**Table 1 The comparison of genotype and allele frequencies of MMP9-1562 C/T and TIMP1 372 T/C polymorphisms**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| *MMP9* -1562 C/T  | **Sedentary** | **Athlete** | **Total** | **χ2** | **p** |
| **n** | **%** | **n** | **%** | **n** | **%** |
| **Genotype** |  |  |  |  |  |  |  |  |
| CC | 34 | 79.07 | 30 | 69.77 | 64 | 74.42 | 0.977 | 0.323 |
| CT | 9 | 20.93 | 13 | 30.23 | 22 | 25.58 |
| **Allele** |  |  |  |  |  |  |  |  |
| C | 77 | 89.53 | 73 | 84.88 | 150 | 87.21 | 0.834 | 0.361 |
| T | 9 | 10.47 | 13 | 15.12 | 22 | 12.79 |
|  |  |  |  |  |  |  |  |  |
| *TIMP1* 372 T/C**Allele** |  |  |  |  |  |  |  |  |
| C | 14 | 32.56 | 18 | 41.86 | 32 | 37.21 | 0.796 | 0.372 |
| T | 29 | 67.44 | 25 | 58.14 | 54 | 62.79 |

**Table 2 The comparison of parameters of the sedentary and athletic groups before and after the exercise belonging to *MMP9* -1562 C/T polymorphism genotype groups**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Pre-exercise** | **Post-exercise** | **Effect** | **F** | **p** | **η2** |  |
| $\overbar{x}$**+sem** | **95% CI** | $\overbar{x}$**+sem** | **95% CI** |  |  |
| **MMP9 (pg/mL)** | **Sed.** | CC | 1778.1±136.61 | 1506.35-2049.85 | 2174.59±122.5 | 1930.9-2418.27 | **E** | 42.232 | <0.001\* | 0.340 |
| CT | 1744.87±265.51 | 1216.68-2273.06 | 2163.08±238.09 | 1689.44-2636.71 | **G** | 5.212 | 0.025\* | 0.060 |
|  |  |  |  |  |  | **M** | 0.003 | 0.959 | 0.000 |
| **Ath.** | CC | 1400.04±145.43 | 1110.73-1689.34 | 1672.68±130.41 | 1413.26-1932.1 | **E\*G** | 0.003 | 0.958 | 0.000 |
| CT | 1312.48±220.92 | 873-1751.96 | 1841.52±198.1 | 1447.43-2235.61 | **E\*M** | 1.250 | 0.267 | 0.015 |
|  |  |  |  |  |  | **M\*G** | 0.031 | 0.861 | 0.000 |
|  |  |  |  |  |  | **E\*G\*M** | 0.890 | 0.348 | 0.011 |
| **TIMP1 (ng/mL)** | **Sed.** | CC | 4.47±0.57 | 3.35-5.6 | 5.08±0.49 | 4.1-6.06 | **E** | 5.623 | 0.020\* | 0.064 |
|  | CT | 5.24±1.1 | 3.05-7.43 | 6.12±0.95 | 4.22-8.01 | **G** | 5.925 | 0.017\* | 0.067 |
|  |  |  |  |  |  | **M** | 0.285 | 0.595 | 0.003 |
| **Ath.** | CC | 3.17±0.6 | 1.97-4.37 | 3.74±0.52 | 2.7-4.78 | **E\*G** | 2.037 | 0.157 | 0.024 |
|  | CT | 3.45±0.92 | 1.63-5.27 | 3.25±0.79 | 1.67-4.83 | **E\*M** | 0.414 | 0.522 | 0.005 |
|  |  |  |  |  |  | **M\*G** | 0.450 | 0.504 | 0.005 |
|  |  |  |  |  |  | **E\*G\*M** | 1.753 | 0.189 | 0.021 |
| **MMP9/TIMP1 (ng/mL)** | **Sed.** | CC | 1.36±0.26 | 0.85-1.87 | 1.38±0.2 | 0.98-1.79 | **E** | 0.167 | 0.684 | 0.002 |
| CT | 1.24±0.5 | 0.26-2.23 | 1.05±0.39 | 0.27-1.83 | **G** | 0.023 | 0.881 | 0.000 |
|  |  |  |  |  |  | **M** | 0.008 | 0.928 | 0.000 |
| **Ath.** | CC | 1.23±0.27 | 0.69-1.77 | 1.1±0.22 | 0.68-1.53 | **E\*G** | 0.637 | 0.427 | 0.008 |
| CT | 1.39±0.41 | 0.57-2.21 | 1.51±0.33 | 0.86-2.16 | **E\*M** | 0.008 | 0.931 | 0.000 |
|  |  |  |  |  |  | **M\*G** | 0.637 | 0.427 | 0.008 |
|  |  |  |  |  |  | **E\*G\*M** | 1.276 | 0.262 | 0.015 |
| **AST (U/L)** | **Sed.** | CC | 21.06±1.3 | 18.47-23.65 | 23.71±1.4 | 20.92-26.49 | **E** | 112.887 | <0.001\* | 0.579 |
|  | CT | 17.56±2.53 | 12.52-22.59 | 18.89±2.72 | 13.47-24.31 | **G** | 0.447 | 0.506 | 0.005 |
|  |  |  |  |  |  | **M** | 0.395 | 0.531 | 0.005 |
| **Ath.** | CC | 19.63±1.39 | 16.88-22.39 | 21.9±1.49 | 18.93-24.87 | **E\*G** | 3.397 | 0.069 | 0.040 |
|  | CT | 20.77±2.1 | 16.58-24.96 | 24.15±2.27 | 19.64-28.66 | **E\*M** | 0.047 | 0.830 | 0.001 |
|  |  |  |  |  |  | **M\*G** | 2.227 | 0.139 | 0.026 |
|  |  |  |  |  |  |  | **E\*G\*M** | 7.195 | 0.009\* | 0.081 |
| **ALT (U/L)** | **Sed.** | CC | 21.35±2.13 | 17.11-25.59 | 23.2±2.34 | 18.54-27.86 | **E** | 34.209 | <0.001\* | 0.294 |
|  | CT | 14.22±4.14 | 5.99-22.46 | 17±4.55 | 7.94-26.06 | **G** | 0.530 | 0.469 | 0.006 |
|  |  |  |  |  |  | **M** | 0.681 | 0.412 | 0.008 |
| **Ath.** | CC | 19.4±2.27 | 14.89-23.91 | 21.9±2.49 | 16.94-26.86 | **E\*G** | 0.062 | 0.804 | 0.001 |
|  | CT | 20.69±3.44 | 13.84-27.54 | 23.23±3.79 | 15.69-30.77 | **E\*M** | 0.337 | 0.563 | 0.004 |
|  |  |  |  |  |  | **M\*G** | 1.514 | 0.222 | 0.018 |
|  |  |  |  |  |  | **E\*G\*M** | 0.289 | 0.592 | 0.004 |
| **CK (IU/L)** | **Sed.** | CC | 205.09±25.34 | 154.68-255.5 | 237.24±28.97 | 179.6-294.87 | **E** | 69.920 | <0.001\* | 0.460 |
|  | CT | 186.78±49.25 | 88.8-284.76 | 208.78±56.31 | 96.76-320.8 | **G** | 1.083 | 0.301 | 0.013 |
|  |  |  |  |  |  | **M** | 0.591 | 0.444 | 0.007 |
| **Ath.** | CC | 254.3±26.98 | 200.63-307.97 | 284.53±30.84 | 223.18-345.89 | **E\*G** | 0.280 | 0.598 | 0.003 |
|  | CT | 216.31±40.98 | 134.78-297.83 | 247.54±46.85 | 154.33-340.74 | **E\*M** | 0.438 | 0.510 | 0.005 |
|  |  |  |  |  |  | **M\*G** | 0.032 | 0.859 | 0.000 |
|  |  |  |  |  |  |  | **E\*G\*M** | 0.650 | 0.423 | 0.008 |
| **TC (mg/dL)** | **Sed.** | CC | 158.06±6.2 | 145.73-170.38 | 162.56±6.87 | 148.89-176.23 | **E** | 21.358 | <0.001\* | 0.207 |
|  | CT | 164.44±12.04 | 140.49-188.4 | 167.67±13.36 | 141.09-194.24 | **G** | 0.348 | 0.557 | 0.004 |
|  |  |  |  |  |  | **M** | 1.071 | 0.304 | 0.013 |
| **Ath.** | CC | 148.93±6.6 | 135.81-162.05 | 152.33±7.32 | 137.78-166.89 | **E\*G** | 1.067 | 0.305 | 0.013 |
|  | CT | 160.15±10.02 | 140.22-180.09 | 168.92±11.12 | 146.81-191.04 | **E\*M** | 0.904 | 0.345 | 0.011 |
|  |  |  |  |  |  | **M\*G** | 0.185 | 0.669 | 0.002 |
|  |  |  |  |  |  | **E\*G\*M** | 2.385 | 0.126 | 0.028 |
| **HDL-C (mg/dL)** | **Sed.** | CC | 47.09±1.8 | 43.51-50.67 | 50.24±1.83 | 46.59-53.88 | **E** | 98.075 | <0.001\* | 0.545 |
|  | CT | 49.11±3.5 | 42.15-56.07 | 52.67±3.56 | 45.58-59.76 | **G** | 0.148 | 0.701 | 0.002 |
|  |  |  |  |  |  | **M** | 0.023 | 0.879 | 0.000 |
| **Ath.** | CC | 50.23±1.92 | 46.42-54.04 | 52.77±1.95 | 48.88-56.65 | **E\*G** | 0.379 | 0.540 | 0.005 |
|  | CT | 48.38±2.91 | 42.6-54.17 | 51.77±2.97 | 45.87-57.67 | **E\*M** | 0.977 | 0.326 | 0.012 |
|  |  |  |  |  |  | **M\*G** | 0.480 | 0.490 | 0.006 |
|  |  |  |  |  |  | **E\*G\*M** | 0.121 | 0.729 | 0.001 |
| **LDL-C (mg/dL)** | **Sed.** | CC | 87.235±4.45 | 78.383-96.087 | 90.147±4.497 | 81.202-99.092 | **E** | 15.266 | <0.001\* | 0.157 |
|  | CT | 86.333±8.649 | 69.128-103.54 | 89.778±8.74 | 72.391-107.16 | **G** | 2.879 | 0.094 | 0.034 |
|  |  |  |  |  |  | **M** | 0.092 | 0.762 | 0.001 |
| **Ath.** | CC | 77.933±4.737 | 68.51-87.357 | 80.133±4.787 | 70.61-89.656 | **E\*G** | 0.005 | 0.945 | 0.000 |
|  | CT | 73.538±7.196 | 59.223-87.854 | 77.923±7.272 | 63.457-92.389 | **E\*M** | 0.673 | 0.414 | 0.008 |
|  |  |  |  |  |  | **M\*G** | 0.042 | 0.837 | 0.001 |
|  |  |  |  |  |  |  | **E\*G\*M** | 0.249 | 0.619 | 0.003 |

*Sed.: sedentary, Ath.: athletic, sem: standard error of means \*p<0,05 E: exercise, G: group, M: MMP9-1562 C/T polymorphism genotype group*

**Table 3 The comparison of parameters of sedentary and athletic groups before and after the exercise belonging to *TIMP1* 372 T/C polymorphism allele groups**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Pre-exercise** | **Post-exercise** | **Effect** | **F** | **p** | **η2** |  |
| $\overbar{x}$**+sem** | **95% CI** | $\overbar{x}$**+sem** | **95% CI** |  |  |
| **MMP9 (pg/mL)** | **Sed.** | C | 1834.83±208.38 | 1420.3-2249.36 | 2308.83±185.84 | 1939.12-2678.53 | **E** | 46.725 | <0.001\* | 0.363 |
| T | 1740.4±144.78 | 1452.38-2028.42 | 2106.21±129.13 | 1849.34-2363.08 | **G** | 9.698 | 0.003\* | 0.106 |
|  |  |  |  |  |  | **T** | 0.932 | 0.337 | 0.011 |
| **Ath.** | C | 1108.65±183.77 | 743.06-1474.23 | 1466±163.9 | 1139.95-1792.05 | **E\*G** | 0.371 | 0.544 | 0.005 |
| T | 1564.31±155.94 | 1254.1-1874.51 | 1909.29±139.07 | 1632.63-2185.95 | **E\*T** | 0.286 | 0.595 | 0.003 |
|  |  |  |  |  |  | **T\*G** | 3.678 | 0.059 | 0.043 |
|  |  |  |  |  |  | **E\*G\*T** | 0.180 | 0.672 | 0.002 |
| **TIMP1 (ng/mL)** | **Sed.** | C |  4.07±0.88 | 2.32-5.82 | 4.76±0.77 | 3.24-6.29 | **E** | 8.376 | 0.005\* | 0.093 |
|  | T | 4.9±0.61 | 3.69-6.12 | 5.56±0.53 | 4.5-6.62 | **G** | 4.566 | 0.036\* | 0.053 |
|  |  |  |  |  |  | **T** | 0.832 | 0.364 | 0.010 |
| **Ath.** | C | 2.95±0.78 | 1.41-4.5 | 3.42±0.68 | 2.08-4.77 | **E\*G** | 0.797 | 0.375 | 0.010 |
|  | T | 3.48±0.66 | 2.17-4.79 | 3.72±0.57 | 2.58-4.86 | **E\*T** | 0.145 | 0.704 | 0.002 |
|  |  |  |  |  |  | **T\*G** | 0.090 | 0.765 | 0.001 |
|  |  |  |  |  |  | **E\*G\*T** | 0.072 | 0.789 | 0.001 |
|  **MMP9/TIMP1 (ng/ mL)** | **Sed.** | C | 1.53±0.4 | 0.74-2.32 | 1.43±0.32 | 0.8-2.06 | **E** | 0.511 | 0.477 | 0.006 |
| T | 1.25±0.28 | 0.7-1.79 | 1.26±0.22 | 0.82-1.7 | **G** | 0.181 | 0.672 | 0.002 |
|  |  |  |  |  |  | **T** | 0.044 | 0.834 | 0.001 |
| **Ath.** | C | 1.36±0.35 | 0.66-2.05 | 1.02±0.28 | 0.47-1.58 | **E\*G** | 0.067 | 0.797 | 0.001 |
| T | 1.22±0.3 | 0.63-1.81 | 1.37±0.24 | 0.9-1.85 | **E\*T** | 2.703 | 0.104 | 0.032 |
|  |  |  |  |  |  | **T\*G** | 0.337 | 0.563 | 0.004 |
|  |  |  |  |  |  | **E\*G\*T** | 1.096 | 0.298 | 0.013 |
|  **AST (U/L)** | **Sed.**  | C | 21.64±2.04 | 17.58-25.7 | 23.86±2.22 | 19.44-28.27 | **E** | 137.038 | <0.001\* | 0.626 |
| T | 19.69±1.42 | 16.87-22.51 | 22.14±1.54 | 19.07-25.21 | **G** | 0.115 | 0.735 | 0.001 |
|  |  |  |  |  |  | **T** | 0.116 | 0.734 | 0.001 |
| **Ath.** | C | 19.56±1.8 | 15.98-23.14 | 22.28±1.96 | 18.38-26.17 | **E\*G** | 0.469 | 0.495 | 0.006 |
| T | 20.28±1.53 | 17.24-23.32 | 22.8±1.66 | 19.5-26.1 | **E\*T** | 0.001 | 0.970 | 0.000 |
|  |  |  |  |  |  | **T\*G** | 0.478 | 0.491 | 0.006 |
|  |  |  |  |  |  | **E\*G\*T** | 0.266 | 0.608 | 0.003 |
| **ALT(U/L)** | **Sed.** | C | 18.07±19.93 | 3.36-3.67 | 11.39±12.62 | 24.75-27.23 | **E** |  40.190 | <0.001\* | 0.329 |
| T | 20.72±22.86 | 2.33-2.55 | 16.08±17.78 | 25.36-27.93 | **G** |  0.059 | 0.808 | 0.001 |
|  |  |  |  |  |  | **T** |  0.117 | 0.733 | 0.001 |
| **Ath.** | C | 19.78±23.22 | 2.96-3.24 | 13.88±16.78 | 25.67-29.67 | **E\*G** |  0.780 | 0.380 | 0.009 |
| T | 19.80±21.64 | 2.51-2.75 | 14.79±16.17 | 24.8-27.11 | **Z\*T** |  0.812 | 0.370 | 0.010 |
|  |  |  |  |  |  | **T\*G** |  0.371 | 0.544 | 0.005 |
|  |  |  |  |  |  | **E\*G\*T** |  1.650 | 0.203 | 0.020 |
| **CK (IU/L)** | **Sed.** | C | 176±39.49 | 97.45-254.55 | 198.5±45.1 | 108.78-288.22 | **E** |  91.989 | <0.001\* | 0.529 |
| T | 213.45±27.44 | 158.87-268.03 | 247.1±31.34 | 184.77-309.44 | **G** |  1.854 | 0.177 | 0.022 |
|  |  |  |  |  |  | **T** |  0.617 | 0.435 | 0.007 |
| **Ath.** | C | 233.83±34.82 | 164.56-303.11 | 267.61±39.77 | 188.49-346.73 | **E\*G** |  0.223 | 0.638 | 0.003 |
| T | 249.28±29.55 | 190.5-308.06 | 277.48±33.75 | 210.34-344.62 | **E\*T** |  0.205 | 0.652 | 0.002 |
|  |  |  |  |  |  | **T\*G** |  0.183 | 0.670 | 0.002 |
|  |  |  |  |  |  | **E\*G\*T** |  1.846 | 0.178 | 0.022 |
| **TC (mg/dL)** | **Sed.** | C | 174.36±9.41 | 155.64-193.08 | 179.86±10.51 | 158.95-200.76 | **E** | 23.729 | <0.001\* | 0.224 |
| T | 152.17±6.54 | 139.17-165.18 | 155.79±7.3 | 141.27-170.32 | **G** | 1.316 | 0.255 | 0.016 |
|  |  |  |  |  |  | **T** | 5.068 | 0.027\* | 0.058 |
| **Ath.** | C | 160.67±8.3 | 144.16-177.18 | 165.67±9.27 | 147.23-184.1 | **E\*G** | 0.055 | 0.816 | 0.001 |
| T | 146.32±7.04 | 132.31-160.33 | 151.36±7.86 | 135.72-167 | **E\*T** | 0.219 | 0.641 | 0.003 |
|  |  |  |  |  |  | **T\*G** | 0.280 | 0.598 | 0.003 |
|  |  |  |  |  |  | **E\*G\*T** | 0.238 | 0.627 | 0.003 |
| **HDL-C (mg/dL)** | **Sed.** | C | 50.79±2.77 | 45.28-56.29 | 53.93±2.82 | 48.32-59.53 | **E** | 112.220 | <0.001\* | 0.578 |
| T | 45.93±1.92 | 42.1-49.76 | 49.21±1.96 | 45.31-53.1 | **G** | 0.326 | 0.569 | 0.004 |
|  |  |  |  |  |  | **T** | 2.618 | 0.109 | 0.031 |
| **Ath.** | C | 51.06±2.44 | 46.2-55.91 | 54.28±2.49 | 49.33-59.22 | **E\*G** | 0.392 | 0.533 | 0.005 |
| T | 48.68±2.07 | 44.56-52.8 | 51.16±2.11 | 46.97-55.35 | **E\*T** | 0.283 | 0.596 | 0.003 |
|  |  |  |  |  |  | **T\*G** | 0.192 | 0.662 | 0.002 |
|  |  |  |  |  |  | **E\*G\*T** | 0.585 | 0.447 | 0.007 |
| **LDL-C (mg/dL)** | **Sed.** | C | 97.71±6.63 | 84.52-110.91 | 102±6.55 | 88.97-115.03 | **E** | 20.939 | <0.001\* | 0.203 |
| T | 81.9±4.61 | 72.73-91.06 | 84.31±6.55 | 75.26-93.36 | **G** | 4.779 | 0.032\* | 0.055 |
|  |  |  |  |  |  | **T** | 9.918 | 0.002\* | 0.108 |
| **Ath.** | C | 85.61±5.85 | 73.97-97.25 | 91.17±5.77 | 79.68-102.65 | **E\*G** | 0.006 | 0.938 | 0.000 |
| T | 70.12±4.96 | 60.24-79.99 | 71.04±4.90 | 61.29-80.79 | **E\*T** | 5.108 | 0.026\* | 0.059 |
|  |  |  |  |  |  | **T\*G** | 0.009 | 0.924 | 0.000 |
|  |  |  |  |  |  | **E\*G\*T** | 0.921 | 0.340 | 0.011 |

 *Sed.: sedentary, Ath.: athletic, \*p<0.05 E: exercise, G: group, T: TIMP1 372 T/C polymorphism allele group*