Isotonic sports drinks containing carbohydrate and electrolyte are commonly used to assist endurance performance, but there is some evidence that hypotonic drinks would be superior. Purpose: To compare absorption and effects on performance of a new hypotonic drink containing carbohydrate and electrolytes with three other drinks: water, Mizone Sportswater (hypotonic, containing carbohydrate and vitamins), and Powerade (isotonic, containing carbohydrate and electrolytes). Methods: In a randomized double-blind crossover study, 16 well-trained cyclists consumed each of the four drinks on separate days at a rate of 250 ml every 15 min during a 2-h steady ride at constant power (55-60% of baseline peak power). This preload was followed by a continuous incremental test to peak power. Tests were performed at room temperature (18-22°C) and were separated by 3-7 d. The physiological measures were: osmolar, electrolyte, glucose and lactate concentrations in blood samples taken before, during and after exercise; volume and osmolarity of urine collected before and after exercise; sweat volume inferred from change in body mass; and heart rate and tympanic temperature recorded throughout exercise. Results: Peak power with the new drink was substantially higher than with water and Mizone (4.3% and 3.2% respectively) but only slightly higher than with Powerade (0.2%) (90% confidence limits for differences, ±2.6%). There were similar outcomes for differences in peak heart rate and peak lactate. Analysis of urine composition and volume after the performance test provided evidence that the new drink was excreted and therefore probably absorbed more rapidly than the other drinks: it produced both the lowest urine osmolarity and the highest urine volume. There was a small-moderate decline in blood osmolarity with water relative to the new drink after the performance test, presumably reflecting the delayed absorption and excretion of water, but differences between the effects of the new drink and the other drinks on blood osmolar, sodium and chloride concentrations after the exercise test were otherwise unclear. Differences in the effects of the drinks on sweat volume were either unclear or could have been trivial. The only noteworthy difference between the effects of the drinks in the steady ride was a small decrease in temperature with water between the first and second hours, presumably reflecting delayed gastric emptying. Conclusion: Consumption of a drink aimed at optimizing fluid absorption may have beneficial effects on endurance performance relative to water and other drinks. Although the new drink may be absorbed and excreted more rapidly, any beneficial effects on performance do not appear to be mediated via increased sweating or a reduction in exercise temperature. Supported by a grant from Frucor Beverages Ltd.