APPENDIX I

GURU NANAK DEV UNIVERSITY, AMRITSAR
(Established By The State Legislature Act No. 21 Of 1969)
Department of Human Genetics

QUESTIONNAIRE

1. Name……………………………………………………………………………………………………
2. a) Age………………………………….. b) Sex…………………………………………
3. Marital status………………………………………………………………………………………
4. Education ……………………………………………………………………………………………
5. Occupation…………………………………………………………………………………………
6. Date……………………………………………………………………………………………………
7. Area……………………………………………………………………………………………………
8. Body Parameters
   a) Weight……………………………………………………………..…………kg
   b) Height……………………………………………………………..……..cm
   c) Hip Circumference……………………………………………...………cm
   d) Waist Circumference………………………………………………cm
9. Derived Variables
   a) Body Mass Index (BMI)……………………………………………………
   b) Waist-Hip Ratio (WHR)………………………………………………
   c) Waist-Height Ratio (WHtR)…………………………………………
   d) Percentage Body Fat………………………………………………..
   e) Lean Body Mass……………………………………………………
10. Step Test
    a) Pulse Rate……………………………………………………………………..
    b) VO₂max……………………………………………………………………..
11. Physical Activities
    a) Sedentary    b) Light   c) Moderate   d) Heavy
12. Types of sports you play…………………………………………………………
13. Since when have you been involved in sports?

........................................................................................................................................

14. How often do you go for sports?

........................................................................................................................................

15. Time (hrs/day) spent on sports.................................................................

16. Warm-Ups
   a) Types of Exercises............................................................................................
   b) Duration (min).................................................................................................

17. Sports specific exercise performed..........................................................

18. Any ill-effects on health after sports activity.............................................

19. Precautions you take before and after exercising....................................

20. Dietary Pattern
   a) Vegetarian       b) Non- Vegetarian       c) Conditional Vegetarian
   c) Do you take any dietary supplements?..........................................................
      i. How soon after exercise?.................................................................
      ii. How often in the day?.................................................................
   d) Any dietary restriction?.............................................................................

21. Use of Mobile
   a) Using since.................................................................................................
   b) Place where put mobile.............. c) it’s daily use.....................................

22. Alcohol intake (ml/week).............................................................................

23. Smoking (no. of cigarettes/week)...............................................................

24. Drugs (If any)..............................................................................................

25. Any other toxicants?..................................................................................

26. Industry/discharge unit near residence: Y/N

27. Exposure History..........................................................................................
   a) Noise pollution.............................................................................................
   b) Any other exposures- Dust, Fertilizer, Pesticides, Traffic fumes, Radiation,
      Chemicals (dyes, solvents etc.), Infectious agents, Lab occupation, etc
28. Medical History (If any): Y/N
   a) Illness ...........................................................................................................
      i. Past..............................  ii. Present ...........................................
   b) Medication
      i. Past.................................. ii. Present ..............................................
29. Any Genetic disorder/anomaly in the family?............................................................
      ...................................................................................................................
      ........................................
30. Pedigree Chart:
APPENDIX II

GURU NANAK DEV UNIVERSITY, AMRITSAR
(Established By The State Legislature Act No. 21 Of 1969)
Department of Human Genetics

CONSENT FORM

I have been explained the possible risks and benefits and have understood the purpose for which blood sample/buccal smear/urine/other is requested from me for the research project in the Department of Human Genetics, Guru Nanak Dev University, Amritsar.

I am free from any pressure and hereby give my consent for withdrawal of blood sample by finger puncture (0.5ml)/ venipuncture (5ml) and for all types of analyses of my blood for non-profit research purposes.

I will have the right to know the analysed result of my sample and I am not giving my consent for disclosure of any personal information, either direct or indirect, from the analysis of my sample to anyone without my further consent.

Date
Name
Address
Sex
Age (y)                          Signatures

Investigator
Name
Signatures
Date
APPENDIX III

PREPARATION OF SOLUTIONS

For carrying out the SCGE Assay

Phosphate Buffer Saline (PBS) For Calcium and magnesium ion-free PBS, 8g Sodium chloride, 11.50g, Potassium dihydrogen phosphate, 0.200 g Potassium chloride and 0.200g Potassium dihydrogen phosphate were mixed in 950 ml of double-distilled water. The final volume was made up to 1,000 ml with double-distilled water (pH 7.4) and was then filtered with Whatman filter paper No. 1 and stored at room temperature.

Working Lysis solution To the lysis stock was added 1ml of 1% Triton X and 9ml of 10% DMSO. It was kept at 4°C for 30-40min before use.

10N NaOH 80g NaOH was dissolved in 200ml double-distilled water and stored at room temperature.

200mM EDTA 14.89g Na₂EDTA was dissolved in 200ml double-distilled water and stored at room temperature.

Electrophoresis buffer For this, 30ml 10N NaOH and 5 ml EDTA were dissolved in 900 ml of double-distilled water and the final volume was made up to 1000 ml with double-distilled water. The pH of electrophoresis buffer was maintained at 13.

Neutralization buffer In 450 ml of double-distilled water, 24.26 g Tris-hydroxyaminomethane was mixed and final volume was made up to 500 ml. The pH was adjusted to 7.5 by adding concentrated ~12ml HCl and the buffer was stored at 4°C.

Fixing solution (Solution A) For making 500 ml fixing solution, 75g of trichloroacetic acid, 25g of zinc sulphate and 25 ml glycerol were dissolved in 450 ml of double-distilled water. The final volume (500ml) was made by adding double-distilled water and it was stored at 4°C in a dark-coloured bottle.

Solution B 25g Sodium carbonate was dissolved in 400 ml double-distilled water by stirring vigorously for 20-30 min. By adding double-distilled water, the volume was adjusted to 500ml and it was stored at 4°C in a dark coloured bottle.
Solution C

100mg Ammonium nitrate, 100 mg silver nitrate, 500 mg tungstosilisic acid and formaldehyde were dissolved in 450 ml double distilled water. Then was added 250 µl of 37% formaldehyde. The final volume was made up to 500 ml by adding double-distilled water and it was stored at 4°C in a dark coloured bottle.

Staining Solution
(Solution D)

It was prepared just before use by adding 68 ml of solution ‘C’ and 32 ml of solution ‘B’ in a beaker covered with brown paper.

Stopping Solution
(Solution E)

One ml glacial acetic acid was mixed in 99 ml double distilled water for preparation of 1% stopping solution.

Enzyme reaction buffer

40mM HEPES, 0.1M KCl, 0.5mM EDTA and 0.2mg/ml BSA were mixed and its pH was adjusted to 8.0 with KOH pellets. It was stored at -20°C as 10x stock aliquots.

For Lipid Peroxidation (Malondialdehyde) Estimation

TrisHCl buffer (150mM) 1.815g TrisHCl was dissolved in 100 ml of double-distilled water and it was stored at 4°C.

Ascorbic Acid (1.5 mM) 0.026g Ascorbic acid was dissolved in 100 ml double-distilled water and it was stored at 4 °C.

1.0 mM Ferrous ammonium sulphate 0.039g Ferrous ammonium sulphate was dissolved in 100 ml of DDW and was stored at 4°C.

10% Tricholoroacetic acid 10 ml Trichloroacetic acid was mixed with 100 ml of double-distilled water and it was stored at 4°C.

0.375% Thiobarbituric acid 0.375g Thiobarbituric acid (TBA) was dissolved in 100 ml of double-distilled water and it was stored at 4°C.

For Total Antioxidant Capacity Estimation

Reagent 1 0.4mol/l Sodium acetate solution was prepared by dissolving 32.8 g of sodium acetate in 1000 ml of double-distilled water.

0.4mol/l Glacial acetic acid was prepared by diluting 22.8 ml of glacial acetic acid with 977.2 ml of double-distilled water.

940 ml Sodium acetate (0.4 mol/l) was added to 60 ml glacial acetic acid (0.4mol/l) to form acetate-acetic acid buffer (pH 5.8). The buffer was stored at 4°C.
Reagent 2

In 75 ml of Sodium acetate (30 mmol/l), 925 ml of 30 mmol/l of acetic acid was added to form an acetate-buffer (pH 3.6). H₂O₂ solution (37%; 278µl) was dissolved in 100 ml of prepared buffer and incubated for 1 h at room temperature so that bluish-green color appeared and then it was stored at 4°C.

Solutions for Total Oxidant Status Estimation

Reagent 1

114mg Xylene orange and 8.18g of NaCl were dissolved in 900 ml of 25mM H₂SO₄. Glycerol (100 ml) was then added to make a final volume of 1000ml and pH of the reagent was maintained at 1.75 and it was stored at 4°C.

Reagent 2

1.96g Ferrous ammonium sulphate and 3.17g of o-dianisidine dihydrochloride were dissolved in 1000 ml of 25 mM H₂SO₄.

Solutions for DNA Isolation

0.5M EDTA

In 800ml of distilled water added 186.1gm EDTA and mixed it well on stirrer. The pH was then adjusted to 8.0 by adding sodium hydroxide pellets. The final volume was made to 1000ml by adding distilled water. The solution was filtered (Whatman No. 1), autoclaved (1.2 lbs, 20 min) and stored at 4°C.

1M Tris-HCL

For 1M Tris, added 60.55gm Tris base in 400ml of distilled water. The contents were mixed well and the final volume was made to 500ml with distilled water.

5M NaCl

In 200ml of distilled water was added 73.05gm of sodium chloride. After mixing well, the final volume was made to 250ml and it was stored at 4°C.

Red cell lysis buffer

In 900ml distilled water, added 82.9g ammonium chloride, 10g potassium bicarbonate and 2ml 0.5M EDTA. The contents were mixed properly, filtered (Whatman No. 1), autoclaved (1.2 lbs, 20 min) and it was stored at 4°C.

White cell lysis buffer

For this, 50ml Tris-HCl, 5M NaCl solution and 0.5M EDTA were mixed and the final volume was made to 500ml; the solution was filtered (Whatman No. 1) autoclaved (1.2 lbs, 20 min) and stored at 4°C.
10% SDS Solution  In pre-warmed distilled water (80ml), added 10g of sodium dodecyl sulphate. The pH was set to 7.2 by adding conc. HCl and the final volume (100ml) was made by adding water.

Tris-EDTA Buffer  In 90ml of distilled water added 1000µl 1M Tris HCl (pH 8.0) and 200 µl 0.5M EDTA (pH 8.0) and the final volume was made to 100ml with distilled water.

Gel loading dye  For the loading dye, added 0.25% bromophenol blue (250mg), to 0.25% xylene cyanol (250mg) and 40% sucrose (40mg). It was stored at 4°C.

10X TBE Buffer  In 800ml distilled water added 108g Tris base, 55g boric acid, 40 µl 0.5M EDTA and the contents were mixed well. The final volume was made to 1000ml and the solution was filtered (Whatman No. 1), autoclaved (1.2 lbs, 20 min) and stored at 4°C.

100bp ladder working 10 µl 100bp ladder and 40 µl bromophenol blue dye were added to 90 µl distilled water

0.8% Agarose gel  0.8g agarose in 100ml TBE buffer was prepared by heating for gel- casting tray. For this 10µl of ethidium bromide was added to the gel. On cooling of the gel, it was poured into the gel-casting tray avoiding air bubbles and the gel was allowed to polymerize (30 minutes).
PREPARATION OF GLASSWARE

The glassware used for carrying out the experimental work was dipped in chromic acid overnight, rinsed with tap water and kept overnight under running water. They were then dipped overnight in labolene solution and cleaned with the help of brush. Again it was kept overnight under running water and subsequent three washings were given with distilled water. For drying the glassware kept in hot air oven at 75°C. The dried glassware was wrapped in Aluminum foil and brown paper and autoclaved at 1.2-1.5 lbs pressure for 15-20 min and kept in oven at 75°C till further use.

PREPARATION OF GLASS SLIDES

Glass slides were dipped in conc. Nitric acid for 5-6 hrs and then kept under running water for 2-3 hrs. Three washings of distilled water were given and kept in hot air oven at 75°C for drying and storage till usage.
APPENDIX IV

LIST OF CHEMICALS

<table>
<thead>
<tr>
<th>CHEMICAL</th>
<th>FIRM</th>
</tr>
</thead>
<tbody>
<tr>
<td>2, 2’-azino-bis (3-ethylbenzothiazoline-6-sulphonic acid)</td>
<td>Sigma, USA</td>
</tr>
<tr>
<td>Acetic acid glacial (C₂H₄O₂)</td>
<td>SRL, India</td>
</tr>
<tr>
<td>Ammonium chloride</td>
<td>Qualigens, India</td>
</tr>
<tr>
<td>Ammonium nitrate (NH₄NO₃)</td>
<td>SRL, India</td>
</tr>
<tr>
<td>Boric acid</td>
<td>Qualigens, India</td>
</tr>
<tr>
<td>Bromophenol blue</td>
<td>SRL, India</td>
</tr>
<tr>
<td>Dehydrated alcohol (Ethanol)</td>
<td>Bengal Chemicals Pvt. Ltd., India</td>
</tr>
<tr>
<td>Dimethyl sulphoxide (DMSO) (CH₃,SCOH)</td>
<td>Qualigens, India</td>
</tr>
<tr>
<td>Ethidium bromide</td>
<td>SRL, India</td>
</tr>
<tr>
<td>Êthylediamin Tetra-acetic acid (EDTA) (CH₂COOH) (CH₂COONA)2.2H₂O</td>
<td>Qualigens, India</td>
</tr>
<tr>
<td>Formaldehyde (HCHO)</td>
<td>Qualigens, India</td>
</tr>
<tr>
<td>Glacial acetic acid</td>
<td>SRL, India</td>
</tr>
<tr>
<td>Glycerol (CH₂OH CHOH₂ OH)</td>
<td>Qualigens, India</td>
</tr>
<tr>
<td>Hydrochloric acid (HCL)</td>
<td>Qualigens, India</td>
</tr>
<tr>
<td>Hydrogen peroxide solution</td>
<td>Qualigens, India</td>
</tr>
<tr>
<td>Hydrogen phosphate disodium salt (Na₂HPO₄)</td>
<td>S.D. Fine Chem. Ltd., India</td>
</tr>
<tr>
<td>Low melting point agarose (Gelling temperature 30°-40°C)</td>
<td>SRL, India</td>
</tr>
<tr>
<td>Normal melting point agarose (Gelling temperature 36°-40°C)</td>
<td>SRL, India</td>
</tr>
<tr>
<td>o-dianisidine dihydrochloride</td>
<td>Sigma, USA</td>
</tr>
<tr>
<td>Potassium chloride (KCl)</td>
<td>Ranbaxy, India</td>
</tr>
<tr>
<td>Potassium dihydrogen phosphate (KH₂PO₄)</td>
<td>SRL, India</td>
</tr>
<tr>
<td>Potassium hydrogen carbonate (KHCO₃)</td>
<td>Qualigens, India</td>
</tr>
<tr>
<td>Silver nitrate (AgNo₃)</td>
<td>SRL, India</td>
</tr>
<tr>
<td>Sodium carbonate (Na₂CO₃)</td>
<td>SRL, India</td>
</tr>
<tr>
<td>Sodium chloride (NaCl)</td>
<td>Qualigens, India</td>
</tr>
</tbody>
</table>
Sodium dihydrogen phosphate (NaH$_2$PO$_4$) | S.D. Fine Chem. Ltd., India
---|---
Sodium Dodecyl Sulphate | SRL, India
Sodium hydroxide (NaOH) Pellets | Qualigens, India
Sucrose | Qualigens, India
Sulphuric acid solution | Qualigens, India
Thiobarbutaric acid | LOBA Chemie, India
Trichloro acetic acid (CCL$_3$.COOH) | Qualigens, India
Tris aminomethane (C$_4$H$_{11}$NO$_3$) | Qualigens, India
Triton X-100 | SRL, India
Trypan blue | Thomas Baker, India
Tungstosilicic acid [H$_4$Si(W$_3$O$_{10}$)]$_3$ | SRL, India
Xylene Cyanol | SRL, India
Xylenol orange | SRL, India
Zinc sulphate (ZnSO$_4$) | SRL, India

### EQUIPMENT AND GLASSWARE USED FOR THE STUDY

**Equipment/ Glassware** | **Company**
---|---
**For SCGE Assay**
Beakers (25ml, 100ml, 250ml) | Borosil, India
Binocular microscope (Magnus- ML-X) | Olympus New Delhi, India
Conical flasks (50ml, 250ml, 500ml) | Borosil, India
Coplin jars (100ml) | Borosil, India
Coverslips (22 X 60mm) | Bluestar, India
Digital camera Olympus 420 | Olympus, New Delhi, India
Electrophoretic unit | Bangalore Genie, Bangalore, India
Glass microscope slides | Bluestar, India
Glass pipettes (5ml, 10ml) | Borosil, India
Incubator | NSW, India
Microcentrifuge tubes (1-5ml) | Tarson and Co., India
Micropipettes (40-2000μl) | Finn pipette, Thermo, Eppendorf
Water Purification System | Millipore Elix-3, France
Hot Air Oven  
NSW, India
Power Supply Unit  
Tarson and Co., India
Beakers (1000ml, 500ml, 250ml)  
Borosil, India
5ml syringes  
Dispo Van, Faridabad, India
BP Apparatus  
Diamond Deluxe, India
Stethoscope  
MSDI-GUARD
Binocular microscope, CH20-I  
Olympus, India
Culture vials  
Borosil, India
Deep Freezer (-20°C)  
Vestfrost
Deep Freezer (-80°C)  
New Brunswick Scientific, Germany
Refrigerator  
LG, south Korea
Incubator  
NSW, India
Measuring cylinders  
Borosil, India
(100ml, 250ml, 500ml)

For Determination of Malondialdehyde, Total Antioxidant Capacity and Total Oxidant Status

Beakers (25ml, 100ml, 250ml)  
Borosil, India
Conical flasks (50ml, 250ml, 500ml)  
Borosil, India
Incubator  
NSW, India
Measuring cylinders  
Borosil, India
(100ml, 250ml, 500ml)
Microtiter-plate (96 wells)  
Poly-lab, India

For Molecular Genetic Analysis

Microtips (0.1-1000µl)  
Tarson and Co., India
Centrifuge tubes (15ml)  
Tarson and Co., India
Microcentrifuge tubes (0.2-1.5 µl)  
Tarson and Co., India
Centrifuge Machine  
Remi, India
Micropipette (0.2-1000 µl)  
Eppendorf, Germany
Thermal Cycler  
Eppendorf (Germany), Applied BioSystem (India)
Spin win  
Dry Bath  
PCR Tube Stand  
Storage box (Mini Cooler)  
UV Transilluminator  
Gel Documentation System  
Spectrophotometer  
Elisa Reader (Bio-Rad 680XR)  
Semi-automated Analyser (CHEM 7)  
Serological Water Bath  

Tarson and Co., India  
Remi, India  
Tarson and Co., India  
Tarson and Co., India  
Benchtop 3UV Th Transilluminator, Cambrige, UK  
UVP, USA  
Perkin Elmer, USA  
Bio-Rad, USA  
Erba Mannheim, Germany  
NSW, India
## APPENDIX V

Comparison of Significance Levels of Parametric and Non-parametric Tests for Genetic Damage Parameters

<table>
<thead>
<tr>
<th>Group</th>
<th>Per cent Tail DNA</th>
<th>Tail Moment</th>
<th>Olive Tail Moment</th>
<th>Damage Index (AU)</th>
<th>Damage Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Players</td>
<td>19.79±0.26</td>
<td>32.56±1.73</td>
<td>25.10±1.07</td>
<td>128.83±1.15</td>
<td>93.46±0.44</td>
</tr>
<tr>
<td>Control</td>
<td>5.65±0.15</td>
<td>2.83±0.12</td>
<td>3.83±0.13</td>
<td>77.65±1.54</td>
<td>65.84±1.24</td>
</tr>
<tr>
<td>Mann-Whitney (p value)</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Students’ t Test (p value)</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Players Males</td>
<td>19.90±0.32</td>
<td>36.61±2.40</td>
<td>27.27±1.52</td>
<td>128.58±1.41</td>
<td>93.50±0.60</td>
</tr>
<tr>
<td>Females</td>
<td>19.62±0.44</td>
<td>26.47±2.26</td>
<td>21.85±1.30</td>
<td>129.20±1.97</td>
<td>93.39±0.65</td>
</tr>
<tr>
<td>Mann-Whitney</td>
<td>0.437</td>
<td>0.007</td>
<td>0.015</td>
<td>0.895</td>
<td>0.640</td>
</tr>
<tr>
<td>Students’ t Test</td>
<td>0.603</td>
<td>0.004</td>
<td>0.012</td>
<td>0.794</td>
<td>0.901</td>
</tr>
<tr>
<td>Controls Males</td>
<td>5.91±0.19</td>
<td>2.48±0.11</td>
<td>3.38±0.13</td>
<td>69.19±2.01</td>
<td>59.60±1.57</td>
</tr>
<tr>
<td>Females</td>
<td>5.22±0.22</td>
<td>3.39±0.25</td>
<td>4.56±0.26</td>
<td>81.47±1.29</td>
<td>76.01±1.40</td>
</tr>
<tr>
<td>Mann-Whitney</td>
<td>0.026</td>
<td>0.004</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
<tr>
<td>Students’ t Test</td>
<td>0.020</td>
<td>0.001</td>
<td>0.000</td>
<td>0.000</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Statistical significance considered at p≤0.05
APPENDIX VI

Genetic Damage as a Function of Population Sub-Groups

<table>
<thead>
<tr>
<th>Population Sub-Groups</th>
<th>Group</th>
<th>Per cent Tail DNA</th>
<th>Tail Moment</th>
<th>Olive Tail Moment</th>
<th>Damage Index (AU)</th>
<th>Damage Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brahmns (n=50)</td>
<td>Players (n=25)</td>
<td>20.07±0.76</td>
<td>35.56±5.31</td>
<td>27.41±3.23</td>
<td>133.24±3.60</td>
<td>92.72±1.33</td>
</tr>
<tr>
<td></td>
<td>Controls (n=25)</td>
<td>5.24±0.39</td>
<td>2.68±0.39</td>
<td>3.90±0.41</td>
<td>78.24±3.57</td>
<td>64.08±1.64</td>
</tr>
<tr>
<td>Jat Sikh (n=250)</td>
<td>Players (n=125)</td>
<td>19.55±0.29</td>
<td>30.93±2.03</td>
<td>24.26±1.29</td>
<td>128.5±1.31</td>
<td>94.15±0.51</td>
</tr>
<tr>
<td></td>
<td>Controls (n=125)</td>
<td>5.61±0.18</td>
<td>2.86±0.16</td>
<td>3.84±0.18</td>
<td>76.97±2.03</td>
<td>66.36±3.32</td>
</tr>
<tr>
<td>Scheduled Castes (n=50)</td>
<td>Players (n=25)</td>
<td>19.77±0.75</td>
<td>36.00±6.05</td>
<td>27.66±3.53</td>
<td>123.76±3.19</td>
<td>92.96±1.06</td>
</tr>
<tr>
<td></td>
<td>Controls (n=25)</td>
<td>5.89±0.44</td>
<td>2.76±0.23</td>
<td>3.57±0.27</td>
<td>80.48±4.29</td>
<td>69.04±3.47</td>
</tr>
<tr>
<td>Backward Classes (n=50)</td>
<td>Players (n=25)</td>
<td>20.70±1.03</td>
<td>34.25±5.07</td>
<td>24.47±2.96</td>
<td>130.96±4.34</td>
<td>91.20±1.74</td>
</tr>
<tr>
<td></td>
<td>Controls (n=25)</td>
<td>6.02±0.45</td>
<td>2.87±0.29</td>
<td>3.95±0.32</td>
<td>77.64±4.33</td>
<td>63.72±3.89</td>
</tr>
</tbody>
</table>

Values presented as mean±SEM
No Statistical significant values observed (p ≤0.05)

Oxidative Stress as a Function of Population Sub-groups

<table>
<thead>
<tr>
<th>Ethnic Group</th>
<th>Group</th>
<th>Malondialdehyde</th>
<th>Superoxide Dismutase</th>
<th>Total Antioxidant Capacity</th>
<th>Total Oxidant Status</th>
<th>Oxidative Stress Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brahmns (n=50)</td>
<td>Players (n=25)</td>
<td>1.22±0.15</td>
<td>91.80±1.59</td>
<td>1.08±0.10</td>
<td>12.31±1.03</td>
<td>1.01±0.14</td>
</tr>
<tr>
<td></td>
<td>Controls (n=25)</td>
<td>1.00±0.13</td>
<td>92.69±1.17</td>
<td>1.09±0.03</td>
<td>9.73±0.63</td>
<td>0.90±0.06</td>
</tr>
<tr>
<td>Jat Sikh (n=250)</td>
<td>Players (n=125)</td>
<td>1.46±0.09</td>
<td>92.68±0.75</td>
<td>1.12±0.02</td>
<td>11.76±0.37</td>
<td>1.15±0.07</td>
</tr>
<tr>
<td></td>
<td>Controls (n=125)</td>
<td>1.06±0.06</td>
<td>92.63±0.58</td>
<td>1.01±0.02</td>
<td>9.09±0.27</td>
<td>0.98±0.05</td>
</tr>
<tr>
<td>Scheduled Castes (n=50)</td>
<td>Players (n=25)</td>
<td>1.40±0.20</td>
<td>90.30±1.70</td>
<td>1.07±0.06</td>
<td>12.67±0.99</td>
<td>1.29±0.13</td>
</tr>
<tr>
<td></td>
<td>Controls (n=25)</td>
<td>1.02±0.10</td>
<td>94.71±0.88</td>
<td>1.00±0.05</td>
<td>9.91±0.62</td>
<td>1.03±0.07</td>
</tr>
<tr>
<td>Backward Classes (n=50)</td>
<td>Players (n=25)</td>
<td>1.64±0.28</td>
<td>94.12±1.69</td>
<td>1.14±0.05</td>
<td>9.90±0.76</td>
<td>0.91±0.08</td>
</tr>
<tr>
<td></td>
<td>Controls (n=25)</td>
<td>1.29±0.26</td>
<td>93.36±1.04</td>
<td>1.04±0.06</td>
<td>9.56±0.75</td>
<td>1.08±0.17</td>
</tr>
</tbody>
</table>

Values presented are means±SEM,
No Statistical significant values observed (p ≤0.05)
Players in each population sub-group had significantly higher levels of biomarkers of genetic damage and oxidative stress compared to value in respective controls. However when comparing players with each other in different sub-groups, no statistical significance was observed inhibiting a similar degree of genetic damage and oxidative stress across these subgroups. Similar results were observed for the control group showing no difference for different sub-groups. Therefore the participants were not stratified by sub-group and were considered together as Punjabi North Indians for further analysis.