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| **Supplementary Table 1. Exercise Protocol** |  |  |  |  |
|  | Protocol A |  Protocol B | Protocol C | Protocol D |
| Warm-Up (watts) | <25 | 25-50 | 25-50 | >75 |
| Stage 1 (watts) | 25 | 25 | 25 | 75 |
| Stage Increments | 10 | 25 | 25 | 25 |

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| **Supplementary Table 2. Subject Demographics and Exercise Data** |   |   |   |   |
|   | Men (n = 13, 5 YA, 8 OA) | Women (n = 11, 7 YA, 4 OA) |
|   | Mean |   | SD | Mean |   | SD |
| Age (years) | 51.4 | ± | 21.9 | 67.4 | ± | 5.0\* |
| Height (cm) | 178.1 | ± | 5.8 | 164.2 | ± | 6.9\* |
| Weight (kg) | 85.6 | ± | 12.3 | 64.7 | ± | 13.7\* |
| Body mass index (BMI) (kg/m2) | 27.0 | ± | 3.2 | 23.9 | ± | 4.6 |
| Total Body Fat (%) | 28.1 | ± | 7.3 | 33.3 | ± | 8.1 |
| Android Body Fat (%) | 35.5 | ± | 11.7 | 34.4 | ± | 13.8 |
| VO2peak (mL/kg/min) | 32.3 | ± | 5.2 | 29.1 | ± | 7.5 |
| VO2peak (L/min) | 2.7 | ± | 0.4 | 1.9 | ± | 0.5\* |
| Peak Power (Watts) | 230.7 | ± | 38.4 | 160.9 | ± | 48.4\* |
| Peak Heart rate (bpm) | 170.8 | ± | 17.6 | 174.0 | ± | 21.0 |
| Exercise Duration (min) | 91.1 | ± | 15.0 | 103.5 | ± | 28.4 |
| Exercise Bout Expenditure (kcals) | 770.8 | ± | 110.4 | 582.7 | ± | 123.7\* |
|   |   |   |   |   |   |   |
| \*Significantly different from Men (p<0.05) |   |   |   |   |   |

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| **Supplementary Table 3. Sex differences in primary metabolic outcomes**  |
|   | Men (n = 13) and Women (n = 11) |
|  | Time | Time\*sex | Time\*sex\*condition |
| TRG | <0.01\* | p=0.70 | p=0.83 |
| Glucose  | <0.01\* | p=0.06 | p=0.77 |
| MLI | p<0.01\* | p=0.76 | p=0.89 |
| TC | p=0.08 | p=0.42 | p=0.21 |
| LDL-C | p<0.01\* | p=0.37 | p=0.17 |
| HDL-C | p=0.02\* | p=0.67 | p=0.25 |
|   |   |   |   |
| \*Significance p<0.05 |   |   |   |