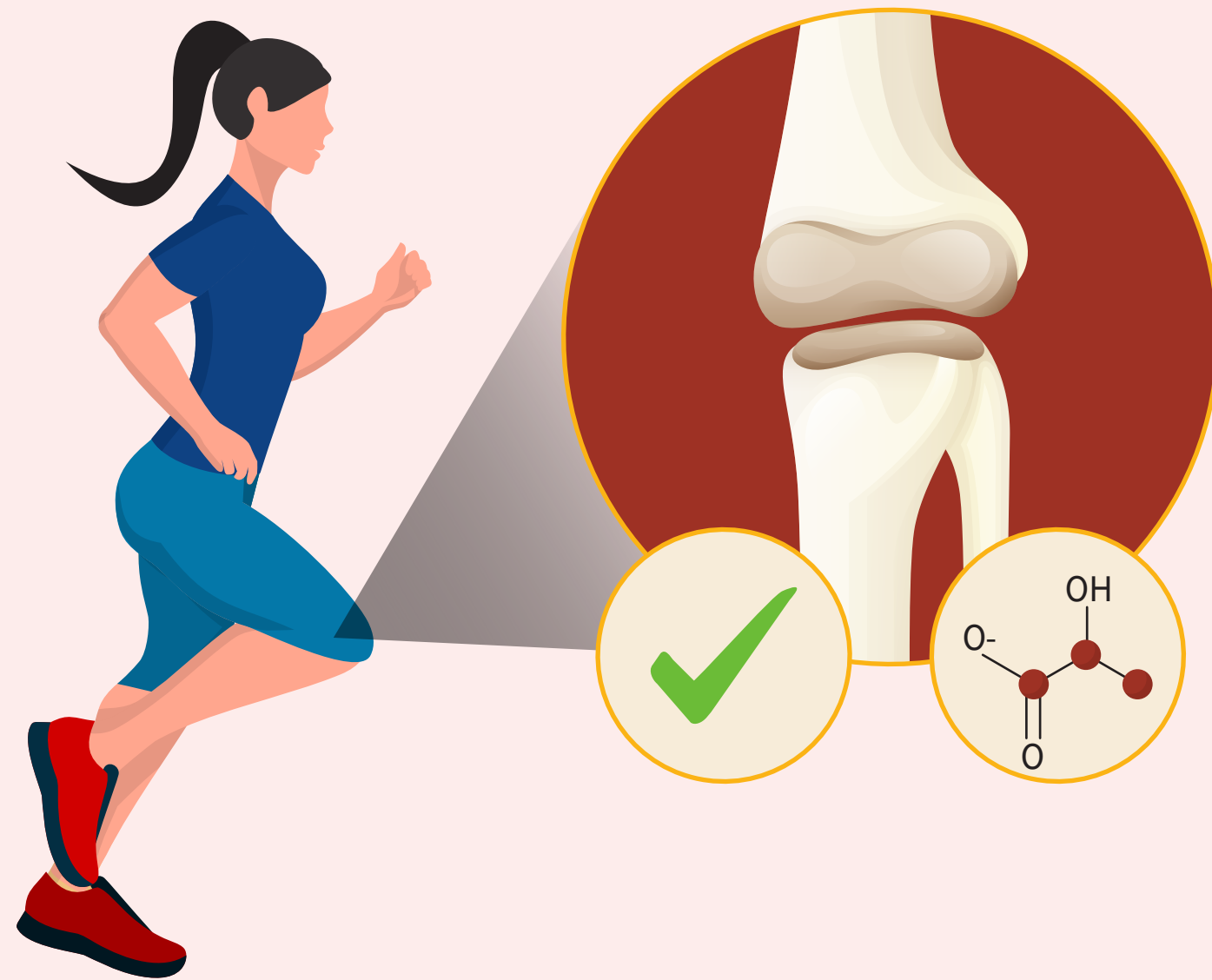
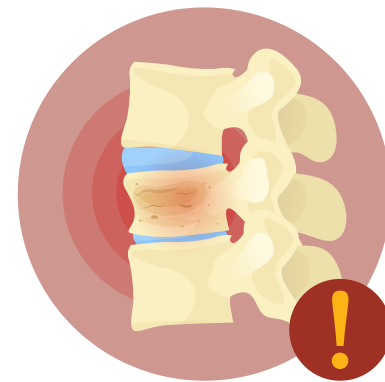


# Role of Lactate in the Bone Anabolic Effect of High-Intensity Exercise

High-intensity interval training (HIIT) has been shown to improve bone metabolism, enhance bone mineral density (BMD), and release lactate into the bloodstream



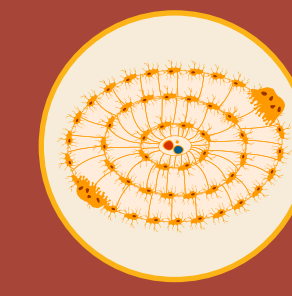
However, older individuals who are more vulnerable to osteoporosis may not be suitable for HIIT



50 female C57BL/6 mice

## Study groups

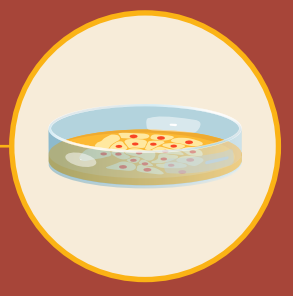
- Nonovariectomized control group
- Ovariectomized group (OVX)
- HIIT group (OVX + HIIT)
- HIIT with lactate transporter inhibition group (OVX + HIIT + INH)
- Lactate subcutaneous injection group (OVX + LAC)



Bone formation/  
resorption  
processes



7-week  
assessment



Bone anabolic  
effect of lactate  
at the cellular level



Bone  
strength



Bone  
mass



Lactate  
measurement

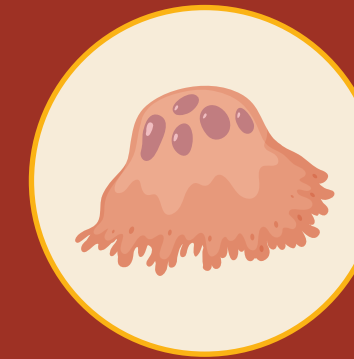
## Compared to OVX alone

### OVX + HIIT and OVX + LAC groups



- Increased BMD
- Significant improvement in mechanical properties

### OVX + HIIT + INH group



- ✗ Benefits of exercise on bone microstructure and biomechanics
- ✗ Expression of osteoblastic biomarkers

### OVX + LAC group



- ↑ Bone augmentation, mechanical properties, and tissue level material properties
- ↑ Bone formation

Lactate may mediate the enhancement in bone growth and metabolism following HIIT, serving as a cost-effective strategy for bone augmentation in the management of osteoporosis

Lactate Mediates the Bone Anabolic Effect of High-Intensity Interval Training by Inducing Osteoblast Differentiation

Zhu et al. (2023) | DOI: 10.2106/JBJS.22.01028

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