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# Beneficial role of physical activity in counteracting musculoskeletal disorders induced by early movement restriction

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## BACKGROUND

Insufficient physical activity, often associated to a sedentary lifestyle, is a health risk for many children and adolescents, especially those with chronic illnesses, accidents that require prolonged bed rest, or developmental coordination disorders (DCD). DCD can lead to motor skill difficulties, cognitive problems, and executive function disorders. Physical hypoactivity during childhood can lead to a variety of sensorimotor disorders including behavioral, metabolic, spinal and muscular alterations and can increase the risk of non-communicable diseases in the future.

Therefore, understanding use-dependent plasticity in children experiencing early hypoactivity is crucial. Otherwise, physical activity is widely recognized for its beneficial effects on general health, including muscles and brain and appears to be necessary for the harmonious maturation of the neuromuscular system.

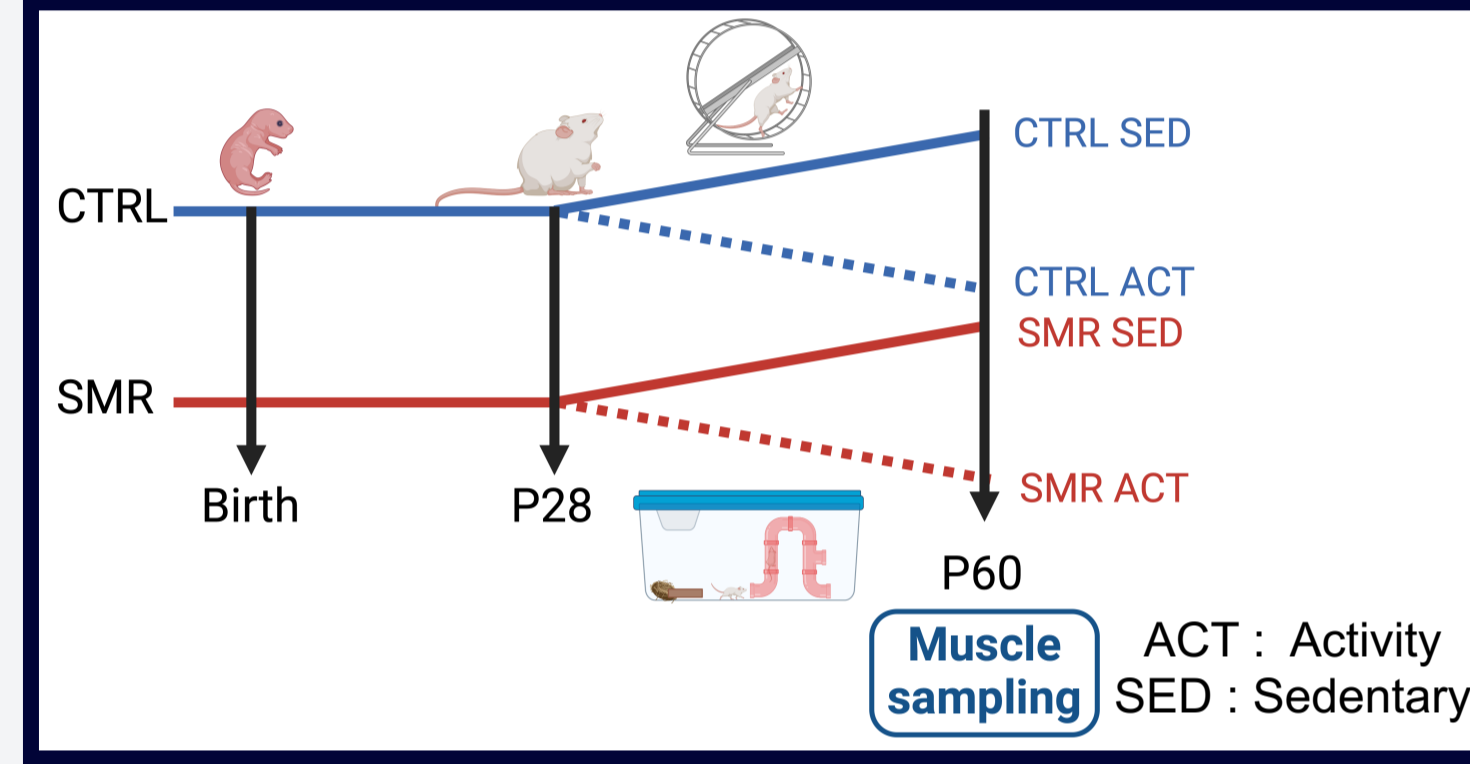
**However, despite the importance of the topic, the ability of physical activity to counteract the deleterious effects of early sensorimotor restriction (SMR) remains to be demonstrated.**

## METHODS

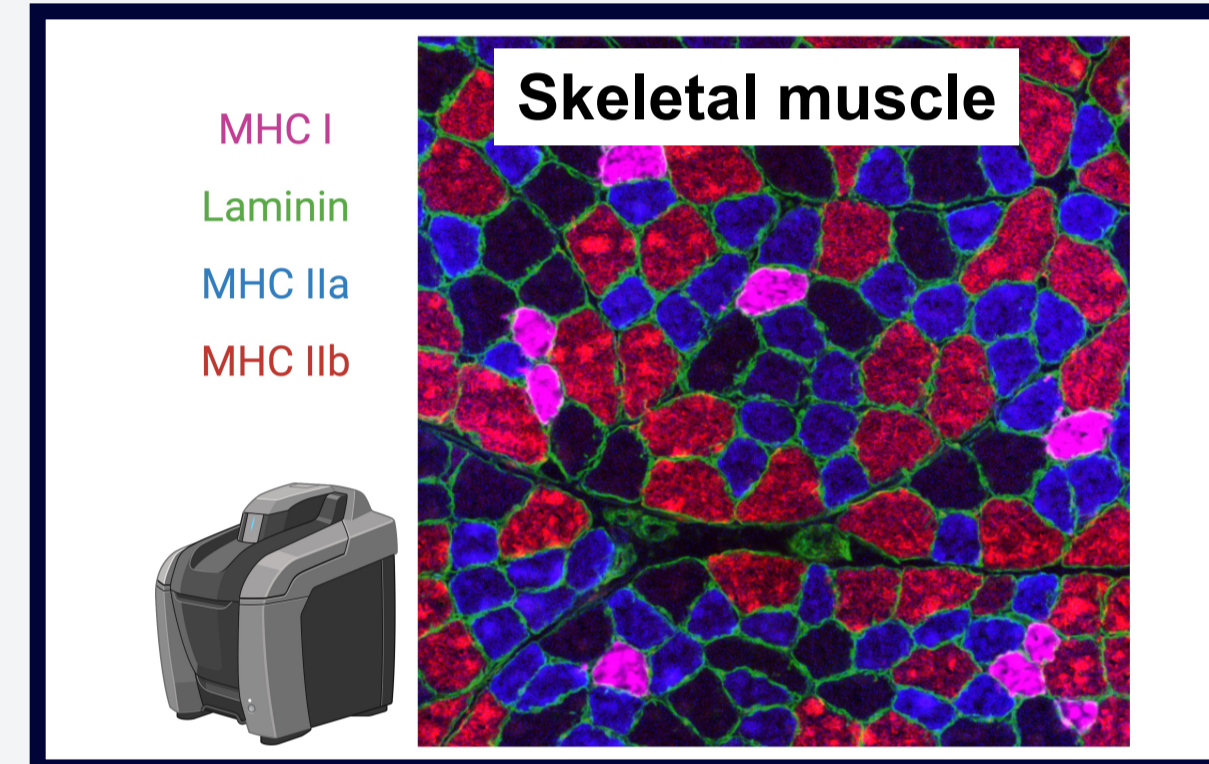
### MODEL



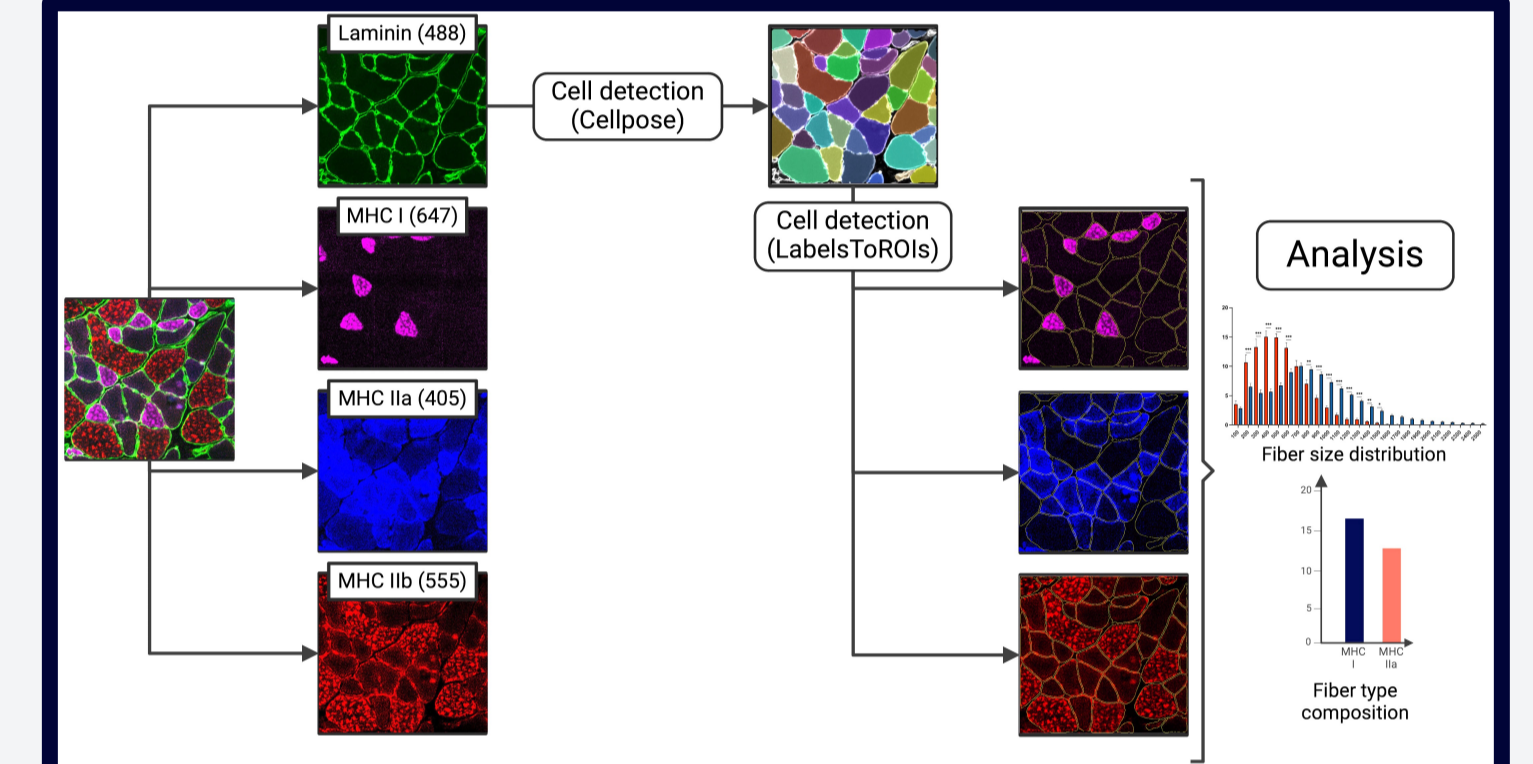
### GROUPS



### IMMUNOHISTOCHEMISTRY

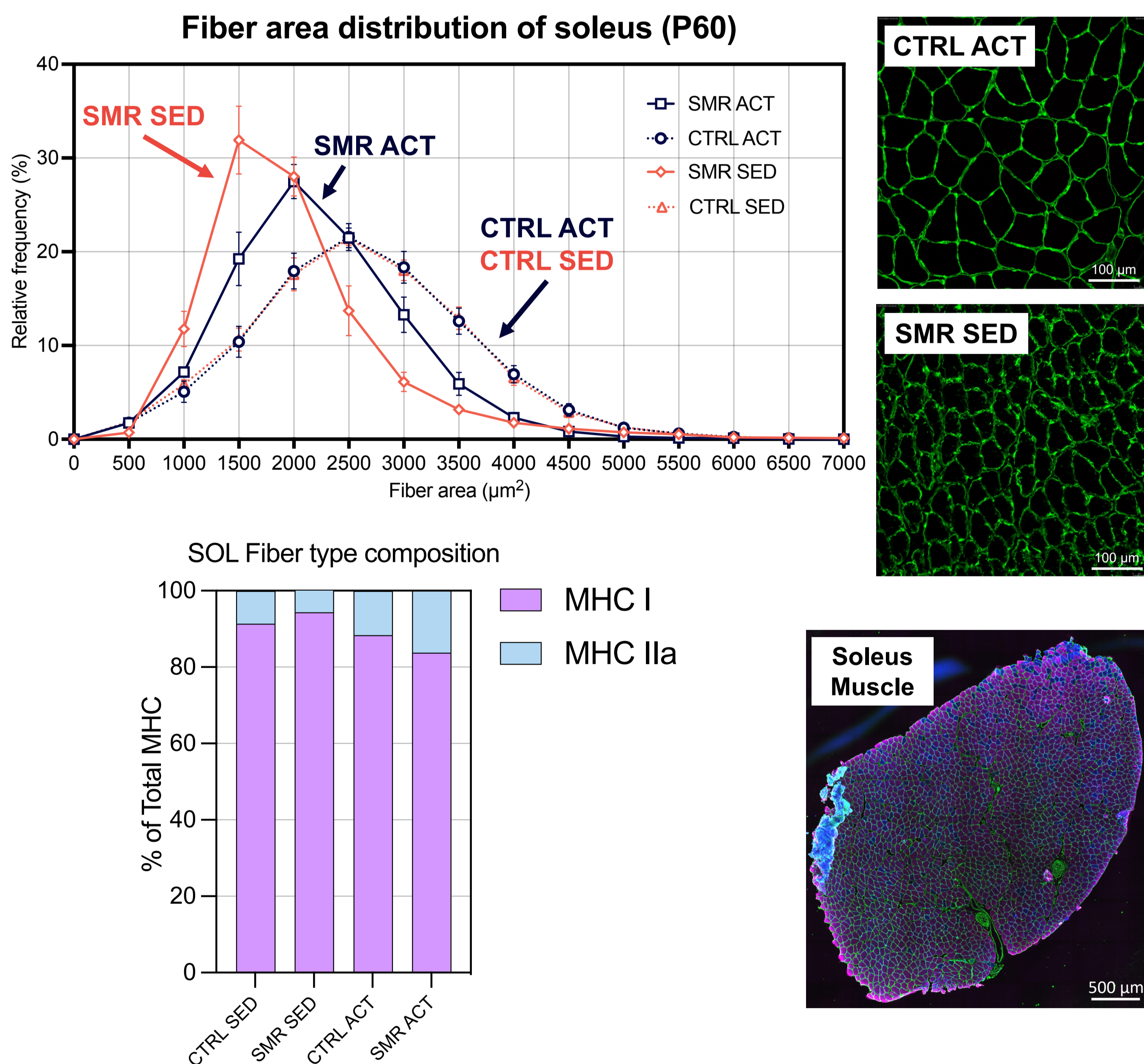


### ANALYSIS



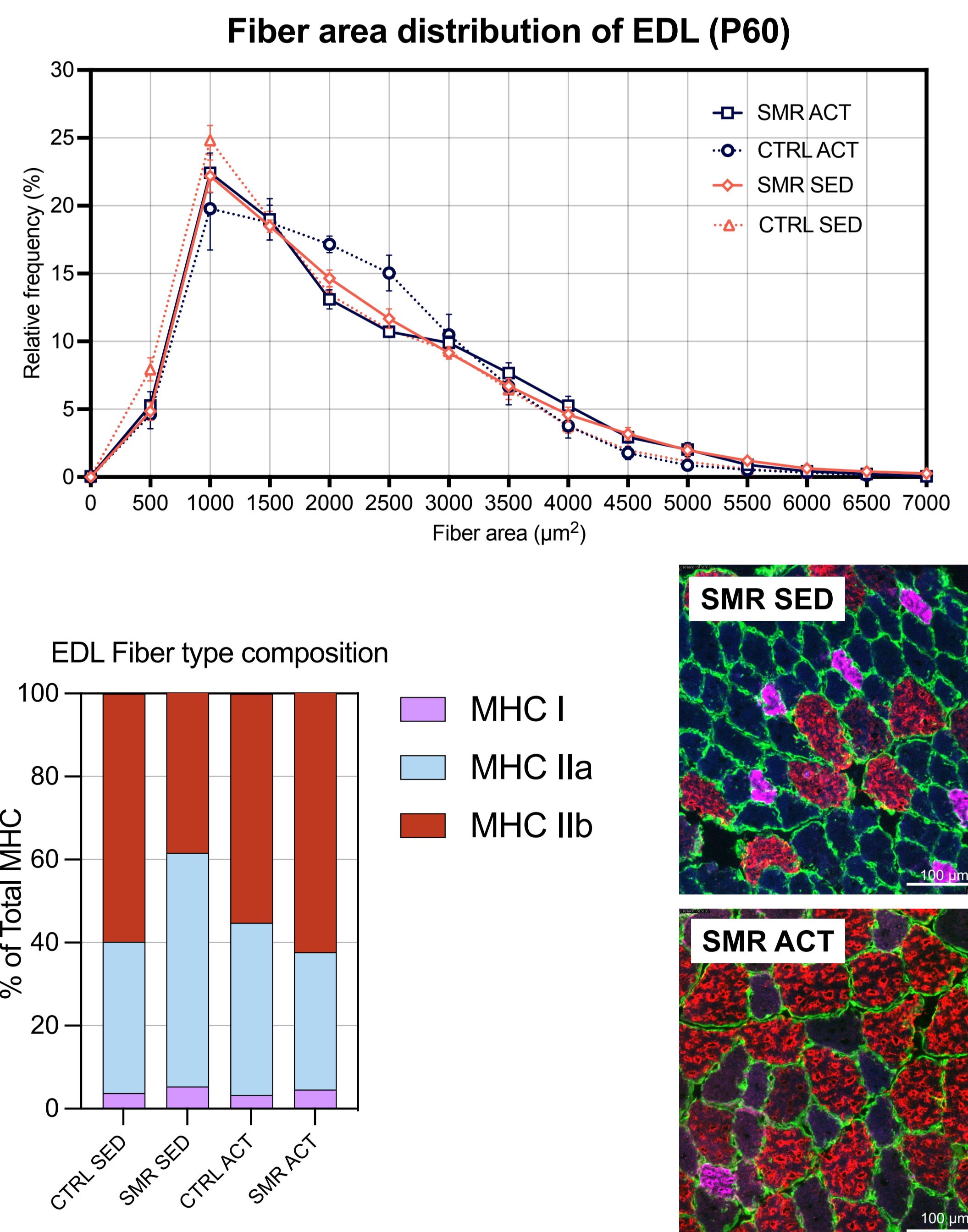
## RESULTS

### Soleus



**Persistent atrophy** is observed in **SMR SED** group, which is **partially prevented** by **activity**.  
**No change in fiber type composition** is observed whatever the group.

### EDL



**No atrophy** is observed whatever the groups.  
**A fast-to-slow transition** is observed in the SMR SED group.

## CONCLUSION

To sum up, early SMR from birth to P28 has persistent detrimental effects that are not completely prevented by continued exercise from P28 to P60. Nevertheless, physical activity seems to be an interesting countermeasure to reverse some of the changes induced by early SMR.

However, **this type of physical activity** does not prevent all the alterations induced by the early sensorimotor restriction. Indeed, we used voluntary physical activity here. It could be interesting to evaluate the effect of a more controlled and standardized exercise protocol.