

# The Effects of Exogenous Ketones on Elite Athletes

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## Background

Unlike endogenously produced ketones that are generated during periods of low carbohydrate availability, exogenous ketones are consumed directly and can rapidly elevate circulating ketone levels without dietary restriction. Emerging evidence suggests that exogenous ketones may influence key physiological markers by modulating inflammation, exercise-induced cortisol responses, erythropoietic function, sleep quality<sup>1,2,3,4,5</sup>. How exogenous ketones affect elite athlete's recovery, training quality, competition preparation, and sleep is not yet fully understood.

## Research Aims

- ❖ To assess the impact of exogenous ketone supplementation on erythropoietic markers (EPO, hemoglobin, hematocrit).
- ❖ To evaluate changes in inflammation-related blood biomarkers (CRP, IL-6, IL-10, TNF- $\alpha$ ).
- ❖ To measure the effect of ketone supplementation on recovery-related salivary markers and steroidogenesis biomarkers in blood (salivary cortisol, salivary IgA, sleep quality, testosterone, DHEA).

## Hypothesis

We hypothesize that exogenous ketone supplementation using Ketone-IQ for one week will favorably modulate salivary biomarkers (sIgA, salivary cortisol), blood biomarkers (EPO, hemoglobin, hematocrit, CRP, IL-6, IL-10, TNF- $\alpha$ , testosterone, DHEA), and sleep quality in elite athletes.

## Significance

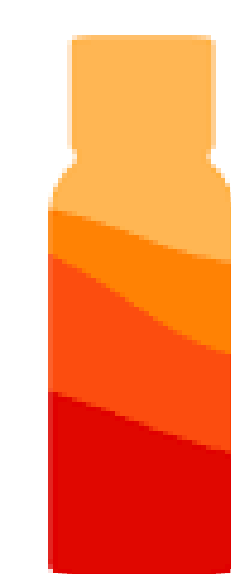
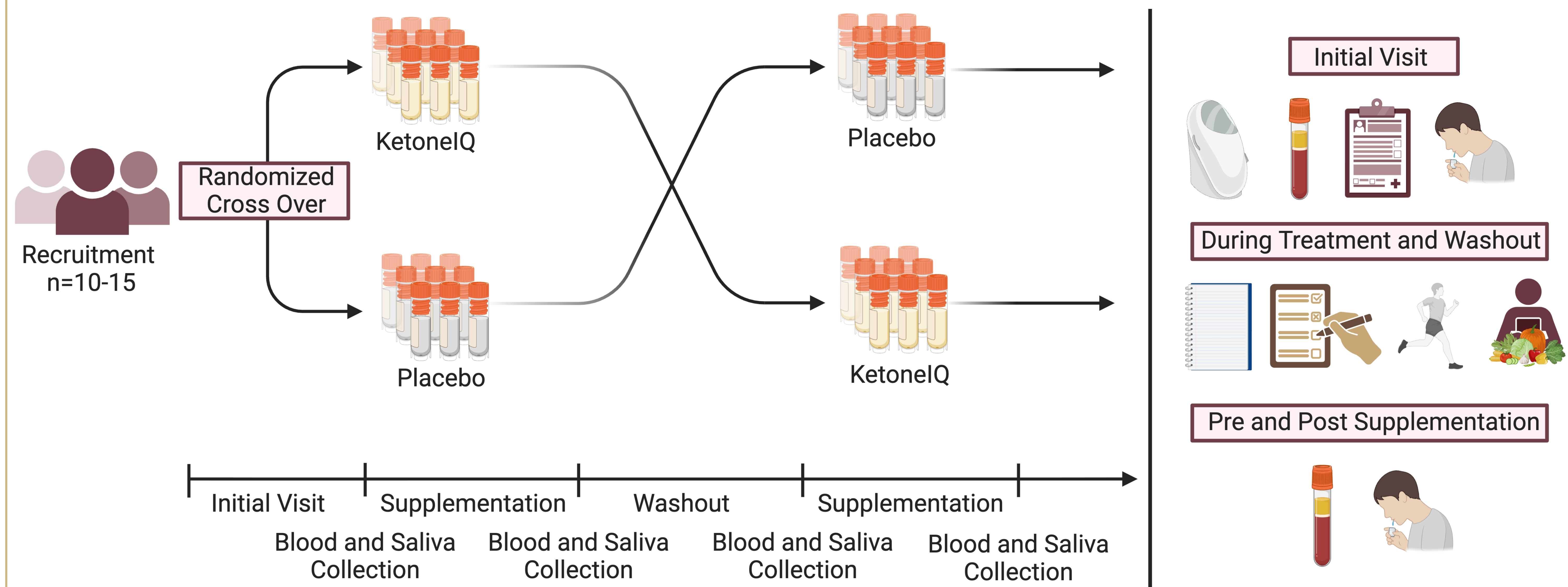
The results of the study are expected to provide more insight how exogenous ketone supplementation can be used as an ergogenic aid for competitive athletes.

## Target Population

- ❖ 10-15 male and female trained endurance athletes aged 18-30 with no cardiovascular or metabolic disease history who regularly exercise at least 7 times per week and have trained this way for at least 4 weeks prior to study start.
- ❖ Subjects must have run a qualifying 5000-meter run time or faster (or equivalent) within the last 12 months of study start (15:30-17:00 for males, 17:30-19:00 for females).

## Research Design

- ❖ **Figure 1.** Study will occur over the course of three weeks. Blood and saliva samples will be collected at the beginning of each week and at end of the week following the supplementation period. Biomarkers will be collected following an overnight fast. Training plans of athletes are to remain unchanged relative to before the study.



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Key References

