

# Greater time spent in hypoglycemia during night compared to day during intensified training in professional cyclists with type 1 diabetes – a prospective observational study

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## Introduction

- People with type 1 diabetes (T1D) face an elevated risk of hypoglycemia after performing endurance exercise
- Especially nocturnal hypoglycemia is dangerous due to a lowered awareness of hypoglycemia during sleep
- Therefore, the aim of this study was to compare time spent in day and night-time glycemia during intensive training in professional cyclists with type 1 diabetes

## Methods

- Fifteen male professional cyclists with T1D on multiple daily injections (age  $27 \pm 4$  years, duration T1D  $11 \pm 5$  years, BMI  $21.6 \pm 1.5$  kg·min<sup>-2</sup>, HbA<sub>1c</sub>  $7.2 \pm 0.7\%$ ,  $\dot{V}O_{2max}$   $73 \pm 4$  ml·kg·min<sup>-1</sup>)
- Road cycle sessions (50 - 90% of the lactate turn point 2 (LTP<sub>2</sub>), duration 1–6 hours) over nine consecutive days
- Time spent in pre-specified glycemic ranges was compared between day and night time using paired t-test and Wilcoxon matched-pairs signed rank test,  $p \leq 0.05$ .

- Glycemic ranges were pre-specified as:
  - Level 2 hypoglycemia  $< 54$  mg·dl<sup>-1</sup>
  - Level 1 hypoglycemia  $54 - 70$  mg·dl<sup>-1</sup>
  - Euglycemia  $71 - 180$  mg·dl<sup>-1</sup>
  - Level 1 hyperglycemia  $181 - 299$  mg·dl<sup>-1</sup>
  - Level 2 hyperglycemia  $> 299$  mg·dl<sup>-1</sup>

## Results

- Overall glycemia is shown in Figure 1
- More time was spent in:
  - **level 1 hypoglycemia** ( $54 - 70$  mg·dl<sup>-1</sup>) ( $6 \pm 5\%$  vs  $4 \pm 3\%$ ,  $p = 0.05$ ) during night versus day periods
  - **level 2 hypoglycemia** ( $< 54$  mg·dl<sup>-1</sup>) ( $3 \pm 5\%$  vs.  $1 \pm 4\%$ ,  $p = 0.002$ ) during night versus day periods
  - **level 2 hyperglycemia** ( $> 299$  mg·dl<sup>-1</sup>) ( $0.2 \pm 0.4\%$  versus  $1.4 \pm 2.3\%$ ,  $p = 0.02$ ) during day versus nights periods

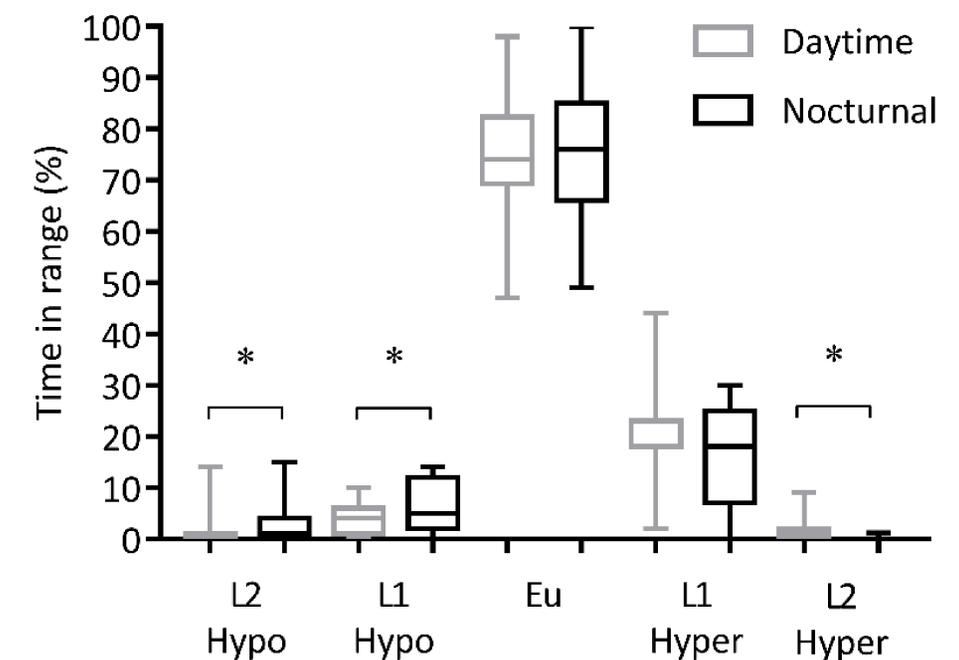


Fig. 1: Overall glycemia

## Conclusion

- **Professional cyclists with T1D spent more time in hypoglycemia during the night compared to day-time during intensified training**
- **Long-lasting insulin-sensitizing effects of endurance exercise may suggest a greater need for additional pre-bed carbohydrates and/or insulin dose reductions**