

Could Elevated Lipoprotein(a) in Ultra-Endurance Athletes Indicate a Hidden Cardiovascular Risk?

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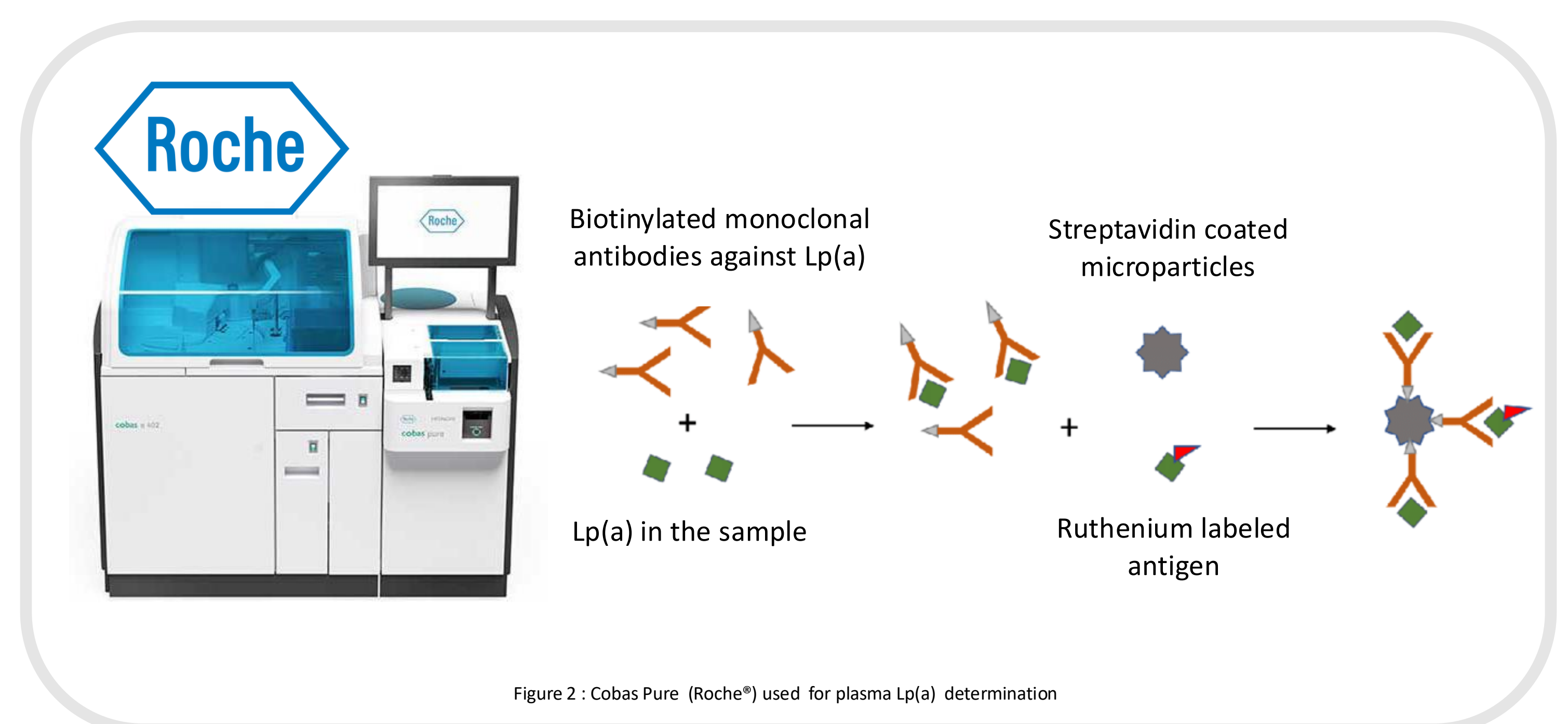
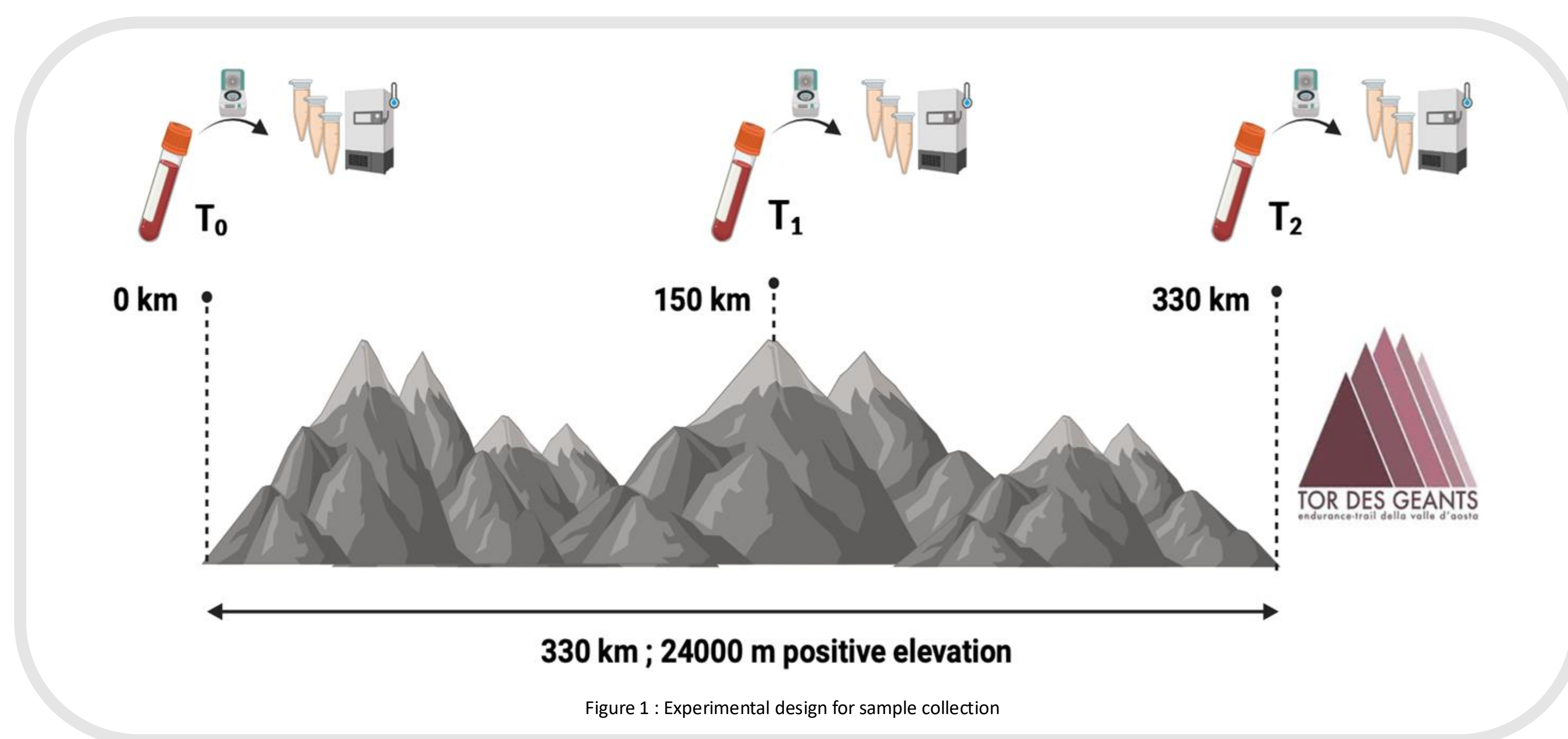
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Introduction

Lipoprotein(a) [Lp(a)] is a genetically determined lipoprotein particle with well-documented pro-atherogenic and pro-thrombotic properties, significantly contributing to cardiovascular risk. While exercise is known to influence various cardiovascular biomarkers, its effect on Lp(a) remains less clear. This study aimed to evaluate plasma Lp(a) concentrations in elite athletes participating in the "Tor des Géants," a 330 km ultra-endurance mountain race, to explore the potential transient effects of extreme physical exertion on Lp(a) concentrations.

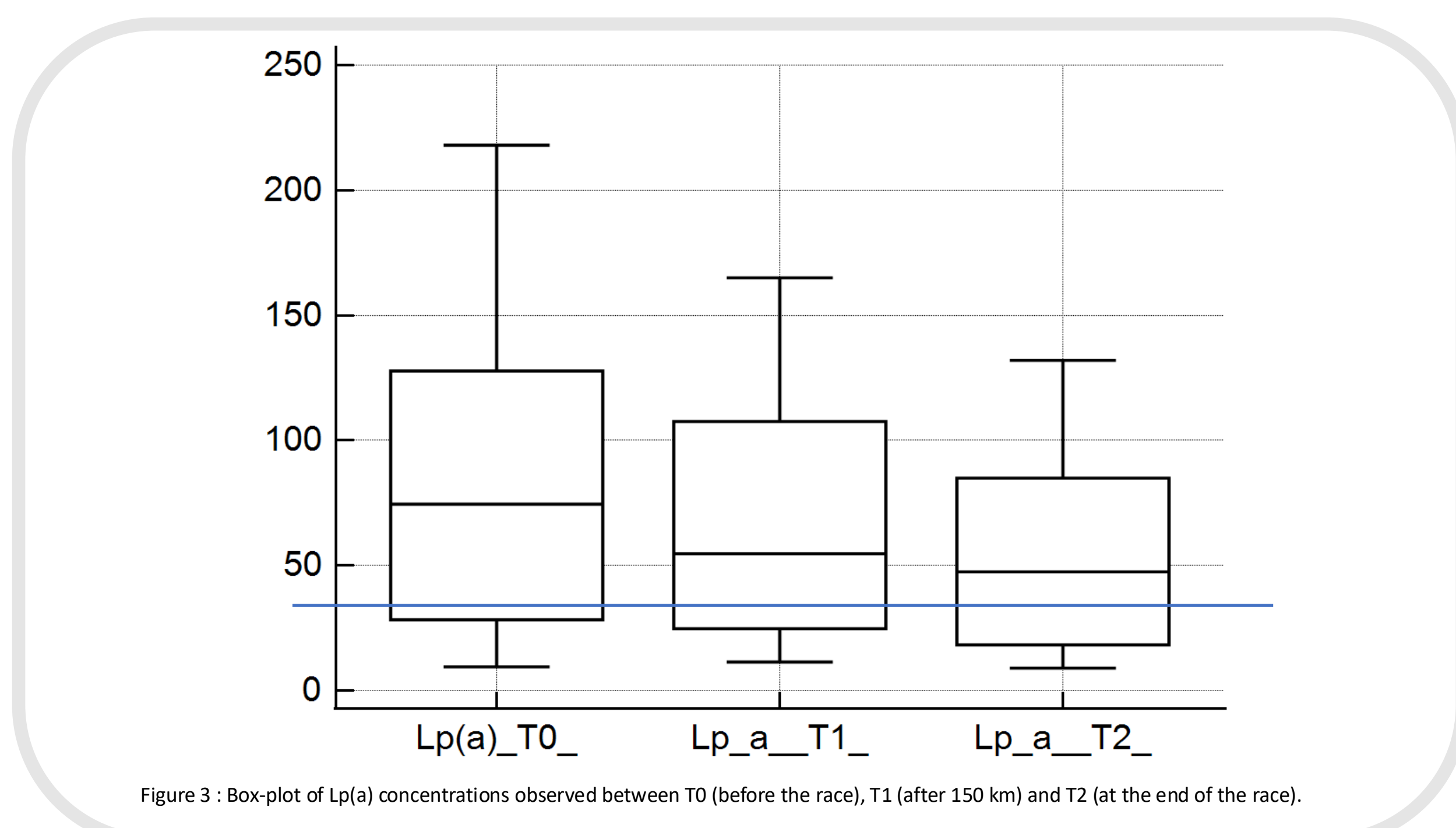
Materials and Methods

Blood samples (n = 49) were collected at three key time points: four days before the race (T0), at the midway checkpoint (T1), and immediately after completion (T2) (Figure 1). Lp(a) concentrations were measured using immunoturbidimetric assays (Cobas Pure, Roche®) (Figure 2). Statistical analysis was performed using t-tests, with normal data distribution.



Results

Statistical analysis revealed a significant decrease in Lp(a) concentrations between T0 and T1, with a reduction of 26% ($p = 0.0109$). This trend continued until the end of the race (T2), where Lp(a) concentration was reduced by 28% compared to T0 ($p = 0.0083$). Between T1 and T2, although the decrease was more modest (-3%), it remained statistically significant with a p-value of 0.0072 (Figure 3 and 4). These findings suggest that while extreme physical exertion during ultra-endurance activities leads to a transient reduction in Lp(a), the effect is not permanent. Previous studies have shown that exercise can temporarily reduce Lp(a) concentrations, but this reduction is typically short-lived, with levels returning to baseline shortly after the physical activity ceases. The persistence of high Lp(a) concentrations post-exercise underlines the importance of considering genetic factors and the limited impact of acute physical exertion on this biomarker.



	P-value	Variation %
T0 vs T1	P=0,0109	- 26%
T0 vs T2	P=0,0083	- 28%
T1 vs T2	P=0,0072	- 3%

Figure 4 : P-value and variation percentage of hs-CRP concentrations observed between T0 (before the race), T1 (after 150 km) and T2 (at the end of the race).

Conclusions

This study highlights the positive but transient effect of ultra-endurance exercise on Lp(a) levels. Routine Lp(a) measurement should be integrated into cardiovascular assessments for athletes to better identify those at increased risk. Further research is needed to explore the interaction between high Lp(a) concentrations and other cardiovascular biomarkers, as well as the potential for targeted interventions to mitigate these risks in endurance athletes.