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Would the (too?) normal adaptation to exercise in sickle cell trait carriers be a reflection of preventive mechanisms



against potential myocardial and muscle injury?



S. Antoine-Jonville^{1,2}, K. Reminy¹ ET. Ngo Sock¹, P. Chérubin¹, O. Hue¹, S. Henri¹

¹ ACTES " Adaptation, Climat Tropical, Exercice et Santé ", EA3596, Université des Antilles, Pointe-à-Pitre, Guadeloupe, France ² LAPEC " Laboratoire de Pharm-Écologie Cardiovasculaire ", EA4278, Avignon Université, Avignon, France

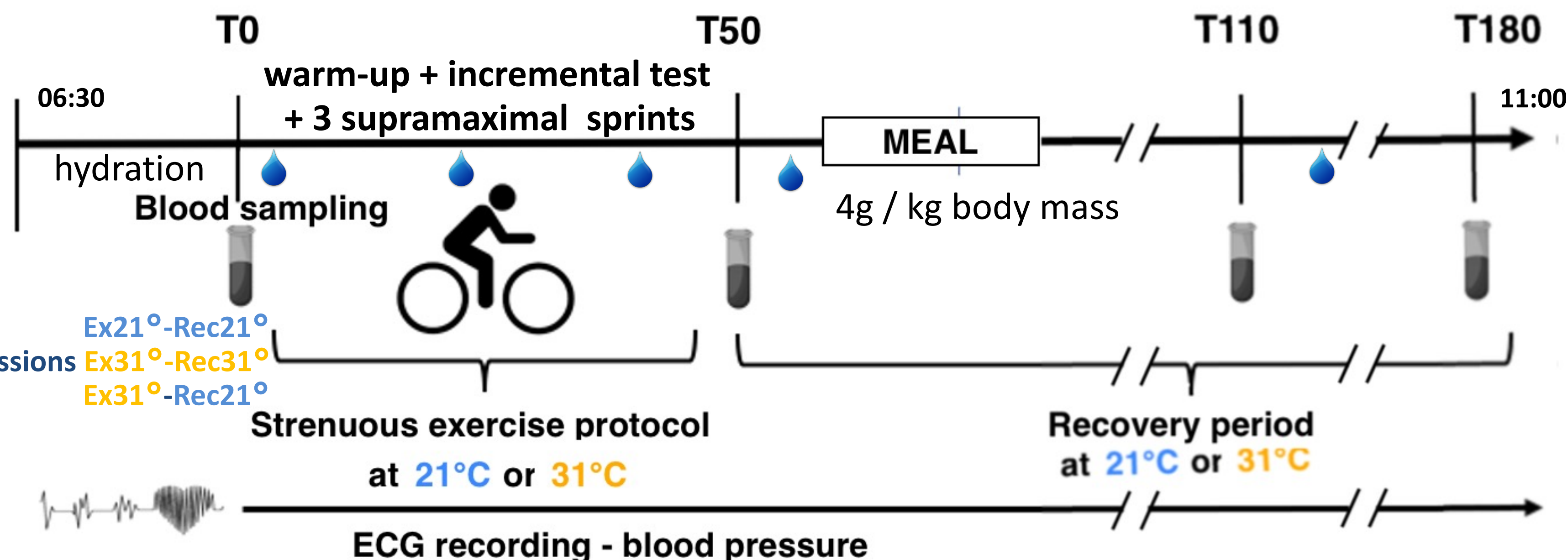
Sickle cell trait (SCT) is an inherited red blood cell condition without medical consequence in most cases. However, it is strongly associated with increased risk of exercise-induced sudden death, in particular in warm environment.



Fig 1. Red blood cell sickling in SCT due to the presence of both normal (HbA) and abnormal (HbS) hemoglobin.

Aims of the study: 1) compare the biomarkers of myocardial and muscle injury response to exercise in SCT and non-SCT; 2) identify the potential deleterious role of warmth during exercise

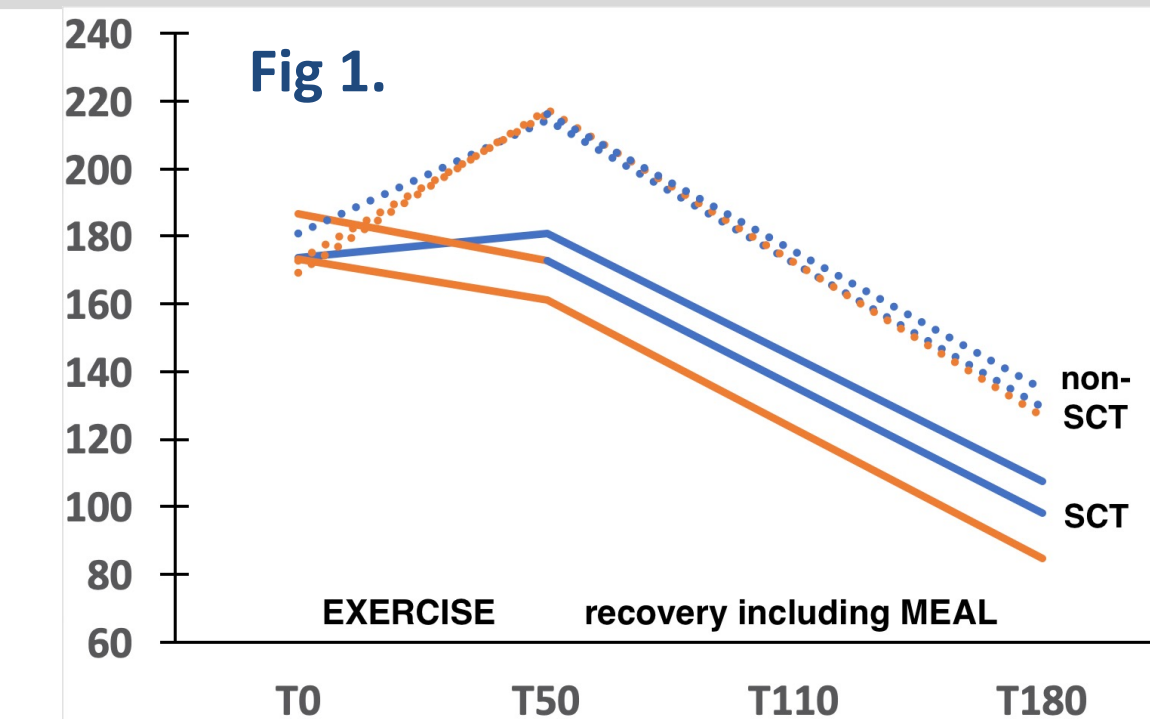
Methods 20 healthy young males with and without SCT, comparable in BMI, physical fitness, physical activity participated in the randomized controlled trial.



Results

	non-SCT	SCT
Clinical signs of occlusive events, clinical signs of rhabdomyolysis	None	None
Rhabdomyolysis markers	Normal evolution with exercise	Normal evolution with exercise
ECG - cardiac injury biomarker – ionogram - complete blood count (except leukocytes count)	Normal adaptation to exercise and recovery	Normal adaptation to exercise and recovery
Performance and cardiorespiratory parameters	Normal adaptation to exercise and recovery Normal adaptation to exercise at 31°C	Normal adaptation to exercise and recovery Normal adaptation to exercise at 31°C
Leukocytes	Significantly LOWER values in SCT compared with non-SCT (p=0.043). Lesser exercise-induced increase in SCT	
Lactate	Trend (p=0.062) for LOWER values in SCT during exercise; Significantly LOWER values in SCT during the recovery in particular after exercise at 31°C	
Cortisol and glucose	The exercise-induced increase in cortisol and glucose concentrations observed in non-SCT did not occur in SCT.	

Fig 1. Mean CORTISOL (ng/mL) throughout the sessions in SCT (full lines) and non-SCT (dotted lines). Exercise: time x group interaction effect: p=0.033. Recovery: Group effect: p=0.003.



Conclusions

- This study extends the accepted knowledge on the parameters that present normal adaptation to exercise, whether the environmental temperature is control or warm.
- This environmental temperature during recovery does not influence the cardiovascular risk profile.
- The contribution of the absence of cortisol rise during exercise to this normal profile is highly questionable. This should be investigated as a track to explain the SCT carriers specific triggering of the metabolic and vascular crisis in fatal events.