PEAK OXYGEN CONSUMPTION AND ANAEROBIC THRESHOLDS IN COLLEGE-AGED, COMPETITIVE CYCLISTS

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PURPOSE

- The purpose of this study was to assess common aerobic fitness metrics of trained college-aged cyclists from a variety of cycling disciplines and explore the relationships between performance and anthropometric measures.

- Specifically, we assessed body fat percentage, VO2 peak, maximum heart rate, and anaerobic threshold of the athletes.

METHODS

- Ten (n = 2 females; aged 19 ± 2 years) well trained cyclists who compete in multiple disciplines including cross country, short track, dual slalom, cyclocross, and road participated in the study.

- These athletes completed the following assessments:
  - Anthropometric measures (height, weight, and BIA body fat)
  - Graded exercise test on a Velotron electronically-braked cycle ergometer

- Heart rate (Polar H10) and expired air (Parvo TrueOne 2400) were measured continuously.

- VO2peak was determined by the highest recorded 30-s VO2 average.

- Anaerobic threshold was determined when the VCO2/VO2 ratio (Respiratory Exchange Ratio) was greater than 1.0.

- Descriptive statistics were conducted, and Pearson's correlations were utilized to explore relationships between anthropometric and performance data.

RESULTS

Table 1. Participant variables.

	Mean	±	SD	Max	Min
Height (cm)	170.9	±	16.3	193.5	152.0
Weight (kg)	65.8	±	13.9	101.9	55.0
Body fat (%)	12.4	±	5.6	21.9	5.6
Lean body mass (kg)	63.3	±	13.5	79.9	40.6
Fat mass (kg)	8.9	±	5.1	22	3.9
GXT PP (W)	328	±	87	400	200
GXT max HR (bpm)	193	±	5	209	181
VO2peak (mL/kg/min)	52.5	±	8.9	70.0	41.8
VO2peak (mL/kg/LBM/min)	58.5	±	12.5	85.0	43.5
AT VO2 (mL/kg/min)	47.4	±	8.6	61.7	37.3
AT HR (bpm)	174	±	17	190	132

GXT: graded exercise test; PP: peak power; HR: heart rate; bpm: beats per minute; LBM: lean body mass; AT: anaerobic threshold;
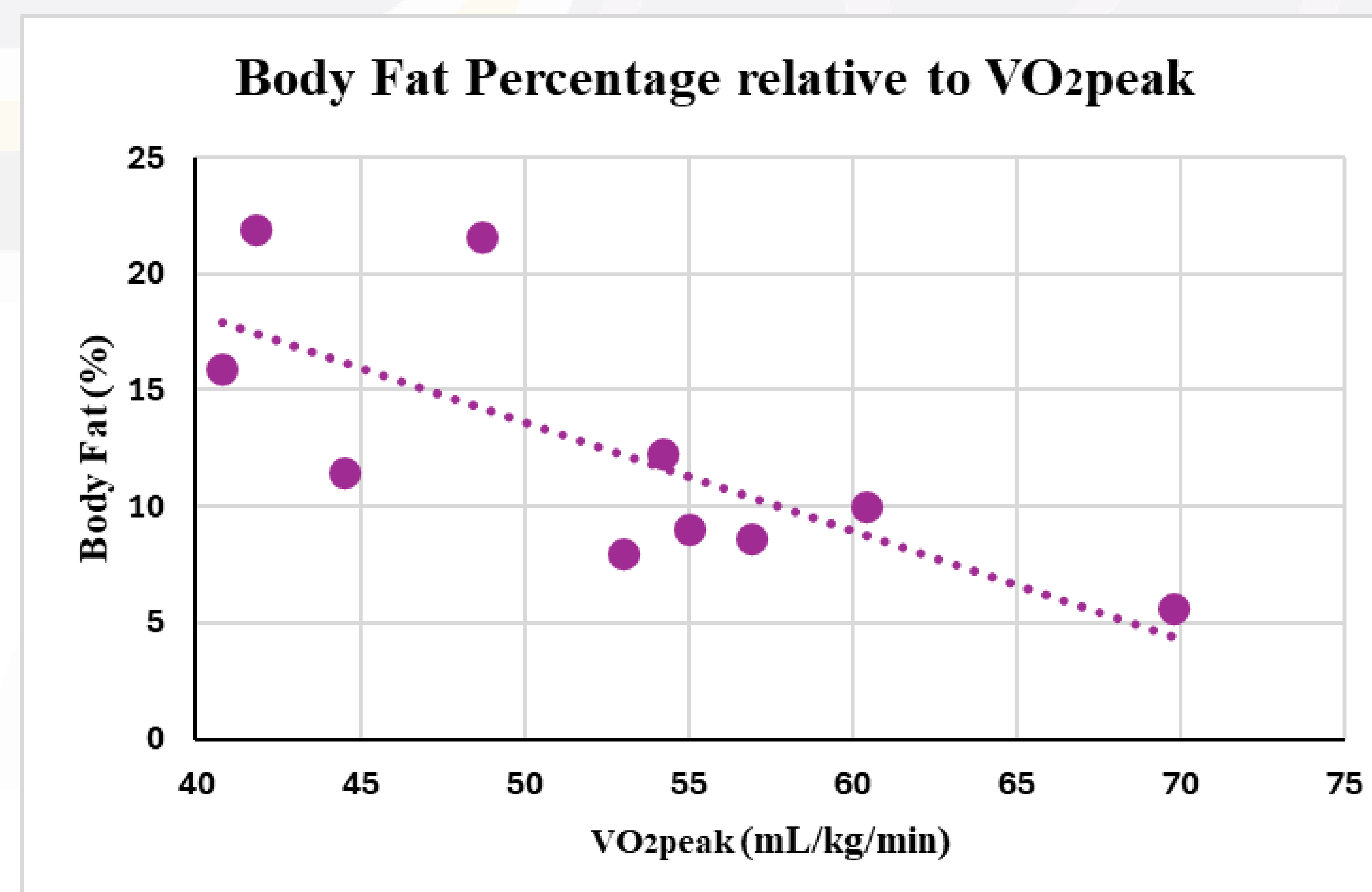

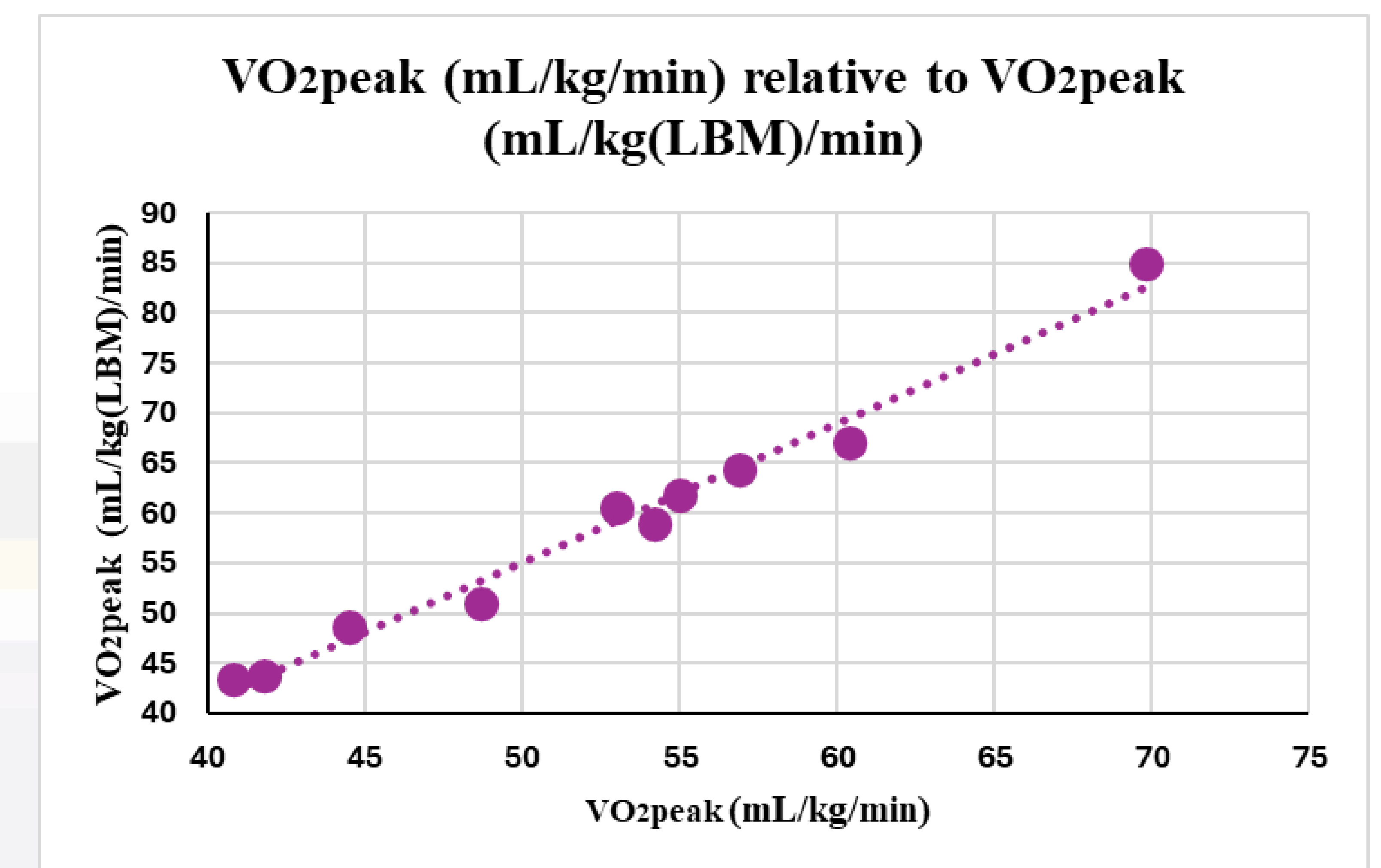**Figure 1.** Relationship between body fat percentage and VO2peak.

Figure 2. Relationship between VO2peak relative to body weight and VO2peak relative to lean body mass.

CONCLUSION

- These athletes VO2peaks are in the 90th percentile for males and females.

- Participants reached their anaerobic threshold at group mean value of 90 ± 7% VO2peak and 90 ± 17% of heart rate max.

- Highly trained cycling athletes have excellent VO2peak values and high anaerobic thresholds.

- Having a lower body fat percentage, even in this group of lean athletes, may yield higher VO2peaks.

PRACTICAL APPLICATION

- These data contribute to establishing normative data in this population.

- Additionally, research to help establish aerobic fitness and anthropometric norms is warranted in trained college age male and female cyclists to inform coaching, athlete monitoring, and program design.

- Furthermore, reducing body fat may improve cyclists VO2peak.