

# FUNDAMENTAL AND EMERGING CONCEPTS IN THE REDOX REGULATION OF EXERCISE RESPONSES AND ADAPTATIONS

*Trying to bring some order to chaos*

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*Trying to bring some order to chaos*

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# I would argue for:

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FUNDAMENTALITY of redox reactions in biology



COMPLEXITY of reactive species metabolism



INVOLVEMENT of reactive species in exercise responses and adaptations

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**F** FUNDAMENTALITY of redox reactions in biology

**C** COMPLEXITY of reactive species metabolism

**I** INVOLVEMENT of reactive species in exercise responses and adaptations

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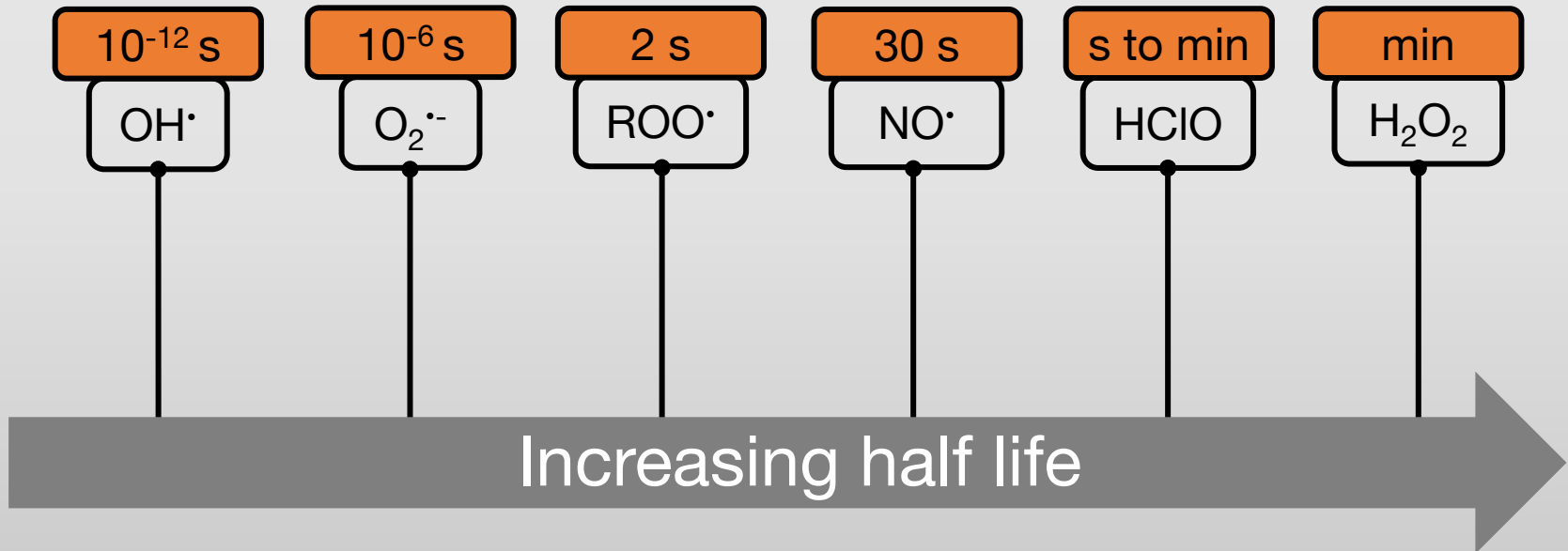


**F** FUNDAMENTALITY of redox reactions in biology

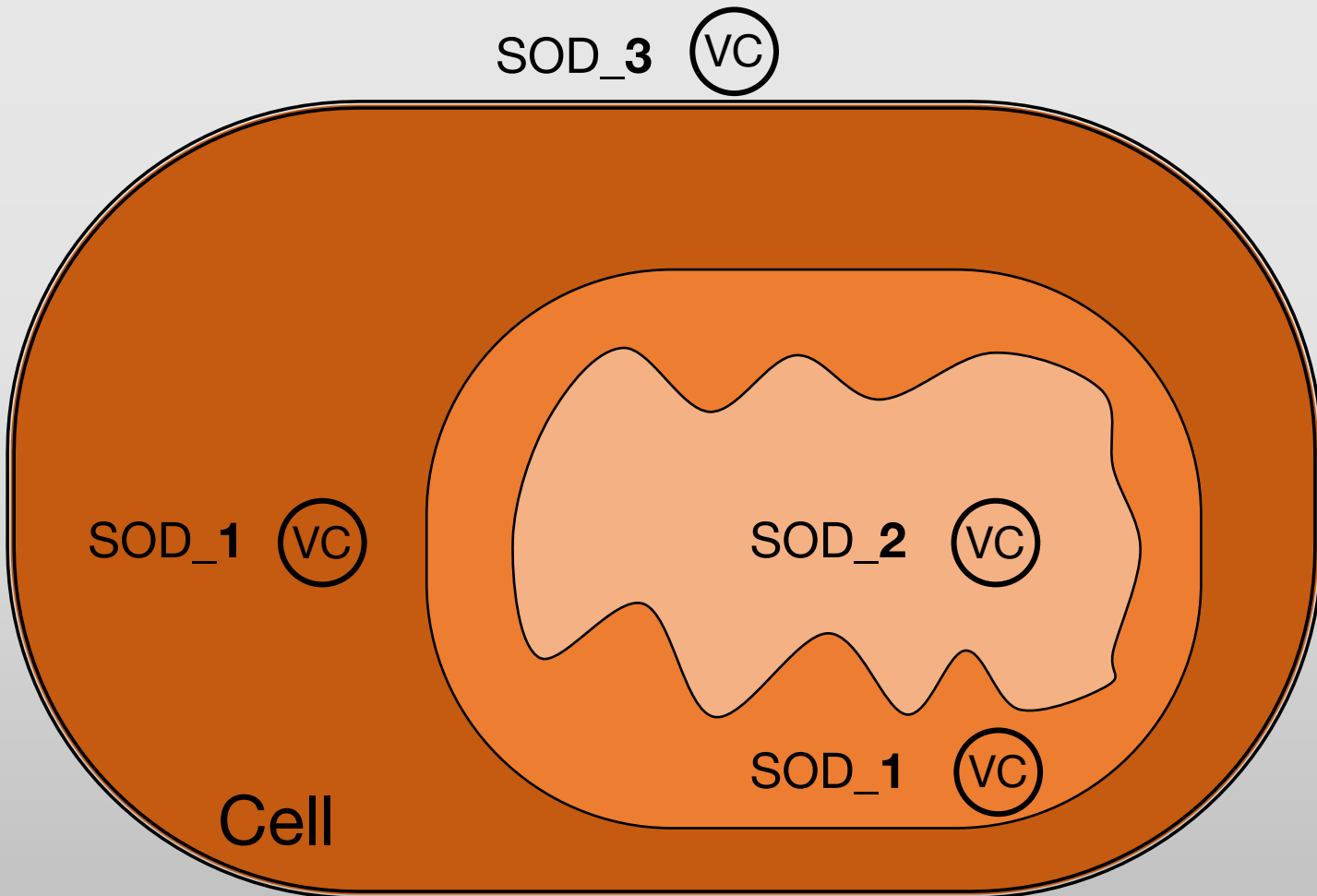
**C** COMPLEXITY of reactive species metabolism

**I** INVOLVEMENT of reactive species in exercise responses and adaptations

# Heterogeneity of reactive species



# Heterogeneity of antioxidants



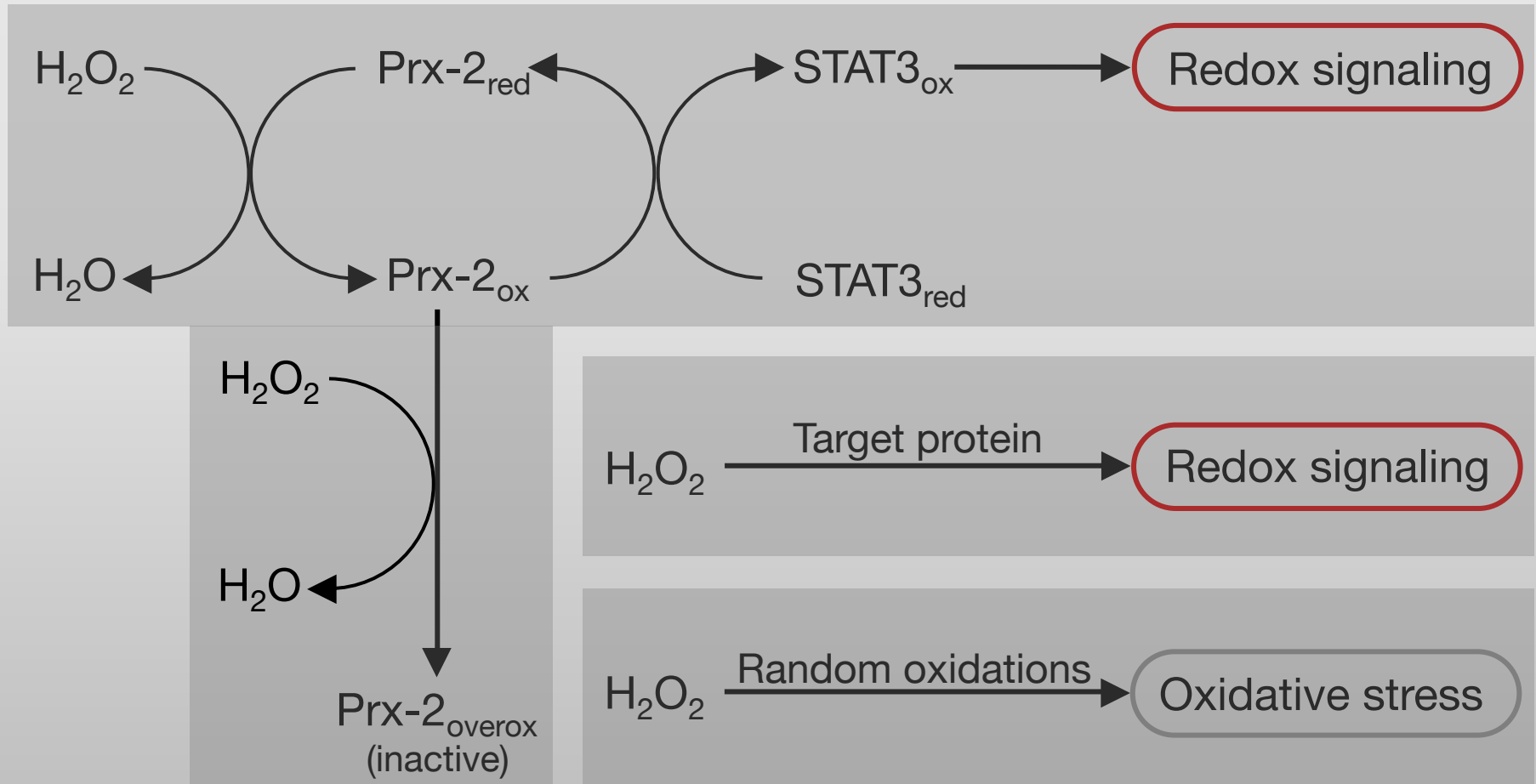


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# Architectural and functional specificity of redox metabolism

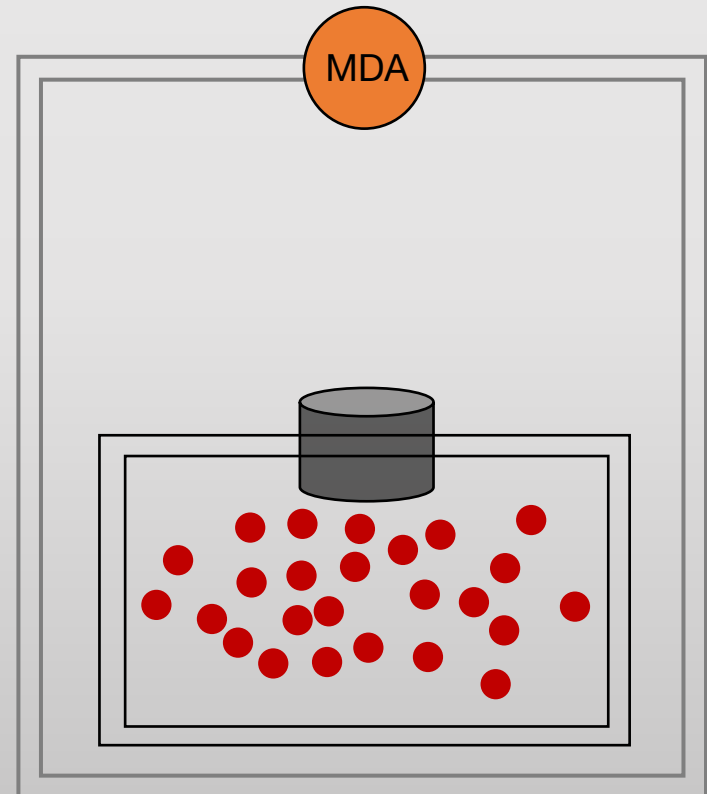
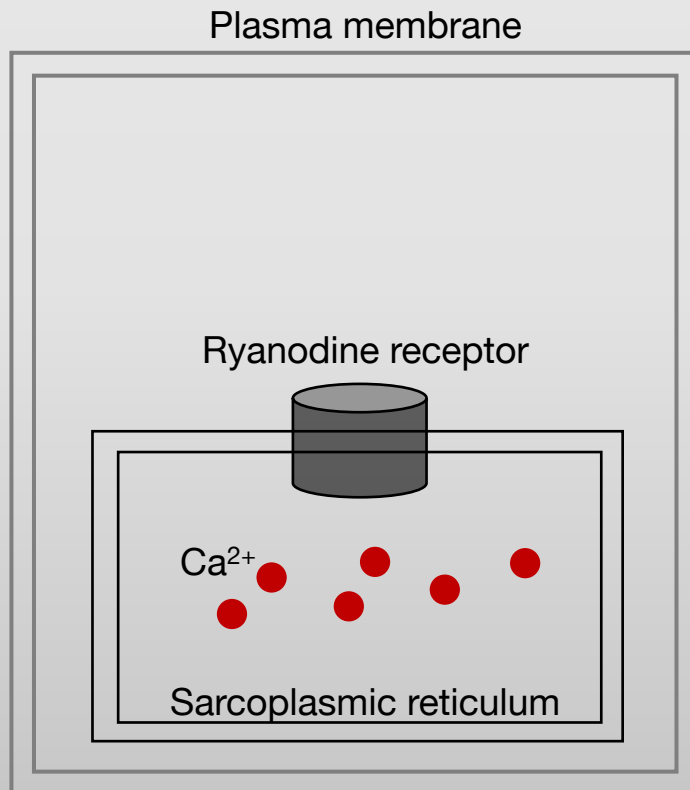
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# Cell signaling via redox molecules



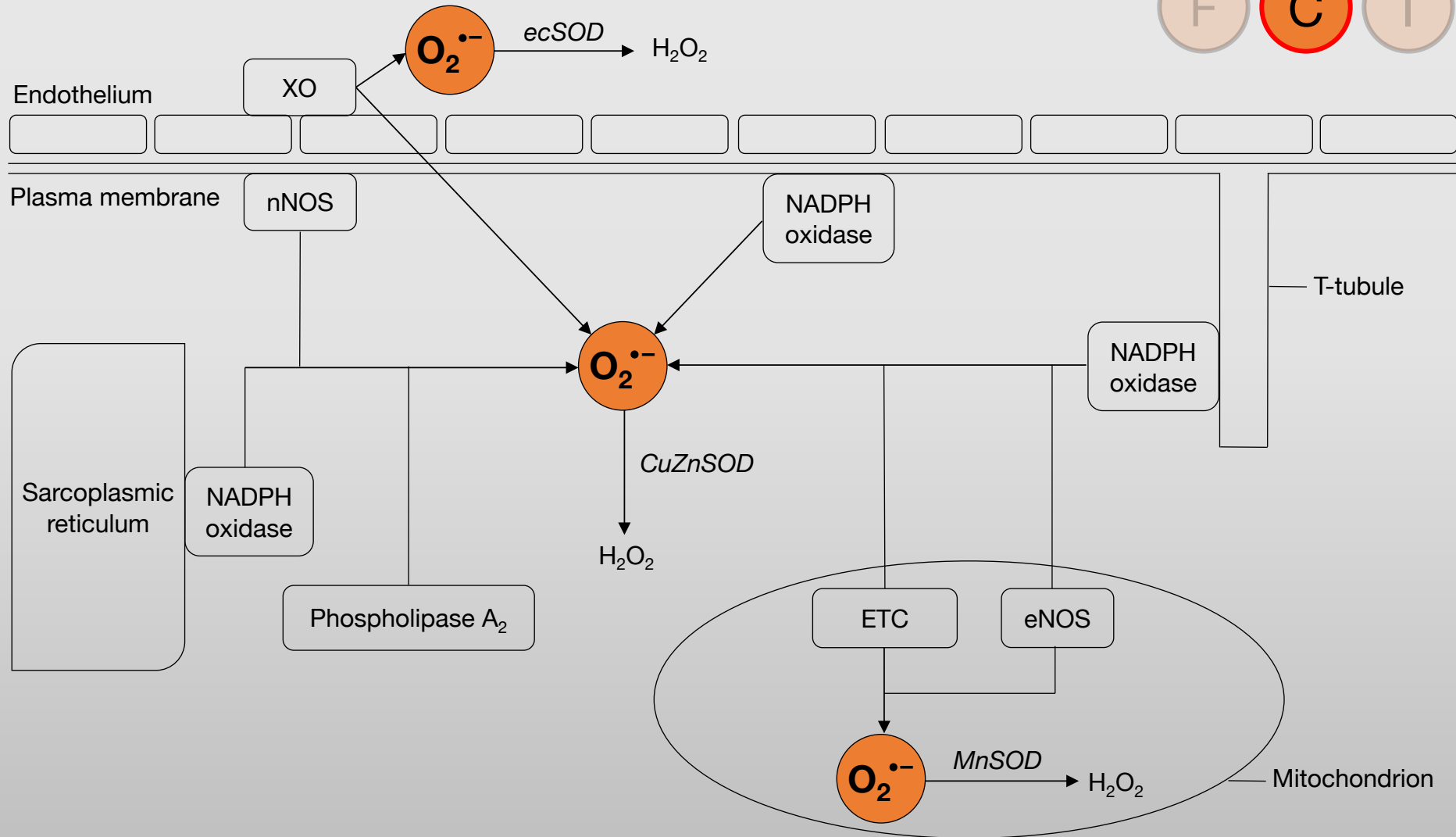
# Responses/adaptations to oxidative stress

F C I



# Exercise produces reactive species

F C I



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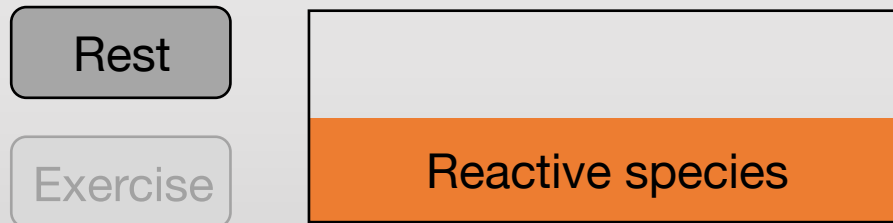
What is the role of reactive species and oxidative stress after exercise?

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# The conventional approach

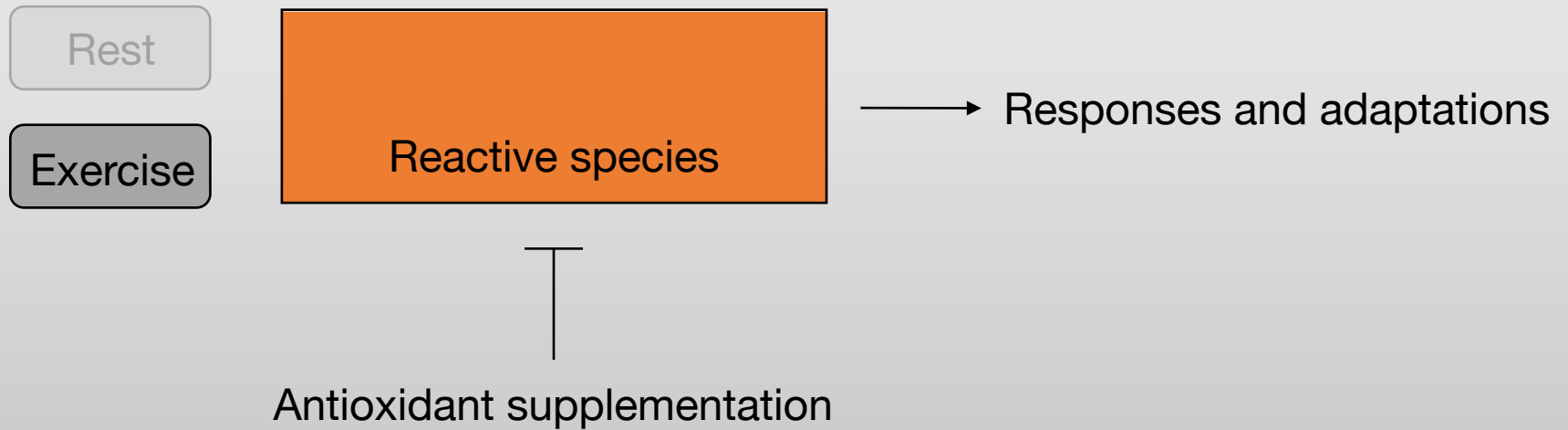
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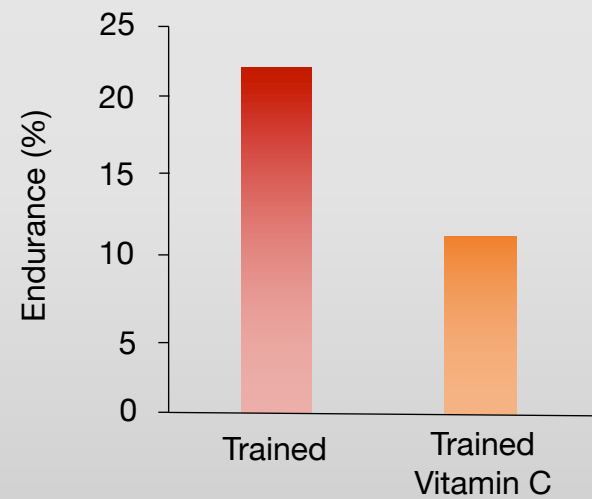
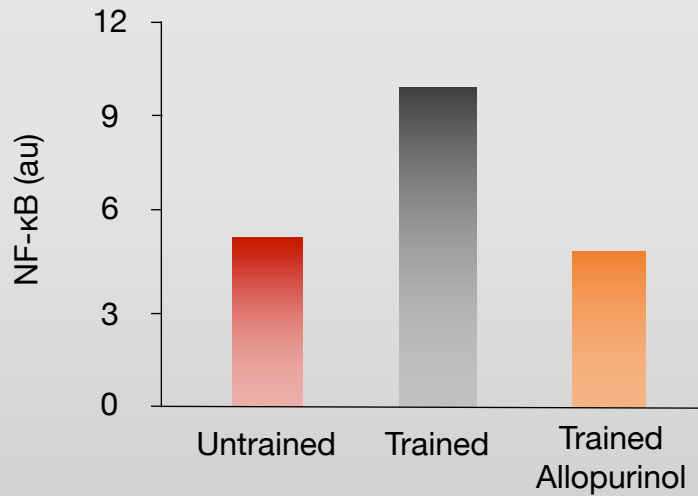
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# The conventional approach

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# A milestone





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Antioxidant supplementation either  
does not augment or hampers  
exercise adaptations

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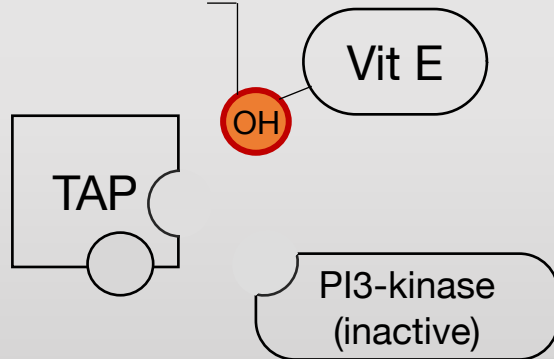
*“Too much of a good thing” \**

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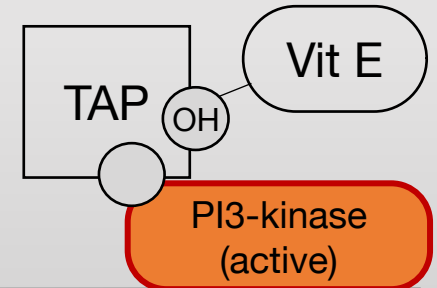
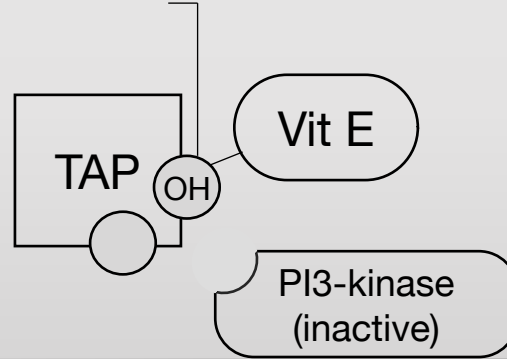
# Non-antioxidant effects of antioxidants



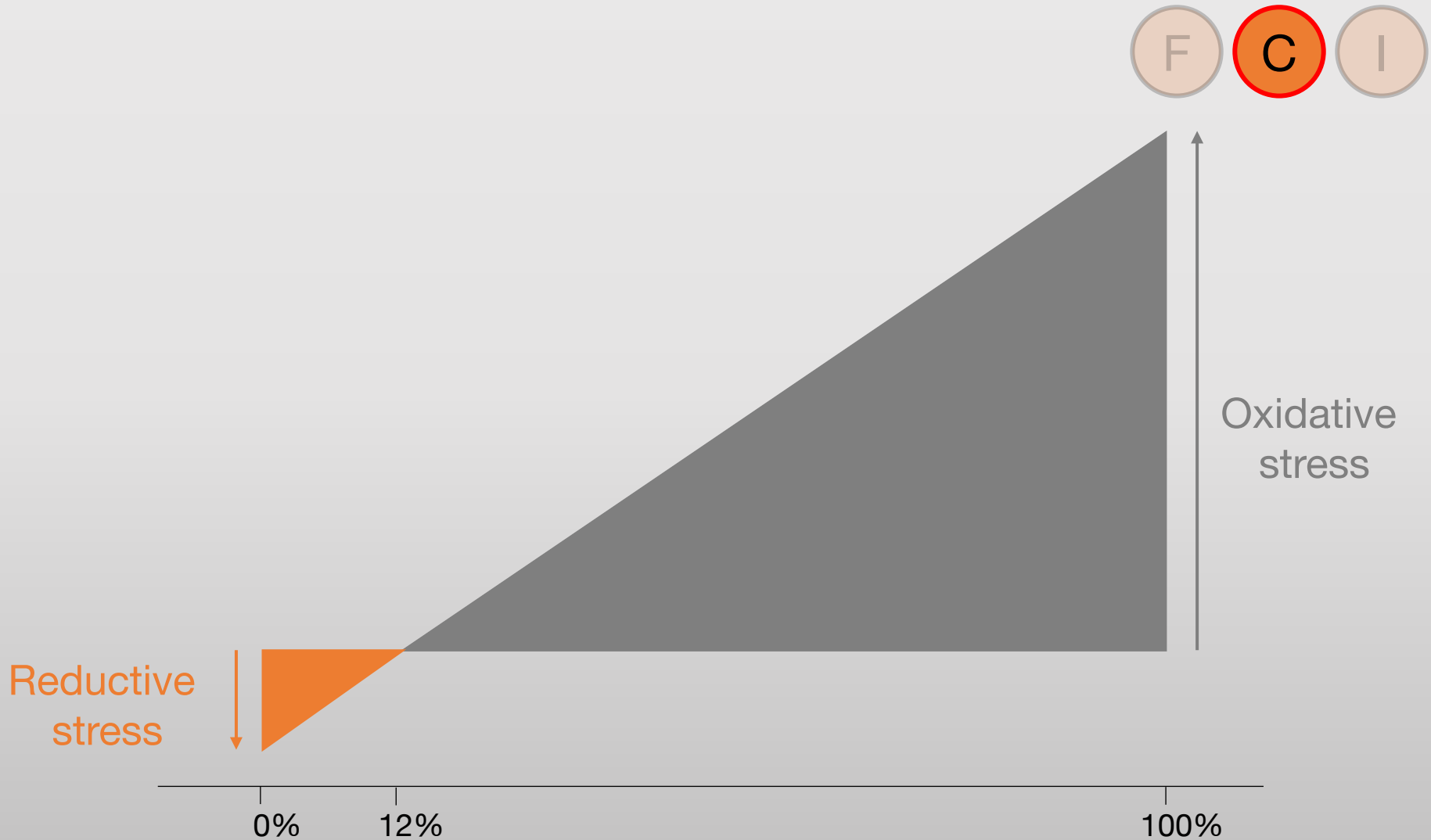
Redox active



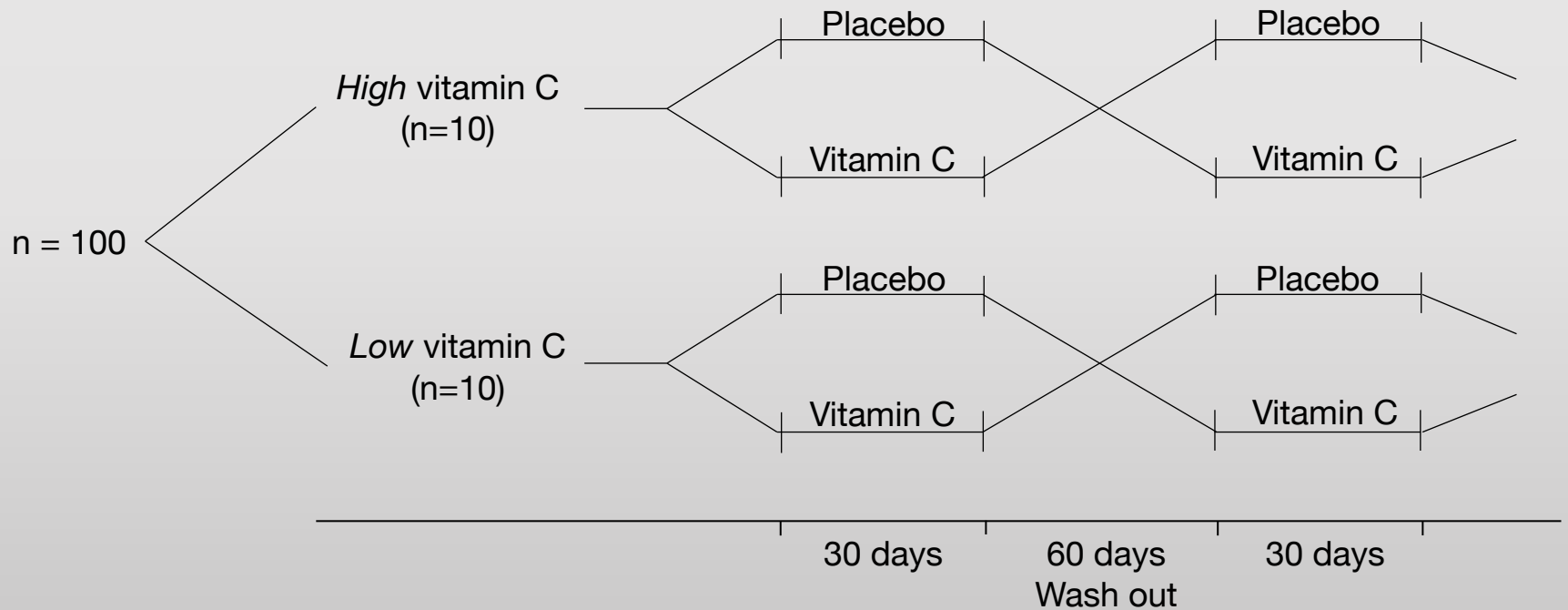
Redox inactive



# Redox individuality



# Personalized antioxidant supplementation

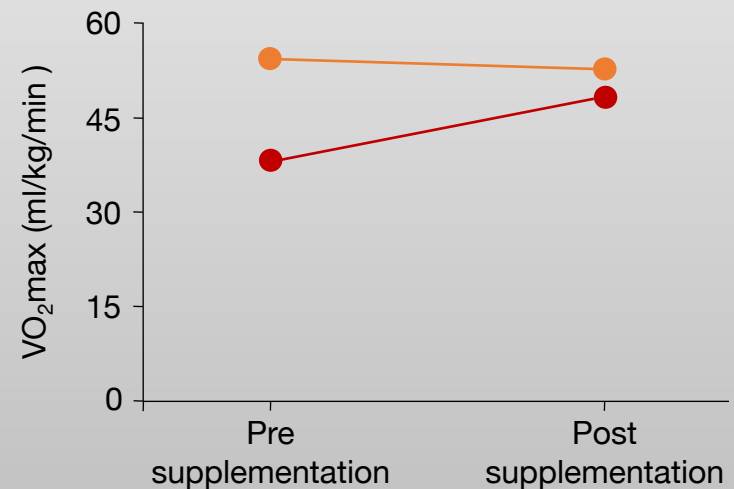
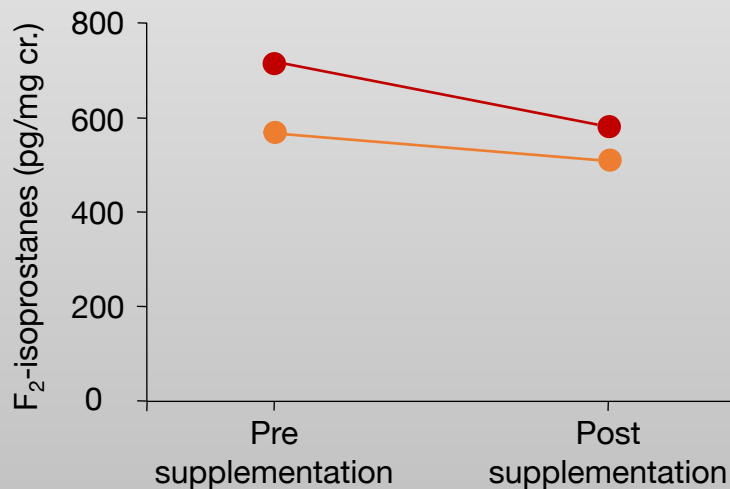
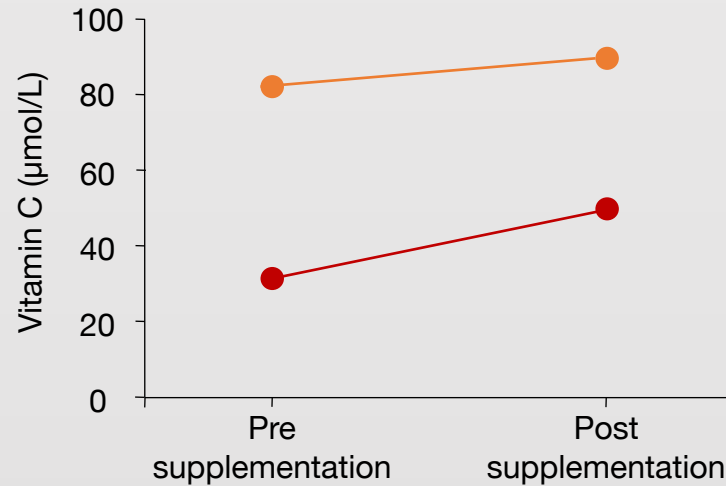


# Beneficial effects of Vit C on the 'rancid'

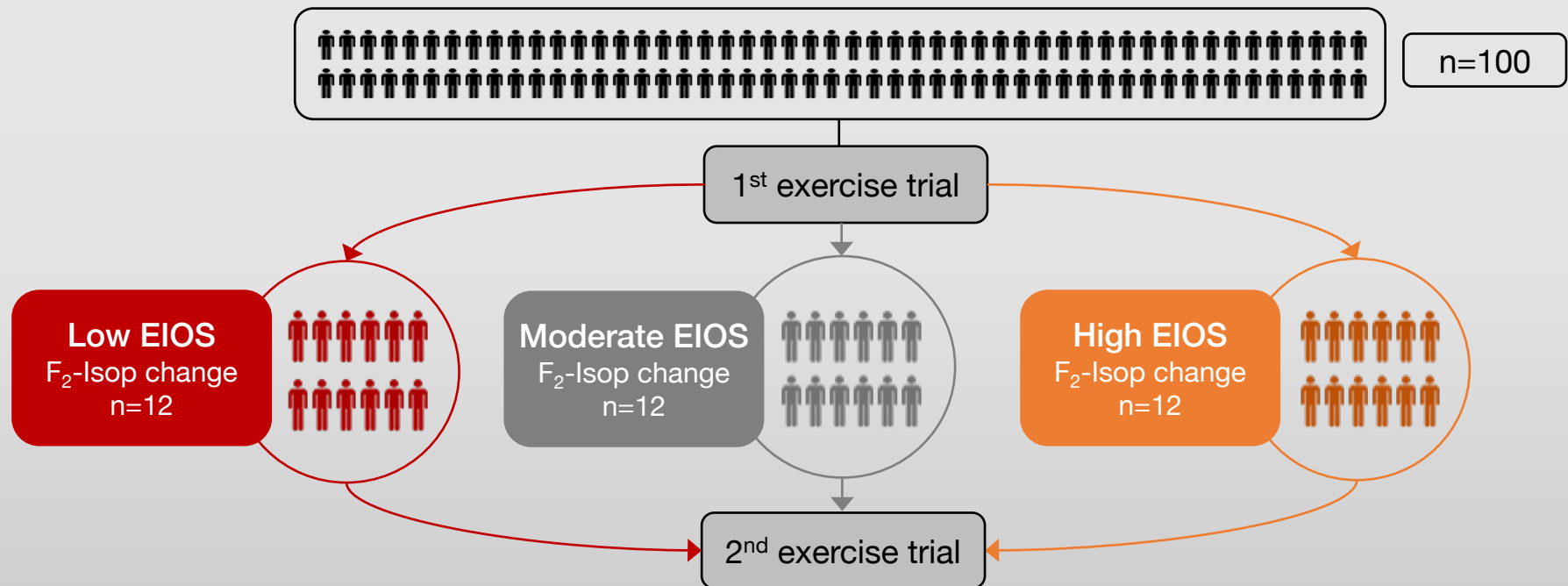


High vitamin C group

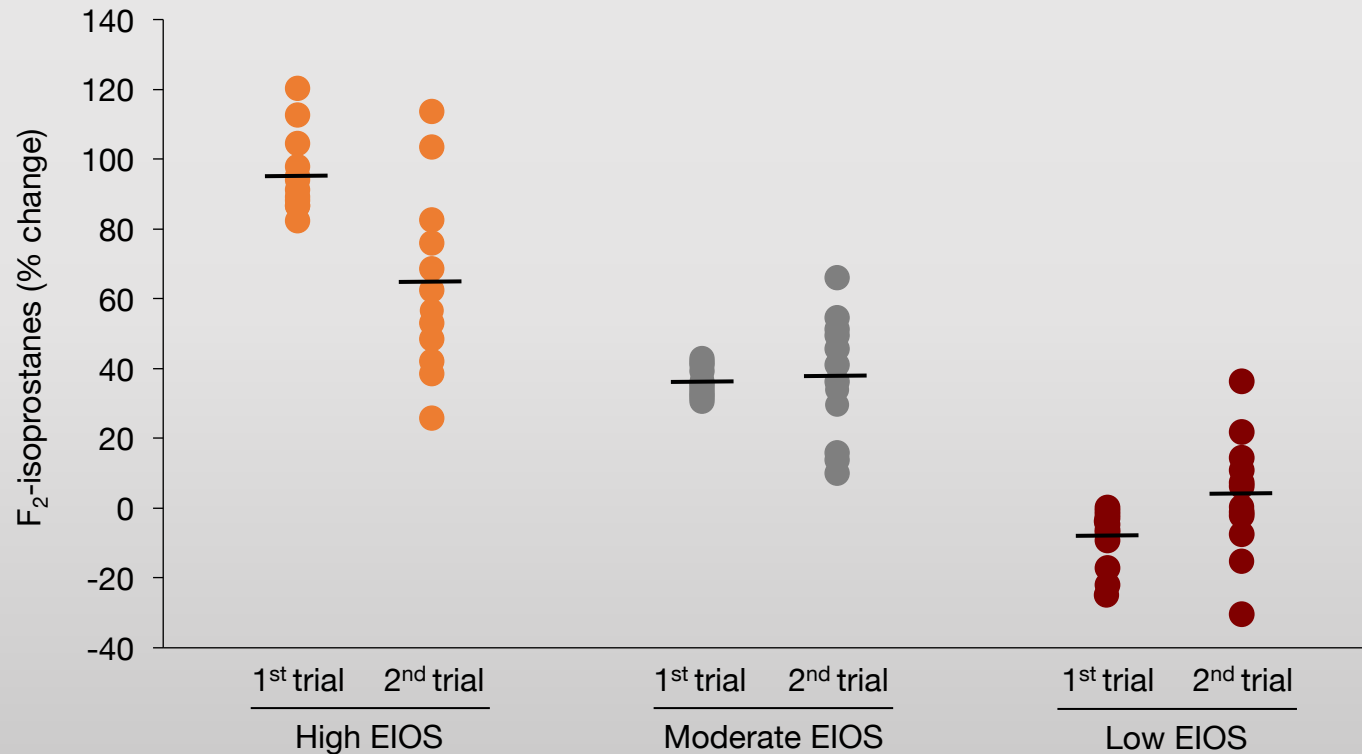
Low vitamin C group



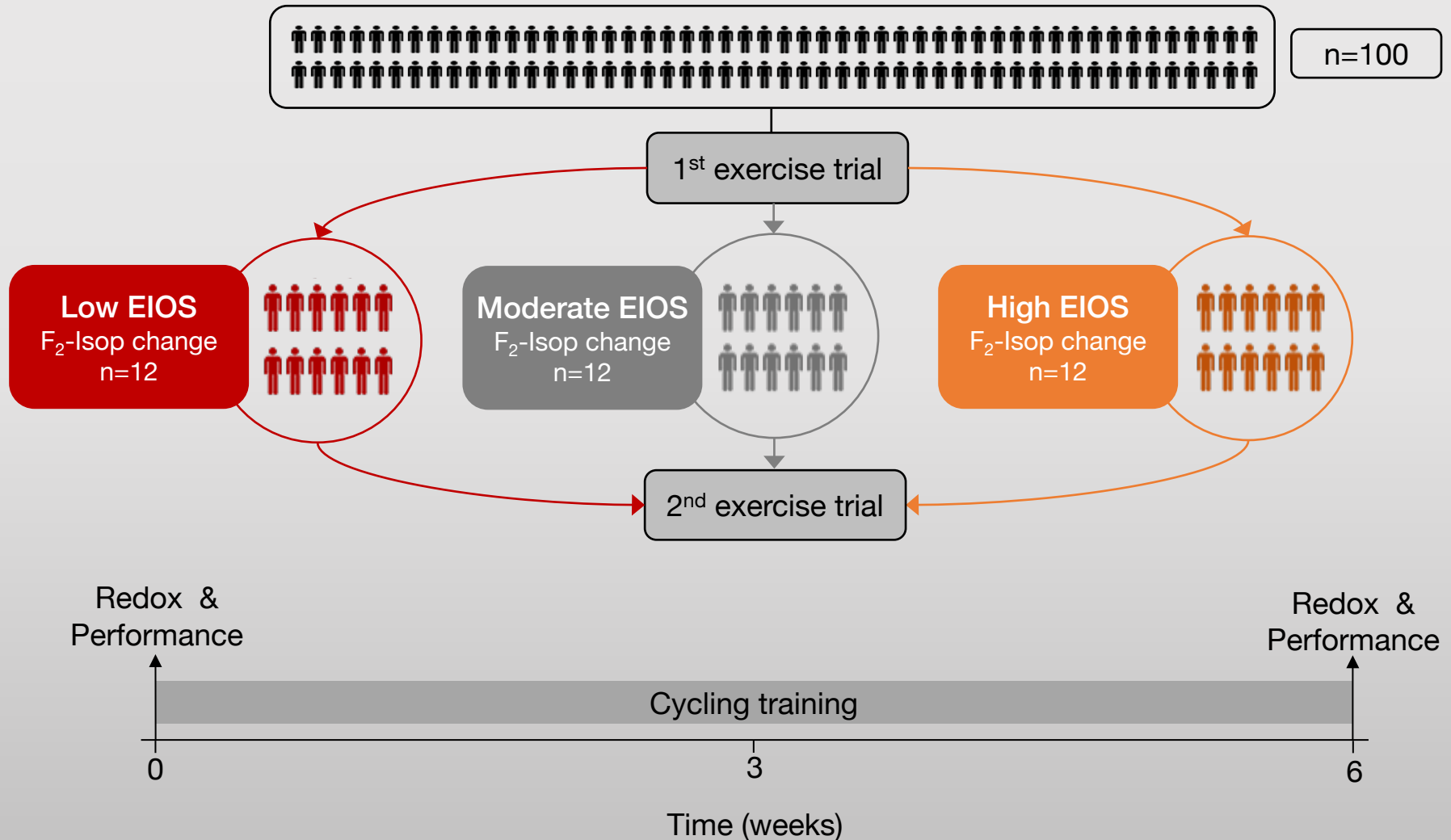
# Stratification and regression to the mean



# Verification of regression to the mean

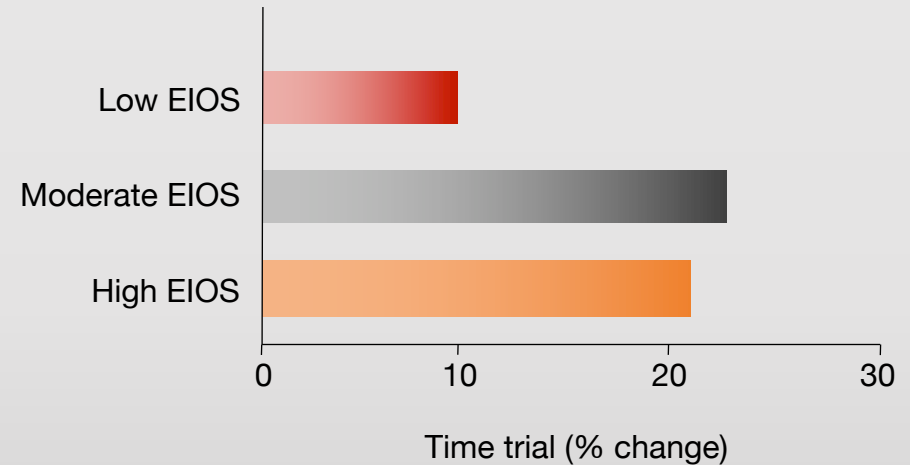
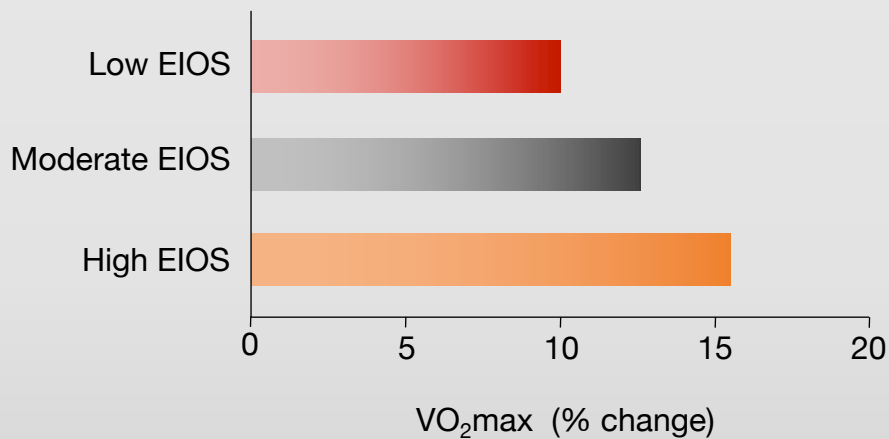


# The role of oxidative stress in adaptations



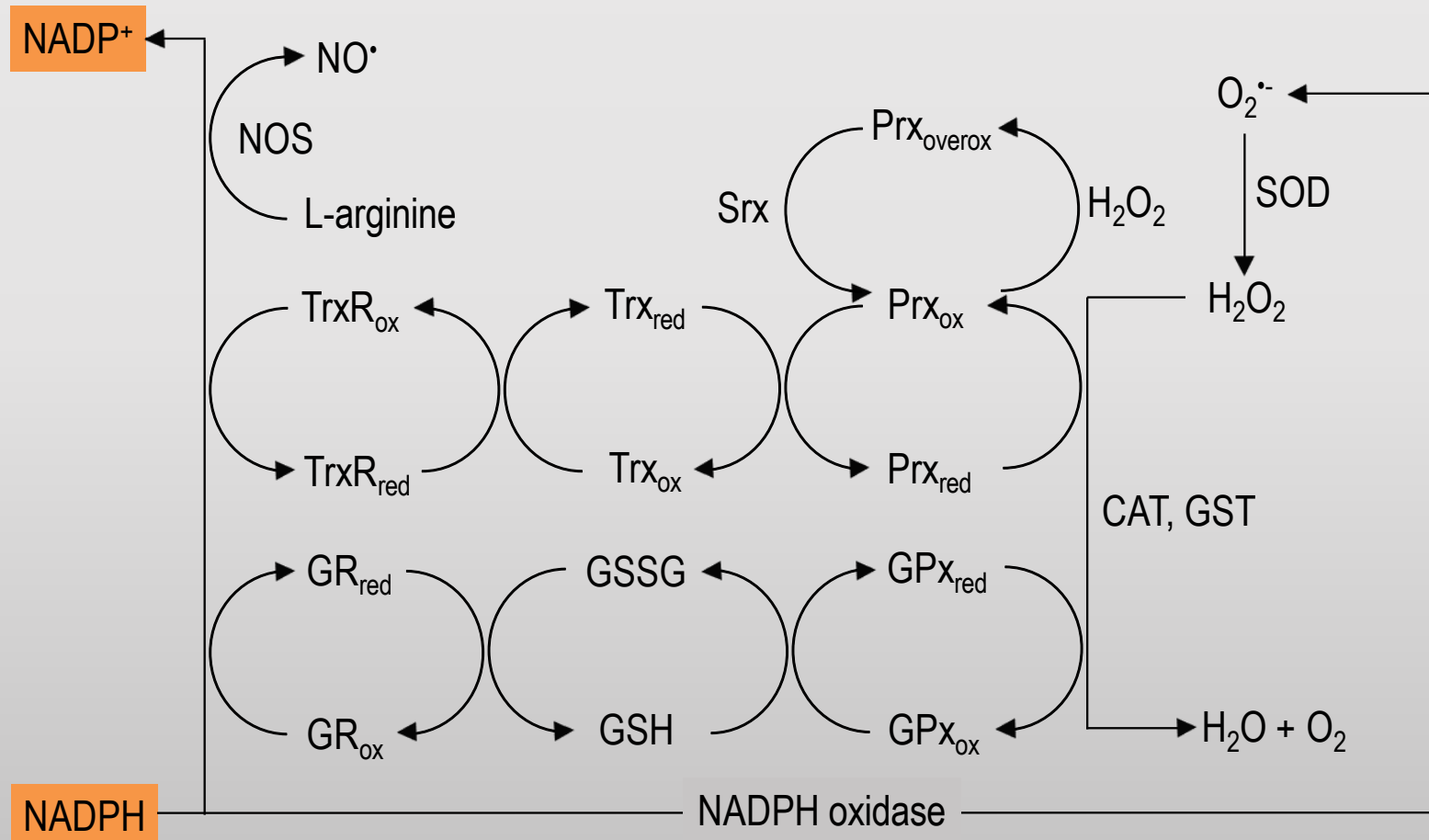


# Low oxidative stress leads to low adaptations



*a 'free radical' supplement*

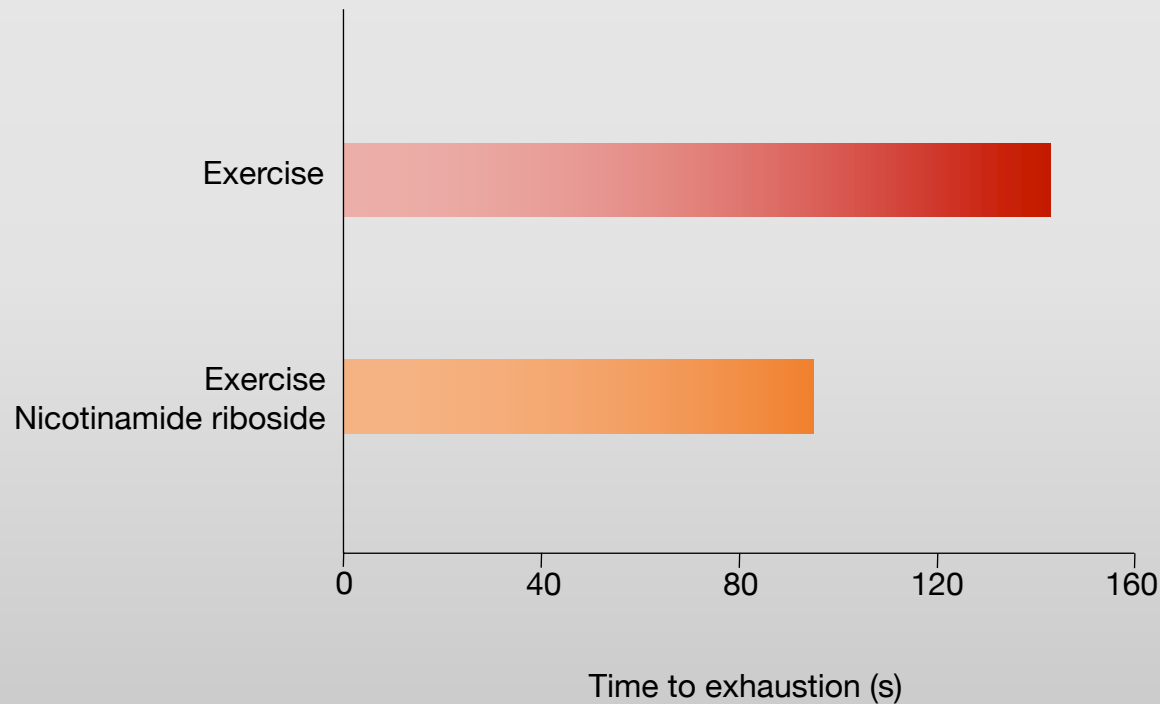
# Centrality of NADPH in redox regulation



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# Nicotinamide riboside: an NADPH booster

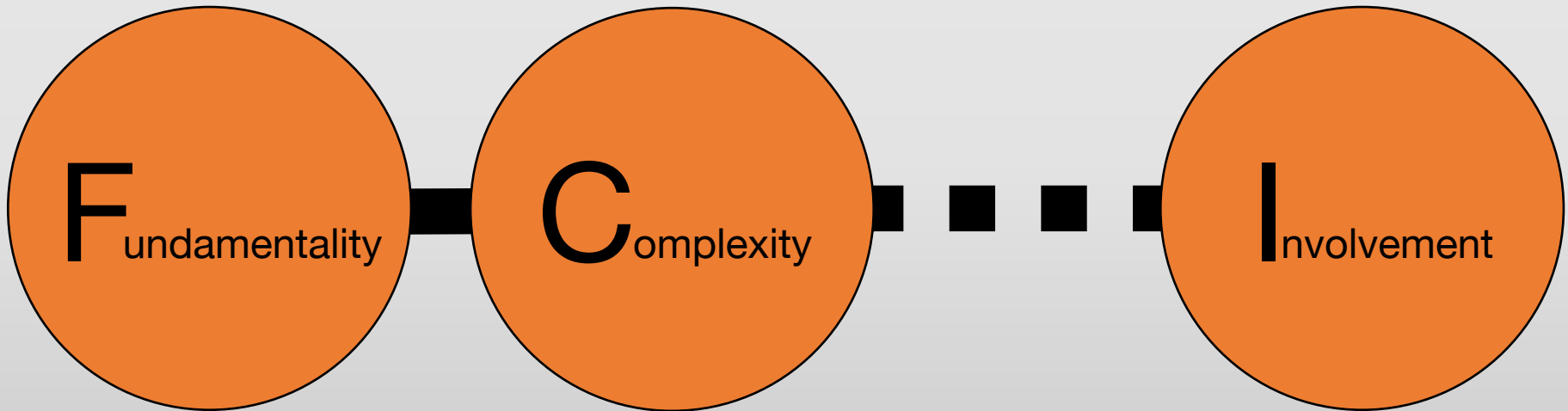
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# Conclusion

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# Acknowledgements

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