your participation.

Sincerely,



Patrick J. Parsons, Ph.D.
Section Head, Proficiency Testing Program for Blood Lead, EP and Trace Elements

**New York State Department of Health
Erythrocyte Protoporphyrin - Extraction Test Results, 2010 Event #1
PERFORMANCE OF PARTICIPATING LABORATORIES**

Lab Code	Method	Results ($\mu\text{g/dL}$ whole blood)					Normalized Mean	
		EP10-01	EP10-02	EP10-03	EP10-04	EP10-05		
Mean Values:		47	33	184	125	77		
108	EtOAc	49	36	188	130	80	1.05	
109	EtOAc	46	32	178	122	76	0.98	
110	EtOAc	48	34	191	133	82	1.04	
168	EtOAc	47	32	163	124	76	0.97	
179	EtOAc	44	30	202	114	71	0.96	
206	EtOAc	45	33	182	127	77	0.99	
445	EtOAc	37 ↓	27	136 ↓	99 ↓	56 ↓	0.77	Info

Notes: ↑ reported value outside upper limit
↓ reported value outside lower limit

Normalized mean: The average of each reported result divided by the corresponding target value. It measures bias.
Info only: results included for informational purposes only.

New York State Department of Health
Erythrocyte Protoporphyrin - Extraction Test Results, 2010 Event #1
STATISTICAL SUMMARY

Lab Code	Method	Results ($\mu\text{g/dL}$ whole blood)				
		EP10-01	EP10-02	EP10-03	EP10-04	EP10-05
108	EtOAc	49	36	188	130	80
109	EtOAc	46	32	178	122	76
110	EtOAc	48	34	191	133	82
168	EtOAc	47	32	163	124	76
179	EtOAc	44	30	202	114	71
206	EtOAc	45	33	182	127	77
Number of Sample Measurements:		6	6	6	6	6
Mean values:		47	33	184	125	77
Standard Deviation:		1.9	2.0	13.2	6.7	3.8
RSD (%):		4.0	6.2	7.2	5.4	4.9
Acceptable Range:						
Upper Limit:		54	39	212	144	89
Lower Limit:		40	27	156	106	65

notes: Results reported as less than the detection limits are treated as zero for statistical and grading purposes.

**New York State Department of Health
Erythrocyte Protoporphyrin - Extraction Test Results, 2010 Event #1
STATISTICAL SUMMARY BY METHOD**

	Results ($\mu\text{g/dL}$ whole blood)				
	EP10-01	EP10-02	EP10-03	EP10-04	EP10-05
EtOAc					
Number of Sample Measurements:	7	7	7	7	7
Mean:	45.1	32.0	177.1	121.3	74.0
Standard Deviation:	4.0	2.9	21.8	11.6	8.7
RSD (%):	8.8	9.0	12.3	9.5	11.7
All Laboratories					
Number of Sample Measurements:	7	7	7	7	7
Mean:	45.1	32.0	177.1	121.3	74.0
Standard Deviation:	4.0	2.9	21.8	11.6	8.7
RSD (%):	8.8	9.0	12.3	9.5	11.7

notes: ? Insufficient data for calculation.

New York State Department of Health
Erythrocyte Protoporphyrin - Hematofluorometer Test Results, 2010 Event #1
PERFORMANCE OF PARTICIPATING LABORATORIES

*An evaluation of the results submitted by participants using
Aviv Biomedical Inc. hematofluorometers
will be issued separately*

New York State Department of Health
Erythrocyte Protoporphyrin - Hematofluorometer (ZPP) Test Results, 2010 Event #1
PERFORMANCE OF PARTICIPATING LABORATORIES

Lab Code	Method	Results ($\mu\text{mol ZPP/mol heme}$)					Normalized Mean
		HF10-01	HF10-02	HF10-03	HF10-04	HF10-05	
Mean Values:		60	46	89	149	197	
110	Helena ZPP	51	41	81	134	177	0.89
197	Helena ZPP	76 ↑	56 ↑	108 ↑	173 ↑	226	1.20
201	Helena ZPP	61	52	92	150	197	1.04
204	Helena ZPP	62	48	90	152	197	1.02
206	Helena ZPP	58	42	88	142	195	0.96
208	Helena ZPP	57	44	87	150	213	0.99
290	Helena ZPP	61	47	89	149	194	1.00
333	Helena ZPP	63	45	91	154	200	1.02
340	Helena ZPP	60	45	83	143	179	0.96
401	Helena ZPP	61	45	89	152	198	1.00
405	Helena ZPP	61	46	91	152	201	1.02
460	Helena ZPP	69	51	99	166	221	1.12

Notes: ↑ reported value outside upper limit
↓ reported value outside lower limit

Normalized mean: The average of each reported result divided by the corresponding target value. It measures bias.
Info only: results included for informational purposes only.

New York State Department of Health
Erythrocyte Protoporphyrin - Hematofluorometer (ZPP) Test Results, 2010 Event #1
STATISTICAL SUMMARY

Lab Code	Method	Results ($\mu\text{mol ZPP/mol heme}$)				
		HF10-01	HF10-02	HF10-03	HF10-04	HF10-05
110	Helena ZPP	51	41	81	134	177
201	Helena ZPP	61	52	92	150	197
204	Helena ZPP	62	48	90	152	197
206	Helena ZPP	58	42	88	142	195
208	Helena ZPP	57	44	87	150	213
290	Helena ZPP	61	47	89	149	194
333	Helena ZPP	63	45	91	154	200
340	Helena ZPP	60	45	83	143	179
401	Helena ZPP	61	45	89	152	198
405	Helena ZPP	61	46	91	152	201
460	Helena ZPP	69	51	99	166	221
Number of Sample Measurements:		11	11	11	11	11
Mean values:		60	46	89	149	197
Standard Deviation:		4.4	3.4	4.7	8.1	12.6
RSD (%):		7.2	7.3	5.3	5.4	6.4
Acceptable Range:						
Upper Limit:		69	53	102	171	227
Lower Limit:		51	39	76	127	167

notes: Results reported as less than the detection limits are treated as zero for statistical and grading purposes.

**New York State Department of Health
Erythrocyte Protoporphyrin - Hematofluorometer (ZPP) Test Results, 2010 Event #1**

STATISTICAL SUMMARY BY METHOD

	Results ($\mu\text{mol ZPP/mol heme}$)				
	HF10-01	HF10-02	HF10-03	HF10-04	HF10-05
Helena ZPP					
Number of Sample Measurements:	12	12	12	12	12
Mean:	61.7	46.8	90.7	151.4	199.8
Standard Deviation:	6.1	4.3	7.1	10.3	14.6
RSD (%):	10.0	9.2	7.8	6.8	7.3
All Laboratories					
Number of Sample Measurements:	12	12	12	12	12
Mean:	61.7	46.8	90.7	151.4	199.8
Standard Deviation:	6.1	4.3	7.1	10.3	14.6
RSD (%):	10.0	9.2	7.8	6.8	7.3

notes: ? Insufficient data for calculation.

New York State Department of Health
Erythrocyte Protoporphyrin - Extraction Test Results, 2010 Event #1

METHOD NOTES

ATOMIC SPECTROMETRY METHODS

- A-1 ETAAS-Z (Electrothermal atomic absorption spectrometry with Zeeman background correction)
- A-2 ETAAS other (i.e., D₂, S-H background correction)
- A-3 FAAS (Flame atomic absorption spectrometry)
- A-4 CV-AAS (Cold vapor atomic absorption spectrometry)
- A-5 HG-AAS (Hydride generation atomic absorption spectrometry)
- A-6 AFS (Atomic fluorescence spectrometry)
- A-7 Other

INDUCTIVELY COUPLED PLASMA

- P-1 ICP-MS (Inductively coupled plasma - mass spectrometry)
- P-2 DRC/CC-ICP-MS (ICP-MS used in the Dynamic Reaction Cell or Collision Cell mode)
- P-3 ICP-AES/OES (ICP atomic/optical emission spectrometry)
- P-4 HR-ICP-MS (High resolution ICP-MS)
- P-5 ETV-ICP-MS (Electrothermal vaporization ICP-MS)
- P-6 ID-ICP-MS (Isotope dilution ICP-MS)
- P-7 Other

ELECTROCHEMICAL METHODS

- E-1 ASV (Anodic stripping voltammetry without digestion)
- E-2 ASV-LeadCare® (Anodic stripping voltammetry using the ESA LeadCare® system)
- E-3 Fluoride specific electrode
- E-4 Other

MOLECULAR FLUORIMETRY

- F-1 EtOAc (Ethyl acetate-acetic acid extraction method for determination of erythrocyte protoporphyrin)
- F-2 Aviv hematofluorometry (for determination of EP at hematocrit 35)
- F-3 Helena ZPP (for determination of zinc protoporphyrin in $\mu\text{mol ZPP/mol heme}$)
- F-4 Other

OTHER METHODS

If your method is not listed in the above list, please describe it briefly.
