

Analysis of Human Serum and Whole Blood for Mineral Content by ICP-MS and ICP-OES: Development of a Mineralomics Method

Supplemental Information

A manuscript submitted to Biological Trace Element Research

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Table S1. Subject information for samples used in this study

Serum samples		
Study Sample ID	Sex	Age
1	Male	54
2	Male	45
3	Male	39
4	Male	24
5	Male	52
6	Female	48
7	Female	35
8	Female	20
9	Female	18
10	Female	44
Whole Blood Samples		
Study Sample ID	Sex	Age
1	Male	31
2	Male	47
3	Male	46
4	Female	59
5	Female	31
6	Female	30

Table S2. Serum Intraday Analysis Results (ng element/mL sample), Day 1

Sample		Ca^a	K^a	Mg^a	Na^a	Cr	Mn	Fe	Co	Cu	Zn	Se	Mo
1	Rep 1	92.5	213	14.8	2420	ND	0.943	ND	0.291	1394	698	107	3.17
	Rep 2	90.9	210	14.3	2315	ND	0.943	125	0.251	1429	729	108	3.33
	Rep 3	97.8	228	16.6	2542	ND	1.54	22.9	0.171	1438	735	107	2.65
	Average	93.7	217	15.2	2426	ND	1.14	74.1	0.238	1420	721	107	3.05
	%RSD	3.13	3.63	6.38	3.82	NA	24.7	97.8	21.0	1.33	2.28	0.583	9.51
2	Rep 1	89.5	195	16.6	2369	ND	2.02	292	0.371	970	681	120	0.851
	Rep 2	94.8	209	17.7	2551	ND	ND	224	0.131	997	765	112	1.21
	Rep 3	94.4	213	17.8	2614	ND	ND	209	0.0914	988	725	111	1.05
	Average	92.9	206	17.4	2512	ND	2.02	242	0.198	985	724	114	1.04
	%RSD	2.61	3.83	2.96	4.14	NA	NA	14.9	62.4	1.15	4.72	3.54	14.2
3	Rep 1	86.1	218	17.7	2342	ND	1.30	ND	0.211	949	751	108	1.17
	Rep 2	95.1	244	18.9	2660	ND	ND	ND	0.211	981	807	129	1.61
	Rep 3	98.3	253	19.7	2708	ND	0.303	353	0.331	985	779	121	1.17
	Average	93.2	238	18.8	2570	ND	0.803	353	0.251	972	779	119	1.32
	%RSD	5.55	6.16	4.24	6.32	NA	88.1	NA	22.5	1.64	2.89	7.18	15.7
4	Rep 1	94.2	220	17.2	2330	ND	2.02	775	0.331	871	840	121	1.29
	Rep 2	99.5	228	17.7	2355	ND	ND	583	0.251	902	901	137	1.01
	Rep 3	101	236	18.3	2620	ND	2.22	922	0.171	888	936	144	0.731
	Average	98.3	228	17.7	2435	ND	2.12	760	0.251	887	892	134	1.01
	%RSD	3.01	2.86	2.49	5.39	NA	6.66	18.3	26.0	1.44	4.45	7.31	22.6
5	Rep 1	97.3	230	22.0	2547	ND	ND	289	ND	1067	719	118	1.05
	Rep 2	99.0	234	22.6	2713	ND	ND	186	ND	1099	666	126	0.771
	Rep 3	95.9	230	21.7	2566	2.77	1.26	1084	0.291	1103	731	125	0.931
	Average	97.4	231	22.1	2609	2.77	1.26	520	0.291	1090	705	123	0.918
	%RSD	1.30	0.855	1.63	2.84	NA	NA	77.2	NA	1.45	3.97	3.07	12.5
6	Rep 1	97.1	225	20.3	2635	ND	ND	76.1	ND	1009	863	121	1.41
	Rep 2	99.3	228	20.8	2730	(112)	0.783	1656	(305)	1068	668	136	1.13
	Rep 3	98.4	222	20.7	2672	ND	3.50	839	0.291	1049	671	120	1.65
	Average	98.3	225	20.6	2679	ND	2.14	857	0.291	1042	734	126	1.40
	%RSD	0.909	1.02	0.975	1.46	NA	89.8	75.3	NA	2.35	12.4	5.79	15.2

Table S2 (ct'd). Serum Interday Analysis Results (ng element/mL sample), Day 1

Sample		Ca^a	K^a	Mg^a	Na^a	Cr	Mn	Fe	Co	Cu	Zn	Se	Mo
7	Rep 1	90.5	210	20.1	2517	ND	ND	161	0.0914	1284	591	117	0.331
	Rep 2	86.1	207	19.6	2434	ND	0.983	707	1.49	1357	540	122	1.53
	Rep 3	92.7	219	20.9	2653	ND	0.823	361	0.691	1355	544	136	0.851
	Average	89.8	212	20.2	2535	ND	0.903	410	0.758	1332	558	125	1.19
	%RSD	3.04	2.26	2.49	3.56	NA	12.5	55.0	75.6	2.56	4.18	6.27	40.4
8	Rep 1	87.2	203	16.9	2312	ND	0.663	176	0.0114	1222	667	98	1.61
	Rep 2	88.0	205	17.3	2382	2.53	0.383	246	0.0914	1299	691	112	1.89
	Rep 3	94.0	226	18.2	2625	4.25	1.18	528	0.171	1305	733	99	1.29
	Average	89.7	211	17.5	2440	3.39	0.743	317	0.131	1275	697	103	1.60
	%RSD	3.41	5.02	3.05	5.50	35.9	44.6	48.1	43.0	2.97	3.91	6.31	15.3
9	Rep 1	96.5	226	17.3	2658	(6340)	20.7	8290	(5500)	1233	776	122	2.21
	Rep 2	102	237	18.1	2693	ND	4.66	3134	0.131	1276	785	150	1.29
	Rep 3	101	227	18.2	2738	ND	ND	705	0.0114	1262	835	141	2.09
	Average	99.9	230	17.9	2697	ND	12.7	4043	0.131	1257	799	137	1.86
	%RSD	2.43	2.07	2.25	1.21	NA	89.5	78.2	NA	1.43	3.23	8.55	21.9
10	Rep 1	92.3	226	12.8	2471	ND	ND	332	0.211	1357	638	126	1.69
	Rep 2	94.3	234	13.2	2549	1.21	ND	230	0.211	1386	616	130	1.53
	Rep 3	100.1	247	13.6	2513	14.2	3.66	1077	0.531	1397	643	127	1.97
	Average	95.6	236	13.2	2511	14.2	3.66	546	0.318	1380	632	128	1.73
	%RSD	3.48	3.69	2.54	1.27	64.7	NA	69.2	47.4	1.22	1.85	1.38	10.5
Pool	Rep 1	96.4	227	17.8	2551	ND	1.10	442	0.0914	1147	743	117	1.57
	Rep 2	98.4	227	17.9	2520	ND	ND	162	0.0114	1156	728	119	1.49
	Rep 3	91.4	213	16.7	2440	3.17	2.86	1929	0.731	1205	747	145	1.57
	Average	95.4	222	17.5	2504	3.17	1.98	1929	0.411	1170	740	127	1.54
	%RSD	3.07	2.99	3.20	1.87	NA	62.8	40.2	110	2.19	1.10	9.94	2.44
Average		94.9	224	18.0	2542	6.78	2.75	812	0.286	1164	724	122	1.51
% Diff from pool		-0.531	0.461	3.31	1.50	114	38.7	-57.9	-30.5	-0.475	-2.08	-4.36	-2.11

Table S3. Serum Intraday Analysis Results (ng element/mL sample), Day 2

Sample		Ca^a	K^a	Mg^a	Na^a	Cr	Mn	Fe	Co	Cu	Zn	Se	Mo
1	Rep 1	90.6	207	14.3	1988	3.06	2.06	645	0.309	1414	717	93.2	4.30
	Rep 2	94.9	214	15.0	2166	ND	2.90	383	0.349	1435	738	108	4.14
	Rep 3	94.8	218	15.1	2064	(20.4)	1.26	243	28.1	1441	850	112	4.78
	Average	93.4	213	14.8	2073	3.06	2.07	424	0.329	1430	768	105	4.41
	%RSD	2.18	2.20	2.34	3.52	NA	32.3	39.4	8.61	0.825	7.59	7.85	6.17
2	Rep 1	94.5	205	17.8	2291	ND	1.94	494	0.109	983	715	126	1.66
	Rep 2	91.9	198	17.4	2252	2.74	3.62	677	0.189	969	720	114	2.38
	Rep 3	89.7	201	17.2	2201	ND	0.577	560	ND	955	714	115	1.62
	Average	92.0	202	17.5	2248	2.74	2.04	577	0.149	969	716	118	1.89
	%RSD	2.11	1.38	1.48	1.64	NA	60.8	13.1	38.1	1.20	0.330	4.76	18.5
3	Rep 1	93.0	233	18.5	2285	ND	1.42	364	0.429	961	772	124	1.54
	Rep 2	96.0	241	19.1	2375	1.98	ND	132	0.349	983	780	112	1.78
	Rep 3	95.3	238	19.0	2396	(12.4)	0.737	398	0.629	965	778	119	5.30
	Average	94.8	237	18.9	2352	1.98	1.08	298	0.469	970	776	118	2.88
	%RSD	1.36	1.41	1.25	2.05	NA	44.6	39.7	25.1	0.982	0.455	4.17	59.8
4	Rep 1	96.2	220	17.7	2295	(71.8)	8.30	1269	1.79	897	966	136	7.82
	Rep 2	96.8	220	18.3	2374	3.78	1.54	778	0.309	907	904	148	2.90
	Rep 3	95.4	214	17.4	2284	ND	0.497	1206	0.149	895	908	141	1.50
	Average	96.1	218	17.8	2318	3.78	3.44	1084	0.749	900	926	141	4.08
	%RSD	0.598	1.30	2.12	1.73	NA	100	20.1	98.6	0.571	3.10	3.47	66.5
5	Rep 1	97.0	225	22.3	2379	ND	1.66	241	0.171	1098	685	130	2.69
	Rep 2	96.8	221	22.0	2229	5.81	2.46	438	3.69	1111	677	126	2.25
	Rep 3	93.6	216	21.3	2290	ND	1.06	197	0.0914	1077	678	114	2.09
	Average	95.8	221	21.9	2299	5.81	1.73	292	1.32	1095	680	123	2.34
	%RSD	1.65	1.71	1.78	2.68	NA	33.2	35.9	127	1.25	0.557	5.60	10.8
6	Rep 1	99.4	221	21.1	2257	ND	ND	99.7	0.331	1046	653	132	2.13
	Rep 2	96.9	219	20.9	2190	2.77	6.22	1200	0.291	1036	639	126	2.57
	Rep 3	100	220	20.9	2226	ND	ND	82.1	ND	1039	635	113	2.53
	Average	98.9	220	20.9	2224	2.77	6.22	460	0.311	1040	642	124	2.41
	%RSD	1.48	0.447	0.474	1.23	NA	NA	113.5	9.08	0.422	1.19	6.17	8.24

Table S3 (ct'd). Serum Interday Analysis Results (ng element/mL sample), Day 2

Sample		Ca^a	K^a	Mg^a	Na^a	Cr	Mn	Fe	Co	Cu	Zn	Se	Mo
7	Rep 1	91.8	212	20.7	2110	ND	ND	660	0.629	1223	570	121	1.10
	Rep 2	89.8	209	20.7	2092	(11384)	31.2	1054	(2687)	1219	592	123	1.42
	Rep 3	89.6	207	20.3	2082	3.01	0.457	495	2.75	1235	578	127	1.42
	Average	90.4	209	20.6	2095	3.01	15.8	736	1.69	1225	580	124	1.32
	%RSD	1.08	1.10	0.872	0.553	NA	137	31.8	88.8	0.566	1.59	1.92	11.5
8	Rep 1	92.4	207	17.9	1898	ND	ND	480	0.589	1137	630	105	1.18
	Rep 2	93.3	212	18.4	2033	ND	1.74	642	0.349	1155	688	111	1.94
	Rep 3	93.4	212	18.3	2122	ND	ND	560	0.109	1183	658	113	0.863
	Average	93.0	210	18.2	2018	ND	1.74	561	0.349	1159	659	110	1.33
	%RSD	0.482	1.03	1.07	4.56	NA	NA	11.8	56.2	1.64	3.62	3.37	34.1
9	Rep 1	94.8	210	17.1	2198	ND	0.497	1023	0.189	1184	786	139	0.983
	Rep 2	96.0	209	17.2	2146	2.86	1.58	1198	0.149	1219	802	136	1.38
	Rep 3	99.2	222	17.9	2312	ND	3.46	1586	0.229	1239	841	137	2.46
	Average	96.7	213	17.4	2219	2.86	1.84	1269	0.189	1214	810	137	1.61
	%RSD	1.92	2.72	2.04	3.12	NA	66.3	18.6	17.3	1.86	2.88	0.994	38.8
10	Rep 1	93.6	224	13.0	2005	(604)	2.18	1026	(957)	1348	636	127	1.94
	Rep 2	91.1	213	12.5	1930	1.50	1.02	666	0.869	1313	631	125	2.10
	Rep 3	92.0	219	12.7	1989	ND	2.02	753	0.549	1306	624	136	2.02
	Average	92.2	219	12.7	1975	1.50	1.74	815	1	1322	631	129	2.02
	%RSD	1.14	2.17	1.82	1.63	NA	29.5	18.8	31.9	1.38	0.779	3.50	3.23
Pool	Rep 1	98.6	227	18.8	2213	ND	ND	585	0.349	1176.1	746	123	1.86
	Rep 2	94.2	214	18.2	2158	ND	45.8	3982	1.07	1189.7	772	128	2.14
	Rep 3	96.1	219	18.6	2138	ND	ND	568	0.109	1190.1	752	131	2.02
	Average	96.3	220	18.5	2170	ND	45.8	1712	0.509	1185	757	127	2.01
	%RSD	1.90	2.41	1.33	1.46	NA	NA	93.8	80.2	0.549	1.49	2.72	5.71
Average		94.3	216	18.1	2182	3.06	7.59	748	0.615	1137	722	123	2.39
% Diff from pool		-2.02	-1.66	-2.51	0.567	NA	-83.4	-56.3	21.0	-4.06	-4.56	-3.02	19.0

Table S4. Serum Intraday Analysis Results (ng element/mL sample), Day 3

Sample		Ca^a	K^a	Mg^a	Na^a	Cr	Mn	Fe	Co	Cu	Zn	Se	Mo
1	Rep 1	92.9	210	14.6	2350	4.27	2.38	687	ND	1370	750	115	3.75
	Rep 2	96.0	217	14.8	2330	ND	ND	ND	0.160	1416	808	120	3.35
	Rep 3	97.0	217	14.9	2351	ND	ND	544	0.160	1403	785	113	3.03
	Average	95.3	214	14.8	2344	4.27	2.38	615	0.160	1396	781	116	3.38
	%RSD	1.82	1.54	0.736	0.413	NA	NA	16.5	0	1.39	3.05	2.59	8.71
2	Rep 1	93.9	201	17.2	2296	(21.6)	ND	6410	ND	943	736	134	ND
	Rep 2	89.8	188	16.4	2129	ND	ND	152	ND	889	714	125	ND
	Rep 3	90.7	193	16.6	2242	1.75	ND	430	ND	921	718	124	0.714
	Average	91.5	194	16.7	2222	1.75	ND	2331	0.120	917	723	128	0.714
	%RSD	1.93	2.79	1.98	3.13	NA	NA	124	NA	2.43	1.33	3.62	NA
3	Rep 1	91.3	223	17.6	2284	ND	ND	ND	ND	991	755	128	0.554
	Rep 2	91.7	222	17.6	2370	3.63	ND	16.9	ND	883	774	130	ND
	Rep 3	93.1	225	18.0	2390	(50.2)	ND	ND	54.6	906	753	141	ND
	Average	92.1	223	17.7	2348	3.63	ND	16.85	ND	927	761	133	0.554
	%RSD	0.835	0.569	1.17	1.96	NA	NA	NA	NA	4.98	1.23	4.28	NA
4	Rep 1	97.0	213	16.9	2281	ND	ND	519	0	840	903	150	ND
	Rep 2	92.7	204	16.2	2238	(92.6)	21.4	1302	0.480	820	923	137	1.75
	Rep 3	91.4	199	16.2	2203	(35043)	66.5	4866	6424	841	938	140	0.554
	Average	93.7	206	16.4	2241	ND	44.0	2229	0.480	834	921	142	1.15
	%RSD	2.56	2.77	2.15	1.42	NA	72.5	84.9	NA	1.19	1.53	3.90	73.5
5	Rep 1	94.3	207	20.8	2282	ND	ND	341	0.0400	1007	714	130	ND
	Rep 2	97.7	213	21.4	2464	ND	ND	379	ND	1050	715	124	ND
	Rep 3	96.0	214	21.2	2364	1.55	ND	624	ND	1036	710	134	ND
	Average	96.0	211	21.2	2370	1.55	ND	448	ND	1031	713	129	ND
	%RSD	1.45	1.36	1.10	3.14	NA	NA	28.1	NA	1.74	0.261	3.07	NA
6	Rep 1	88.1	183	17.9	2215	ND	ND	112	-0.200	917	648	126	ND
	Rep 2	89.5	190	18.5	2308	(87.8)	10.7	795	0.480	941	718	127	1.87
	Rep 3	92.2	196	18.9	2323	4.23	8.22	1306	0.120	965	682	124	1.35
	Average	89.9	190	18.5	2282	4.23	9.44	738	0.300	941	682	126	1.61
	%RSD	1.87	2.74	2.27	2.09	NA	18.3	66.3	84.9	2.05	4.17	0.729	22.8

Table S4 (ct'd). Serum Interday Analysis Results (ng element/mL sample), Day 3

Sample		Ca^a	K^a	Mg^a	Na^a	Cr	Mn	Fe	Co	Cu	Zn	Se	Mo
7	Rep 1	91.1	202	20.0	2371	3.43	11.7	1320	0.480	1277	552	126	0.954
	Rep 2	91.3	210	19.9	2466	ND	2.58	244	ND	1216	537	125	2.51
	Rep 3	91.7	201	20.1	2414	ND	15.8	357	ND	1253	585	121	0.634
	Average	91.4	205	20.0	2417	3.43	10.0	640	0.480	1249	558	124	1.37
	%RSD	0.251	1.88	0.409	1.61	NA	55.2	75.3	NA	2.00	3.60	1.46	60.05
8	Rep 1	95.8	210	18.5	2418	0.749	ND	376	ND	1225	686	114	ND
	Rep 2	95.3	216	18.4	2481	ND	8.46	396	0.280	1285	668	109	2.23
	Rep 3	98.1	221	18.5	2468	ND	ND	300	0.120	1217	698	111	2.11
	Average	96.4	216	18.5	2456	ND	8.46	357	0.200	1243	684	112	2.17
	%RSD	1.30	2.05	0.408	1.11	NA	NA	11.5	56.6	2.44	1.76	1.78	3.90
9	Rep 1	92.6	206	16.3	2344	ND	ND	760	ND	1138	788	143	2.35
	Rep 2	96.5	214	17.1	2517	ND	ND	747	0.360	1195	840	150	2.11
	Rep 3	97.4	214	17.0	2489	ND	ND	796	ND	1193	817	154	2.23
	Average	95.5	211	16.8	2450	ND	ND	768	0.360	1175	815	149	2.23
	%RSD	2.16	1.74	2.25	3.09	NA	NA	2.67	NA	2.23	2.57	3.28	4.39
10	Rep 1	95.7	229	13.0	2451	ND	7.02	359	ND	1331	653	144	1.99
	Rep 2	97.6	234	13.0	2382	ND	ND	332	0.240	1335	646	133	1.75
	Rep 3	95.5	222	12.9	2312	1563	261	1274	3229	1353	660	141	0.634
	Average	96.3	228	13.0	2382	ND	7.02	655	0.240	1340	653	139	1.46
	%RSD	0.983	2.26	0.442	2.38	NA	NA	66.8	NA	0.69	0.851	3.27	40.6
Pool	Rep 1	96.3	224	17.7	2460	ND	21.1	486	0.160	1118	719	132	1.87
	Rep 2	98.1	233	18.3	2638	2.51	ND	274	2.92	1135	738	143	2.23
	Rep 3	98.1	230	18.1	2581	7683	27.6	3461	3062	1113	716	136	2.51
	Average	97.5	229	18.1	2560	2.51	24.3	1407	1.54	1122	724	137	2.21
	%RSD	0.890	1.54	1.35	2.90	NA	18.8	103	127	0.87	1.38	3.50	11.9
Average		93.8	210	17.3	2351	3.14	13.5	880	0.293	1105	729	130	1.63
% Diff from pool		-3.77	-8.37	-3.90	-8.15	25.2	-44.3	-37.5	-81.0	-1.49	0.650	-5.15	-26.2

Table S5. Whole Blood Intraday Analysis Results (ng element/mL sample), Day 1

Sample		Ca^a	K^a	Mg^a	Na^a	Cr	Mn	Fe^a	Co	Cu	Zn	Se	Mo
1	Rep 1	58.1	1655	28.0	1527	ND	15.6	488	0.447	951	7607	204	ND
	Rep 2	60.0	1717	28.5	1570	(51.3)	15.6	497	(53.3)	938	7527	203	ND
	Rep 3	62.2	1801	29.5	1678	ND	15.5	517	0.567	960	7747	225	ND
	Average	60.1	1725	28.7	1592	ND	15.6	500	0.507	950	7627	211	ND
	%RSD	2.77	3.47	2.16	3.99	NA	0.210	2.39	16.7	0.954	1.19	4.69	NA
2	Rep 1	63.0	1983	34.7	1488	1.70	28.1	480	0.647	1022	6143	196	ND
	Rep 2	70.0	2032	36.4	1599	ND	27.6	493	0.727	1025	6239	208	1.09
	Rep 3	65.3	2025	36.3	1513	ND	27.7	509	0.727	1019	7095	208	ND
	Average	66.1	2014	35.8	1534	1.70	27.8	494	0.700	1022	6493	204	1.087
	%RSD	4.41	1.07	2.18	3.10	NA	0.733	2.38	5.39	0.256	6.59	2.60	NA
3	Rep 1	64.9	1894	40.0	1792	(762)	17.4	496	(1176)	1010	5819	151	1.29
	Rep 2	67.9	1900	42.2	1685	ND	16.1	524	0.567	1057	6159	178	ND
	Rep 3	65.0	1800	40.3	1547	(108711)	216	512	(19844)	1051	5855	159	ND
	Average	65.9	1865	40.8	1675	ND	16.8	511	0.567	1039	5945	163	1.29
	%RSD	2.15	2.46	2.38	5.99	NA	5.57	2.18	NA	2.02	2.57	7.07	NA
4	Rep 1	69.3	1855	34.5	1574	ND	12.4	505	0.567	1366	6483	198	ND
	Rep 2	65.2	1816	32.8	1663	0.420	12.7	483	0.487	1351	6379	217	1.69
	Rep 3	66.1	1851	33.4	1692	ND	13.1	489	0.487	1373	6499	207	1.73
	Average	66.9	1841	33.6	1643	0.420	12.7	492	0.513	1363	6454	208	1.71
	%RSD	2.66	0.952	2.00	3.06	NA	2.44	1.90	7.35	0.651	0.824	3.72	1.66

Table S5 (ct'd). Whole Blood Interday Analysis Results (ng element/mL sample), Day 1

Sample		Ca^a	K^a	Mg^a	Na^a	Cr	Mn	Fe^a	Co	Cu	Zn	Se	Mo
5	Rep 1	60.7	1785	38.2	1690	ND	18.8	501	1.05	718	5655	194	1.85
	Rep 2	56.3	1687	36.7	1460	ND	19.3	474	0.447	710	5703	191	ND
	Rep 3	59.2	1742	37.6	1660	ND	17.9	493	0.447	702	5627	198	1.45
	Average	58.7	1738	37.5	1604	ND	18.7	489	0.647	710	5662	194	1.65
	%RSD	3.08	2.31	1.66	6.37	NA	3.08	2.33	43.7	0.943	0.554	1.45	17.2
6	Rep 1	60.9	1645	36.7	1701	ND	18.4	462	0.407	1134	6943	194	1.57
	Rep 2	62.7	1742	37.9	1771	1.22	19.9	474	0.527	1141	6959	212	1.93
	Rep 3	60.8	1681	36.6	1557	ND	22.1	460	0.407	1132	6867	187	ND
	Average	61.4	1690	37.1	1677	1.22	20.1	465	0.447	1136	6923	198	1.75
	%RSD	1.41	2.37	1.53	5.31	NA	7.58	1.37	12.7	0.348	0.580	5.26	14.6
Pool	Rep 1	64.7	1733	35.5	1693	ND	16.8	486	0.527	1024	6415	188	2.01
	Rep 2	63.7	1730	34.5	1692	0.660	18.0	474	0.567	1023	6407	205	2.45
	Rep 3	64.0	1724	34.6	1677	ND	17.5	473	0.527	1001	6243	192	2.05
	Average	64.1	1729	34.9	1688	0.660	17.4	477	0.540	1016	6355	195	2.17
	%RSD	0.604	0.216	1.29	0.434	NA	2.73	1.32	3.49	1.06	1.25	3.80	9.17
Average		63.2	1812	35.6	1621	1.11	18.6	492	0.577	1037	6517	196	1.49
% Diff from pool		-1.47	4.78	1.99	-3.97	68.7	6.83	3.03	6.79	2.01	2.55	0.747	-31.0

Table S6. Whole Blood Intraday Analysis Results (ng element/mL sample), Day 2

Sample		Ca^a	K^a	Mg^a	Na^a	Cr	Mn	Fe^a	Co	Cu	Zn	Se	Mo
1	Rep 1	58.0	1759	29.3	1666	0.451	15.5	469	0.543	929	8122	216	1.69
	Rep 2	62.4	1837	31.4	1836	4.21	16.6	516	0.543	973	8586	212	1.97
	Rep 3	59.0	1773	29.9	1675	(1872)	22.6	489	(2000)	956	8410	205	3.49
	Average	59.8	1790	30.2	1726	2.33	18.2	491	0.543	953	8372	211	2.38
	%RSD	3.18	1.90	3.02	4.53	114	17.0	3.87	0	1.92	2.28	2.23	33.2
2	Rep 1	58.7	2023	35.2	1556	(26666)	126	488	(21940)	1159	6522	195	1.69
	Rep 2	58.7	2053	35.0	1602	1.41	29.4	470	0.863	1010	6626	206	1.65
	Rep 3	58.4	2030	34.9	1577	ND	29.0	471	0.783	1012	6574	211	1.89
	Average	58.6	2035	35.1	1578	1.41	61.3	476	0.823	1060	6574	204	1.74
	%RSD	0.291	0.630	0.343	1.19	NA	74.1	1.74	6.87	6.59	0.646	3.13	6.02
3	Rep 1	56.8	1825	38.3	1582	ND	15.6	462	0.423	988	6234	173	1.89
	Rep 2	56.4	1815	38.1	1542	ND	15.6	462	0.423	1002	6358	159	1.65
	Rep 3	61.2	1913	40.6	1643	0.491	15.9	498	0.383	1026	6666	176	1.81
	Average	58.2	1851	39.0	1589	0.491	15.7	474	0.410	1005	6419	169	1.78
	%RSD	3.76	2.38	2.90	2.61	NA	1.03	3.63	4.60	1.54	2.83	4.43	5.59
4	Rep 1	66.5	1842	35.0	1571	1.41	13.5	493	0.423	1330	6690	211	1.97
	Rep 2	65.0	1851	34.7	1568	16.8	15.4	494	0.623	1336	6746	205	4.97
	Rep 3	58.4	1701	31.5	1414	ND	22.2	435	0.543	1324	6678	197	2.01
	Average	63.3	1798	33.7	1518	9.09	17.0	474	0.530	1330	6704	204	2.98
	%RSD	5.54	3.82	4.59	4.83	84.5	21.9	5.86	15.5	0.381	0.442	2.74	47.1

Table S6 (ct'd). Whole Blood Interday Analysis Results (ng element/mL sample), Day 2

Sample		Ca^a	K^a	Mg^a	Na^a	Cr	Mn	Fe^a	Co	Cu	Zn	Se	Mo
5	Rep 1	54.5	1725	36.1	1521	0.251	16.7	448	0.423	694	6058	190	2.09
	Rep 2	58.0	1710	38.7	1504	1.57	22.5	490	0.503	706	6158	194	2.29
	Rep 3	58.5	1731	38.7	1529	ND	17.7	496	0.383	718	6330	190	2.01
	Average	57.0	1722	37.8	1518	0.911	19.0	478	0.436	706	6182	191	2.13
	%RSD	3.13	0.513	3.15	0.687	102	13.4	4.44	11.4	1.41	1.82	1.08	5.52
6	Rep 1	63.7	1659	38.1	1620	0.371	18.0	462	0.383	1140	7302	211	2.01
	Rep 2	60.8	1597	38.0	1575	ND	18.3	459	0.303	1124	7186	195	1.81
	Rep 3	58.3	1576	37.0	1528	0.411	18.6	444	0.503	1088	6994	196	1.65
	Average	60.9	1611	37.7	1574	0.391	18.3	455	0.396	1117	7160	201	1.82
	%RSD	3.67	2.19	1.28	2.39	7.23	1.16	1.74	20.7	1.96	1.77	3.70	8.07
Pool	Rep 1	60.9	1716	36.0	1555	1.05	16.5	470	0.423	1012	6518	185	2.09
	Rep 2	59.8	1699	35.9	1511	0.531	15.8	470	0.423	986	6366	198	2.25
	Rep 3	58.3	1646	34.5	1427	0.531	15.8	458	0.383	979	6366	198	1.85
	Average	59.6	1687	35.5	1498	0.705	16.0	466	0.410	992	6416	194	2.06
	%RSD	1.77	1.77	1.89	3.55	34.8	2.12	1.27	4.60	1.44	1.12	3.22	7.96
Average		59.6	1801	35.6	1584	2.44	24.9	475	0.523	1029	6902	197	2.14
% Diff from pool		0.0112	6.76	0.282	5.75	246	55.5	1.91	27.7	3.67	7.57	1.71	3.77

Table S7. Whole Blood Intraday Analysis Results (ng element/mL sample), Day 3

Sample		Ca^a	K^a	Mg^a	Na^a	Cr	Mn	Fe^a	Co	Cu	Zn	Se	Mo
1	Rep 1	61.4	1623	28.4	1663	ND	(57.0)	486	0.736	999	9074	246	1.44
	Rep 2	61.0	1587	27.8	1636	ND	10.8	480	0.336	945	8550	210	1.12
	Rep 3	63.9	1728	29.4	1824	ND	14.1	512	0.496	983	8858	220	2.32
	Average	62.1	1646	28.5	1708	ND	12.4	493	0.523	976	8828	225	1.63
	%RSD	2.10	3.63	2.20	4.86	NA	18.4	2.76	31.5	2.33	2.44	6.75	31.2
2	Rep 1	60.6	1858	33.1	1464	ND	28.1	467	0.616	1004	6594	211	1.36
	Rep 2	59.9	1796	32.9	1401	ND	30.2	477	0.656	973	6558	203	ND
	Rep 3	63.3	1875	34.2	1515	ND	86.5	484	0.736	1054	6874	231	1.24
	Average	61.3	1843	33.4	1460	ND	48.3	476	0.669	1010	6676	215	1.30
	%RSD	2.41	1.84	1.74	3.19	NA	56.1	1.43	7.5	3.31	2.12	5.41	4.62
3	Rep 1	57.4	1627	34.7	1415	ND	33.0	437	0.256	978	6246	149	ND
	Rep 2	60.6	1717	36.5	1545	ND	22.3	459	0.256	994	6354	165	ND
	Rep 3	61.9	1722	37.8	1567	0.584	15.3	485	0.296	980	6330	178	ND
	Average	59.9	1689	36.3	1509	0.584	23.5	460	0.269	984	6310	164	ND
	%RSD	3.16	2.58	3.59	4.44	NA	30.8	4.24	7.00	0.704	0.734	7.18	NA
4	Rep 1	68.4	1852	33.7	1670	ND	19.7	505	0.296	1399	6878	200	ND
	Rep 2	64.7	1820	32.5	1658	ND	24.5	486	0.216	1357	6942	213	ND
	Rep 3	65.0	1846	32.5	1708	ND	(71.3)	485	0.216	1372	7030	212	1.04
	Average	66.1	1840	32.9	1679	ND	22.1	492	0.243	1376	6950	208	1.04
	%RSD	2.53	0.755	1.69	1.27	NA	15.2	1.85	15.5	1.25	0.897	2.78	NA

Table S7 (ct'd). Whole Blood Interday Analysis Results (ng element/mL sample), Day 3

Sample		Ca^a	K^a	Mg^a	Na^a	Cr	Mn	Fe^a	Co	Cu	Zn	Se	Mo
5	Rep 1	55.6	1650	34.5	1551	ND	18.7	454	0.176	685	6094	176	ND
	Rep 2	56.2	1665	35.0	1523	0.584	18.8	469	0.376	695	6198	197	5.16
	Rep 3	57.4	1724	35.8	1628	ND	15.9	477	0.256	722	6482	193	ND
	Average	56.4	1680	35.1	1568	0.58	17.8	467	0.269	700	6258	189	5.16
	%RSD	1.31	1.90	1.55	2.83	NA	7.46	2.02	30.5	2.24	2.62	4.74	NA
6	Rep 1	60.5	1627	35.6	1668	ND	31.6	454	0.176	1131	7254	192	ND
	Rep 2	61.3	1661	36.2	1728	ND	18.4	457	0.176	1146	7354	199	ND
	Rep 3	61.3	1687	36.2	1765	213	32.4	455	0.376	1155	7326	192	1.92
	Average	61.0	1659	36.0	1721	ND	27.5	455	0.243	1144	7312	194	1.92
	%RSD	0.658	1.48	0.761	2.32	NA	23.4	0.259	38.9	0.869	0.576	1.81	NA
Pool	Rep 1	61.2	1820	33.7	1739	3.74	24.2	465	1.90	1002	5894	170	ND
	Rep 2	66.3	1854	36.1	1780	(1151)	24.9	504	(1321)	1069	6298	189	ND
	Rep 3	66.6	1826	36.1	1735	ND	19.9	506	0.536	1050	6214	177	ND
	Average	64.7	1834	35.3	1752	3.74	23.0	492	1.22	1040	6136	179	ND
	%RSD	3.81	0.808	3.23	1.16	NA	9.71	3.88	55.9	2.69	2.84	4.40	NA
Average		61.1	1726	33.7	1608	0.58	25.3	474	0.369	1032	7056	199	2.21
% Diff from pool		-5.55	-5.86	-4.42	-8.23	-84.4	9.9	-3.59	-69.6	-0.820	15.0	11.6	NA