

# Static and dynamic loops form AP-1 bound activation hubs during macrophage development

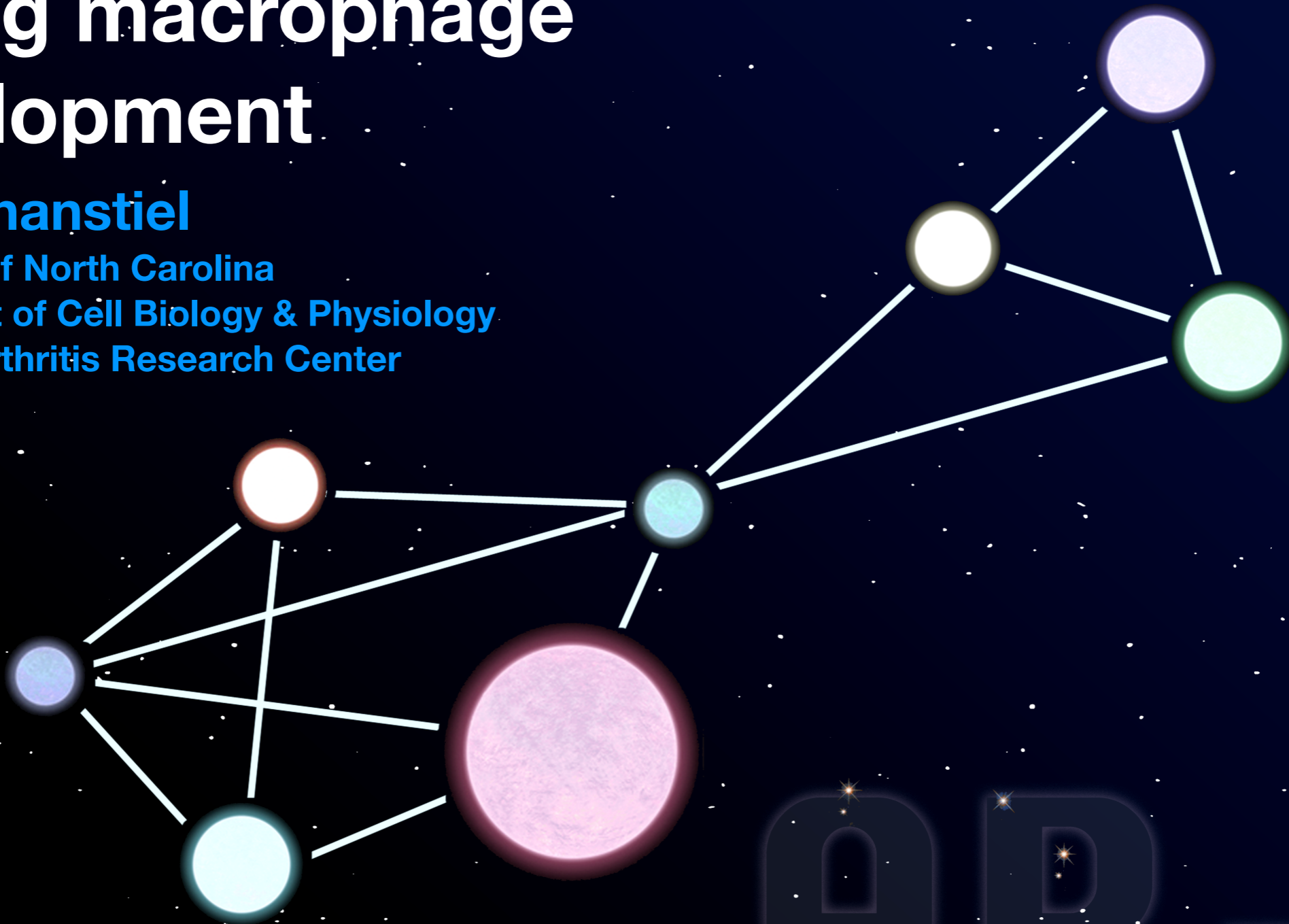
**Doug Phanstiel**

University of North Carolina

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08.11.2017

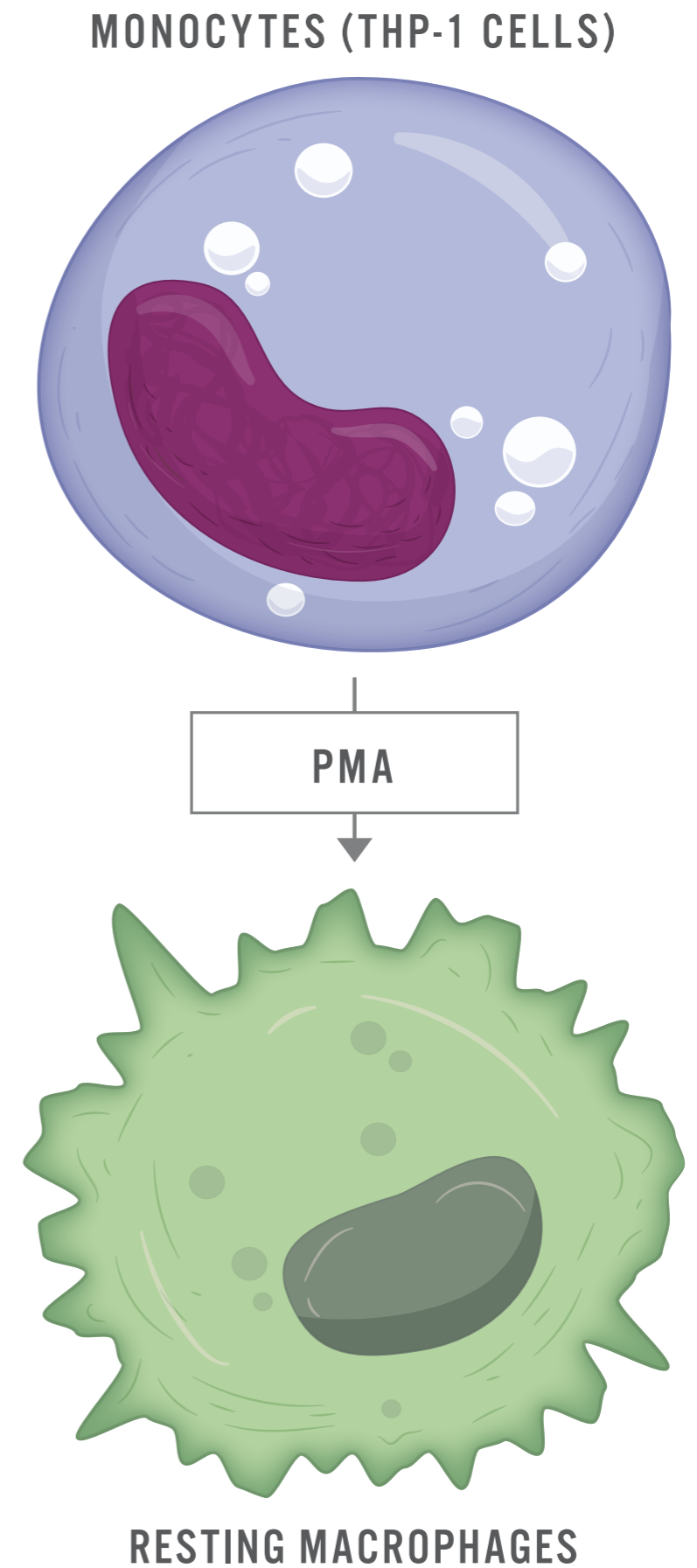


AP-1

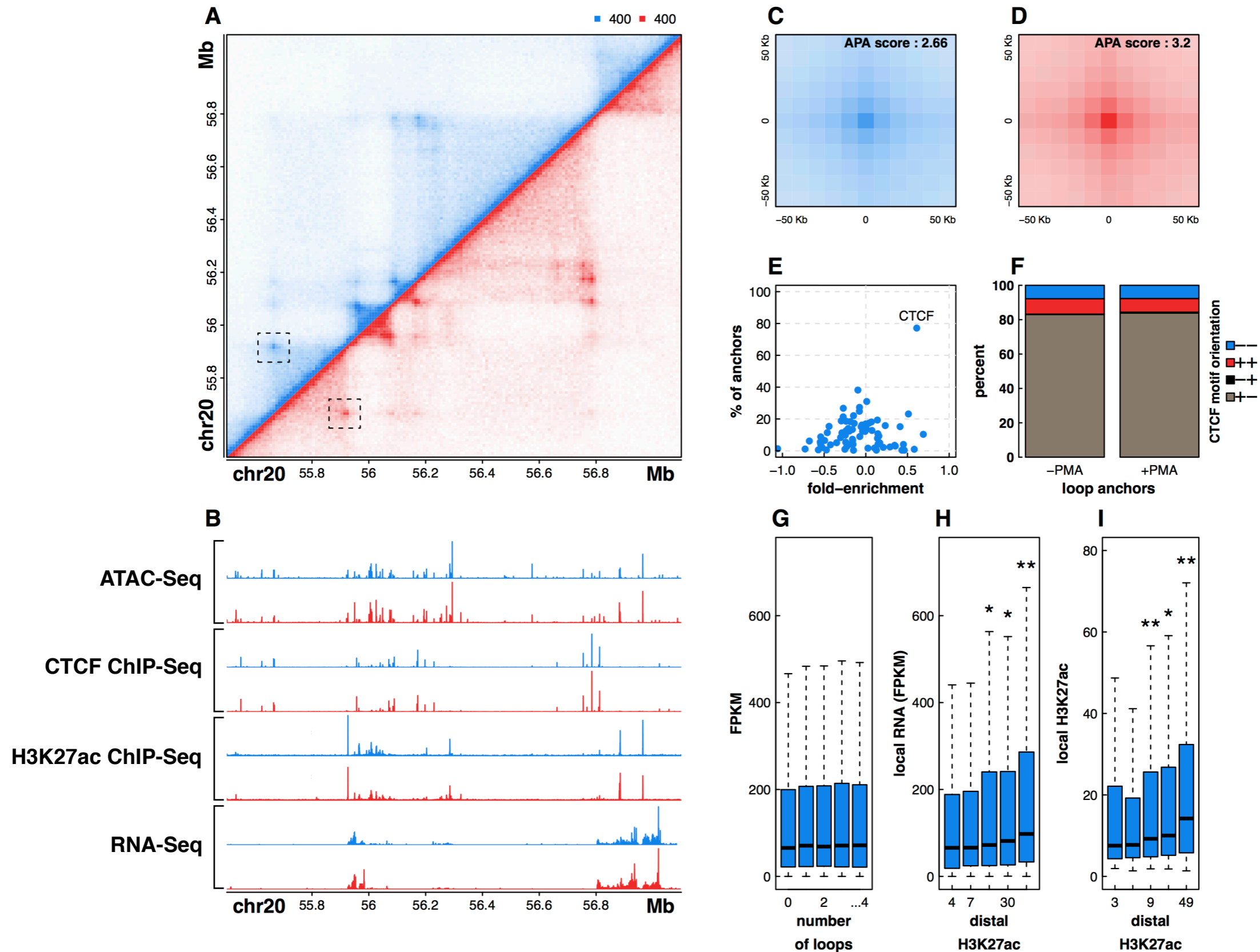
# Part 1

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High resolution map of DNA loops during macrophage development



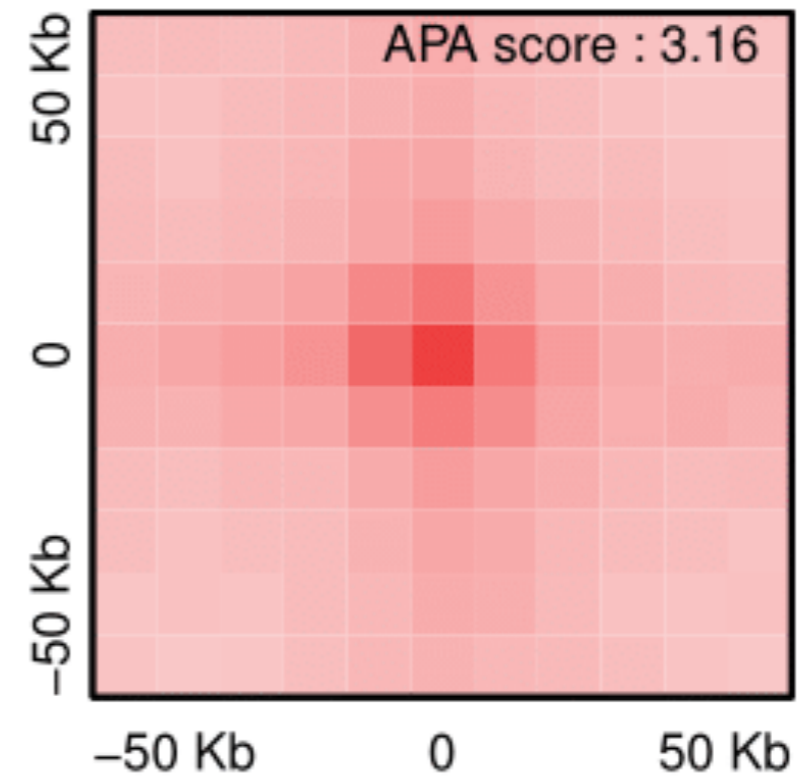
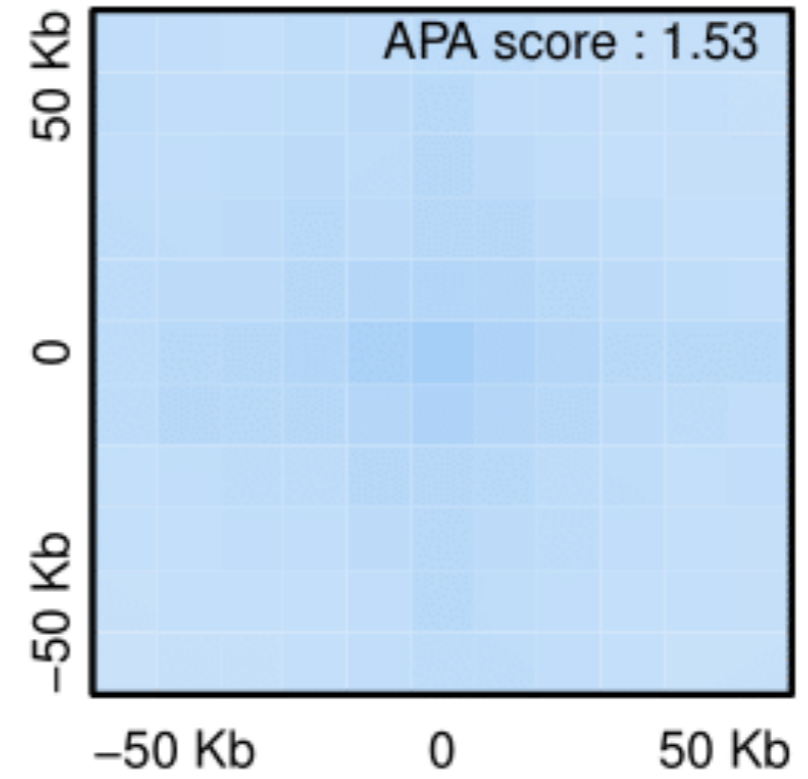
# High resolution map of 3D chromatin



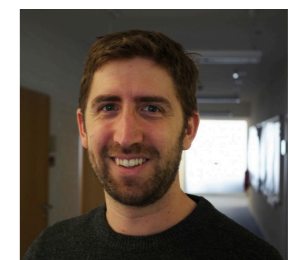
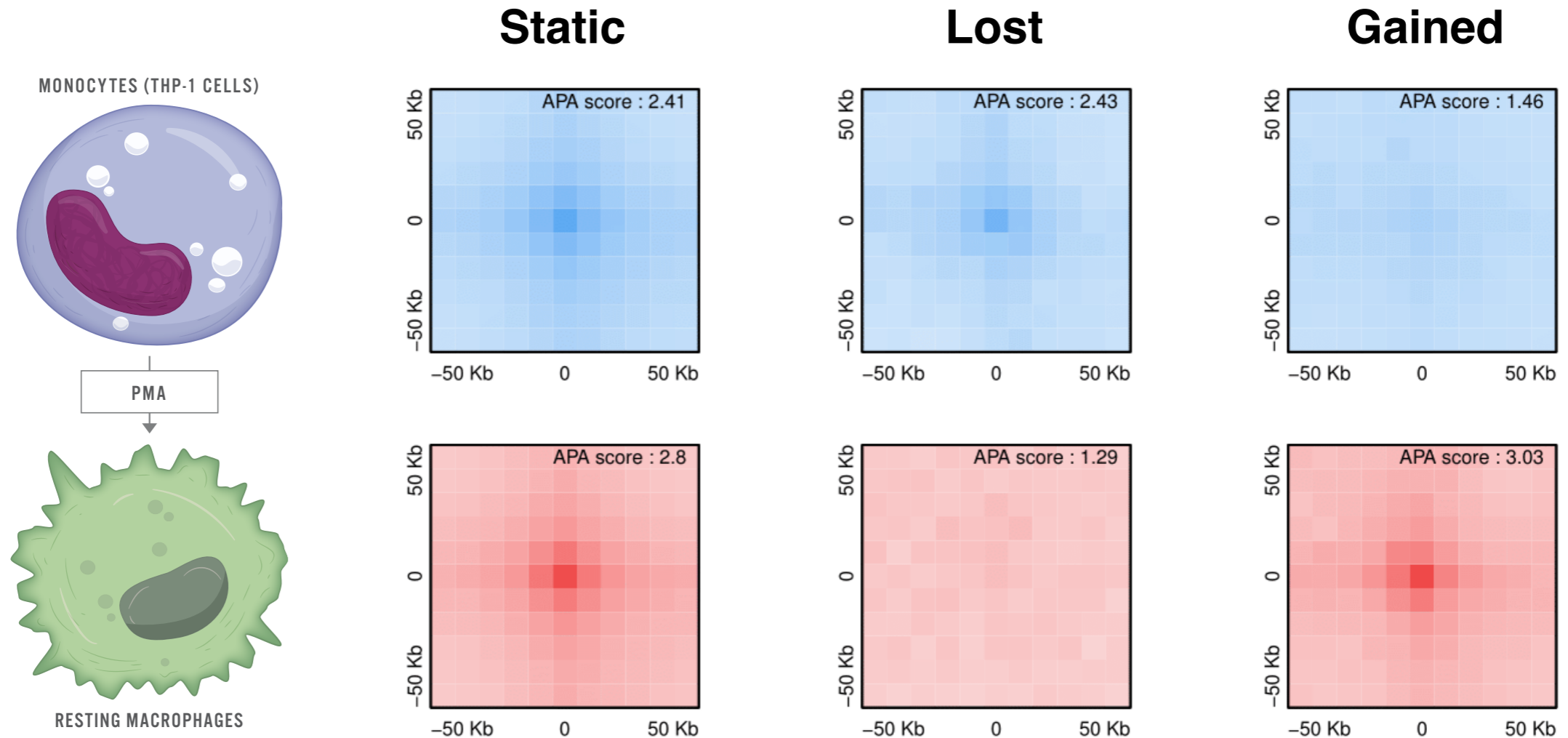
# Part 2

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Differential looping during macrophage development

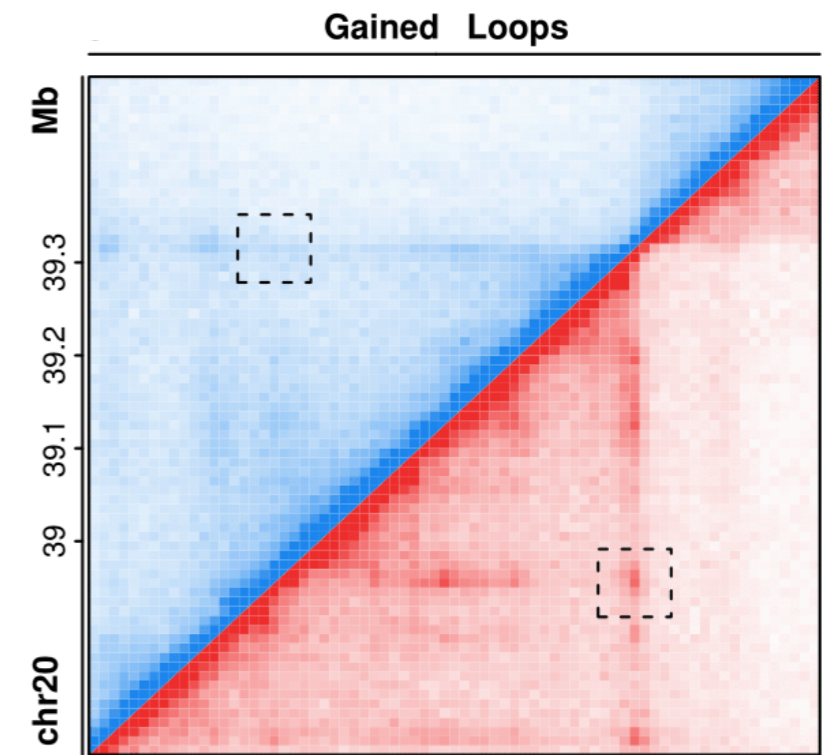
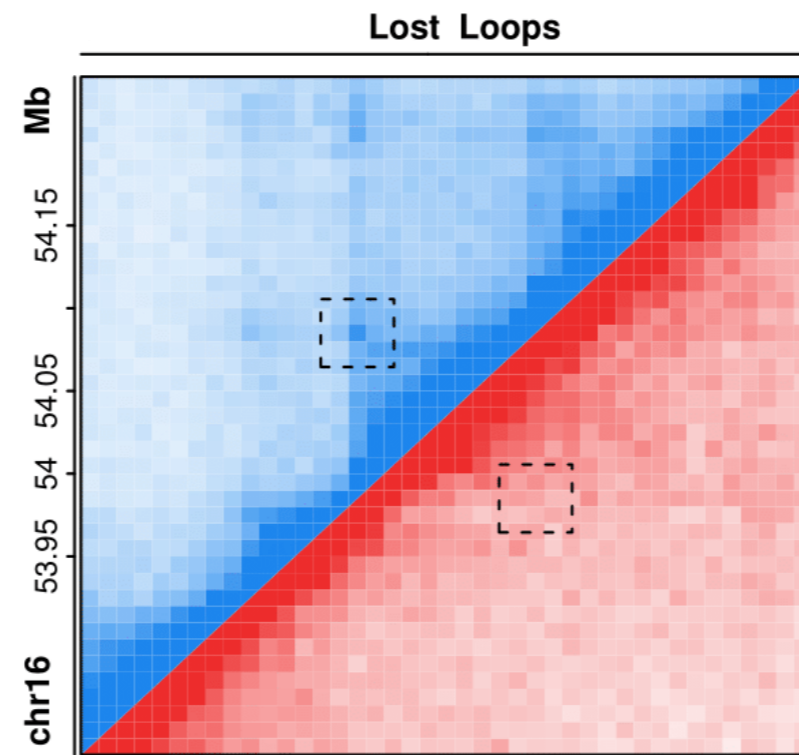
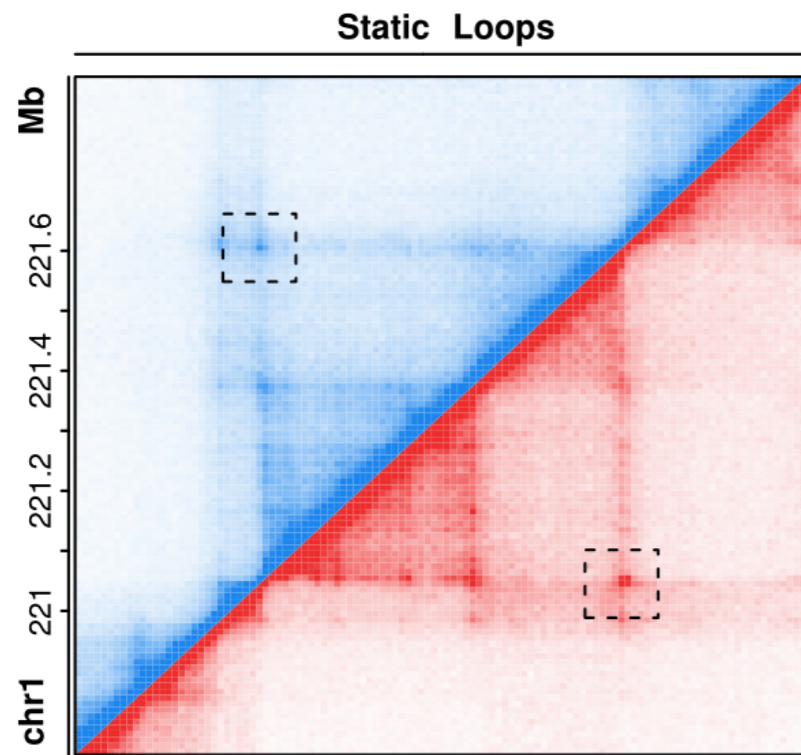


# Differential Loop Detection

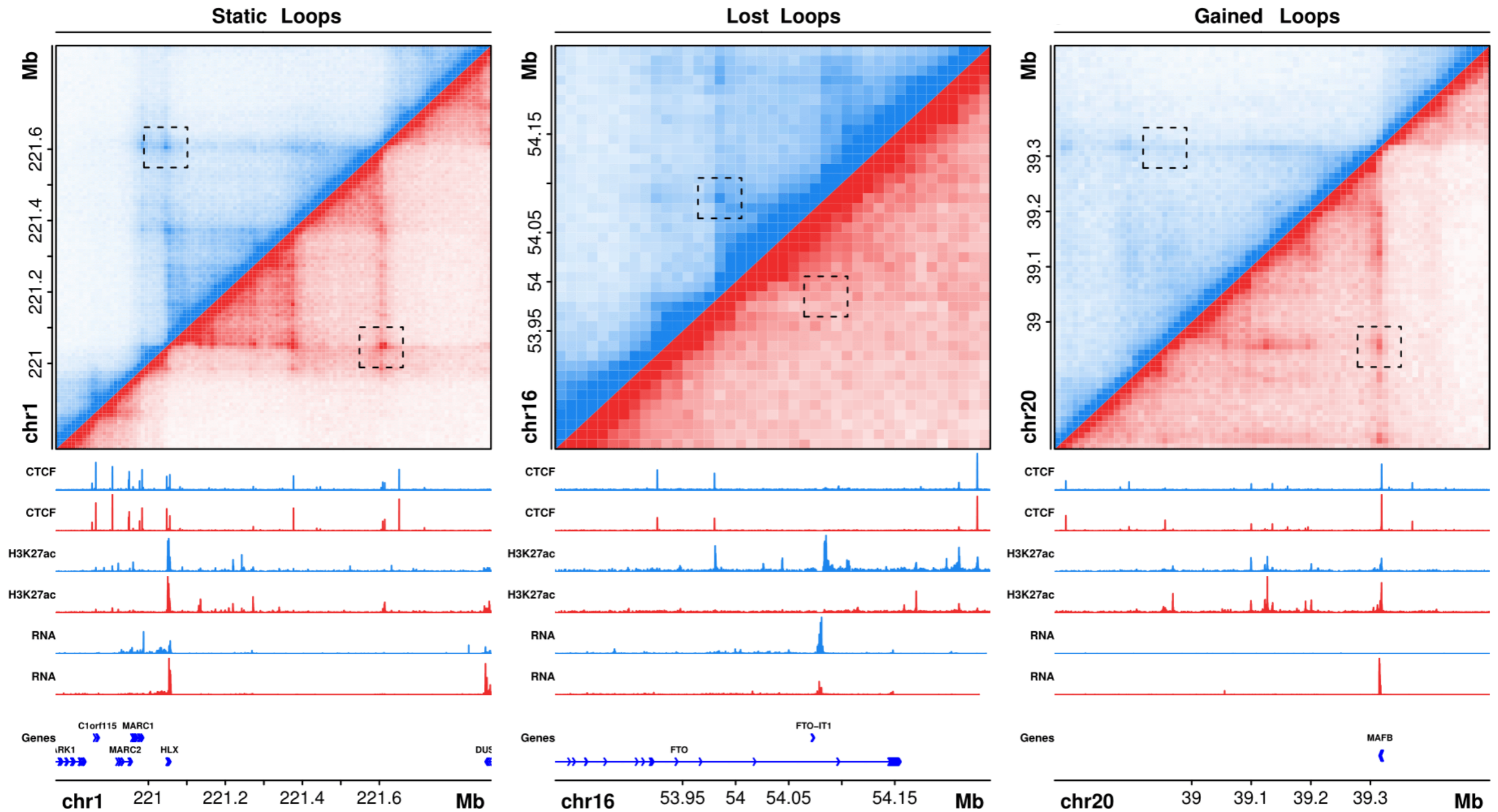


Mike Love

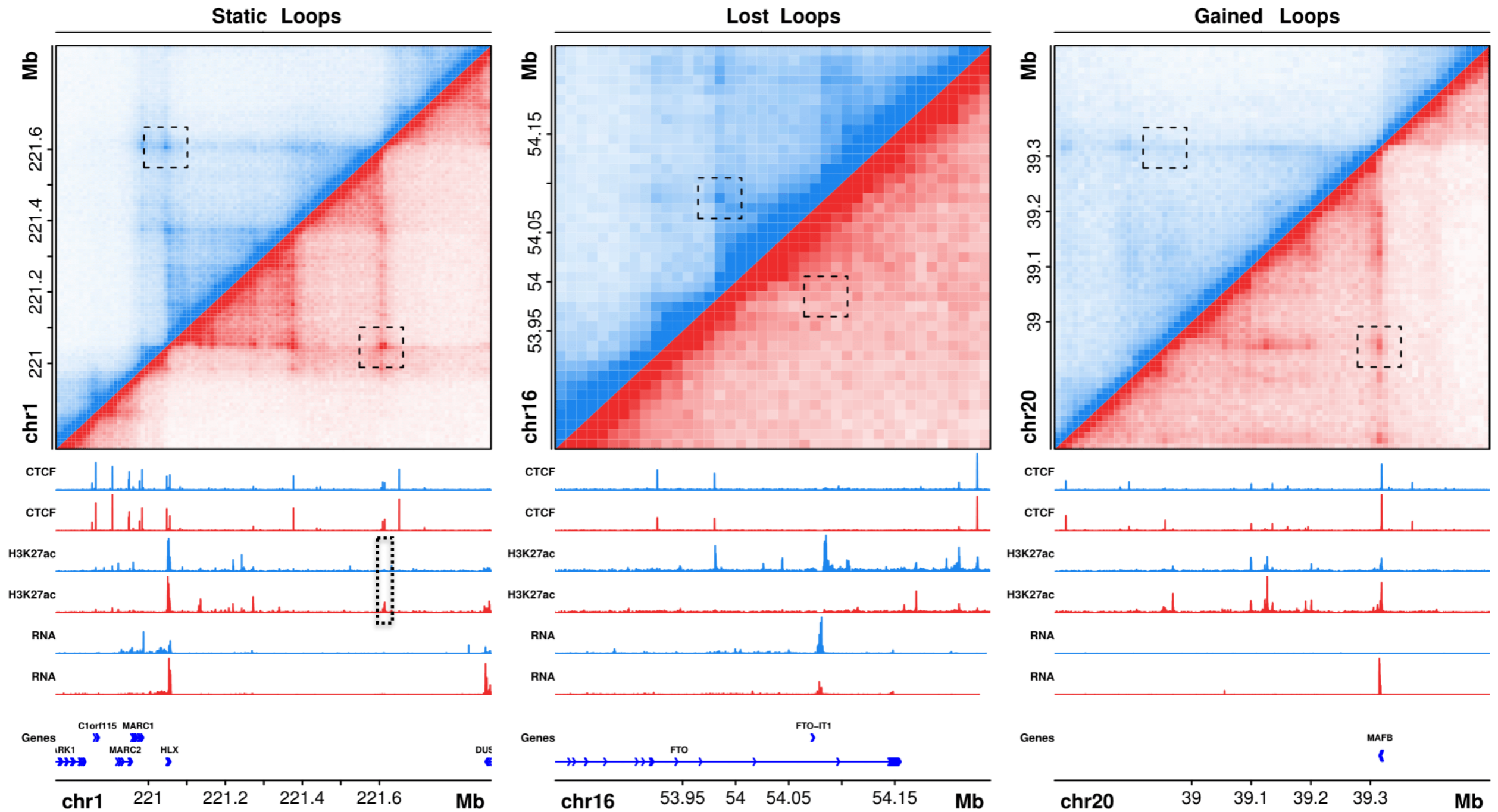
# Differential Loop Examples



# Differential Loop Examples

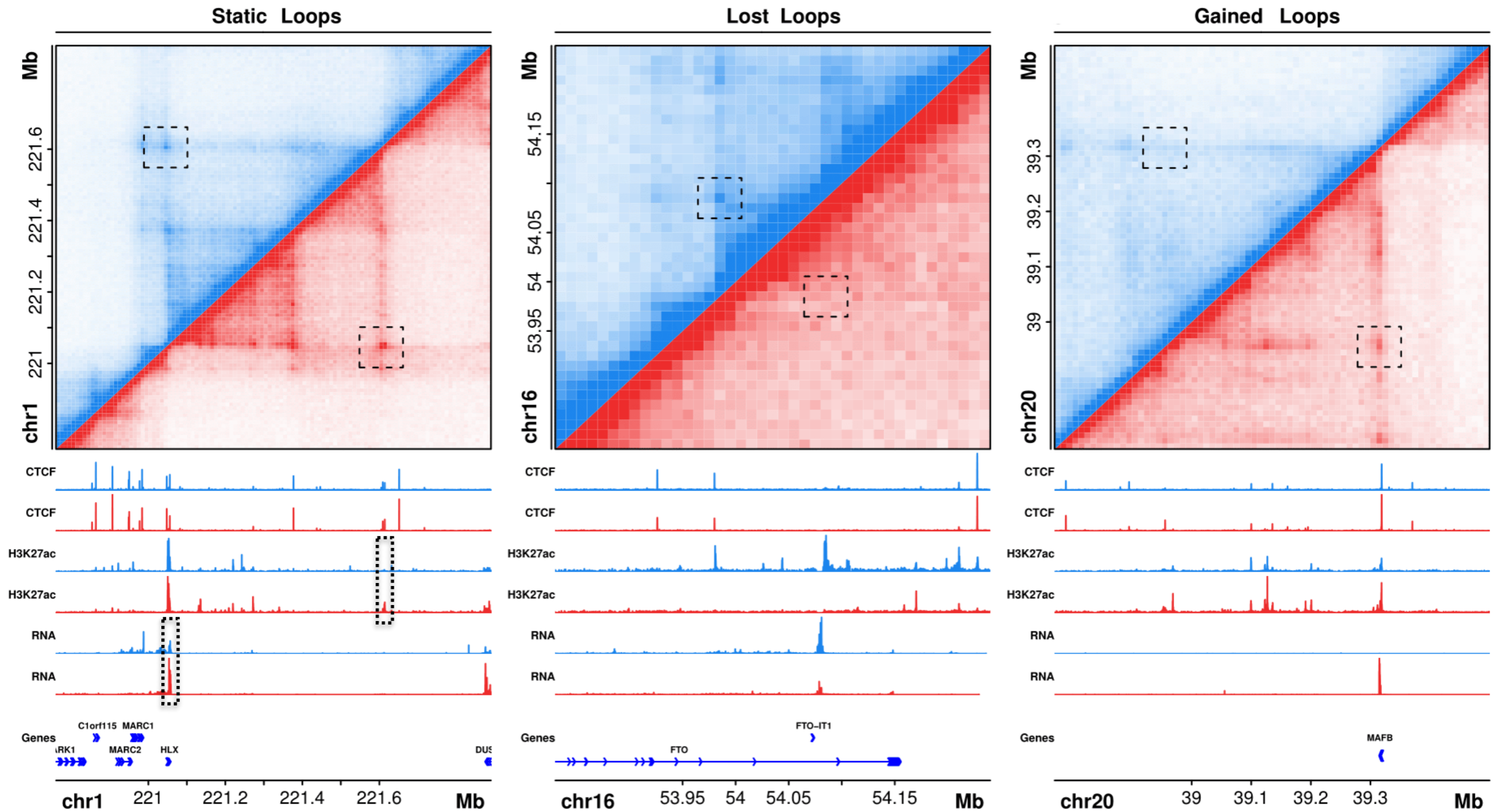


# Differential Loop Examples

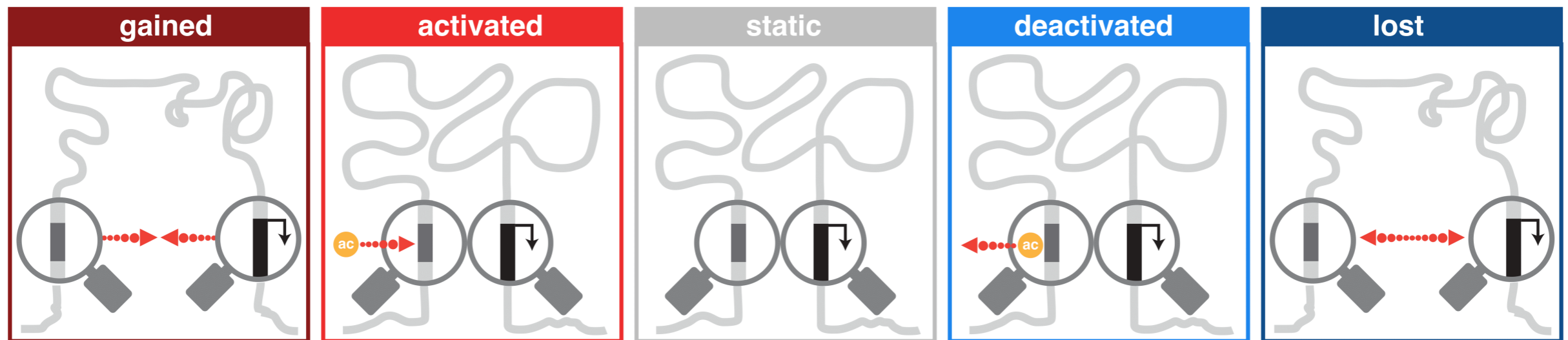




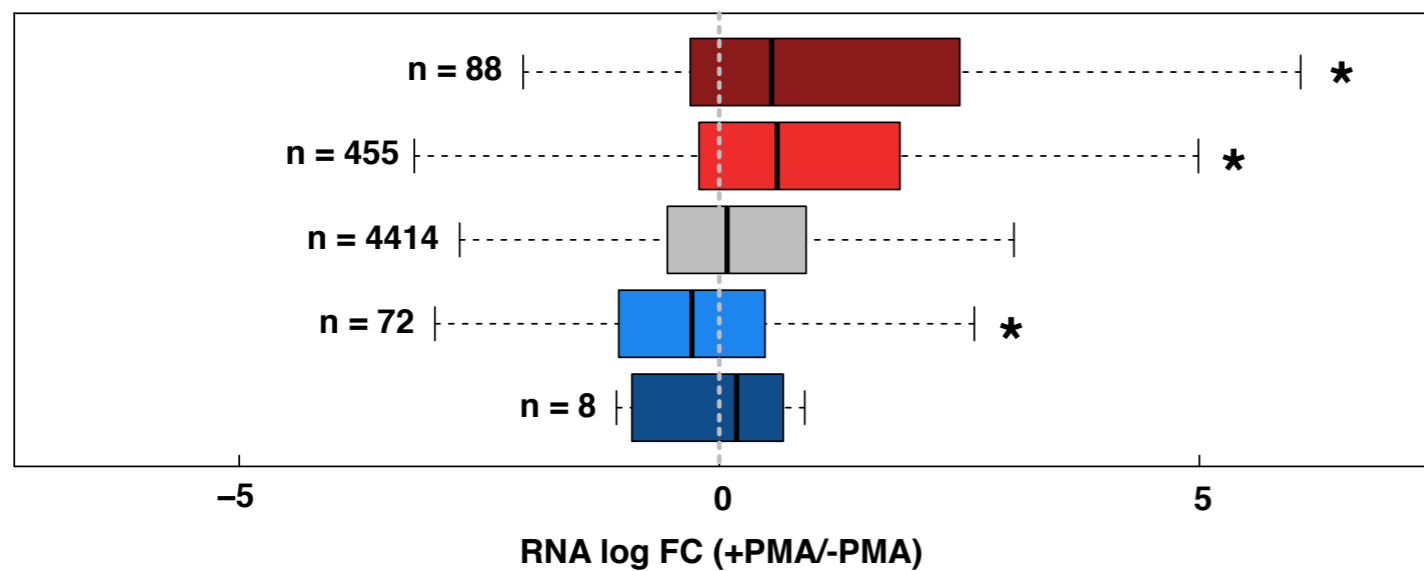
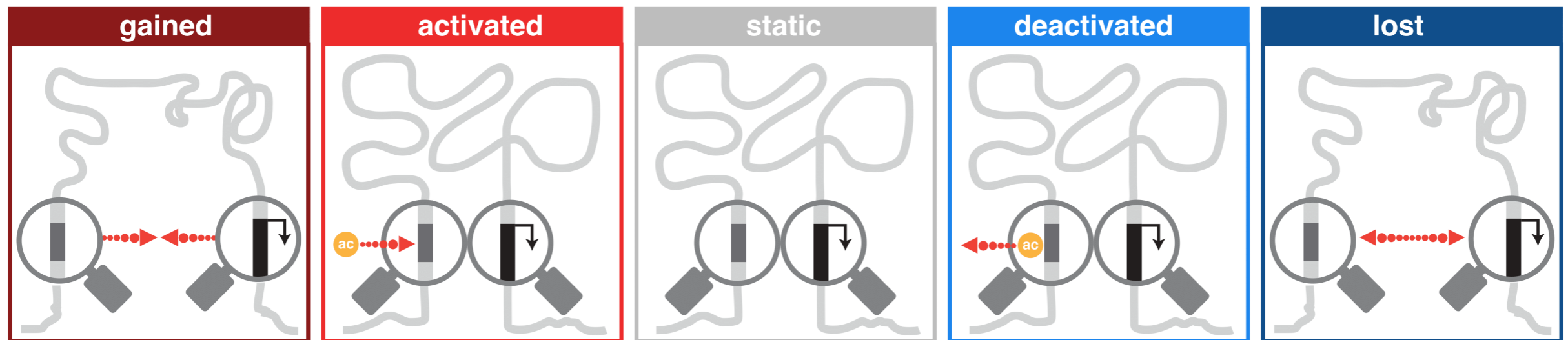
# Differential Loop Examples



# Five classes of loops



# Five classes of loops



Gained

Activated

Static

Deactivated

Lost

~ DNA

■ regulatory element

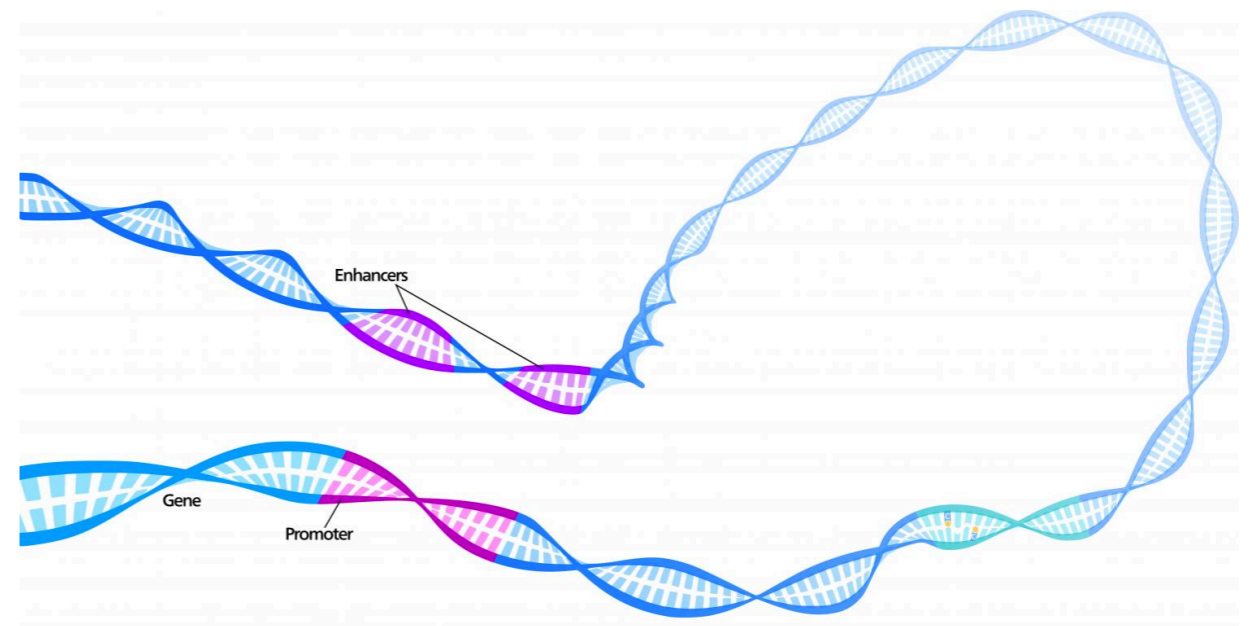
⤴ gene promoter

ac H3K27 acetylation

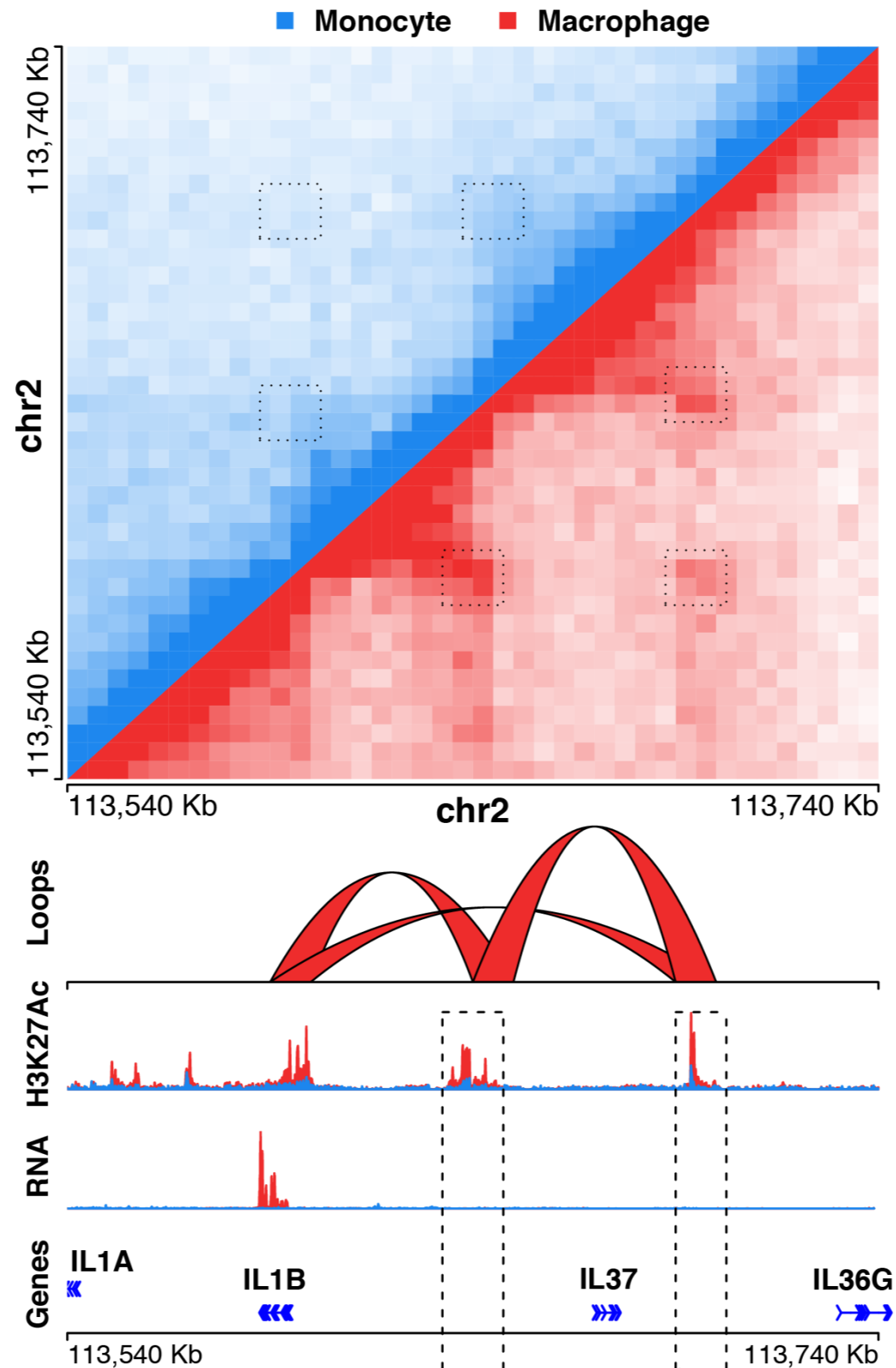
# Part 3

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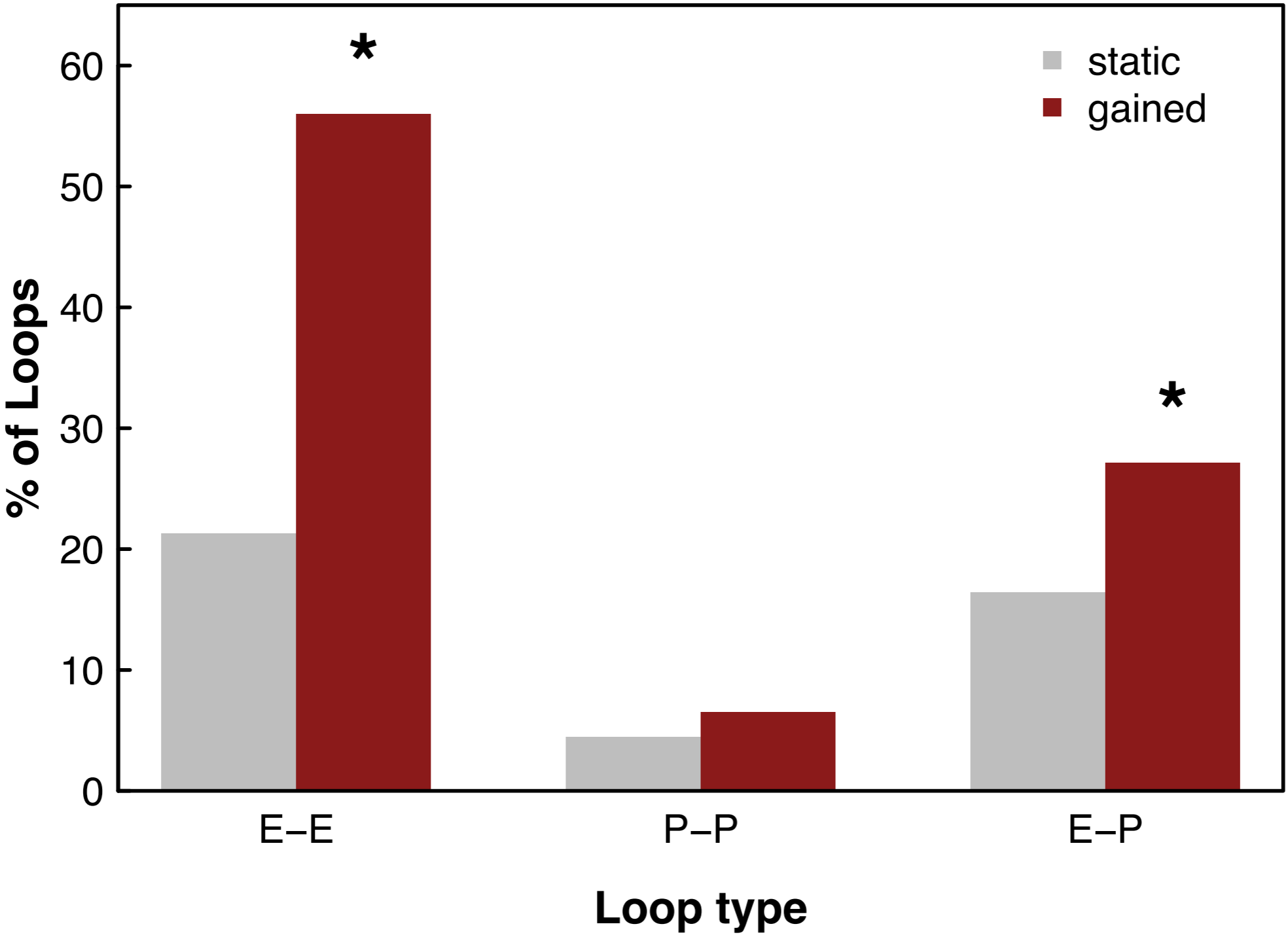
## Enhancer-bound loops



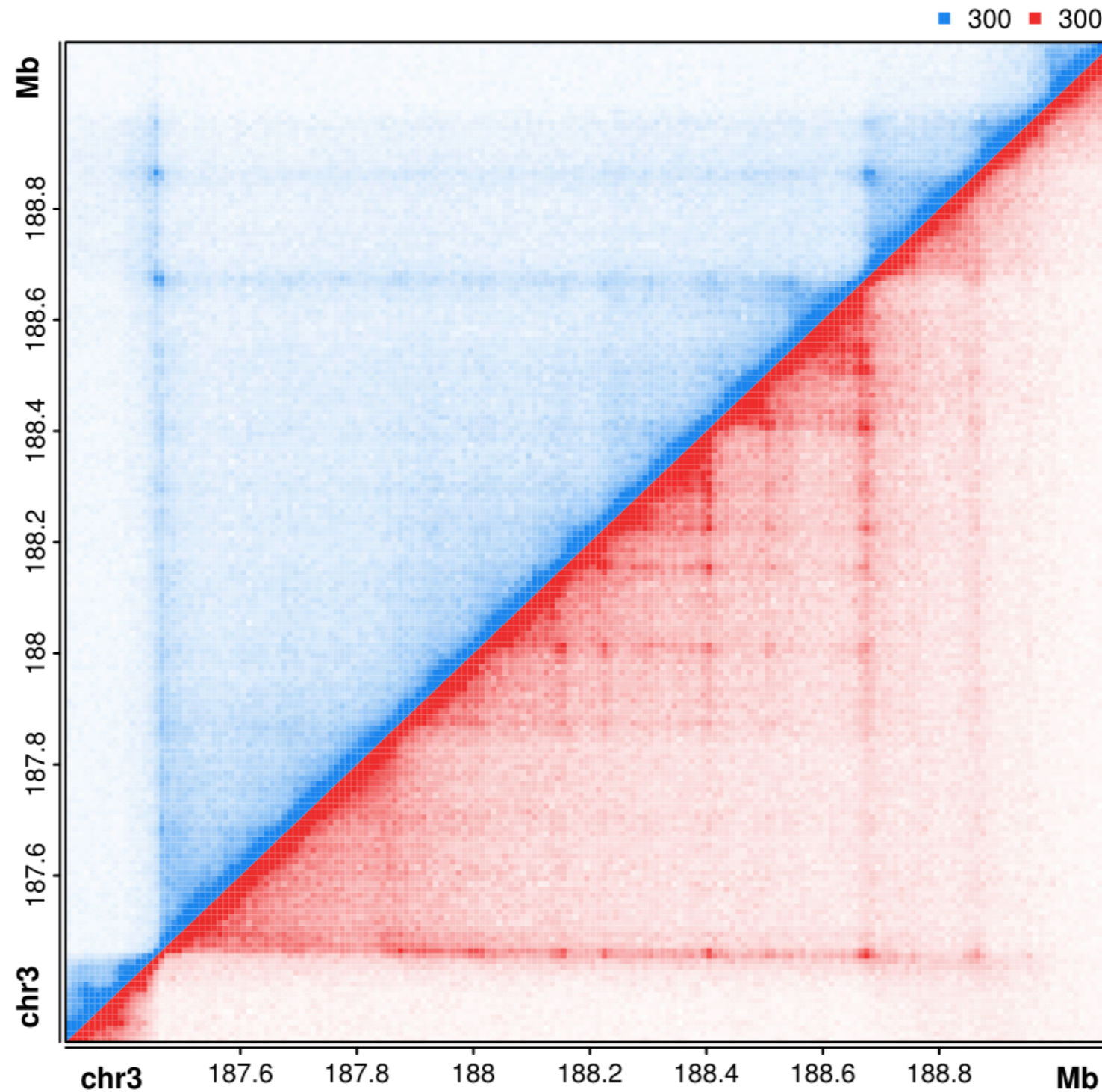
# Gained loops connect H3K27ac peaks



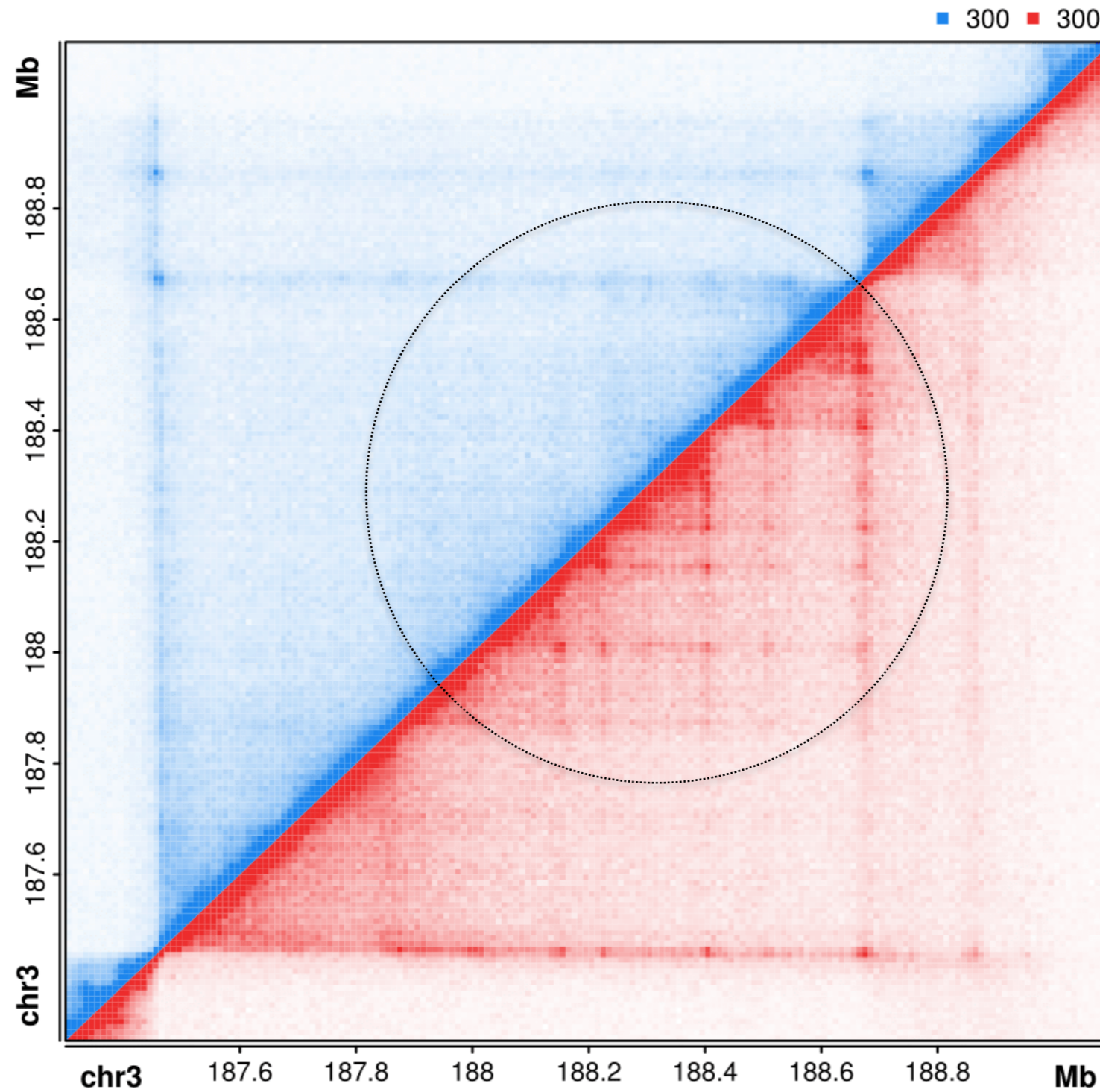
# Gained loops connect enhancers to enhancers?



# What if we had multi-loop hubs?

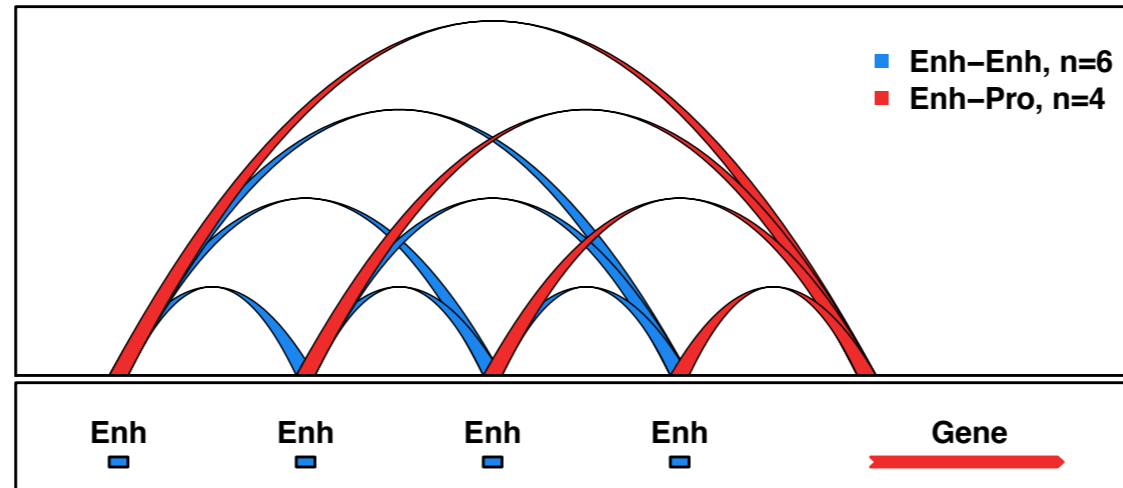


# What if we had multi-loop hubs?

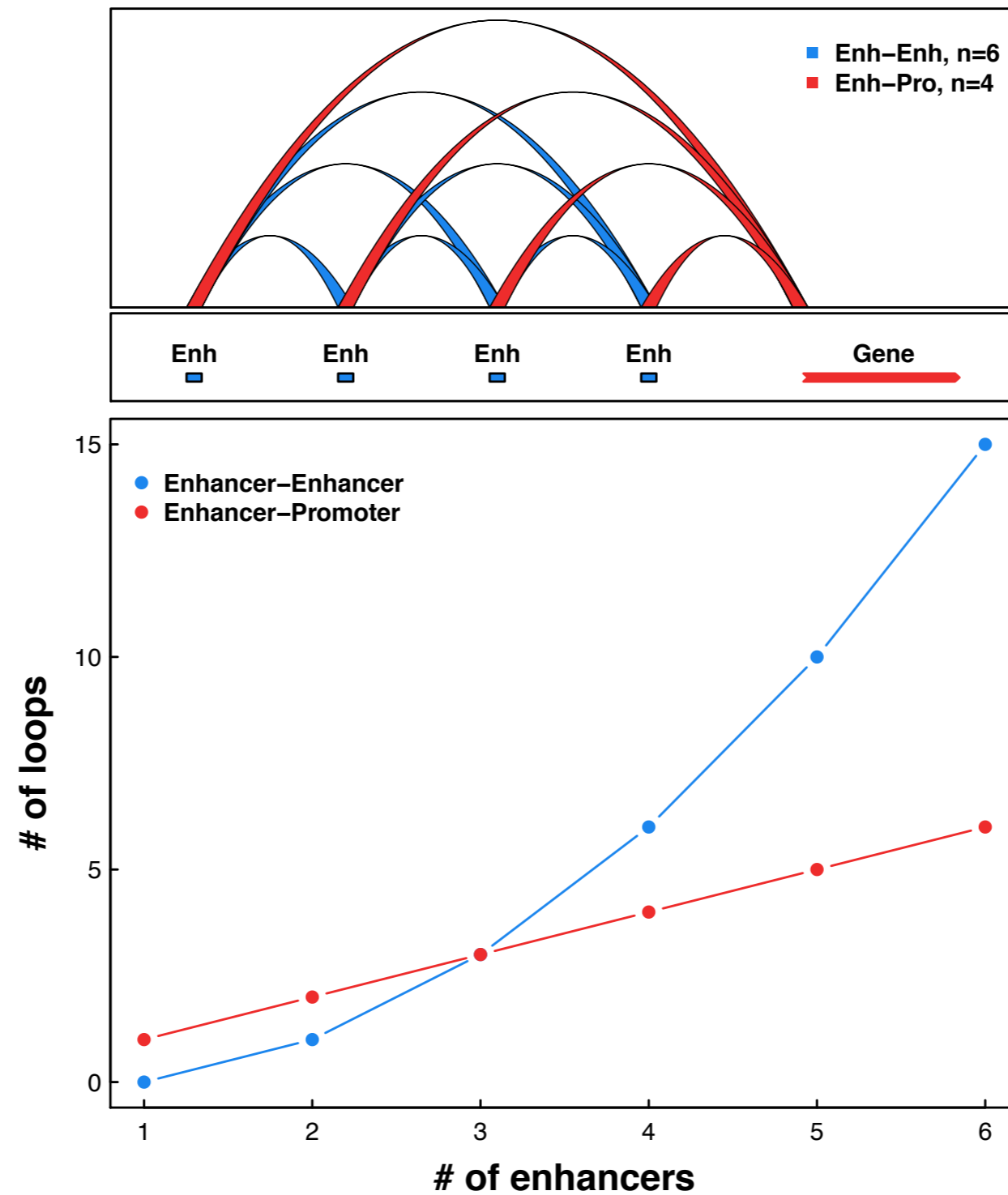




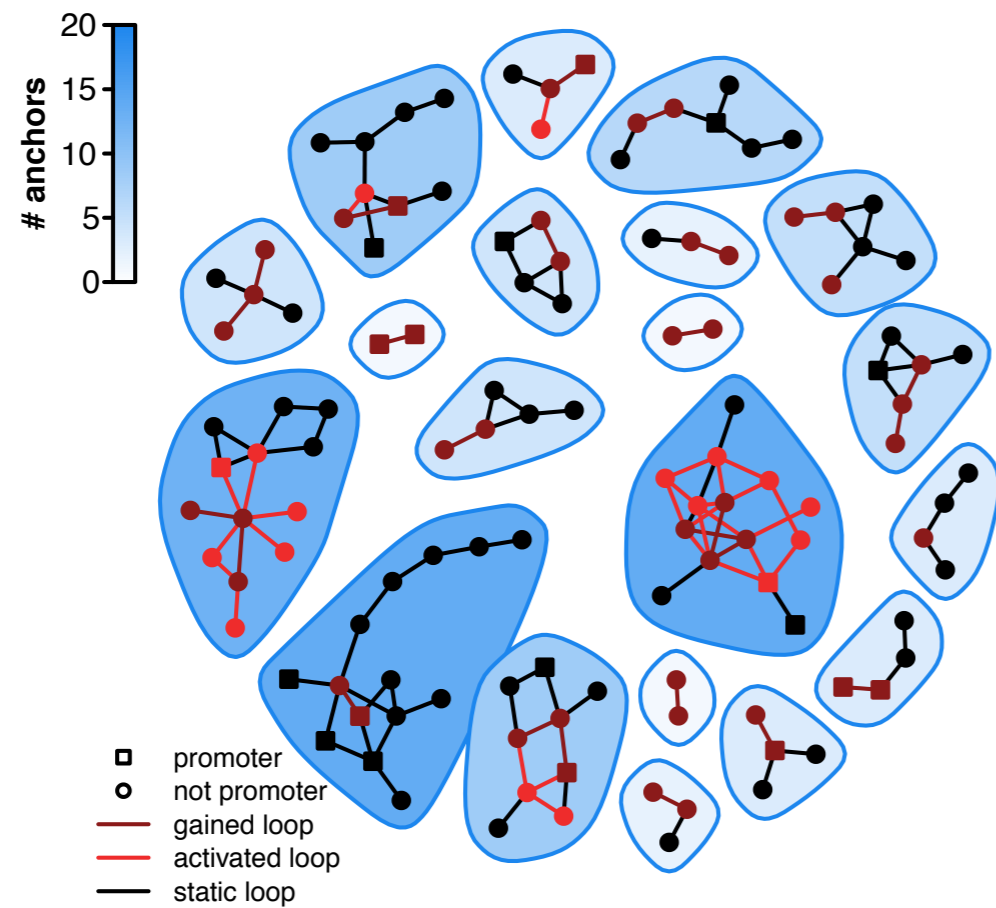
# Multi-loop hubs could explain Enh-Enh loops



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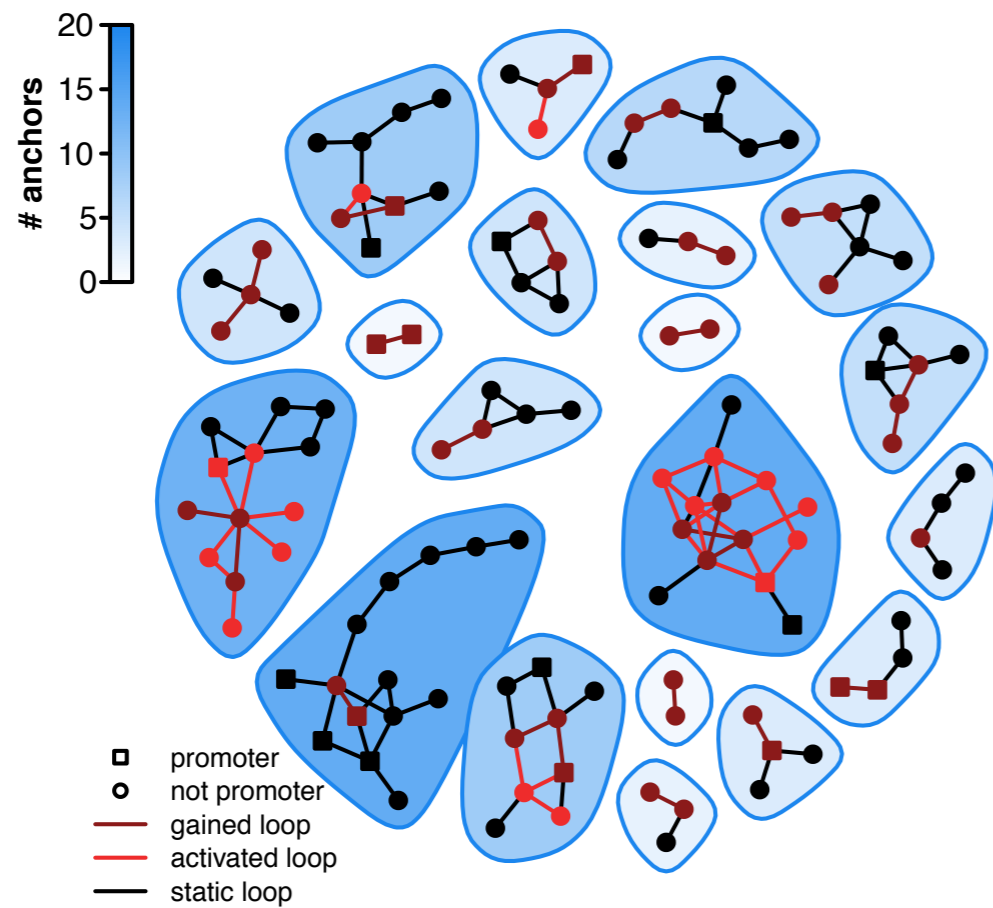


# Communities with gained loops have more members

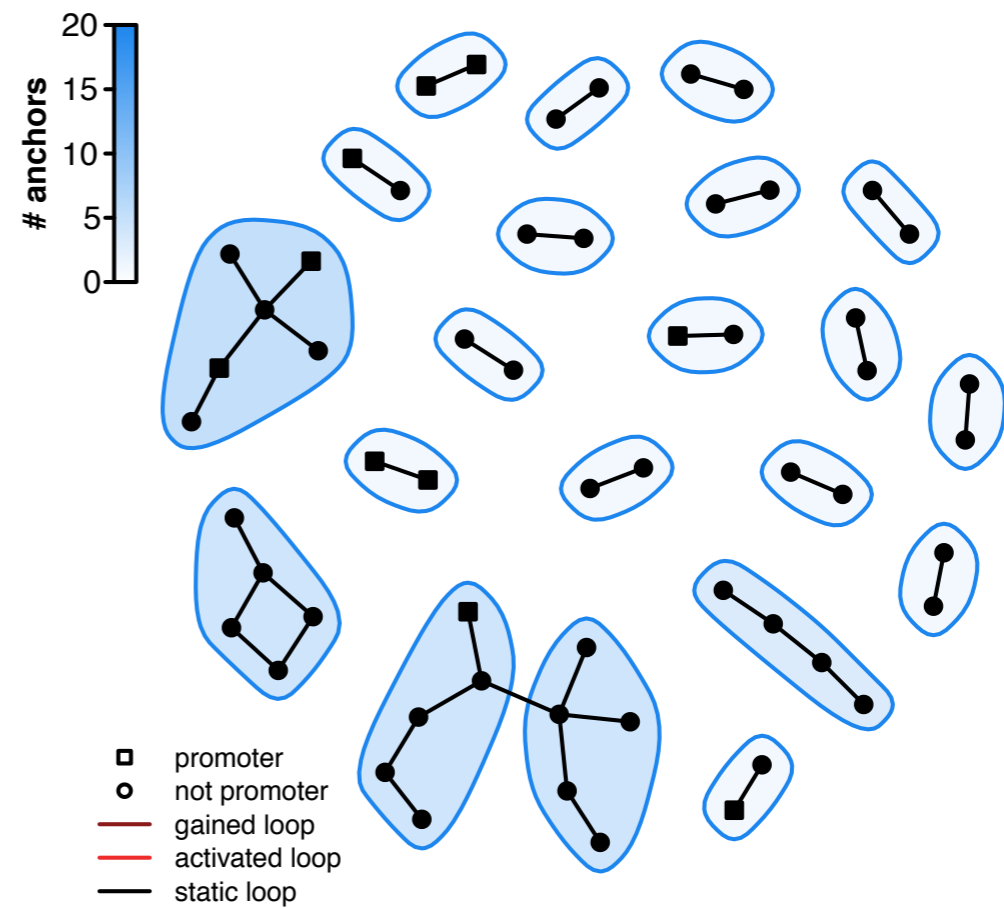


**communities containing gained loop**

# Communities with gained loops have more members

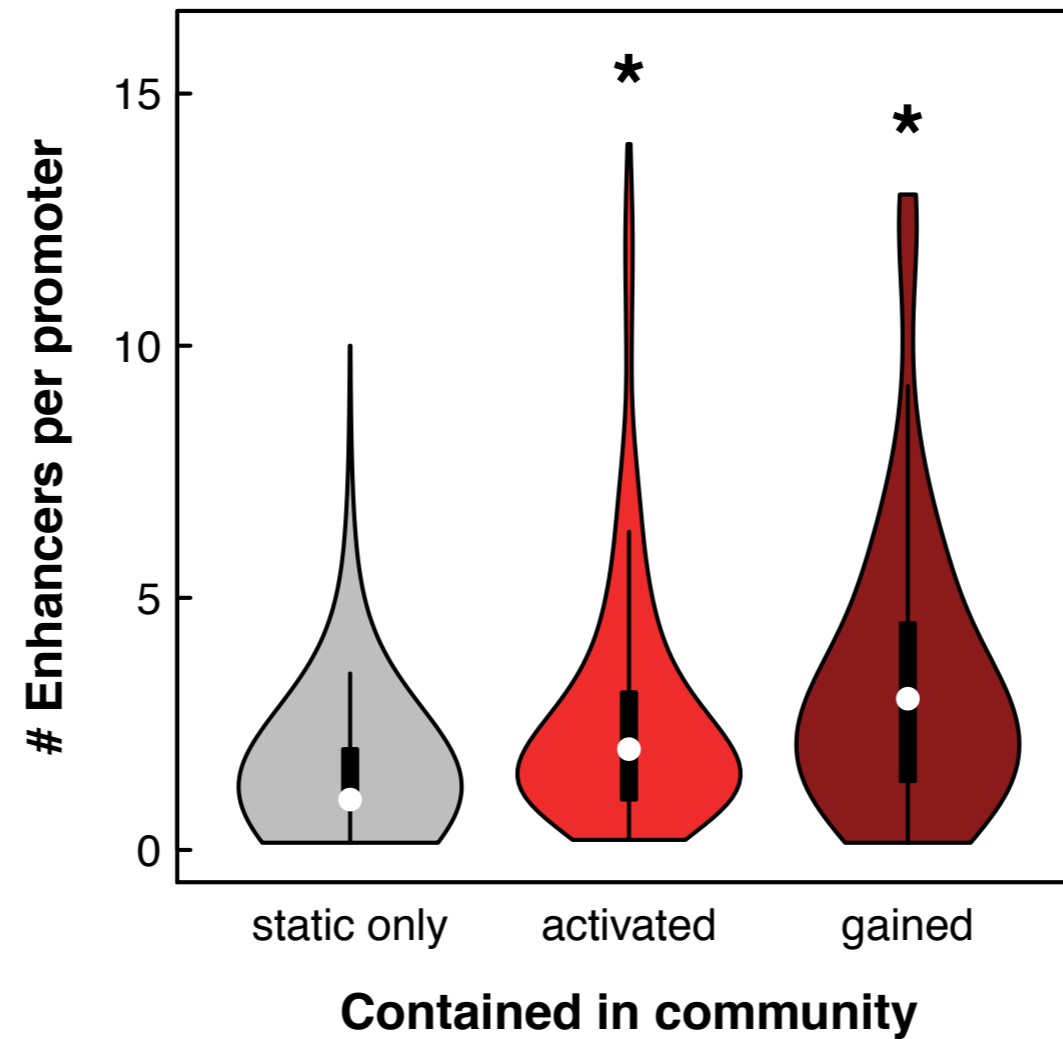


**communities containing gained loop**

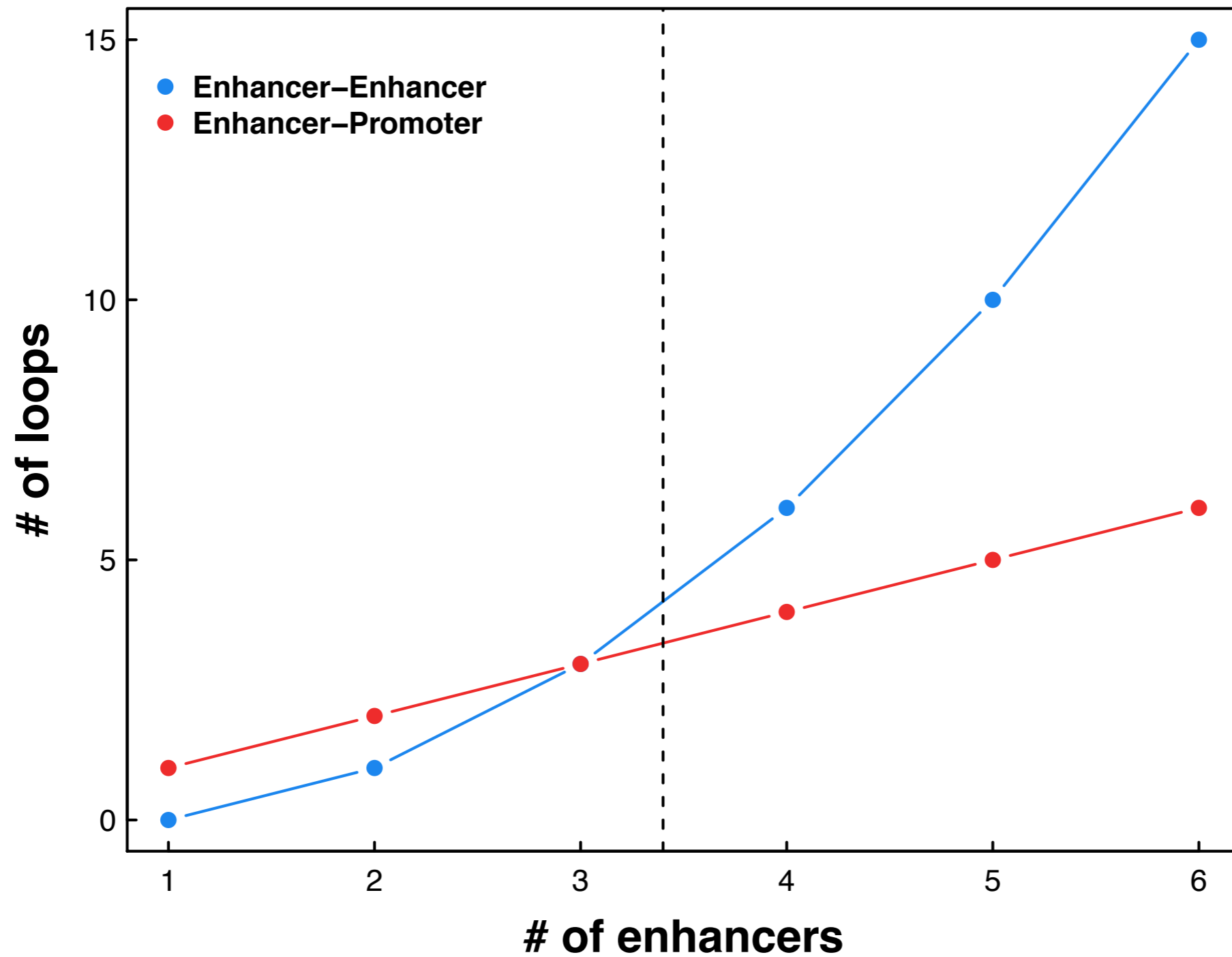


**communities lacking gained loop**

Communities w/gained loops have more enhancers per promoter



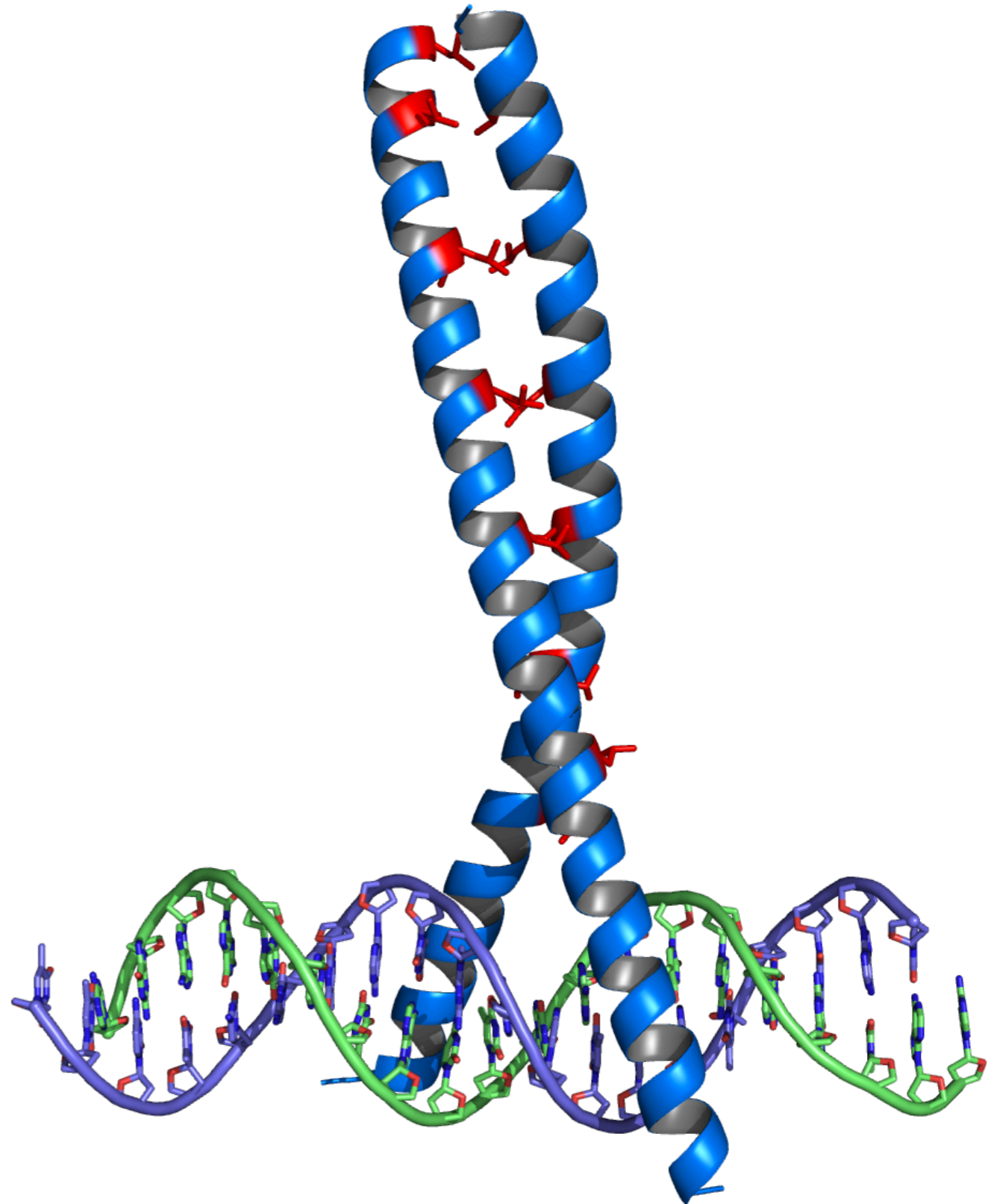
# Hubs explain Enh-Enh loops



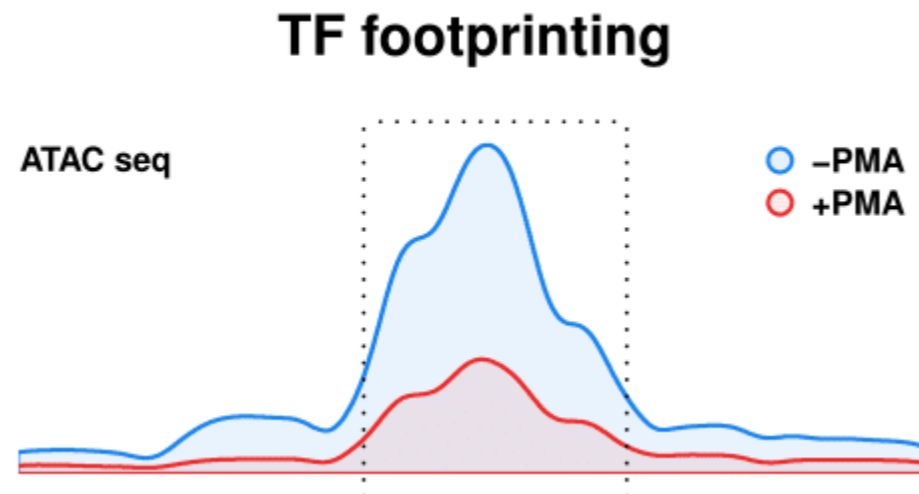
# Part 4

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TF enrichment at loop anchors

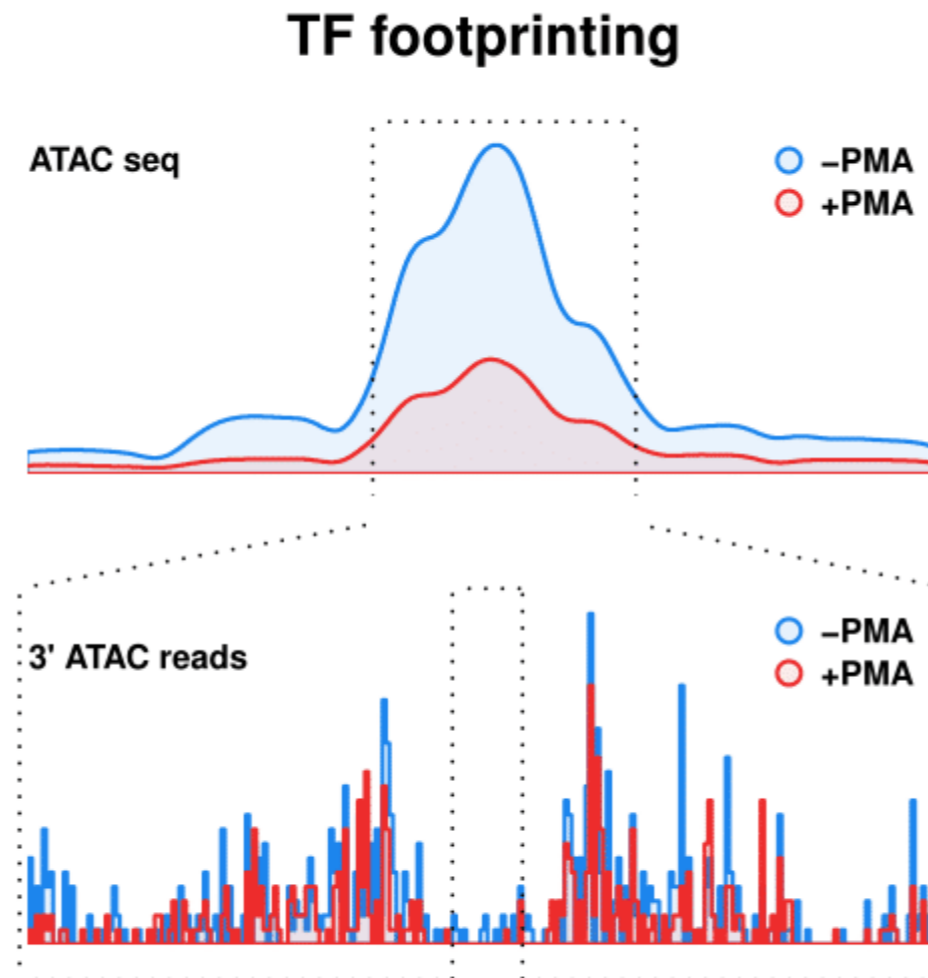


# TF footprinting

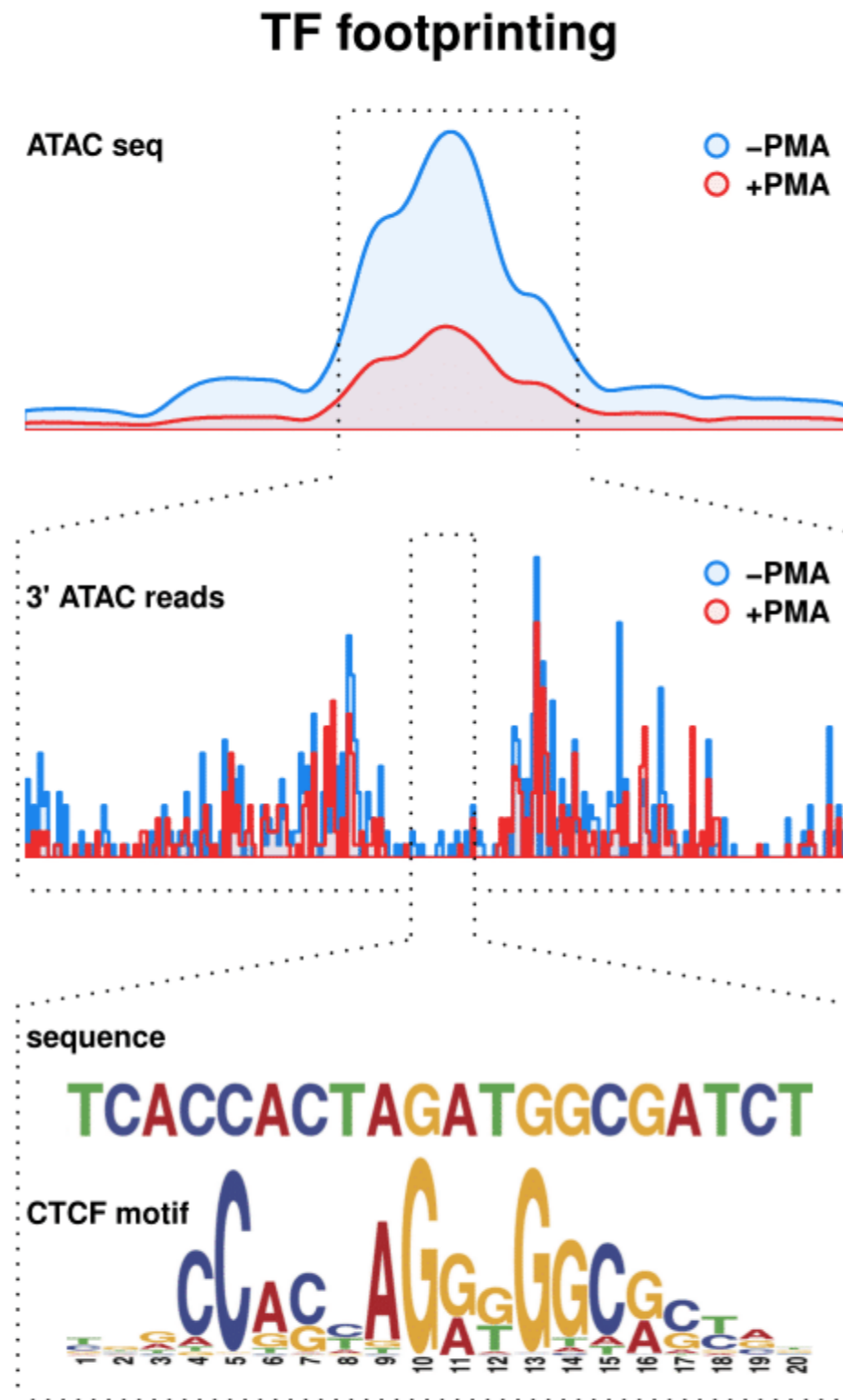




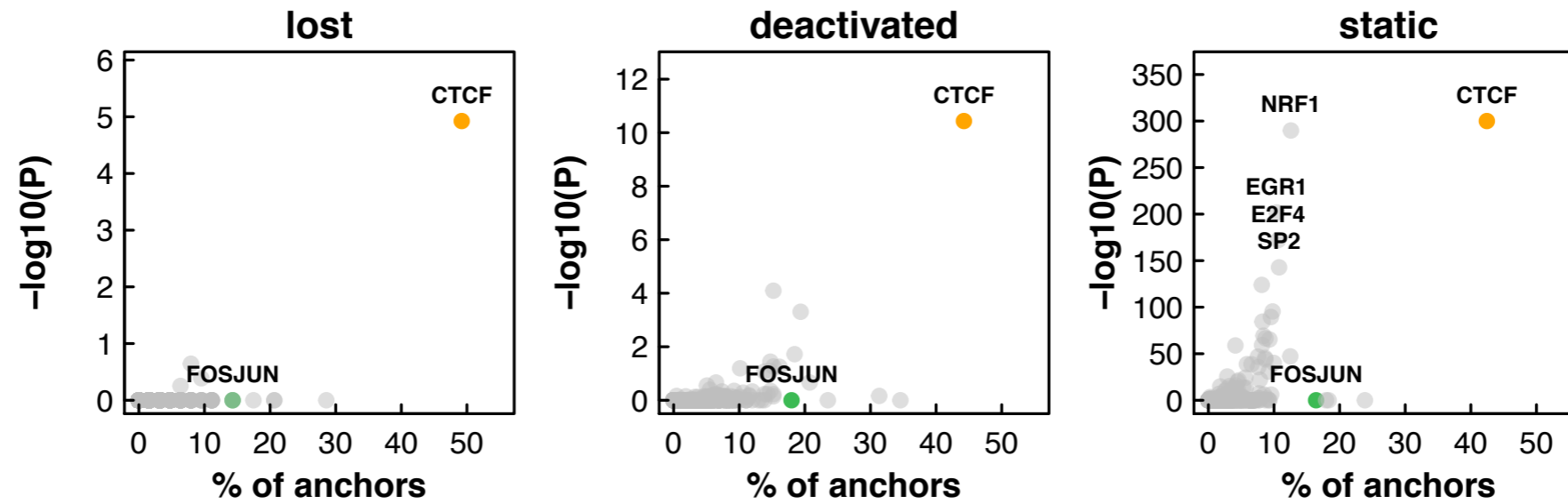
# TF footprinting



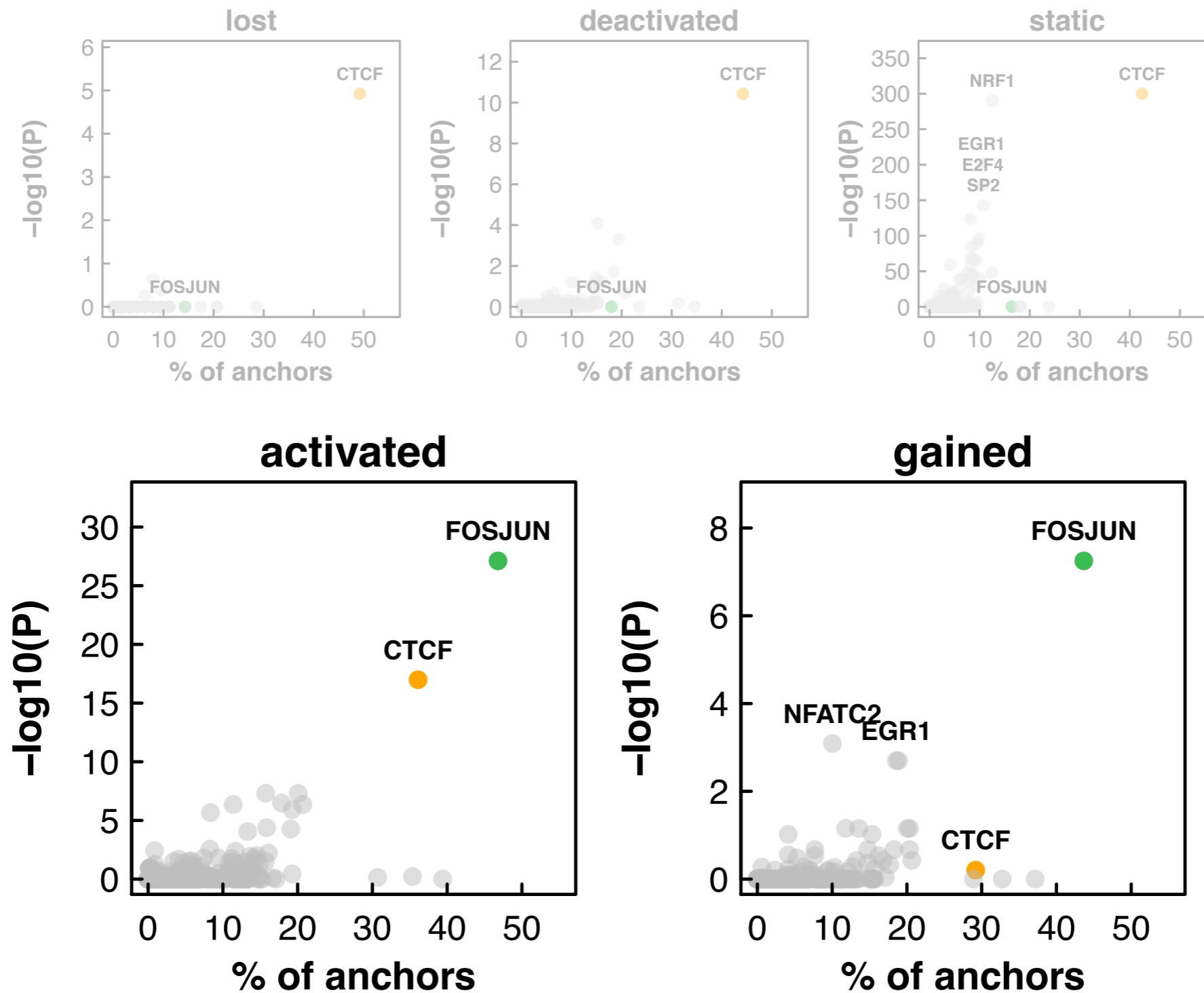
# TF footprinting



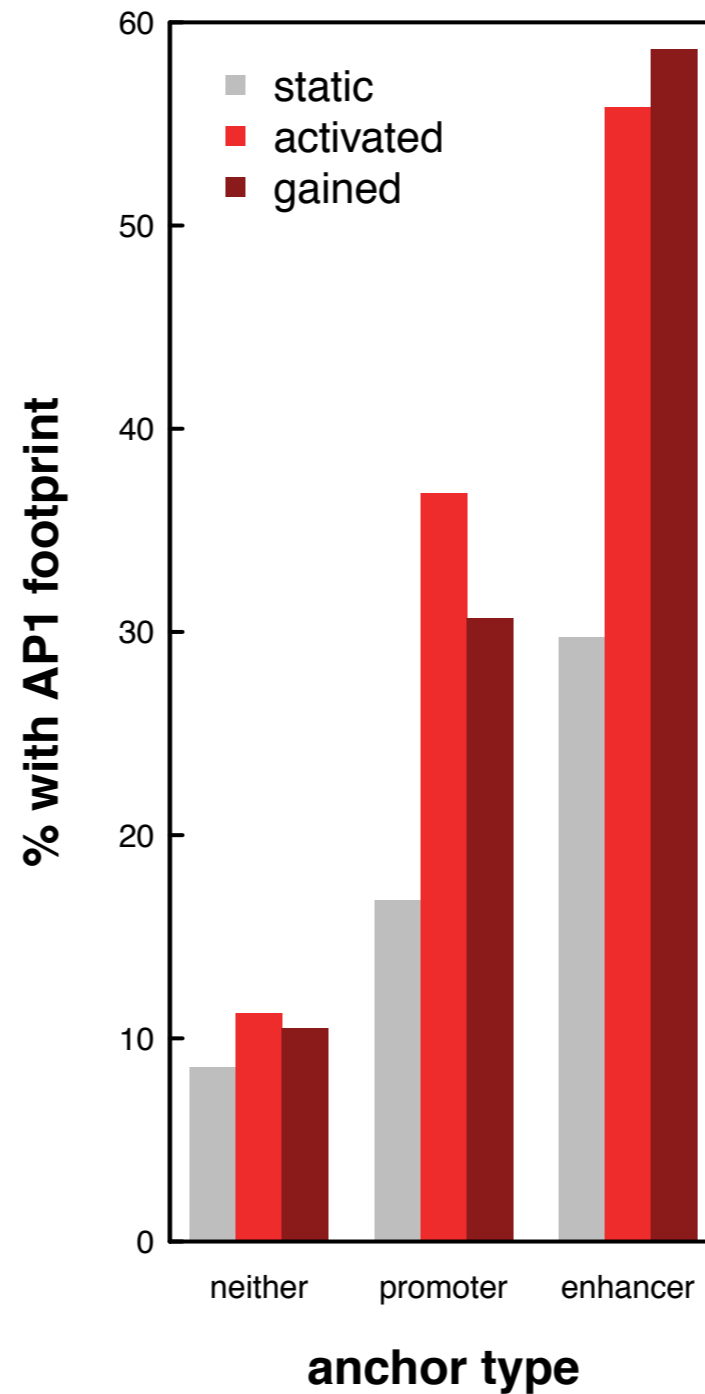
# TF enrichment at loop anchors



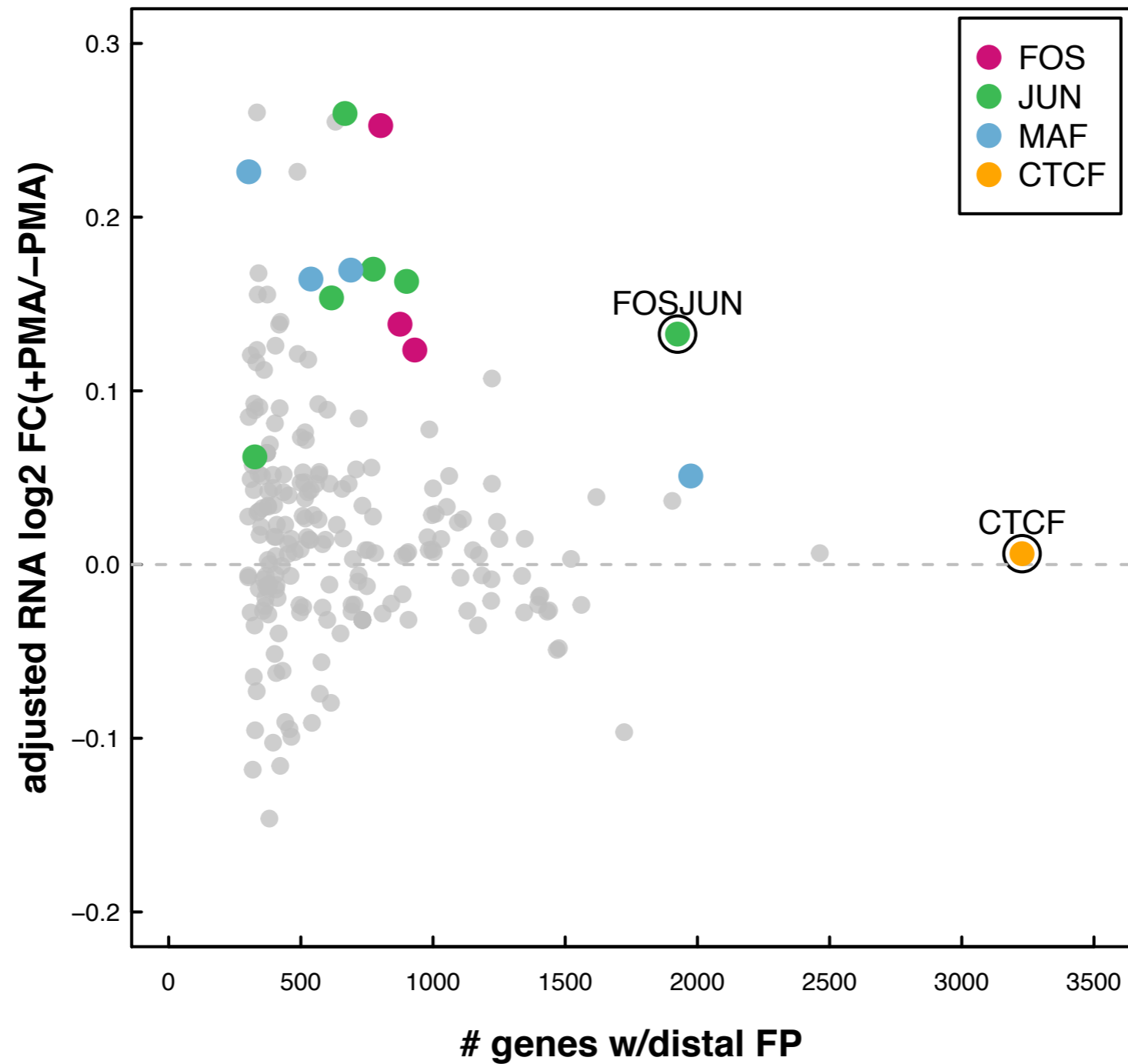
# TF enrichment at loop anchors



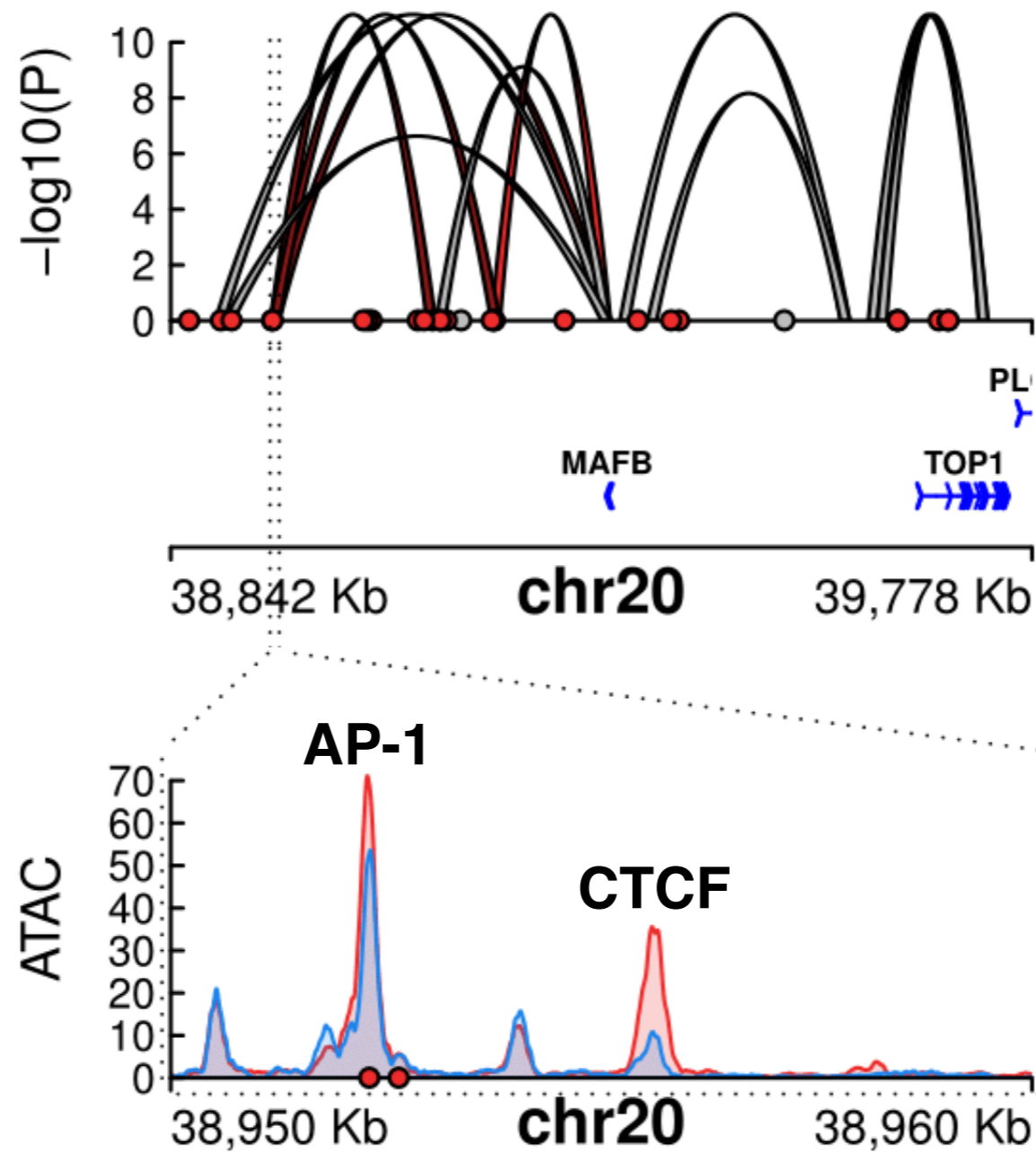
# AP-1 is enriched at enhancer ends of loops



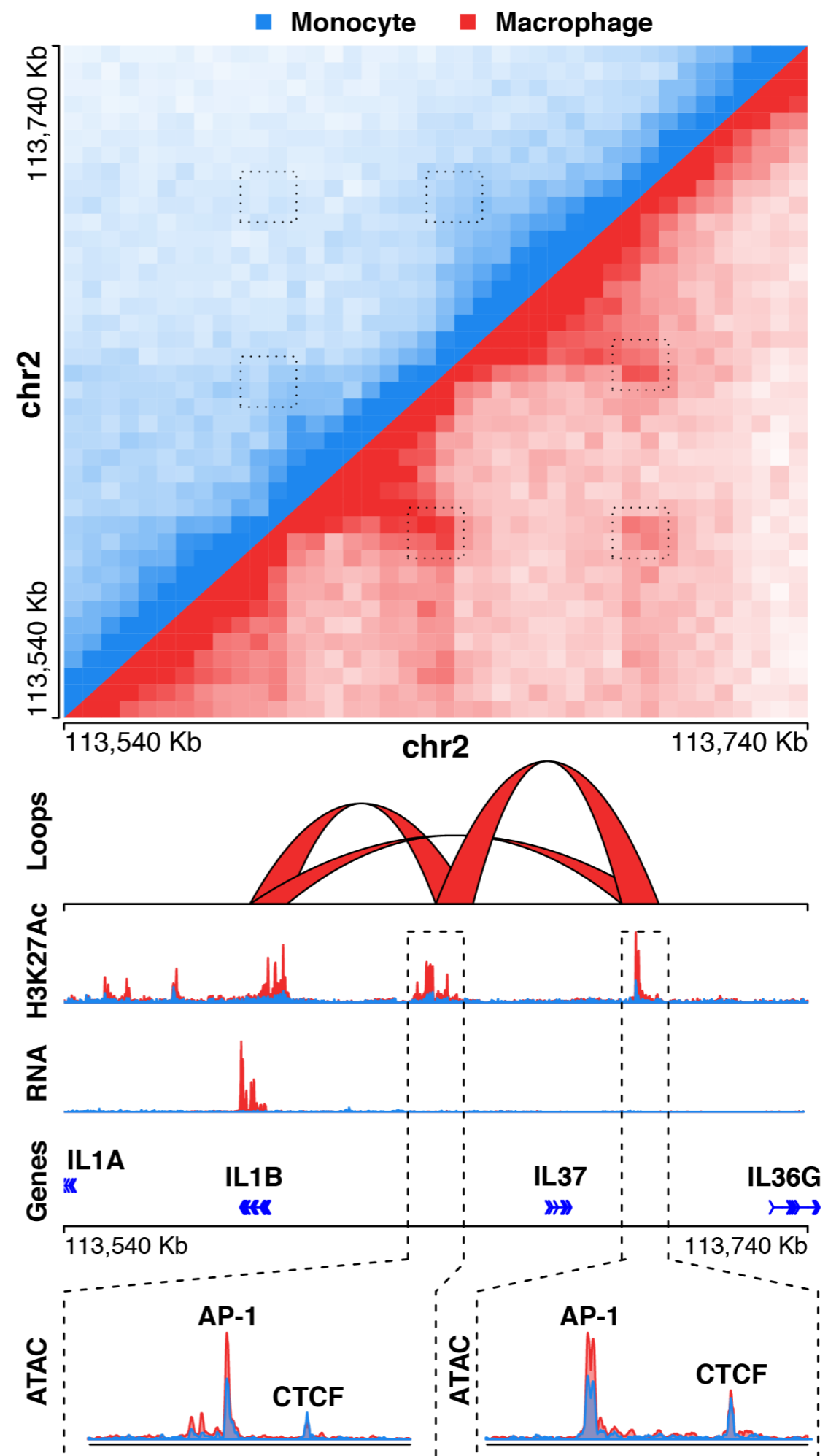
# Distal AP-1 binding correlates with increased expression



# AP-1 bound activation hub



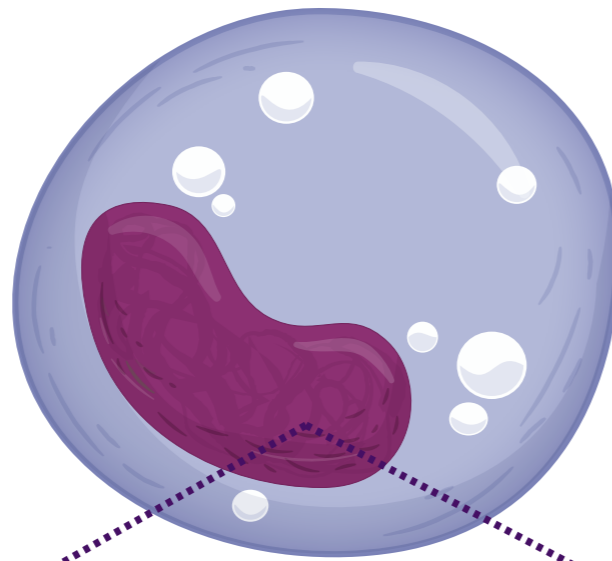
# AP-1 involved in loop formation?





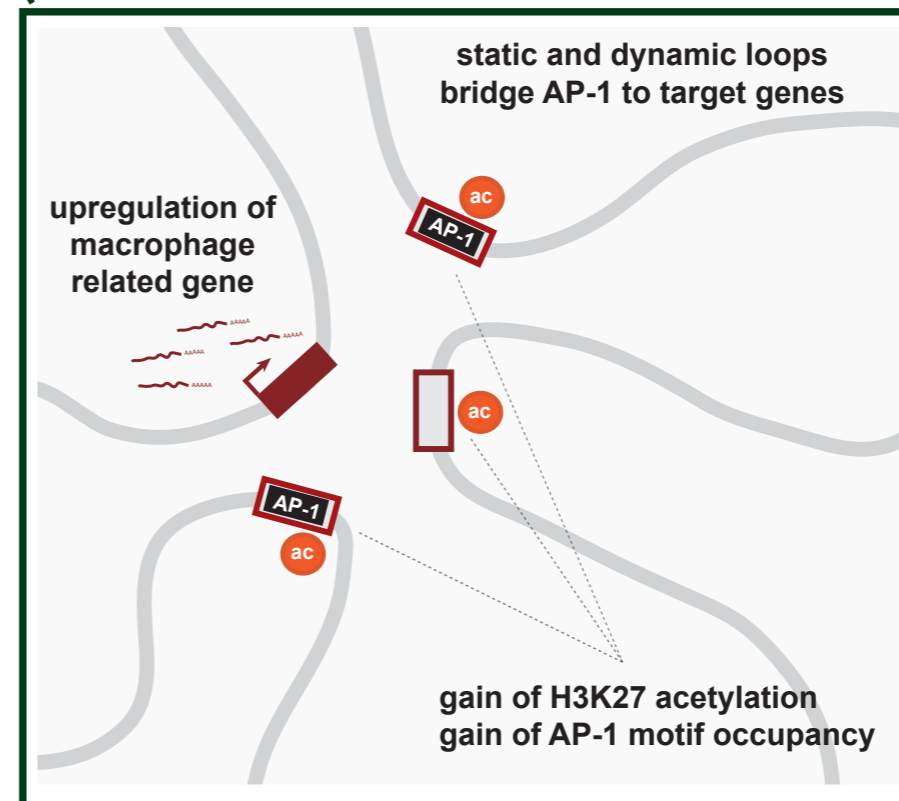
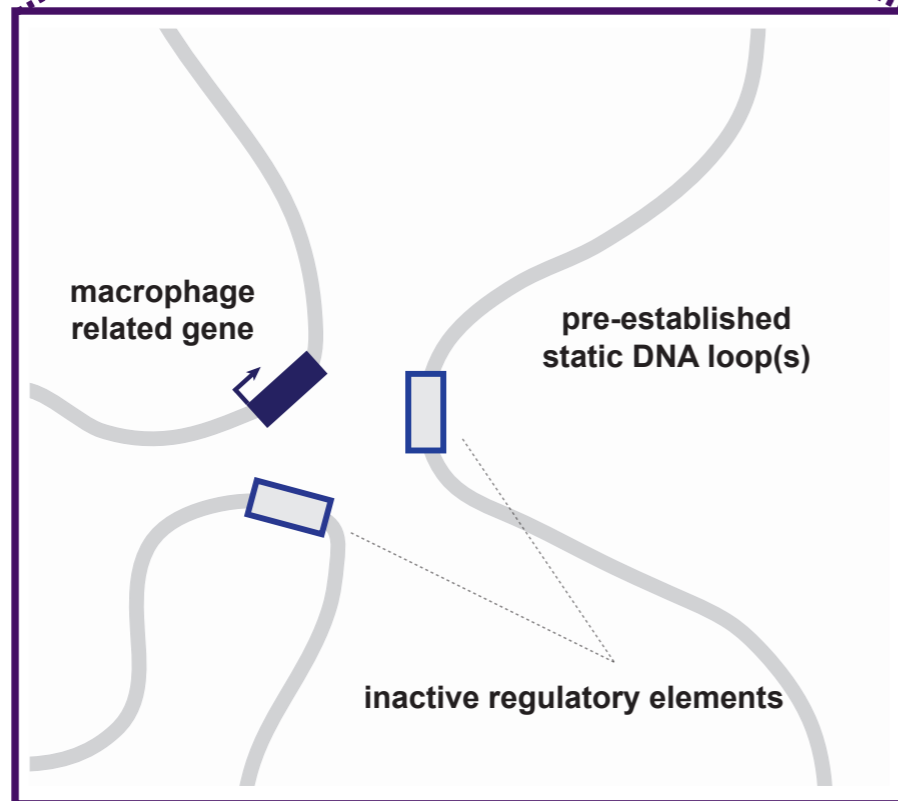
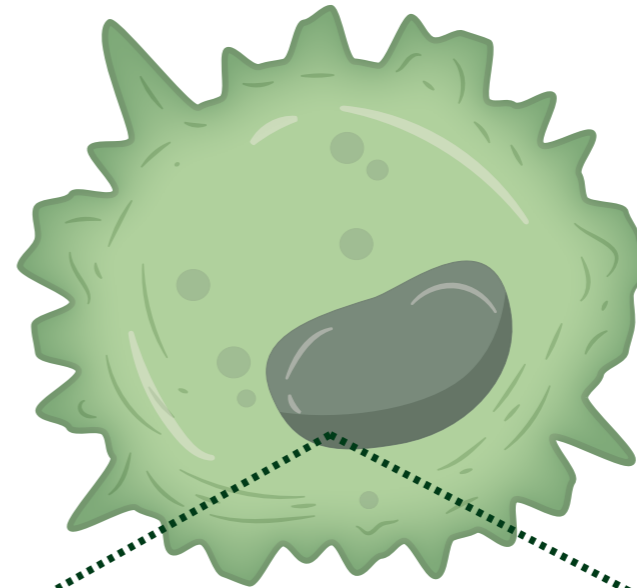
# Summary

## Monocyte



72 h PMA →

## Macrophage



ac H3K27 acetylation

AP-1 bound AP-1 motif

# Acknowledgements

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