Anticipatory Testosterone Response to Competition in Female Collegiate Endurance Athletes

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Testosterone is naturally occurring hormone in both the female and male bodies, however, it has also been used in the form of anabolic steroids\(^1\). In addition to increases in muscle mass and strength, individuals who take anabolic steroids often experience dramatic rises in aggressive behavior\(^2\). Increases in natural circulating testosterone has also been shown to increase aggression in women\(^4\,5\). This increase in aggression could facilitate an increase in competitiveness (a type of aggression) in athletic competition. A relatively new concept, coined “anticipatory testosterone,” is defined as when an athlete experiences an increase in circulating testosterone before he/she participates in an athletic competition\(^3\). Because of circulating testosterone’s role in competitive aggression, the amount of circulating testosterone in an athlete’s body prior to competition could indicate the level of competitiveness that the athlete is feeling at that point in time.

**Purpose**

This study was designed to examine the relationship between competitive aggression and an anticipatory circulating testosterone in female endurance athletes in a simulated distance race.

**Materials and Methods**

**Subjects**

Twelve apparently healthy female endurance athletes with at least 1 season of Cross-Country or Track and Field competitive experience. (see table 1).

**Testing Protocol**

**Testing days:** Protocol was split into two days per testing cycle: resting sample collection and race days.

**Resting Sample Collection:**
- Subjects did not exercise
- Blood sample taken 24 hours prior to the race
- ~8mL was taken from the antecubital vian (see figure 1)

**Race Day** (see figure 2):
- Subjects were split into two DMR teams
- A 15-min pre-race blood sample was taken (~8mL)
- Subjects completed a DMR race (a relay split into legs of 1200, 400, 800, and 1600 meters, respectively)
- The Revised Competitiveness Index (RCI) test was given immediately post-race.

**Revised Competitiveness Index (RCI)**
- Fourteen question self-assessment survey
- Each question is scored on a scale from 1-5 (5=highly competitive)

**Serum Collection:**
- Blood was allowed to clot and then centrifuged at 10 degrees C until separated (~20min at 4000 rpm)
- Serum was removed and aliquoted into microcentrifuge tubes
- Stored at 70 degrees C.

**Continued Research:**
- Serum will be analyzed in duplicate to determine circulating testosterone concentration. Pearson’s correlation will be used to examine the relationship between pre-race T concentrations and RCI scores

**Background**

Testosterone and androgens in women.

**Results**

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<th>Subject #</th>
<th>Height (cm)</th>
<th>Weight (kg)</th>
<th>Age (years)</th>
<th>Oral Contraceptive</th>
<th>Menstrual Cycle (day)</th>
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Table 1. Subject demographic data. Menstrual cycle day is relative to 1=first day of menstruation.

**Conclusion**

The majority of the RCI scores found in the current study were within one standard deviation of the accepted mean (see figure 3). In addition, there was no correlation between race completion time and competitiveness score (r=−0.14) (see figure 4).

**References**


**Acknowledgements**

This research was funded by a University of Puget Sound 2011 General Summer Research Grant and by a grant funded by the University Enrichment Committee.