Bacteria Influence on Testosterone Level

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1. Abstract

1.1. Objective: We examined Lizate of *Bacillus* Lyuba, which was isolated from ancient permafrost, on human.

1.2. Method and materials: There were eighteen participants included in this study. All participants underwent daily taking of lizate of 10^9 bacterial cells, in 40% alcohol solution (about 2-4 ml) in the morning for one month. Two of the eighteen participants took supplement twice with interval of 6 months between tests. The changes were monitored by blood sampling, including the levels of white blood cell (WBC) count, red blood cell (RBC) count, hemoglobin, hemotocrite, hematies (MCV), Amount of Hemolobine in Hematite (MCH), Gemoglobine concentration in hematies (MCHC), Platlet, TGP or ALT, TGO, PAL, Bilirubin Total, Bilirubin direct, Bilirubin indirect, Protein Total, Albumine, Creatinine, Uree, Uree Acid, Tryglycerides, Cholesterol, HDL Cholesterol, LDL Cholesterol, TSH, Glucose for both female and male participants. Level of Testosterone and PSA Total were checked in male participants; level of CA125 was checked in female participants.

1.3. Results: Among the parameters, white blood cell count, Hemotocrite, MCV, MCH, MCHC, Bilirubin indirect, Tryglycerides, Testosterone are different significantly. No negative effects were detected. No significant differences were noted between female and male or between age <65 or >=65.

1.4. Conclusion: There was no negative effect detected, but positive results have been showed in this study. This work is captivating to inspire further research to identify biochemical features of permafrost microorganism and more efficient application on human.

2. Introduction

Probiotics have been found effective to improve human health and immune system [1] including curing a number of deceases. They treat infections [2,3], show effects in irritable bowel syndrome [4,5], diarrhea [6], colic [7], atopic dermatitis [8] and other issues [9,10,11], including cancer development [12,13,14]. Probiotics can regulate of intestinal radiosensitivity [15], hemoglobin levels [16] as well as intestinal injury and repair [17]. They affect serum minerals, liver enzymes and blood pressure [18]. Permafrost is a unique recess for unknown microorganisms. Considerable abundance and a high microbial diversity of microorganisms are present in permafrost [19,20]. In Siberian permafrost, abundant viable bacteria were presented by using DNA sequencing technique or low-temperature recovery strategies [21,22].

Genome Sequence of *Bacillus cereus* Strain Lyuba was reported by Brenner et al. [23]. The genome sequence data showed high level of homology with modern *Bacillus cereus* strains. A recent study involved the probiotic activity of a bacterial strain isolated from ancient permafrost using mouse *Salmonella sp.* enteric model [24]. The authors demonstrated that. Bacterial strain *Bacillus sp.* strain Lyuba was assessed as nonpathogenic and against Salmonella infection in mice. A group of new bacteria strain isolated from the ancient permafrost have been conducted and possible applications in biotechnology have been proposed [25]. The effects of relic microorganism *Bacillus sp.* on laboratory animals has been studied [26,27,28]. A "sensitive" model as the developing larvae was designed to determine optimal and toxic dose [28]. A wide range of *Bacillus sp.* concentrations (1-500 million cells of *Bacillus sp.* per 1 ml of the flies feeding medium) was tested and no toxic effects of *Bacillus sp.* on developing larvae was found. Furthermore, imagoes developed on the mediums with *Bacillus. sp.* application had higher motor activity and survival of the flies increased at the heat shock or ultraviolet irradiation. Effects of relic microorganism *Bacillus. sp.* on elevated stress resistance and survival of *Drosophila melanogaster* were demonstrated. However, the effect of lizate of *Bacillus* Lyuba isolated from ancient permafrost bacteria in human has not been reported. In our study, we examined lizate of *Bacillus* Lyuba on human.

3. Materials and Methods

There were eighteen participants included in this study. The study was approved by the institutional review board and ethics committee at Tyumen Scientific Centre SB RAS.

Bacillus cereus strain Lyuba was sampled from relict permafrost sediment that located on the Mammoth Mountain in Central Yakutia in Eastern Siberia [29]. Lizate of *Bacillus* Lyuba was collected and treated as previous report [23].

All participants underwent daily taking of lizate of 10^9 bacterial cells, in 40% alcohol solution (about 2-4 ml) in the morning for one month. Two of the eighteen participants took supplement twice with interval of 6 months between tests. The changes were monitored by blood sampling, including the levels of white blood cell (WBC) count, red blood cell (RBC) count, hemoglobin, hemotocrite, hematies (MCV), Amount of Hemolobine in Hematite (MCH), Gemoglobine concentration in hematies (MCHC), Platlet, TGP or ALT, TGO, PAL, Bilirubin Total, Bilirubin direct, Bilirubin indirect, Protein Total, Albumine, Creatinine, Uree, Uree Acid, Tryglycerides, Cholesterol, HDL Cholesterol, LDL Cholesterol, TSH, Glucose for both female and male participants. Level of Testosterone and PSA Total were checked in male participants; level of CA125 was checked in female participants. For statistical analysis, the program SPSS for Windows version 14 (SPSS Inc., Chicago, IL, USA) was used. *P* value < 0.05 is considered statistically significant.

4. Results

A total of 18 persons, including 9 women and 9 men were included in this study. Two men took food supplement twice 6 months between tests. The changes in levels of white blood cell (WBC) count, red blood cell (RBC) count, hemoglobin, hemotocrite, hematies (MCV), Amount of Hemolobine in Hematite (MCH), Gemoglobine concentration in hematies (MCHC), Platlet, TGP or ALT, TGO, PAL, Bilirubin Total, Bilirubin direct, Bilirubin indirect, Protein Total, Albumine, Creatinine, Uree, Uree Acid, Tryglycerides, Cholesterol, HDL Cholesterol, LDL Cholesterol, TSH, Glucose, Testosterone, PSA and CA125 after 1 month daily taking of lizate of 10^9 bacterial cells are shown in Table 1. Among the parameters, levels of white blood cell (WBC) count, hematies (MCV), Amount of Hemolobine in Hematite (MCH), Gemoglobine concentration in hematies (MCHC), Bilirubin indirect, Tryglycerides, Testosterone are different significantly. No negative effects were detected. Comparison of females and males in changes after 1 month daily taking of lizate of 10^9 bacterial cells are shown in Table 2. No significant difference was noted between female and male. Comparison of changes after 1 month daily taking of lizate of 10^9 bacterial cells, in 40% alcohol solution, about 2-4 ml in the morning according to age <65 or >=65. No significant difference was noted between age <65 or >=65. (Table 3)

5. Discussion

The present study showed that levels of white blood cell (WBC) count, hematies (MCV), Amount of Hemolobine in Hematite (MCH), Gemoglobine concentration in hematies (MCHC), Bilirubin indirect, Tryglycerides, Testosterone were significantly changed after 1 month daily taking of lizate of 10^9 bacterial cells. Probiotics have been found effective to improve human health not only from improvements in the intestinal microbial balance but also by modulating immune functions [1]. A previous study demonstrated improvement of physical condition and Immune stimulation of *Drosophila melanogaster* and mice by being cultured a 16S rDNA sequence identified from a strain of *Bacillus sp.* which was contained in cryolithozone [30]. Motion activity, muscular force, cellular immunity activity and psychoemotional condition of CBA mice (laboratory mice) were improved by being injected microorganisms of genus *Bacillus* strain 3M (permafrost microorganisms--PM) [31]. In our study, the level of WBC count significantly increase, and both the levels of before and after supplement intake are within normal limit (Table 1). No participants presented infection sigh during the study period. Probiotics could be used to exert health benefits by cholesterol-lowering effects on humans [32]. Furthermore, Jumar et al. showed that Cholesterol-lowering probiotics could be as potential biotherapeutics for metabolic diseases by the ability of cholesterol removal and hypocholesterolemic effects [33]. A meta-analysis of short-term intervention (2-8 weeks) studies on the effects of milk product on plasma cholesteroln showed a minor change in total cholesterol concentration, and a decrease in serum LDL concentration [34]. Hypocholesterolaemic effect of fermented dairy products over 6 months was assessed by Kiessling et al. The authors showed that the serum HDL level increased significantly and the ratio of LDL/HDL cholesterol significantly decreased [35]. In our study, Tryglycerides was significantly

changed after 1 month daily taking of lizate of 10^9 bacterial cells.

It had been demonstrated that elevated stress resistance and survival of Drosophila melanogaster on the mediums with *Bacillus sp.* application [28]. In this study, level of testosterone significantly increase in man participants (Table 1)

In our study, alcohol was used as a conservative substance. The 40% is something minimal to prevent the product spoilage or contamination. The larger percentage can affect human body, less can cause the lyzate spoilage. Furthermore, the alcohol is a perfect solvent. There are several limitations in our study. The parameters of blood sampling or health status could be affected by life style or subclinical infection etc during the study period. More studies for long term use and specific subjects are needed. This Preliminary study focused on testing for lizate of *Bacillus* Lyuba. There was no negative effect detected, but positive results have been showed in this study. This work is captivating to inspire further research to identify biochemical features of permafrost microorganism and more efficient application on human.

Table 1: Tests Bacterial lizate One Month Uptake Monitoring of changes after 1 month daily taking of lizate of 10^9 bacterial cells, in 40% alcohol solution, about 2-4 ml in the morning

	Before								After								
	N	Mean	SD	Median	Q_1	Q_3	Min	Max	N	Mean	SD	Median	Q_1	Q_3	Min	Max	P-value
WBC white blood cell count (WBC)	19	6.22	1.61	5.90	5.30	6.96	2.90	9.50	19	6.85	2.04	6.70	5.20	7.90	3.00	10.50	0.030
RBC	20	4.71	0.48	4.89	4.36	5.00	3.81	5.41	20	4.63	0.46	4.58	4.19	5.02	3.91	5.39	0.100
Hemoglobin	20	14.36	1.63	14.30	12.73	15.75	11.70	17.20	20	14.55	2.11	14.45	12.80	16.13	11.20	19.90	0.669
Hemotocrite	20	42.87	4.12	43.25	39.00	46.75	36.60	49.60	20	41.40	4.71	41.30	36.95	45.68	32.80	50.00	0.007
Hematies (volume hematies?)	20	91.44	6.76	91.00	89.25	93.93	75.10	110.00	20	89.70	7.69	91.78	86.38	92.70	69.10	109.00	0.029
Amount of Hemolobine in Hematite	20	78.93	23.05	90.00	76.58	92.75	31.70	97.00	20	77.35	22.82	87.85	71.58	92.00	31.60	95.00	0.016
Gemoglobine concentration in hematies, mg/l	20	33.25	1.20	33.50	32.40	33.95	31.00	36.00	20	34.49	1.47	34.25	33.38	35.95	31.30	36.80	0.003
Plaquettes	20	239.73	76.50	252.00	184.75	301.75	28.00	353.00	20	255.40	52.25	254.50	212.50	287.25	172.00	371.00	0.204
TGP or ALT	16	27.20	11.56	23.50	19.05	29.88	14.30	56.60	16	24.27	13.17	23.00	15.30	26.83	12.00	66.90	0.179
TGO	16	23.97	14.69	20.65	15.73	25.53	14.20	75.60	16	26.99	24.37	21.25	17.20	25.70	14.00	116.80	0.629
PAL	9	139.61	57.87	134.00	88.50	183.00	66.50	244.00	9	137.84	48.49	135.00	96.50	181.50	69.60	215.00	0.813
Bilirubin Total, mcM/l	18	12.57	3.87	13.15	8.35	15.43	5.99	19.20	18	11.71	4.13	10.56	8.98	13.45	5.00	21.70	0.446
Bilirubin direct	11	3.36	0.84	3.30	3.10	4.10	1.30	4.30	11	4.53	3.54	2.87	2.10	7.20	1.46	11.10	0.790
Bilirubin indirect	11	10.58	3.19	11.20	8.09	13.00	4.69	14.90	11	7.57	2.85	8.14	6.50	8.90	1.80	11.40	0.041
Protein Total	15	70.27	4.15	69.20	67.50	72.50	66.10	81.50	15	69.46	4.09	68.70	66.60	73.00	62.53	77.20	0.865
Albumine	8	41.02	5.06	41.00	36.25	44.25	35.00	50.00	8	44.37	4.72	45.00	40.59	47.30	36.00	51.00	0.091
Creatinine, mcM/l	20	82.29	31.02	75.70	68.00	87.00	50.00	200.00	20	82.06	22.60	84.00	61.90	99.50	37.00	117.00	0.235
Uree, mM/l	16	4.66	2.17	3.95	3.58	6.03	0.13	9.40	16	4.53	1.52	4.30	3.50	5.70	2.30	7.90	0.609
Uree Acid, mcM/l	13	316.11	63.96	303.00	268.20	351.00	240.00	444.00	13	310.43	70.22	315.00	275.50	356.80	185.00	439.00	0.753
Tryglycerides	17	88.38	8.22	90.35	87.50	93.35	64.00	97.00	17	86.56	8.99	89.00	84.50	92.10	62.00	95.00	0.019
Cholesterol	17	5.14	1.15	5.14	4.50	5.70	2.54	7.41	17	5.08	0.97	5.09	4.14	5.59	3.16	6.81	0.705
HDL Cholesterol	9	1.76	0.52	1.68	1.25	2.23	1.22	2.66	9	1.44	0.25	1.49	1.26	1.52	1.13	1.98	0.263
LDL Cholesterol	10	2.91	0.95	2.83	2.50	3.51	1.03	4.76	10	2.91	0.93	2.88	2.34	3.65	1.35	4.50	0.878
TSH	8	2.97	0.75	3.13	2.53	3.61	1.49	3.81	8	3.48	1.47	3.00	2.55	3.92	2.29	6.84	0.128
Glucose, mM/l	17	4.83	0.50	4.73	4.45	5.06	4.19	6.09	17	5.21	0.82	5.05	4.70	5.53	4.15	7.62	0.058
Testosterone	7	6.33	5.57	3.60	2.85	10.90	2.30	17.10	7	8.91	6.09	5.75	4.50	17.15	4.44	18.20	0.018
PSA Total	8	0.35	0.26	0.21	0.19	0.61	0.11	0.80	8	0.27	0.10	0.23	0.18	0.35	0.17	0.46	0.326
CA125	3	24.94	16.33	27.05	7.66	40.11	7.66	40.11	3	26.05	19.71	30.38	4.53	43.23	4.53	43.23	0.593
P-value by Wilcoxon Signed Ranks Test																	
Q_1: Percentile 25; Q_3: Percentile 75																	

Table 2: Tests Bacterial lizate One Month Uptake Monitoring of changes after 1 month daily taking of lizate of 10^9 bacterial cells, in 40% alcohol solution, about 2-4 ml in the morning

	Sex																		
	Female						Mean						Total						
	N						N						N						
Amount of change (back-before)			SD	Median	Min	Max	N	Mean	SD	Median	Min	Max	N	Mean	SD	Median	Min	Max	P-value
	8	0.79																	
WBC	9	-0.12	1.54	0.85	-1.40	3.80	11	0.52	0.92	0.10	-0.52	2.50	19	0.63	1.19	0.70	-1.40	3.80	0.535
RBC	9	-0.13	0.25	-0.19	-0.52	0.23	11	-0.05	0.13	-0.03	-0.25	0.17	20	-0.08	0.19	-0.04	-0.52	0.23	0.494
Hemoglobin	9	-2.28	0.66	0.00	-1.50	0.50	11	0.45	1.27	0.10	-0.60	4.10	20	0.19	1.06	0.00	-1.50	4.10	0.357
Hemotocrite	9	-2.96	2.34	-3.00	-4.60	1.70	11	-0.81	1.32	-1.00	-2.80	1.40	20	-1.47	1.94	-1.10	-4.60	1.70	0.119
Hematies	9	-2.59	4.00	-2.00	-10.10	2.40	11	-0.74	1.73	-1.00	-3.00	2.00	20	-1.74	3.10	-1.25	-10.10	2.40	0.208
Amount of Hemolobine in Hematite	9	1.74	3.59	-2.00	-10.10	1.20	11	-0.76	1.75	-1.00	-3.00	2.00	20	-1.59	2.81	-1.25	-10.10	2.00	0.361
Gemoglobine concentration in hematies, mg/l	9	14.26	1.41	2.10	-0.40	3.50	11	0.83	1.34	0.60	-1.10	2.70	20	1.24	1.41	1.35	-1.10	3.50	0.149
Plaquettes	7	-3.93	76.91	3.30	-88.00	176.00	11	16.82	40.31	3.00	-47.00	110.00	20	15.67	57.86	3.15	-88.00	176.00	0.819
TGP or ALT	7	0.76	5.59	-5.40	-9.20	7.00	9	-2.16	9.83	-2.70	-18.50	10.40	16	-2.93	8.05	-4.00	-18.50	10.40	0.397
TGO	4	7.25	5.79	-1.00	-5.00	11.92	9	4.77	14.53	0.80	-8.00	41.20	16	3.02	11.41	0.30	-8.00	41.20	0.491
PAL	8	-1.32	15.48	8.00	-12.00	25.00	5	-8.98	20.74	-16.00	-29.00	21.00	9	-1.77	19.44	3.10	-29.00	25.00	0.142
Bilirubin Total, mcM/l	4	0.44	4.26	-0.42	-7.40	5.40	10	-0.50	6.49	-0.35	-7.80	6.90	18	-0.86	5.47	-0.42	-7.80	6.90	0.859
Bilirubin direct	4	-2.84	1.94	0.02	-1.40	3.10	7	1.59	4.37	-0.63	-2.10	8.00	11	1.17	3.60	-0.46	-2.10	8.00	0.776
Bilirubin indirect	7	-2.45	6.24	-3.44	-9.40	4.90	7	-3.10	3.42	-4.55	-6.20	2.81	11	-3.01	4.33	-4.55	-9.40	4.90	0.850
Protein Total	3	-0.53	7.01	-1.23	-16.10	6.90	8	0.62	5.14	0.85	-9.97	7.70	15	-0.81	6.07	-0.70	-16.10	7.70	0.183
Albumine	9	0.38	4.32	0.00	-5.10	3.50	5	5.68	4.63	6.70	0.69	10.50	8	3.35	5.28	2.25	-5.10	10.50	0.101
Creatinine, mcM/l	6	-0.44	14.87	2.50	-34.00	16.00	11	-0.73	29.48	5.00	-83.00	23.00	20	-0.23	23.47	4.50	-83.00	23.00	0.518
Uree, mM/l	4	-25.00	1.83	0.10	-3.70	1.58	10	0.05	2.57	-0.85	-2.63	5.57	16	-0.13	2.27	-0.15	-3.70	5.57	0.914
Uree Acid, mcM/l	8	-3.11	43.30	-16.00	-79.00	11.00	9	2.91	59.80	-5.00	-83.00	110.00	13	-5.68	55.07	-5.00	-83.00	110.00	0.537
Tryglycerides	8	-0.25	3.58	-2.00	-10.10	1.20	9	-0.68	1.93	-1.00	-3.00	2.00	17	-1.82	3.01	-2.00	-10.10	2.00	0.133
Cholesterol	4	-0.28	0.92	-0.32	-1.94	1.16	9	0.12	0.60	-0.05	-0.62	1.25	17	-0.05	0.77	-0.22	-1.94	1.25	0.360
HDL Cholesterol	4	-0.21	0.75	-0.04	-1.37	0.31	5	-0.35	0.54	-0.13	-1.01	0.22	9	-0.32	0.60	-0.13	-1.37	0.31	0.806
LDL Cholesterol	3	0.98	0.56	-0.09	-0.97	0.32	6	0.14	0.66	0.00	-0.72	1.24	10	0.00	0.62	-0.01	-0.97	1.24	0.394
TSH	8	0.52	1.87	0.28	-0.44	3.10	5	0.23	0.33	0.10	0.00	0.80	8	0.51	1.10	0.15	-0.44	3.10	0.655
Glucose, mM/l			0.77	0.40	-0.63	1.70	9	0.25	0.78	0.25	-1.05	1.30	17	0.38	0.77	0.40	-1.05	1.70	0.563
Testosterone							7	2.58	2.66	1.10	0.05	7.30	7	2.58	2.66	1.10	0.05	7.30	
PSA Total	3	1.11					8	-0.08	0.18	-0.02	-0.47	0.08	8	-0.08	0.18	-0.02	-0.47	0.08	
CA125			3.67	3.12	-3.13	3.33							3	1.11	3.67	3.12	-3.13	3.33	
P-value by Mann-Whitney U Test																			

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Table 3: Tests Bacterial lizate One Month Uptake Monitoring of changes after 1 month daily taking of lizate of 10^9 bacterial cells, in 40% alcohol solution, about 2-4 ml in the morning

Amount of Change(back-before)	Age												Total						P-val
	<65						>=65												
	N	Mean	SD	Median	Min	Max	N	Mean	SD	Median	Min	Max	N	Mean	SD	Median	Min	Max	P-val
WBC	15	0.73	1.31	0.70	-1.40	3.80	4	0.28	0.56	0.30	-0.40	0.90	19	0.63	1.19	0.70	-1.40	3.80	0.515
RBC	16	-0.10	0.19	-0.04	-0.52	0.23	4	-0.01	0.21	0.02	-0.25	0.17	20	-0.08	0.19	-0.04	-0.52	0.23	0.450
Hemoglobin	16	0.18	1.19	0.00	-1.50	4.10	4	0.20	0.22	0.15	0.00	0.50	20	0.19	1.06	0.00	-1.50	4.10	0.391
Hemotocrite	16	-1.69	1.98	-1.30	-4.60	1.70	4	-0.60	1.77	-0.50	-2.80	1.40	20	-1.47	1.94	-1.10	-4.60	1.70	0.298
Hematies	16	-1.92	3.28	-1.75	-10.10	2.40	4	-1.00	2.45	-1.00	-4.00	2.00	20	-1.74	3.10	-1.25	-10.10	2.40	0.670
Amount of Hemolobine in Hematite	16	-1.69	2.95	-1.10	-10.10	2.00	4	-1.15	2.47	-1.30	-4.00	2.00	20	-1.59	2.81	-1.25	-10.10	2.00	0.962
Gemoglobine concentration in hematies, mg/l	16	1.33	1.42	1.45	-0.90	3.50	4	0.88	1.53	1.05	-1.10	2.50	20	1.24	1.41	1.35	-1.10	3.50	0.570
Plaquettes	16	14.27	64.18	3.00	-88.00	176.00	4	21.25	23.47	13.50	3.00	55.00	20	15.67	57.86	3.15	-88.00	176.00	0.368
TGP or ALT	12	-2.91	7.78	-3.60	-18.50	10.40	4	-3.00	10.11	-4.00	-14.30	10.30	16	-2.93	8.05	-4.00	-18.50	10.40	1.000
TGO	12	0.25	5.17	-0.20	-8.00	11.92	4	11.33	20.75	4.55	-5.00	41.20	16	3.02	11.41	0.30	-8.00	41.20	0.396
PAL	8	1.64	17.69	3.55	-24.00	25.00	1	-29.00		-29.00	-29.00	-29.00	9	-1.77	19.44	3.10	-29.00	25.00	0.121
Bilirubin Total, mcM/l	14	-2.30	5.28	-4.15	-7.80	6.90	4	4.18	2.31	4.51	1.10	6.60	18	-0.86	5.47	-0.42	-7.80	6.90	0.063
Bilirubin direct	9	0.41	3.11	-0.63	-2.10	7.60	2	4.60	4.81	4.60	1.20	8.00	11	1.17	3.60	-0.46	-2.10	8.00	0.098
Bilirubin indirect	9	-3.83	4.25	-5.70	-9.40	4.90	2	0.71	2.98	0.71	-1.40	2.81	11	-3.01	4.33	-4.55	-9.40	4.90	0.239
Protein Total	13	-1.85	5.81	-1.00	-16.10	6.90	2	5.90	2.55	5.90	4.10	7.70	15	-0.81	6.07	-0.70	-16.10	7.70	0.041
Albumine	7	2.47	5.04	1.00	-5.10	10.50	1	9.50		9.50	9.50	9.50	8	3.35	5.28	2.25	-5.10	10.50	0.275
Creatinine, mcM/l	16	4.21	13.26	5.00	-34.00	23.00	4	-18.00	45.64	-5.50	-83.00	22.00	20	-0.23	23.47	4.50	-83.00	23.00	0.298
Uree, mM/l	14	-0.40	1.75	-0.15	-3.70	2.75	2	1.74	5.42	1.74	-2.10	5.57	16	-0.13	2.27	-0.15	-3.70	5.57	0.751
Uree Acid, mcM/l	11	-0.22	56.90	9.00	-83.00	110.00	2	-35.70	43.42	-35.70	-66.40	-5.00	13	-5.68	55.07	-5.00	-83.00	110.00	0.374
Tryglycerides	14	-2.00	3.09	-2.00	-10.10	2.00	3	-1.00	3.00	-1.00	-4.00	2.00	17	-1.82	3.01	-2.00	-10.10	2.00	0.657
Cholesterol	15	-0.10	0.79	-0.22	-1.94	1.25	2	0.26	0.69	0.26	-0.23	0.74	17	-0.05	0.77	-0.22	-1.94	1.25	0.551
HDL Cholesterol	8	-0.26	0.61	-0.07	-1.37	0.31	1	-0.82		-0.82	-0.82	-0.82	9	-0.32	0.60	-0.13	-1.37	0.31	0.439
LDL Cholesterol	9	-0.05	0.63	-0.09	-0.97	1.24	1	0.46		0.46	0.46	0.46	10	0.00	0.62	-0.01	-0.97	1.24	0.223
TSH	7	0.57	1.17	0.20	-0.44	3.10	1	0.10		0.10	0.10	0.10	8	0.51	1.10	0.15	-0.44	3.10	0.827
Glucose, mM/l	15	0.44	0.75	0.40	-1.05	1.70	2	-0.11	0.93	-0.11	-0.77	0.55	17	0.38	0.77	0.40	-1.05	1.70	0.456
Testosterone	5	1.47	1.82	0.84	0.05	4.65	2	5.38	2.72	5.38	3.45	7.30	7	2.58	2.66	1.10	0.05	7.30	0.121
PSA Total	6	-0.04	0.10	-0.02	-0.20	0.08	2	-0.22	0.36	-0.22	-0.47	0.03	8	-0.08	0.18	-0.02	-0.47	0.08	0.739
CA125	3	1.11	3.67	3.12	-3.13	3.33							3	1.11	3.67	3.12	-3.13	3.33	
P-value by Mann-Whitney U Test																			

6. Acknowledgements

7. Parameters and abbreviation

WBC: White Blood Cell Count; RBC: Red Blood Cell Count; Hemoglobin, Hemotocrite, hematies, MCV: Amount of Hemolobine in Hematite; MCH: Gemoglobine Concentration in Hematies; MCHC: Platlet, TGP or ALT, TGO, PAL, Bilirubin Total, Bilirubin direct, Bilirubin indirect, Protein Total, Albumine, Creatinine, Uree, Uree Acid, Tryglycerides, Cholesterol, HDL Cholesterol, LDL Cholesterol, TSH, Glucose, Testosterone, PSA, CA125

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