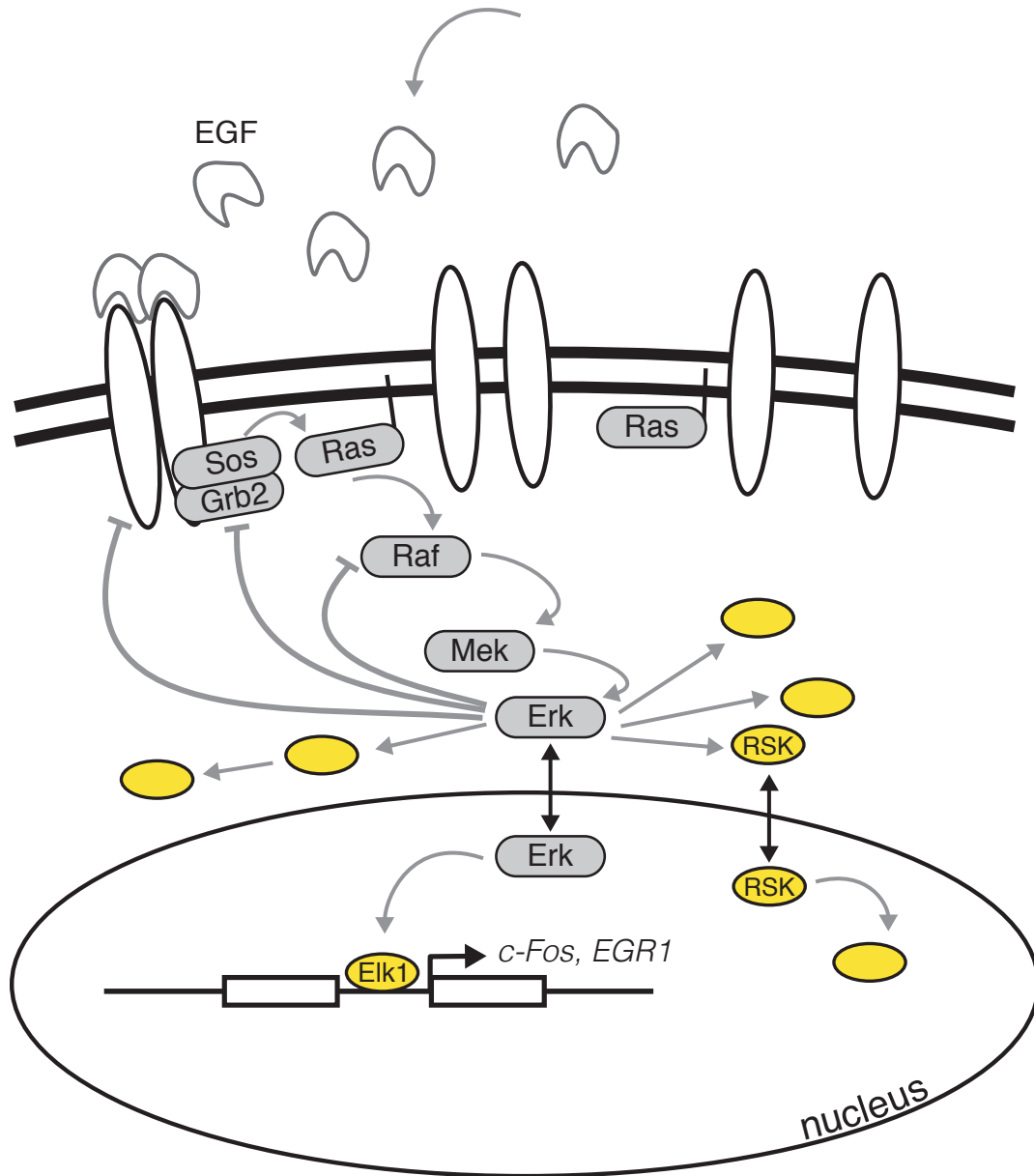
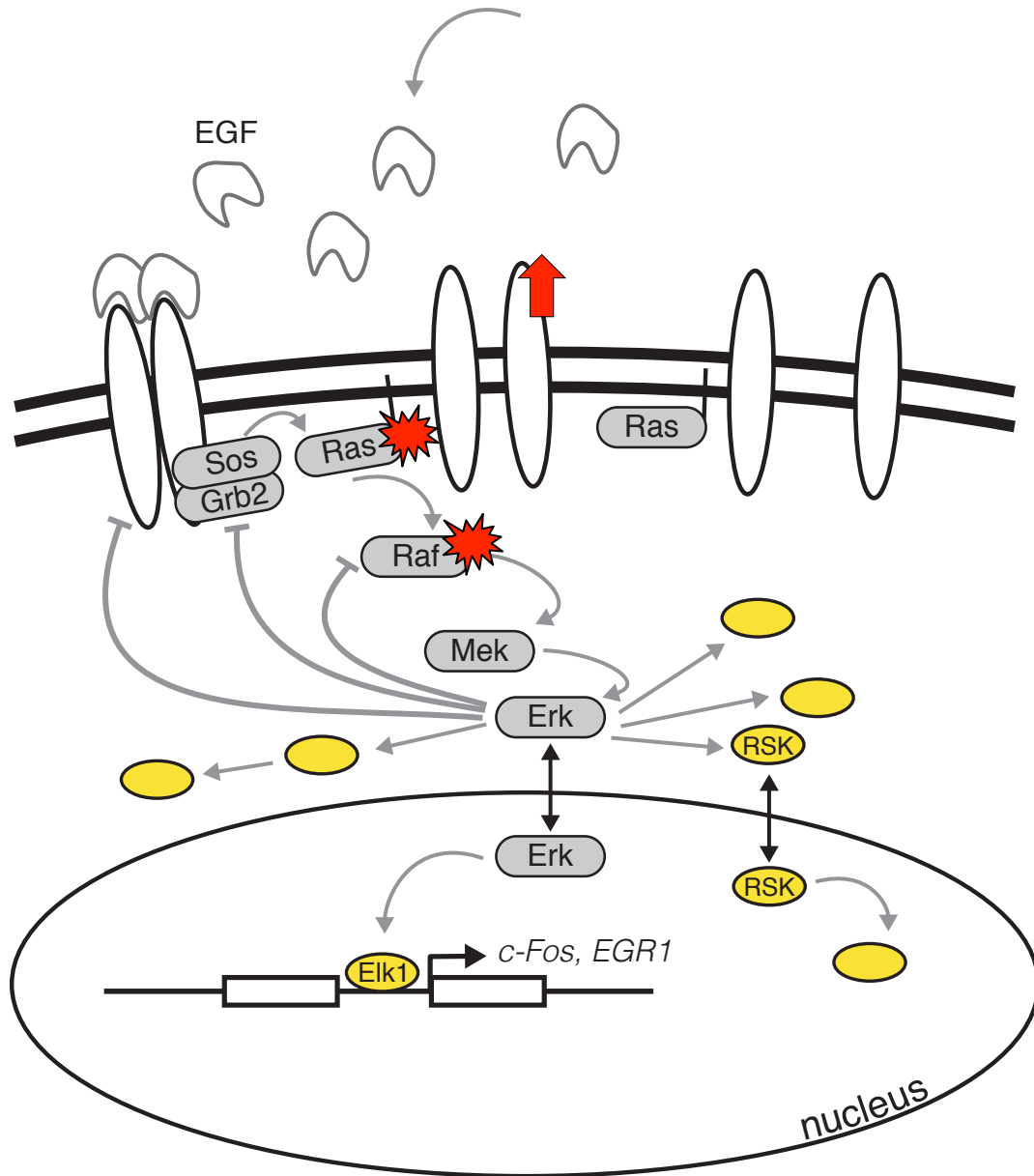


# Integral feedback control in Erk1/2 signalling

Franziska Witzel  
Computational Modelling in Medicine



● Erk target

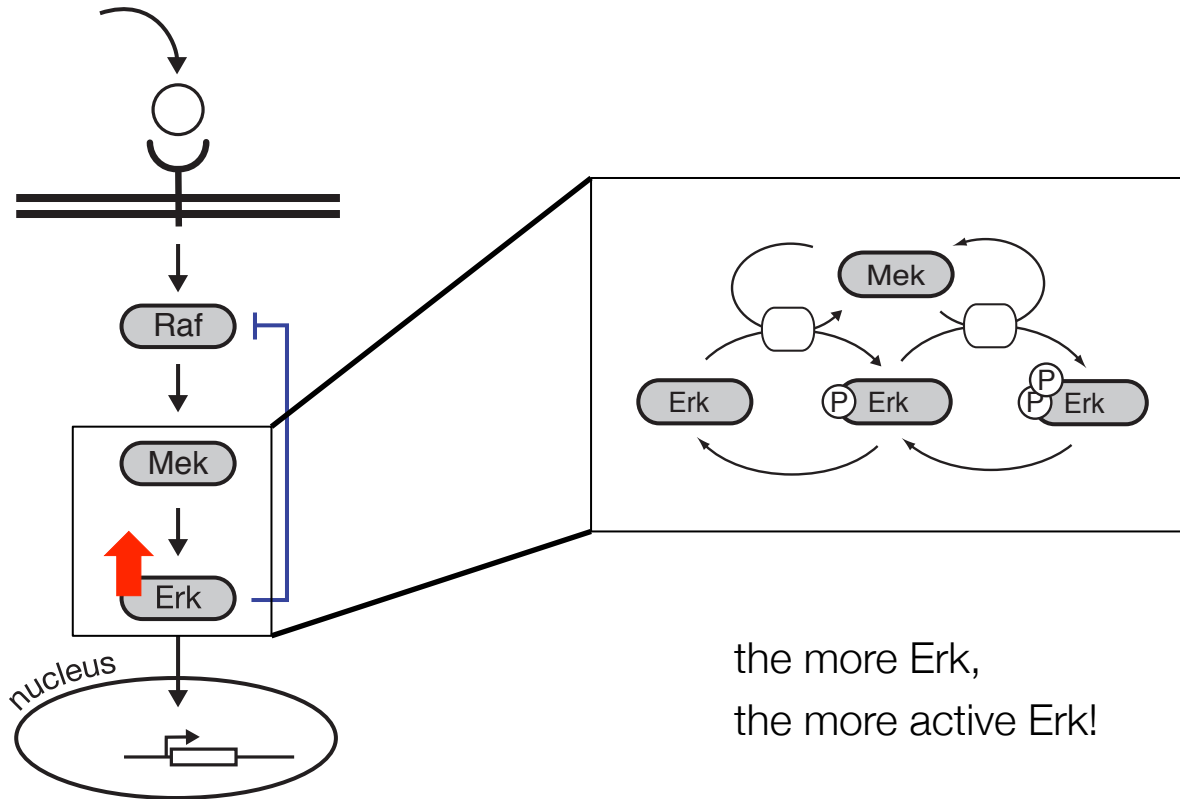


 Erk target

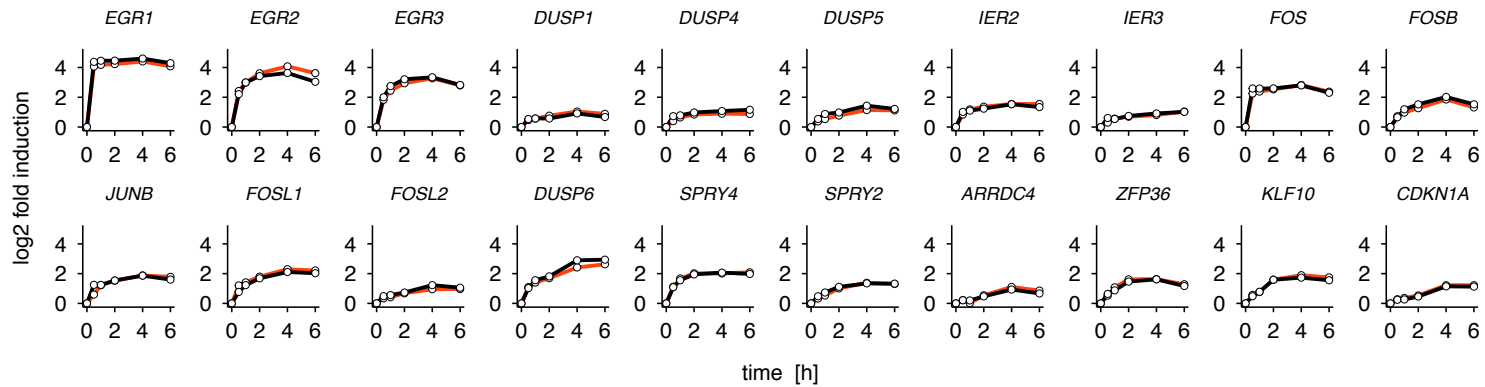
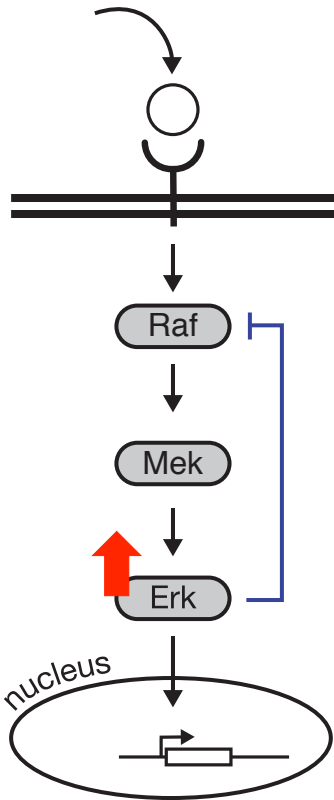
 overexpression

 mutation

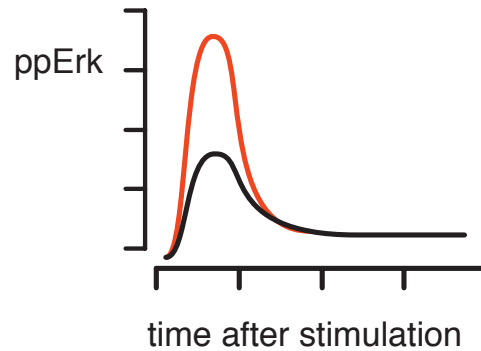
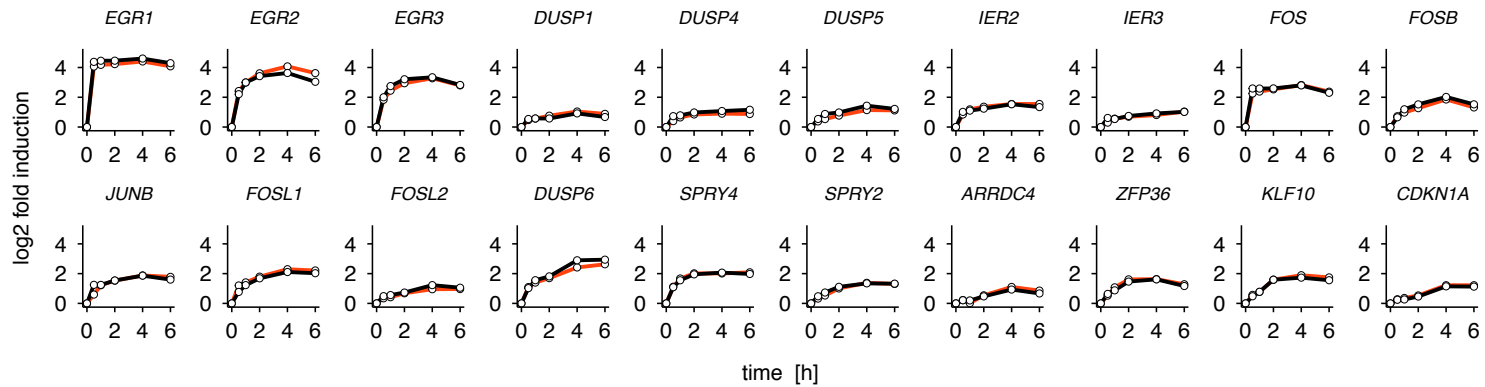
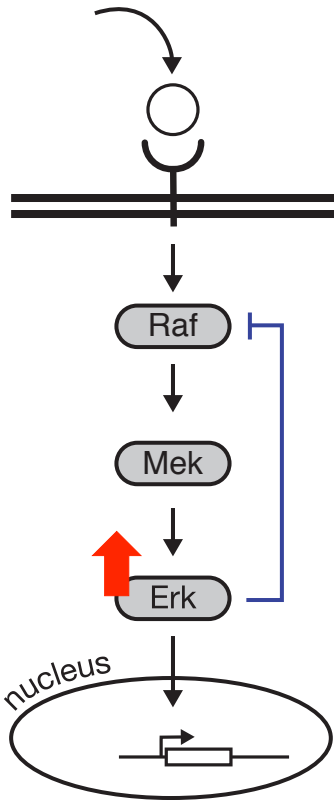
# Erk overexpression



# Robustness to Erk overexpression



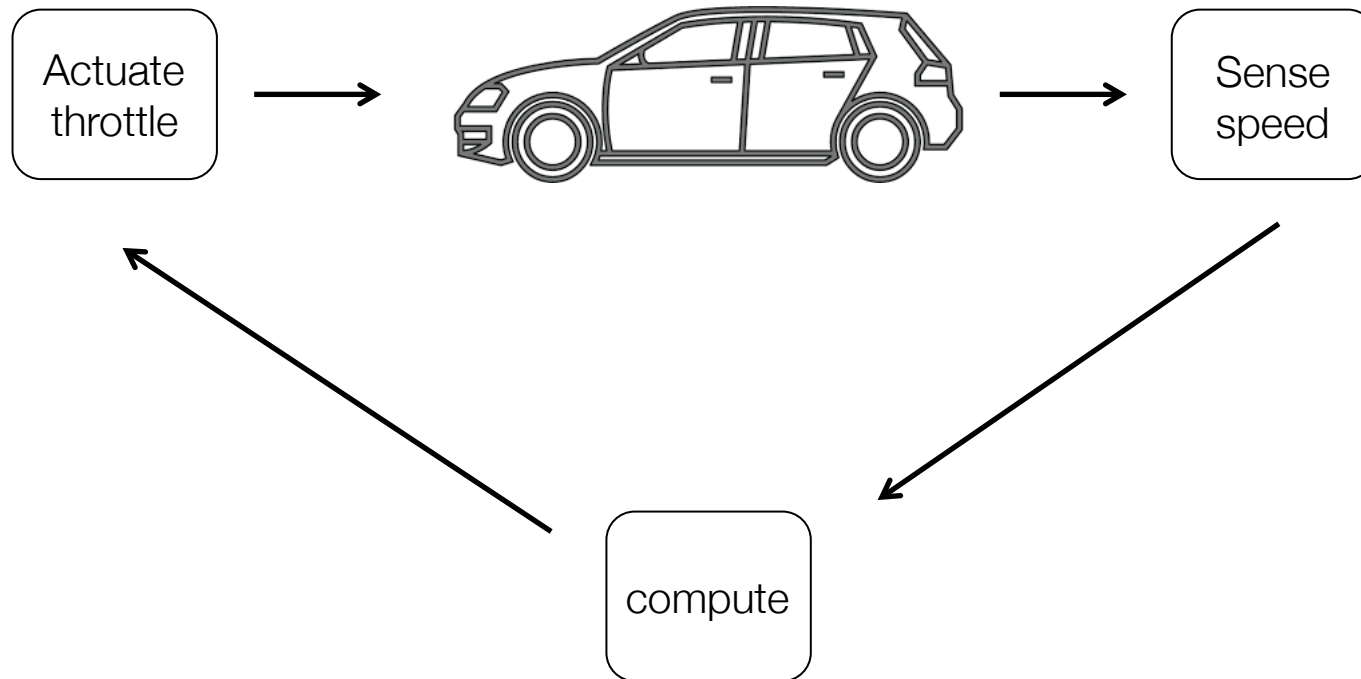
# Robustness to Erk overexpression



# Cruise control

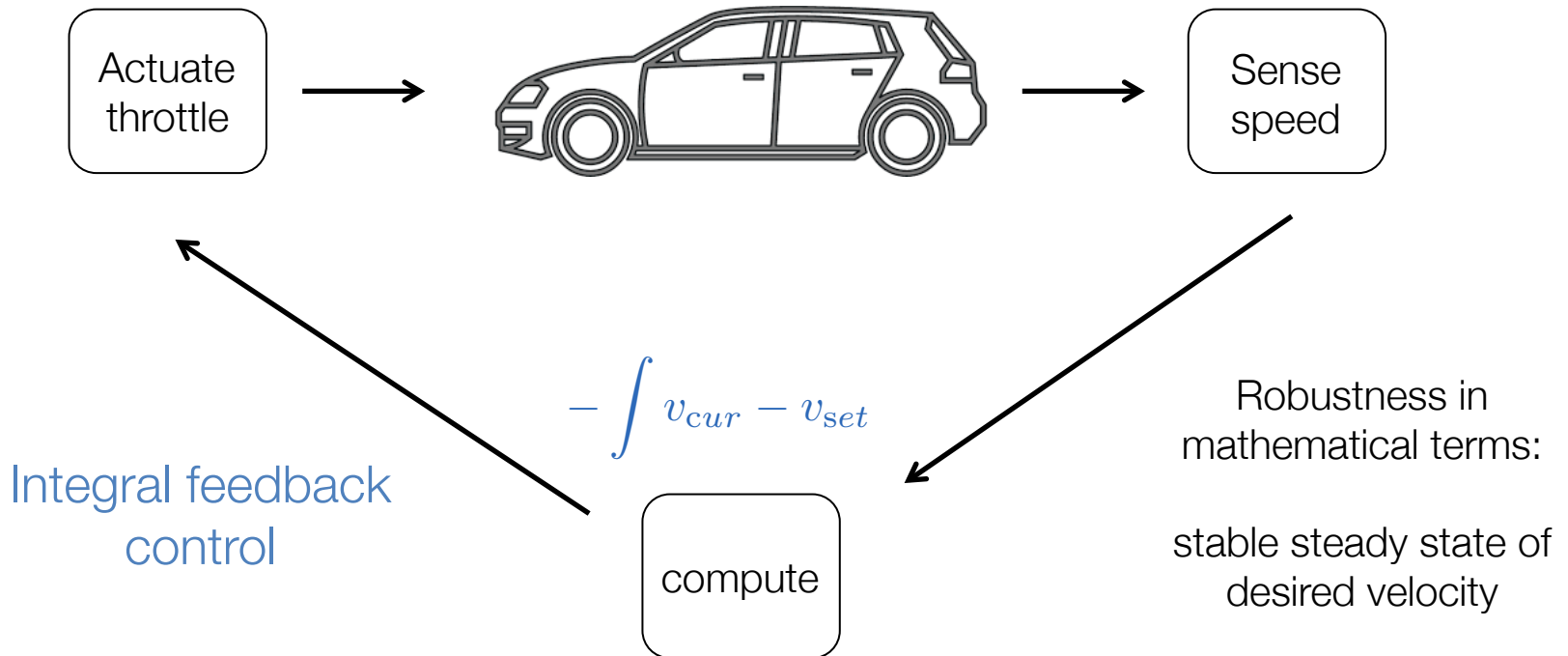
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Several unpredictable factors like weight of the car, slope of the street ...



# Cruise control

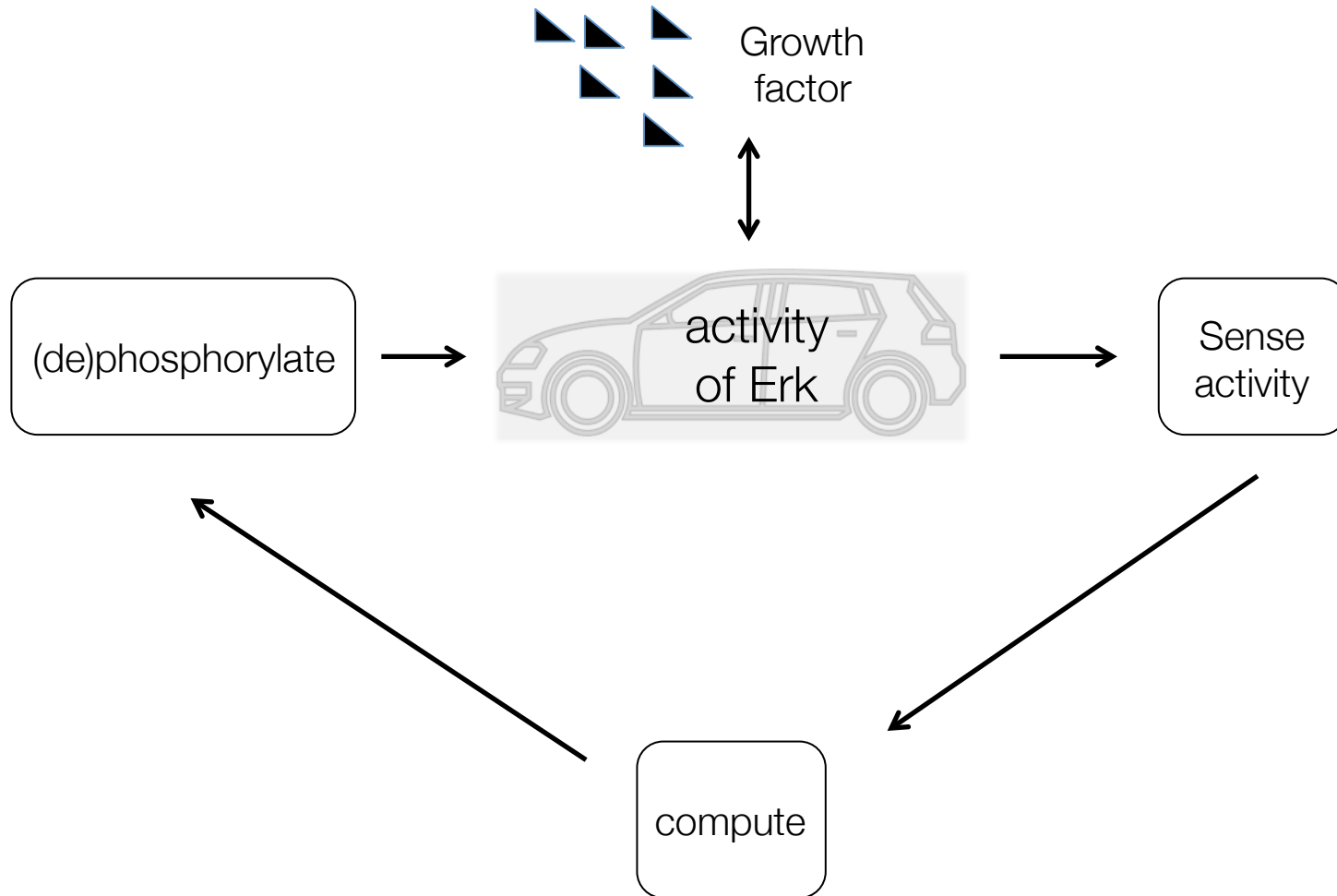
Several unpredictable factors like weight of the car, slope of the street ...



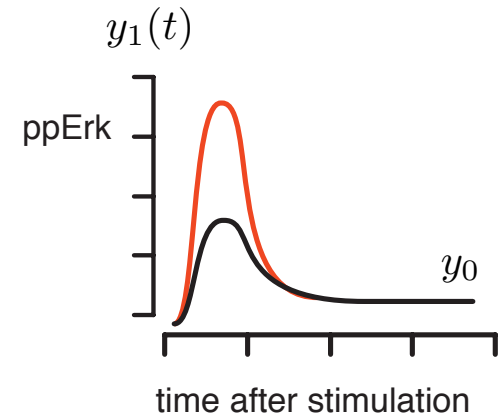
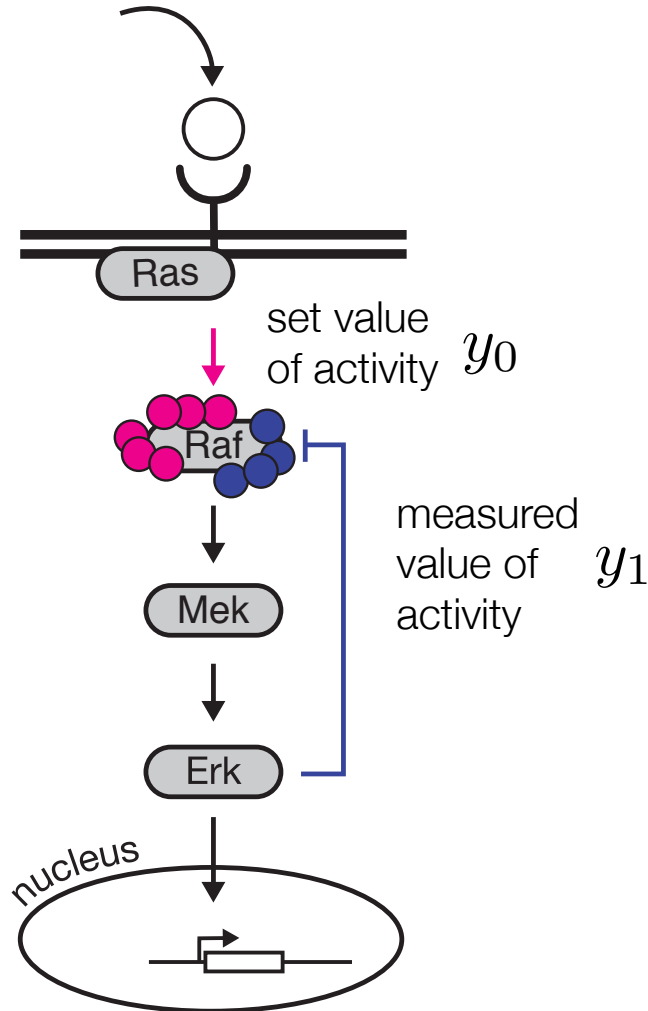


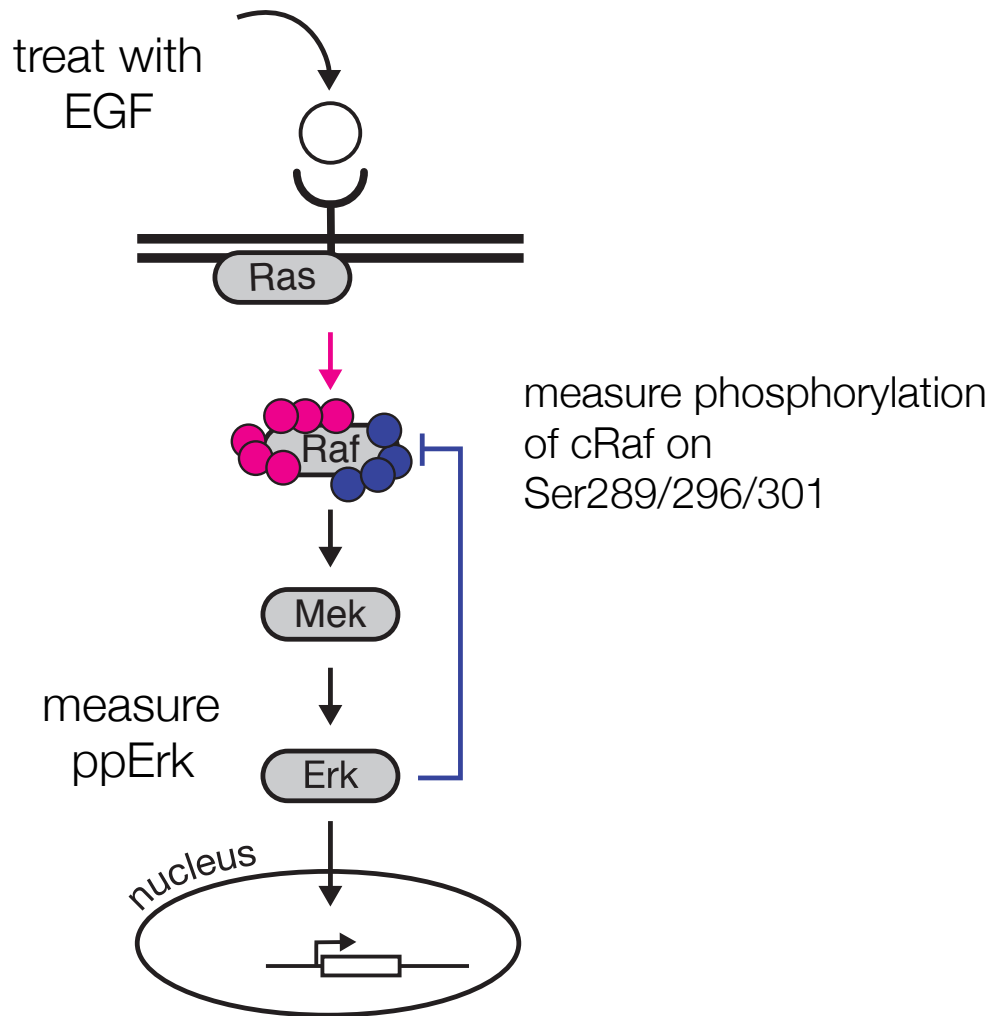
# Control of Erk activity

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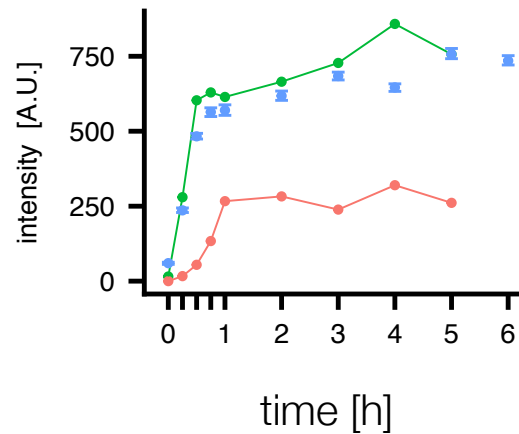
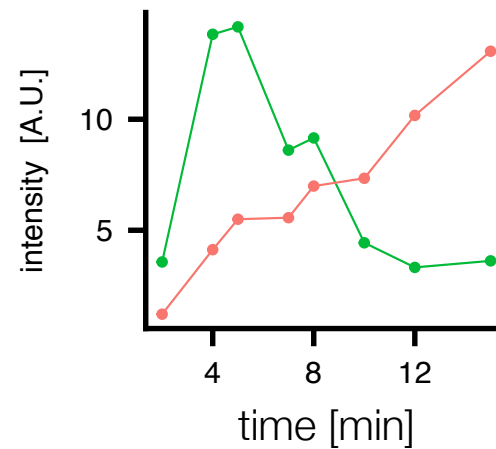
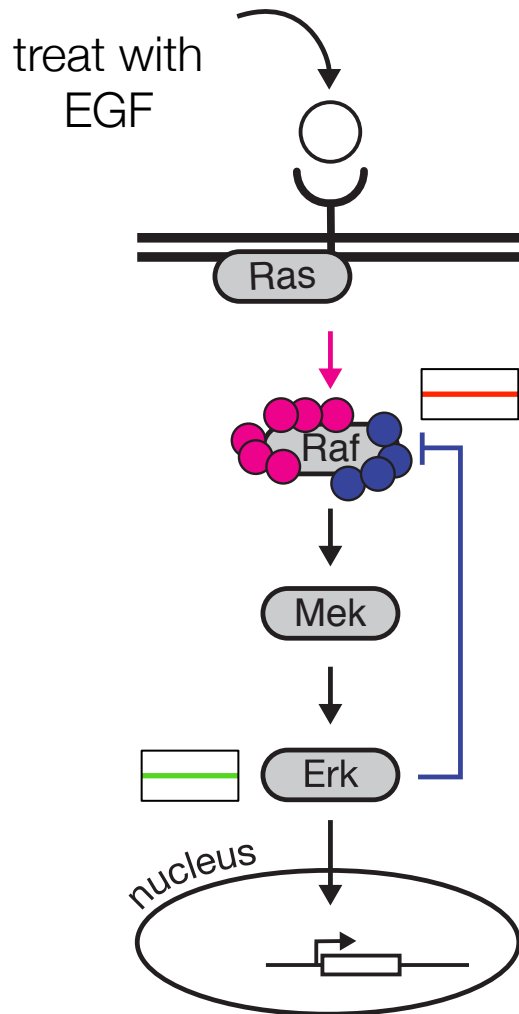


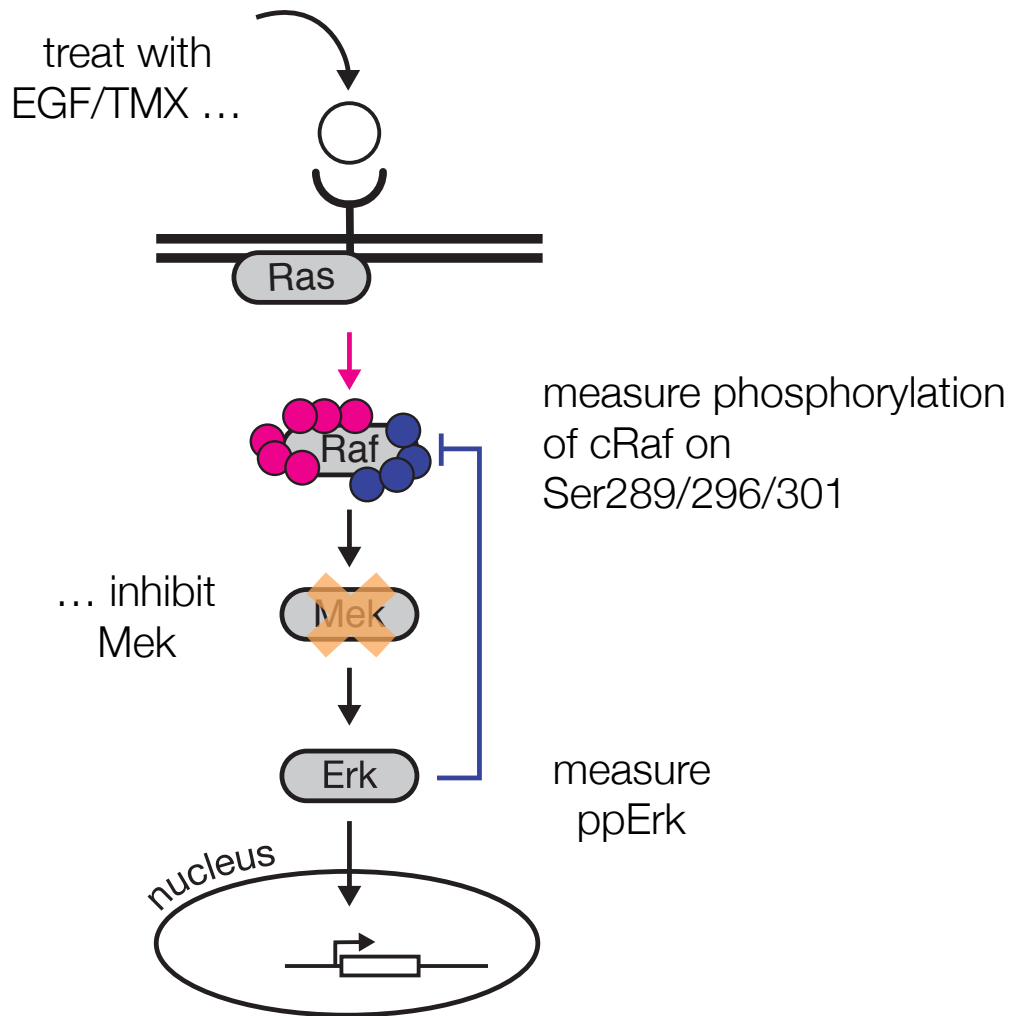
# Raf as integrating unit

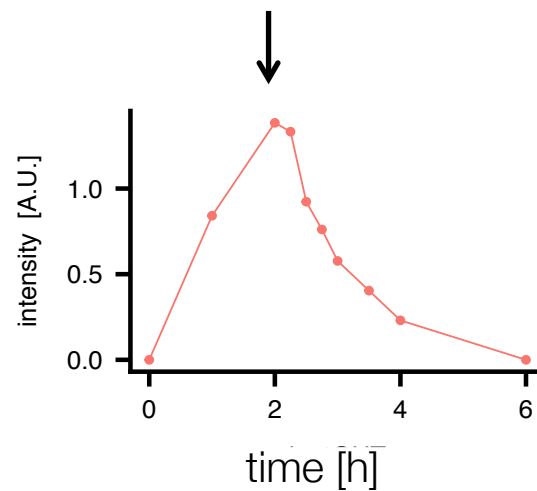
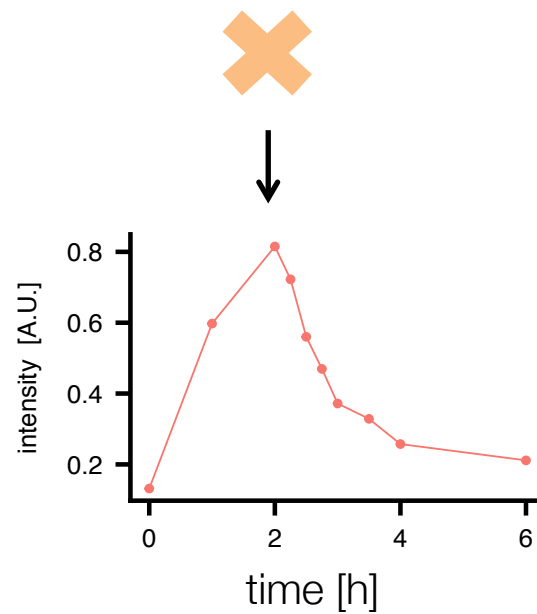
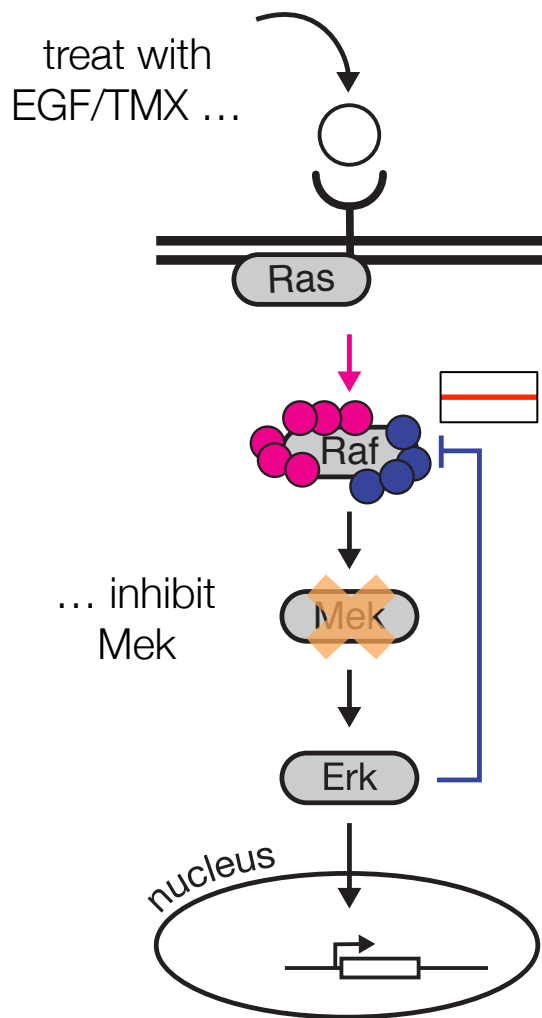


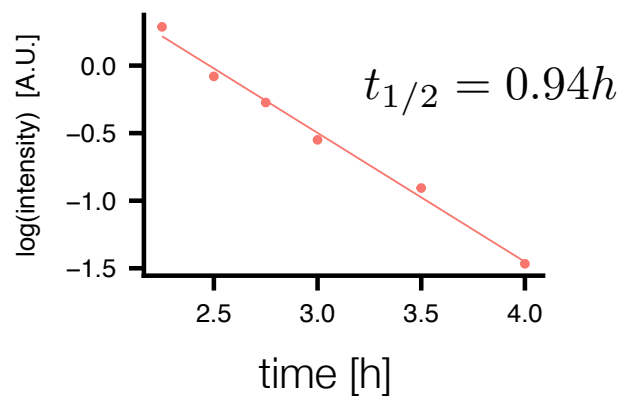
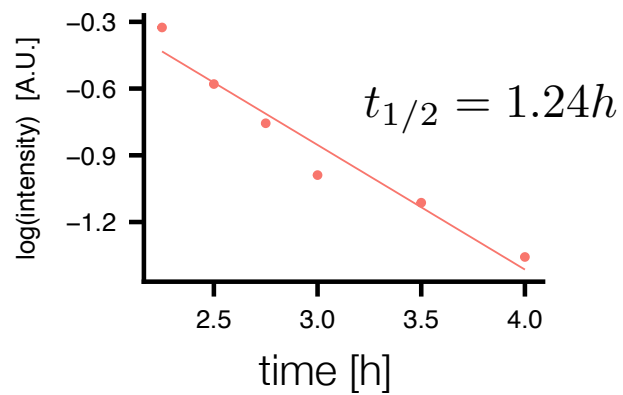
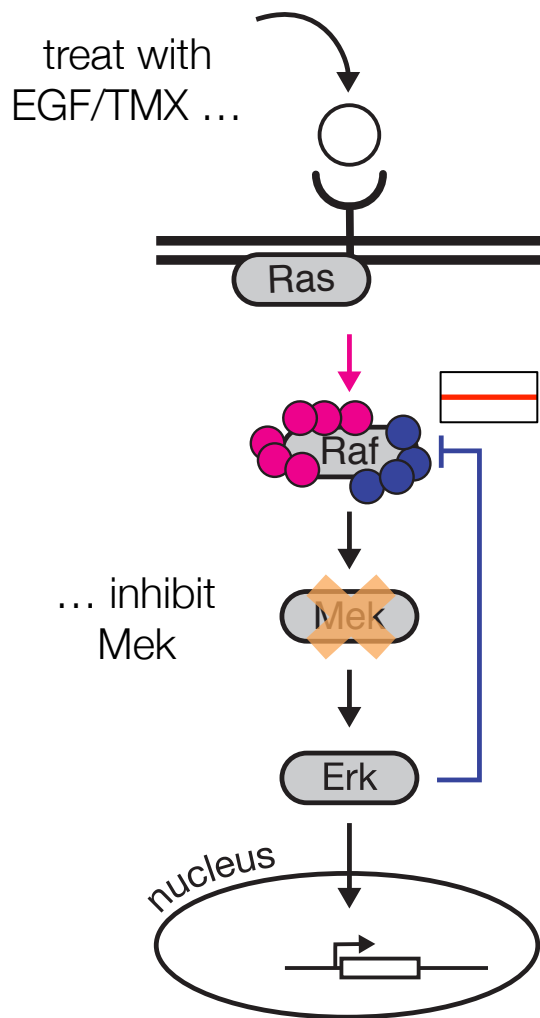


# Accumulation of negative phospho marks on cRaf









# Take home message

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- Strong robustness of MAPK signaling to perturbations in expression levels of Erk
- Integral feedback might establish this robustness