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BASELINE NATURAL KILLER CELL CYTOTOXICITY IS ENHANCED IN THE PRESENCE OF POST-EXERCISE AUTOLOGOUS SERUM

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KEYWORDS: -NKCA, cycling, stress hormones

Natural Killer (NK) cells recognize and eradicate tumor cells. Multiple studies have shown that the killing capacity of each NK-cell (termed Natural Killer Cell Activity(NKCA)) is greatest during recovery from exercise. However, the factors responsible for increased NKCA per cell after exercise are not fully understood. It is thought that exercise-induced phenotypic shifts in NK-cell subsets play a role. Exercise also alters the concentration of various stress hormones(glucocorticoids) and cytokines, which could also impact NKCA. **PURPOSE:** To determine the role of exercise-induced shifts in NK-cell subsets, cytokines and hormones on exercise-induced changes in NKCA per cell. **METHODS:** Healthy adults (n=13,7women; 31.9±7yrs) cycled 30min at 115% of their lactate threshold power. Blood was collected pre-, post-, and 1H post-exercise. Effector cells isolated from blood were incubated with K562 or U266 tumor target cells in the presence of autologous serum. NKCA was assessed after 4h by measuring lysed target cells in a flow cytometry based assay. NK cell phenotype was also assessed by 10-parameter flow cytometry. To investigate the effects of hormones and cytokines released during exercise, pre-exercise effector cells were incubated with target cells in the presence of pre-, post-, and 1H post-exercise serum. The effect of shifts in NK-cell subsets was determined by incubating pre-, post- and 1H post-effector cells with target cells in the presence of pre-exercise serum. Linear Mixed Models were used to assess the effect of time and condition on NKCA on a per cell basis and NK-cell phenotype. **RESULTS:** The cytotoxicity of pre-exercise effector cells was significantly increased against the HLA-expressing target cells(U266) when incubated in 1H post-exercise serum (Pre vs.post vs.1H post =0.318±0.039vs. 0.334±0.039vs. 0.438±0.039,p<0.05). Incubation

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of pre-effector cells with 1H post-exercise serum significantly reduced the proportion of cells with the inhibitory phenotype NKG2A⁺/NKG2C⁻ (Pre vs. post vs. 1H post = $45.0 \pm 6\%$ vs. $44.2 \pm 6\%$ vs. $42.8 \pm 6\%$, $p < 0.05$) on NK cells. There was no difference in cytotoxicity of pre, post-, 1H post-effector cells incubated with pre-exercise serum (Pre vs. post vs. 1H post = 0.321 ± 0.047 vs. 0.282 ± 0.047 vs. 0.323 ± 0.047 , $p < 0.05$). CONCLUSION: The cytotoxicity of resting NK-cells is enhanced following incubation with autologous serum drawn 1H-post exercise. This corresponds with decreased proportion of NK-cells exhibiting the inhibitory phenotype NKG2A⁺/NKG2C⁻. We suggest that exercise-induced changes in serum increase NKCA. Future work will identify the levels of hormone and cytokines that are present in 1H post-exercise serum.