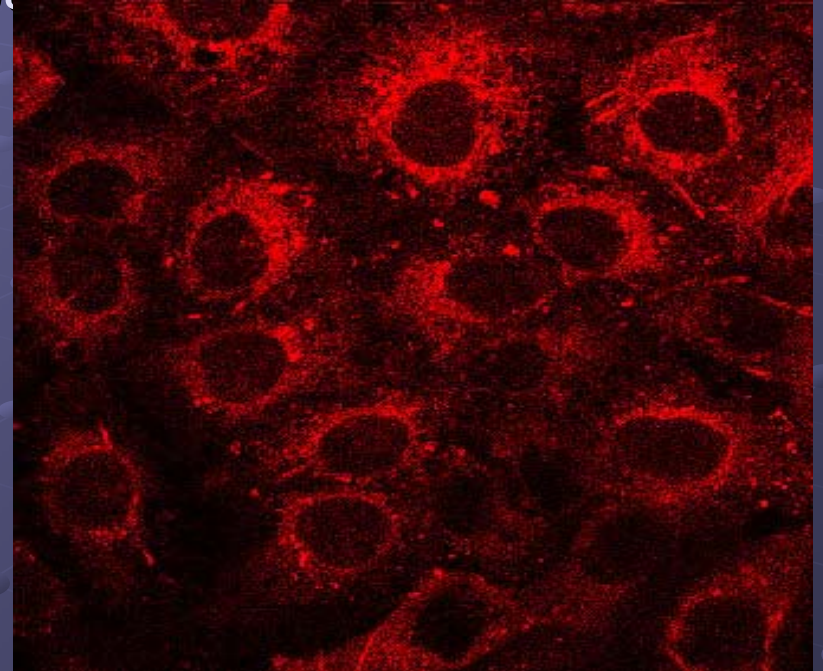
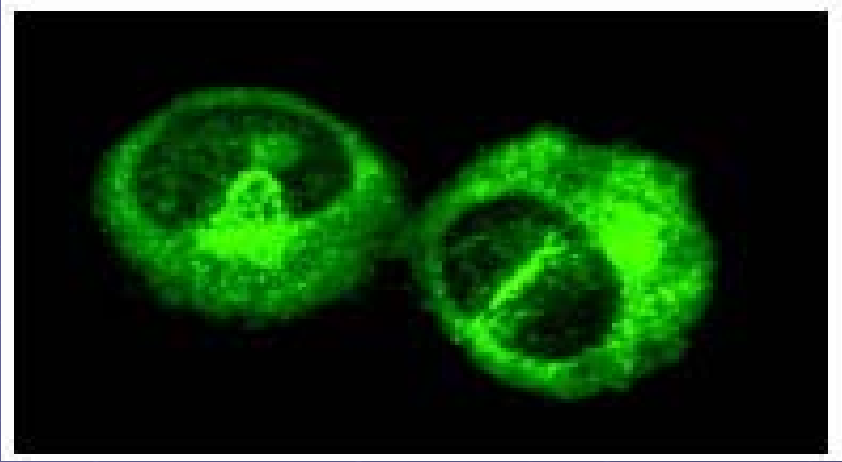


Exercise's Effects on Factors Associated with Prostate Cancer

by Anwar Jackson



- Photo on the left is courtesy of Santa Cruz Biotechnology Inc.
- Photo on the right is courtesy of the University of Zurich's Institute of Anatomy

Introduction

- Prostate cancer is the second-leading cause of death among American men.
- Age, race, and diet are speculated to be prostate cancer risk factors
- Other risk factors exist at the molecular level, such as androgen and insulin-like growth factor-1 (IGF-1) levels.
- Insulin-like growth factor binding protein-3 (IGFBP-3) is also believed to have a relation with prostate cancer
- Outside studies have shown that exercise may reduce the risk of prostate cancer.

Goal of the Study

- We hypothesized that exercise can reduce a person's risk for prostate cancer
- We also hypothesized that exercise can increase a person's IGFBP-3 serum levels.
- We also hypothesized that exercise can reduce cancerous growth in vitro.

Methods

- Nineteen African-American men between the ages of 20 and 25 volunteered for the study.
- The men were randomly put into three exercise groups in which they would follow that group's exercise regimen for seven consecutive days.
 - Aerobic Exercise (n=7)
 - Resistance Training (n=7)
 - Control Group (n=5)
- Serum was extracted from each subject before and after the exercise regimen.

Methods (continued)

- LNCaP cells were washed with DPBS.
- LNCaP cells were then trypsinized and incubated in order to detach them from their flask.
- RPMI 1640 medium was used to deactivate trypsin, and the LNCaP cells were dislodged into a single-cell suspension.
- The LNCaP cells were then counted with a hemocytometer, and the number of cells was used to determine the volumes of medium and cells that were to be used.

Methods (continued)

- 200 microliters of the mixture were placed in each well of an MTT assay.
- After 24 hr incubation period, the medium was removed from all wells.
 - The LNCaP cells stick to the wells' surfaces.
- Serum-free medium was added to all wells.
- 20 microliters each of serum and control were added to the wells, and the assays are incubated for 48 hr.
- 38.3 mL of RPMI medium and 1.7 mL of LNCaP cells were placed in two T-25 flasks (40 mL in each flask).

Methods (continued)

- The MTT assay was used to test LNCaP cell growth in each pre and post-exercise serum sample.
 - Samples were tested in triplicate
 - Fetal Bovine Serum (FBS) was used as the control
- An IGFBP-3 assay was used to test the binding protein's expression in each pre and post-exercise serum sample.
 - Samples were tested in duplicate
- Plate readers measured cell growth and gene expression by measuring the absorption levels of each plate well.

Methods (continued)

- The absorptions were matched with their corresponding patients and groups.
- The mean and standard deviation was calculated for each exercise group (in both IGFBP-3 and LNCaP growth analysis).
- A one-tailed paired t-test was used to calculate the statistical significance in LNCaP cell growth and IGFBP-3 expression between pre and post-exercise serum.

Results

- The difference in LNCaP cell growth between pre and post-exercise serum was insignificant for the aerobic, resistance, and control groups.
 - Aerobic: $p = 0.486$
 - Resistance: $p = 0.147$
 - Control: $p = 0.196$
- The difference in IGFBP-3 levels between pre and post-exercise serum was insignificant for aerobic and control groups.
 - Aerobic: $p = 0.135$
 - Control: $p = 0.156$

Results (continued)

- IGFBP-3 levels for the resistance group was significantly higher ($p = 0.014$) in the post-exercise serum than in the pre-exercise serum.

Figure 1 : Aerobic Exercise and IGFBP-3 levels

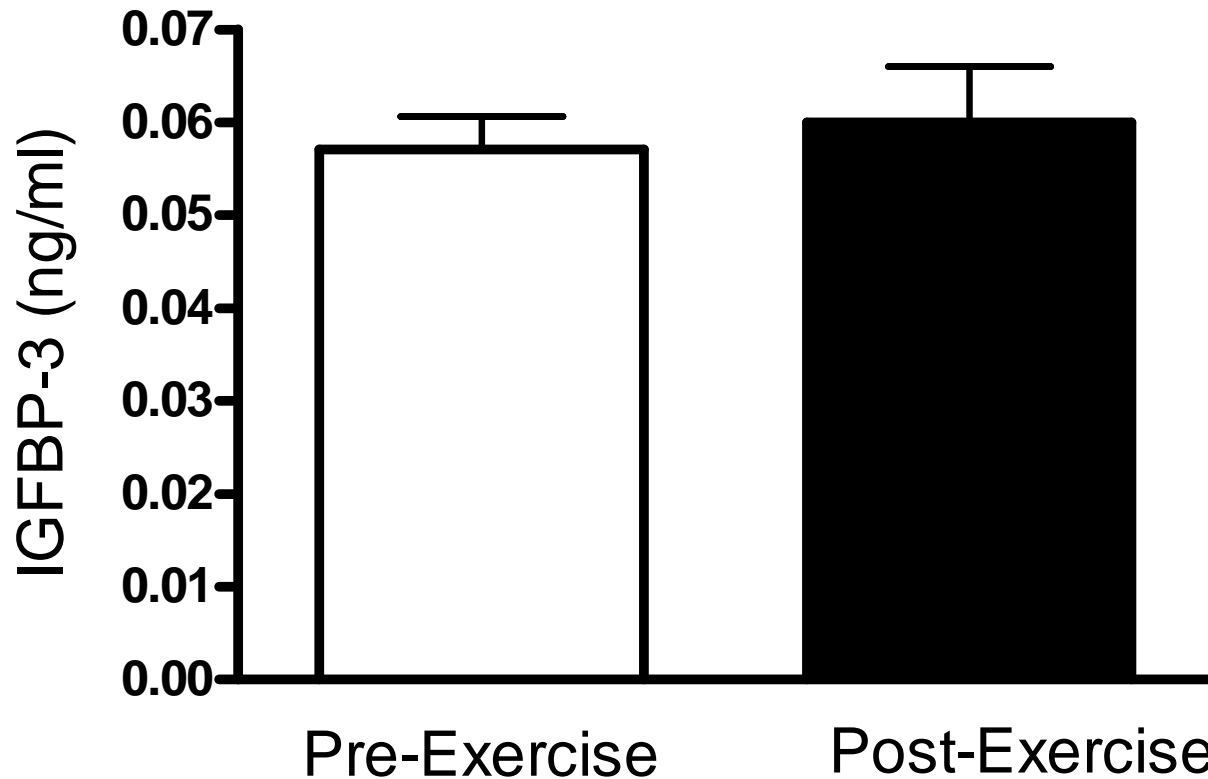


Figure 1. Mean \pm SD values for IGFBP-3 in the aerobic exercise group during pre and post exercise conditions.

Figure 2: Aerobic Exercise and LNCaP cell growth

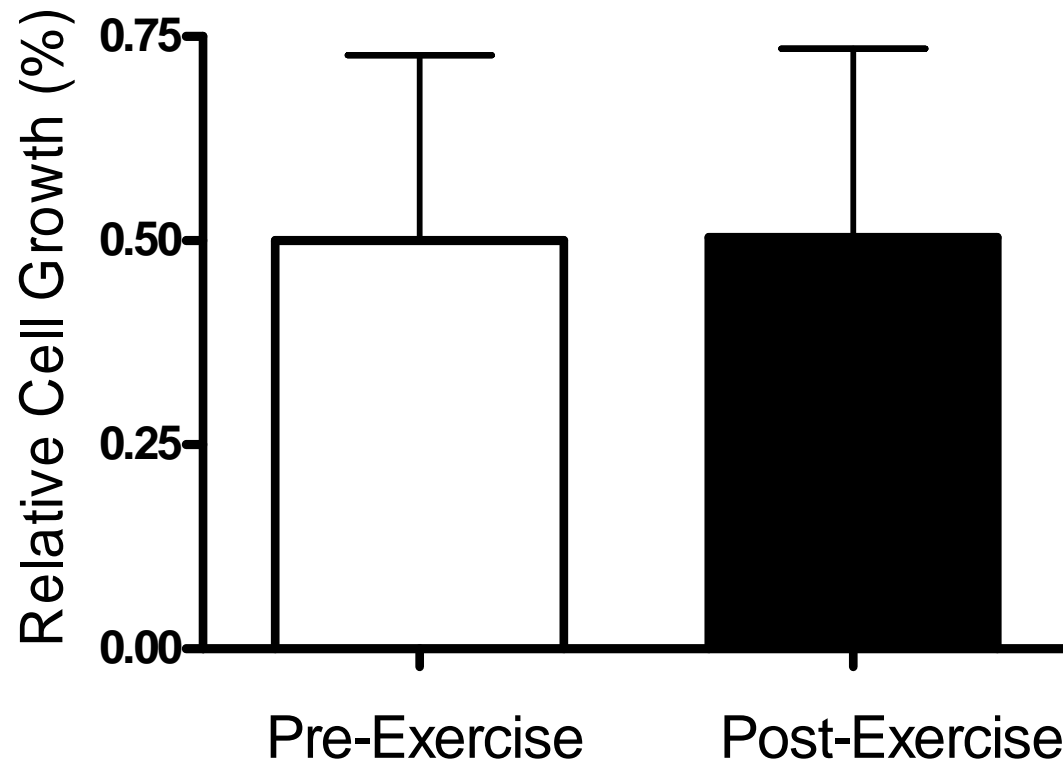


Figure 2. Mean \pm SD values for relative LNCaP cell growth in the aerobic exercise group during pre and post exercise conditions

Figure 3: Resistance Training and IGFBP-3 levels

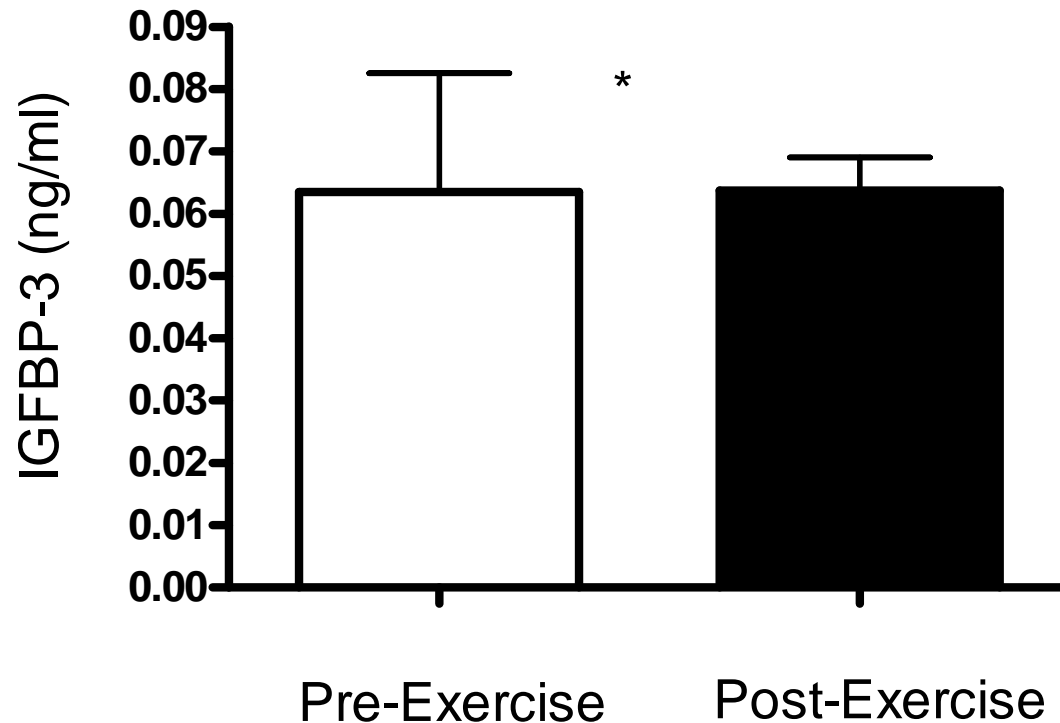


Figure 3. Mean \pm SD values for IGFBP-3 in the resistance exercise group during pre and post exercise conditions.

*Figure 3 has significant difference

Figure 4: Resistance Training and LNCaP cell growth

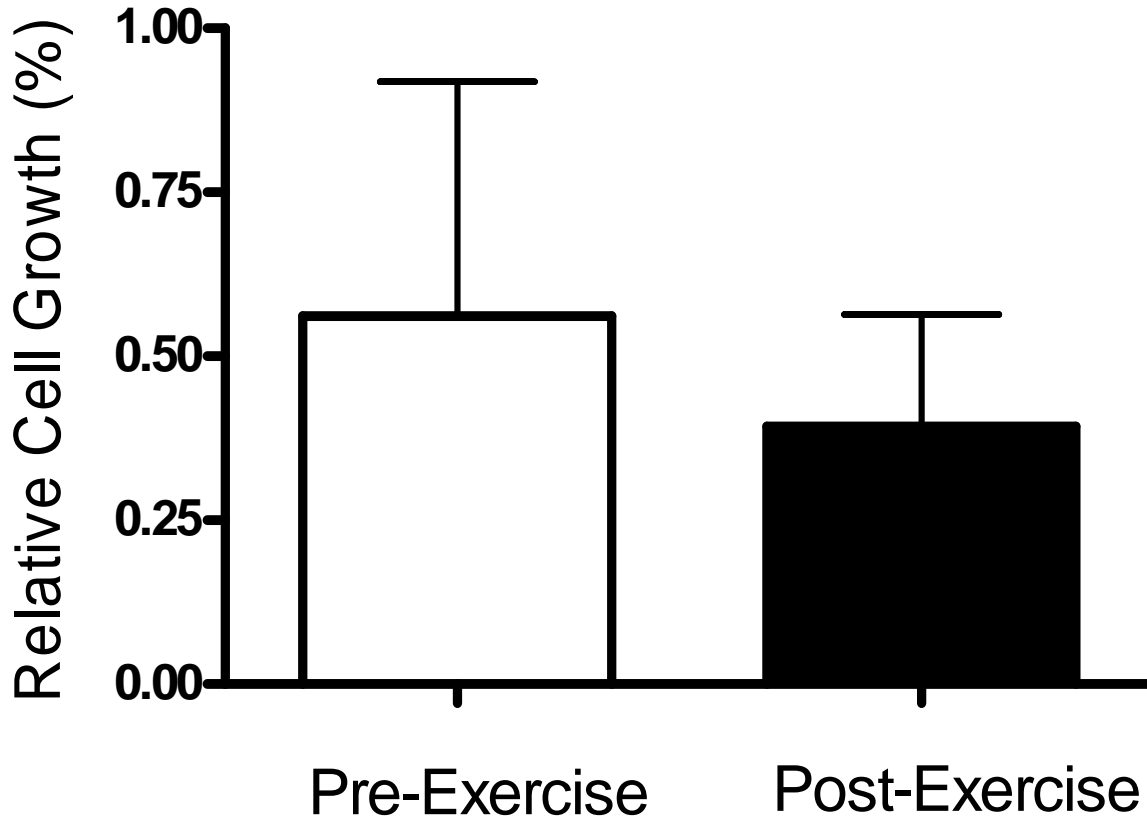


Figure 4. Mean \pm SD values for relative LNCaP cell growth in the resistance exercise group during pre and post exercise conditions

Figure 5: Control Group and IGFBP-3 levels

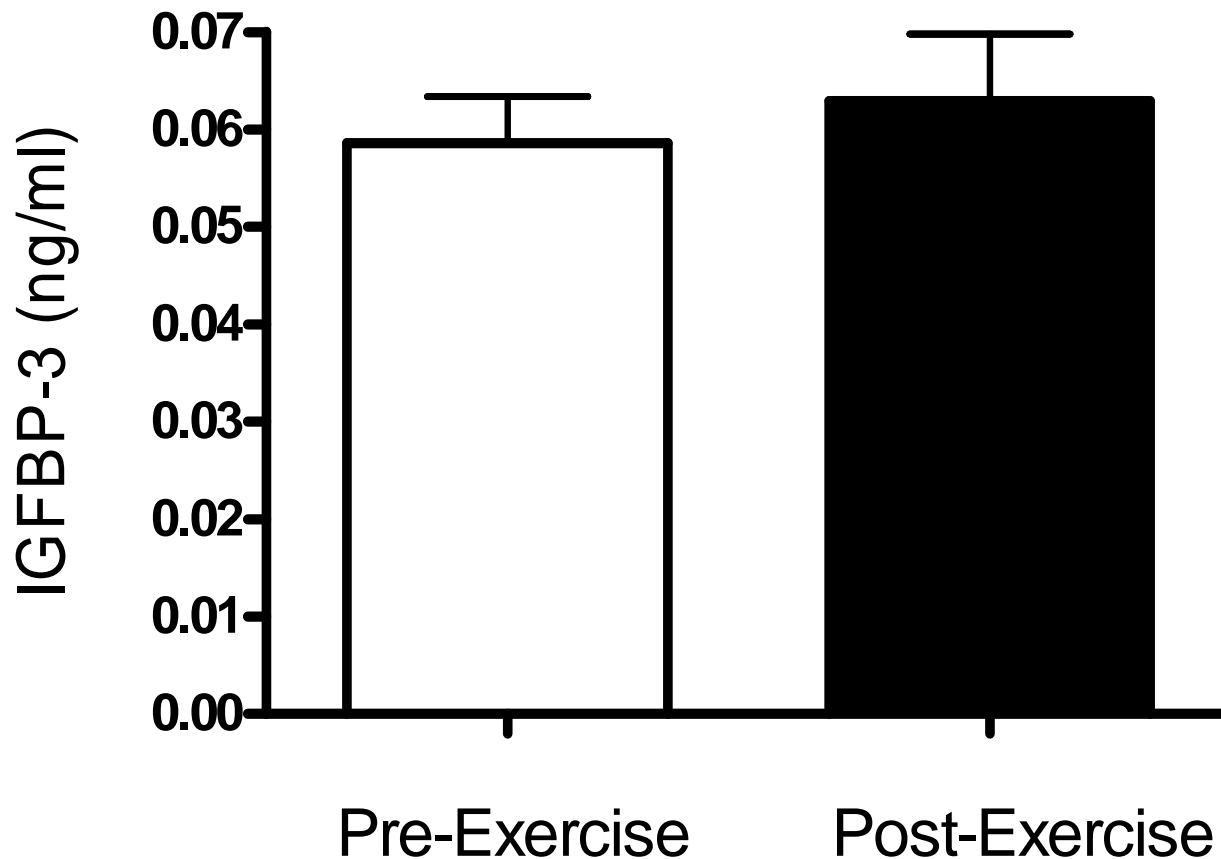


Figure 5. Mean \pm SD values for IGFBP-3 in the control group during pre and post control conditions

Figure 6: Control Group and LNCaP cell growth

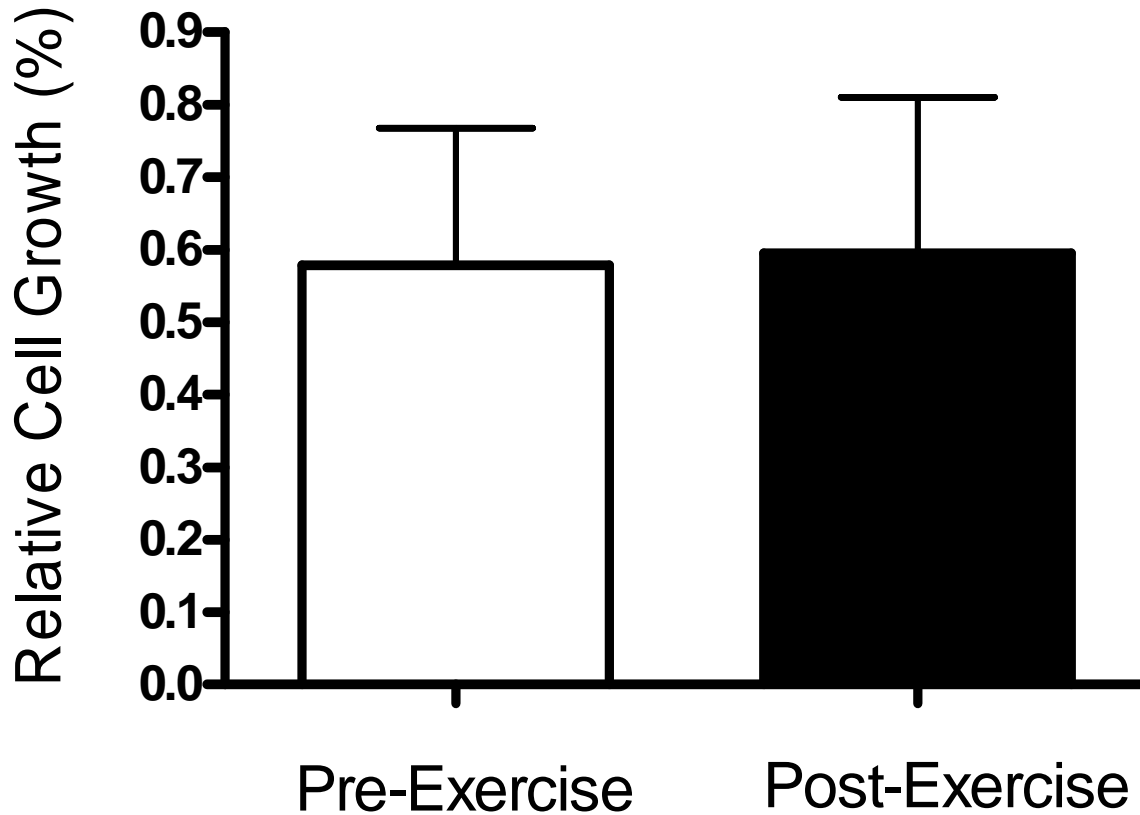


Figure 6. Mean \pm SD values for relative LNCaP cell growth in the control group during pre and post control conditions

Conclusion

- Our hypothesis concerning the change in IGFBP-3 serum levels for the resistance training group was supported by the increase in said levels from pre-exercise to post-exercise.
- Our hypotheses concerning LNCaP cell growth in vitro and the change in IGFBP-3 serum levels in the aerobic exercise group were not supported.

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