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## Characterizing the Mechanisms of *C. elegans* PRMT1 Temperature Dependence

Arianna Towne

Utah State University, towne.arianna@gmail.com

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# Characterizing the mechanisms of *C. elegans* PRMT1 temperature dependence



**Anna Towne** (towne.arianna@gmail.com)

Owen M Price, Ph.D.

Joan M. Hevel, Ph.D.

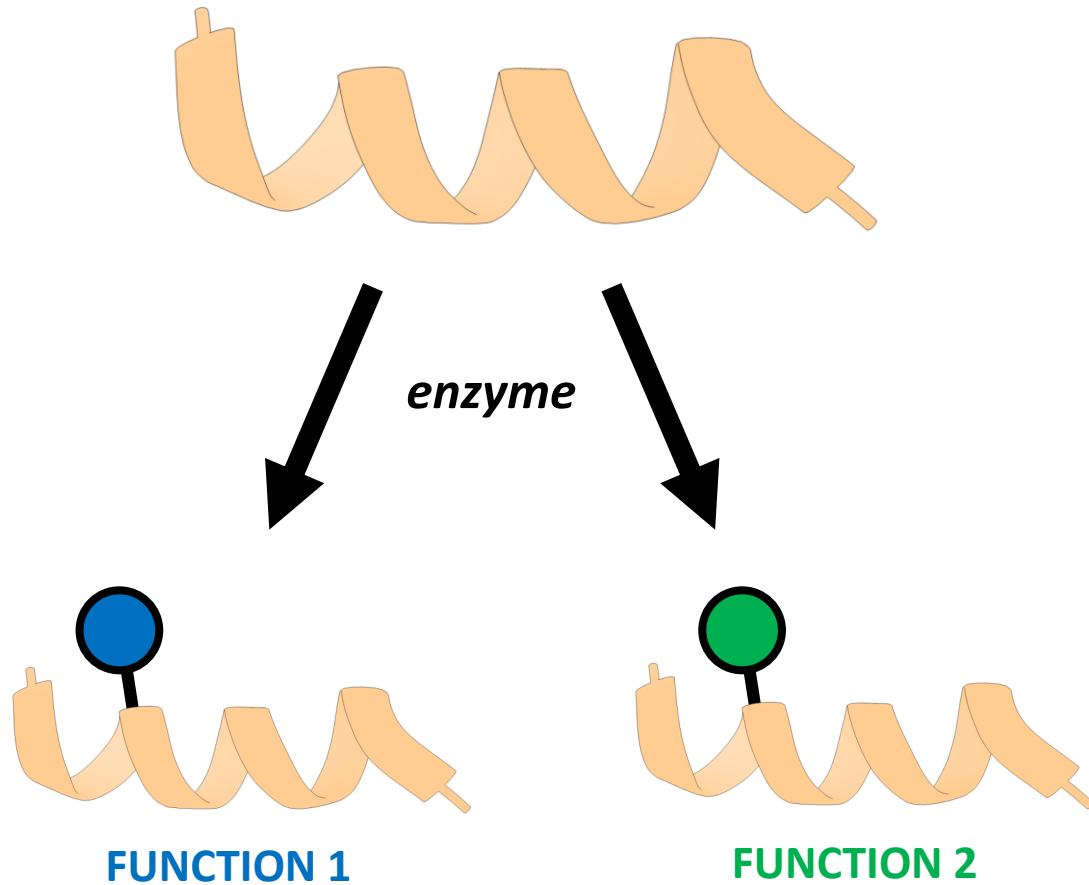
**Peak** | Summer  
Research  
Fellowship



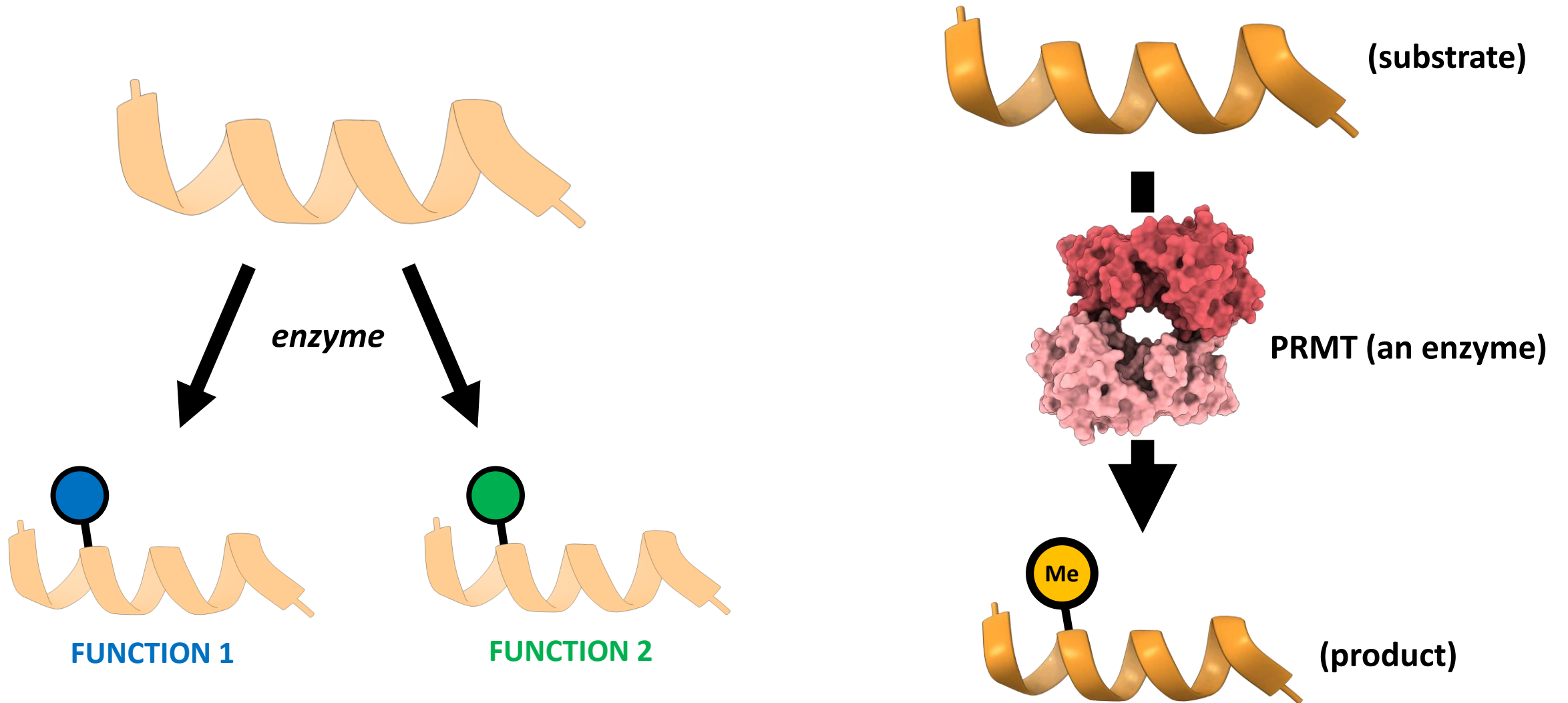
**UNDERGRADUATE**  
RESEARCH & CREATIVE  
**OPPORTUNITIES**

# Proteins are modified/regulated by post-production tags

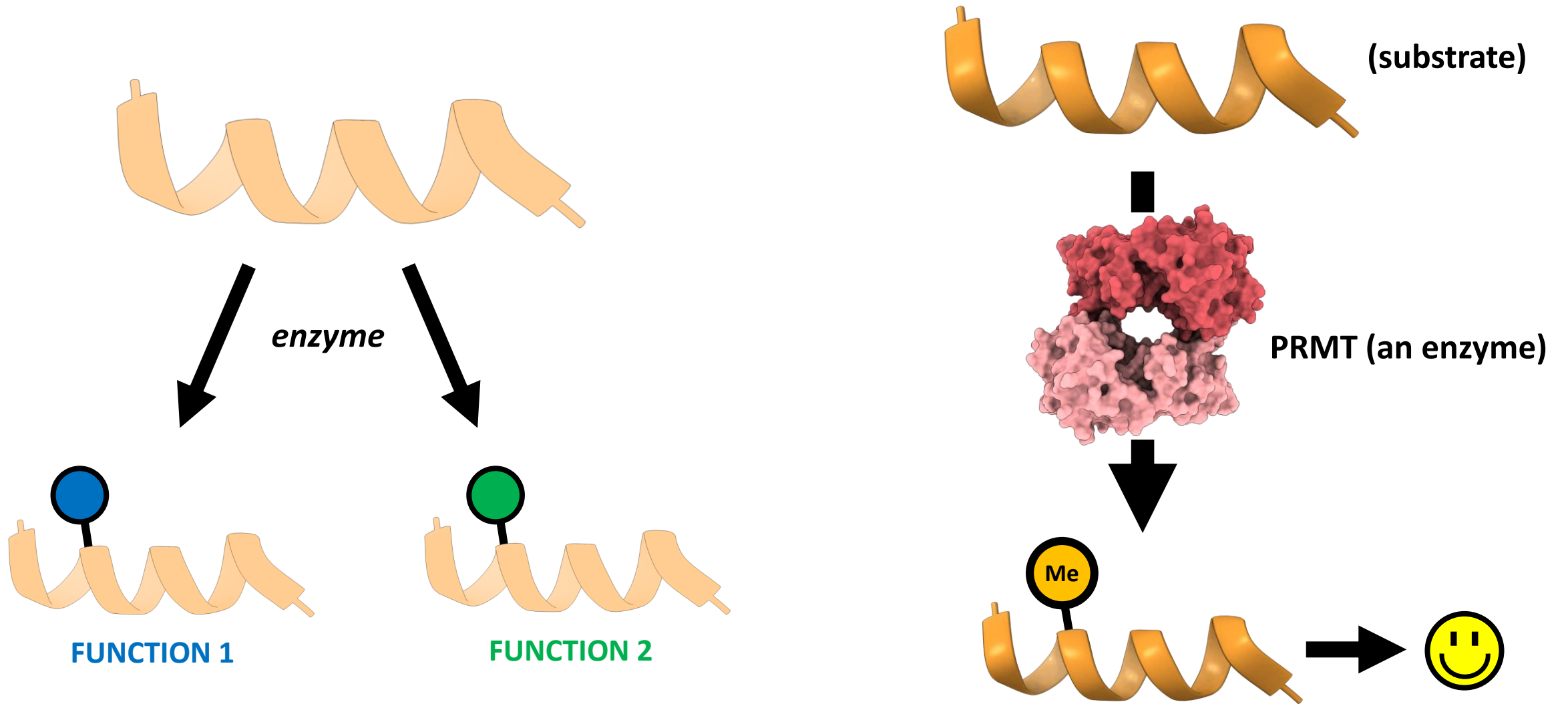
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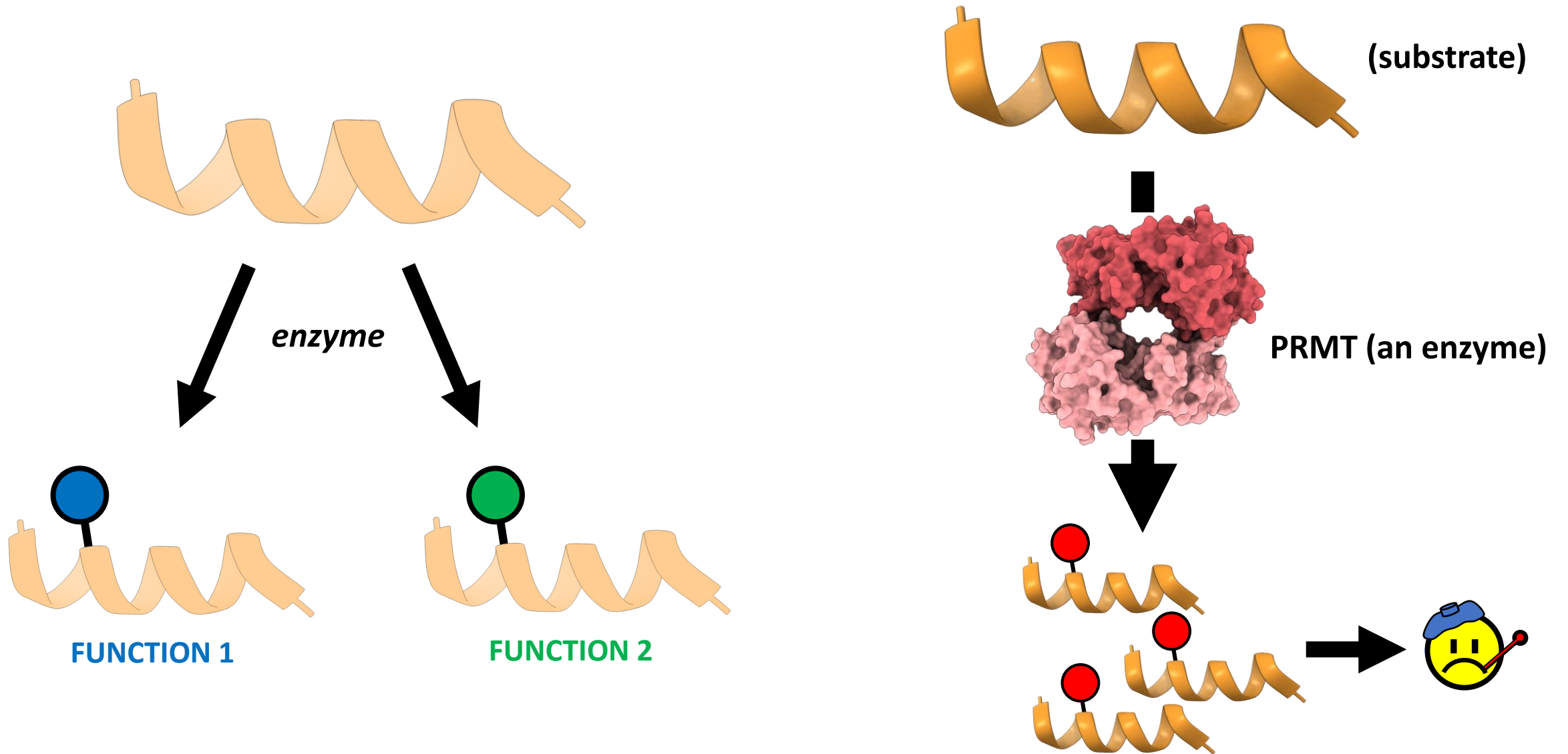
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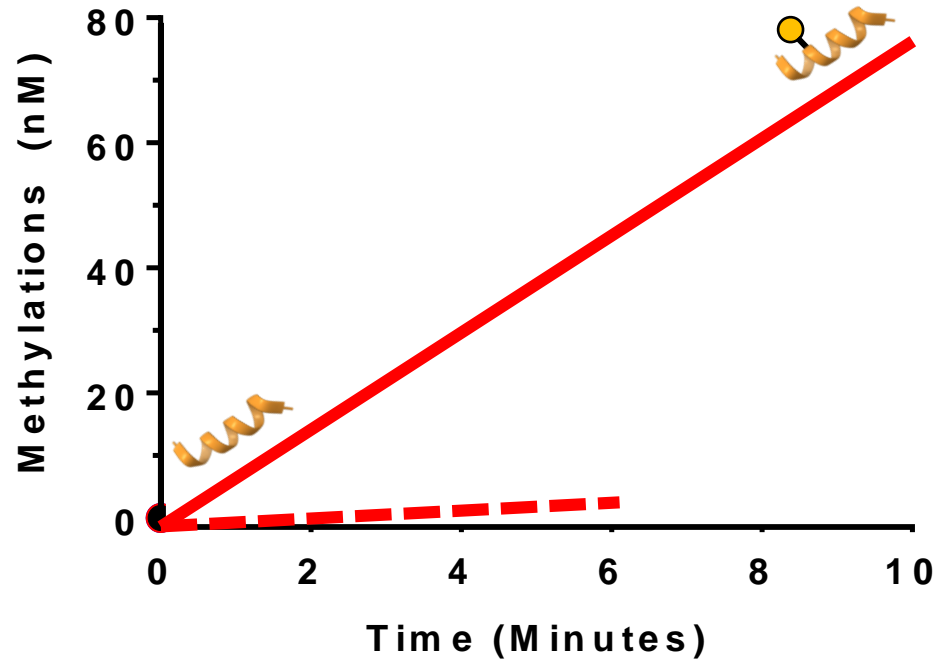
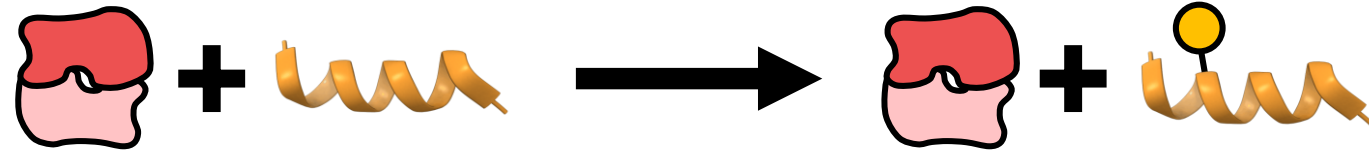
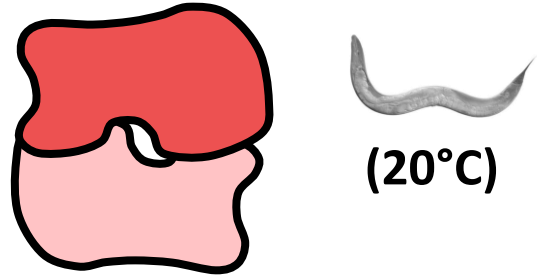


# Some PRMTs are sensitive to temperature



Price

*C. elegans* PRMT1



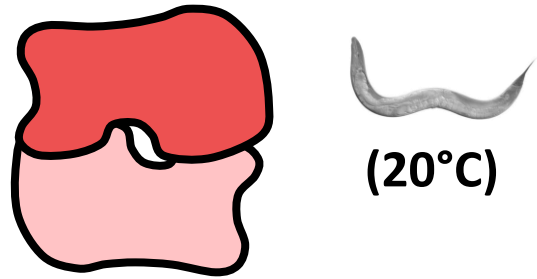
■ cPRMT1, 20°C  
▤ cPRMT1, 37°C

# Some PRMTs are sensitive to temperature



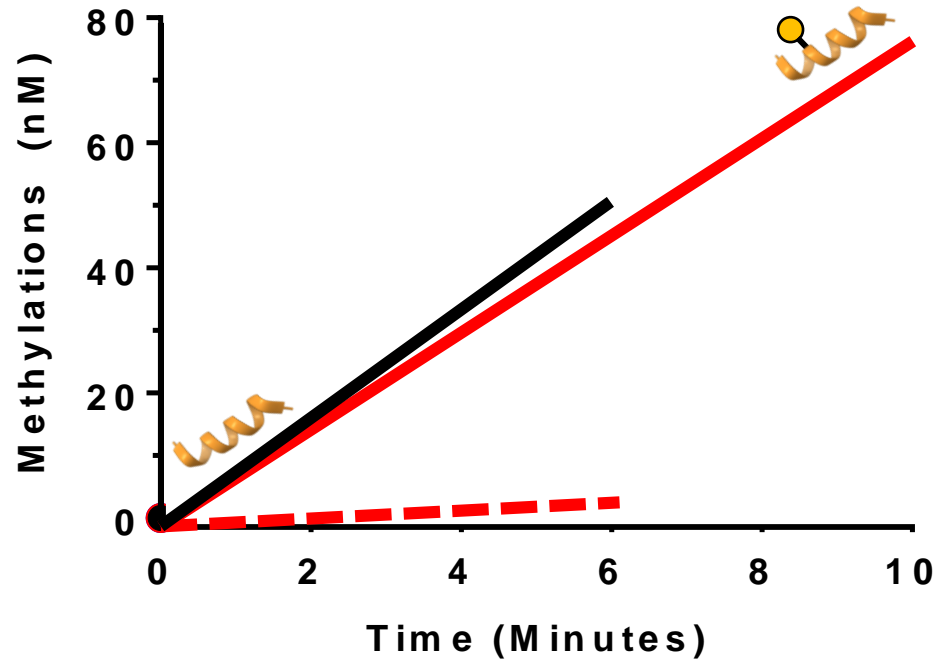
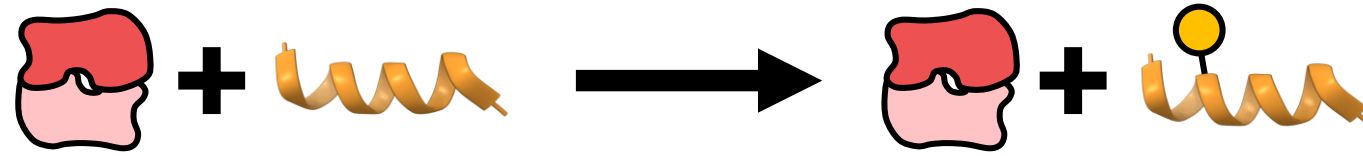
Price

C. elegans PRMT1



63% identical

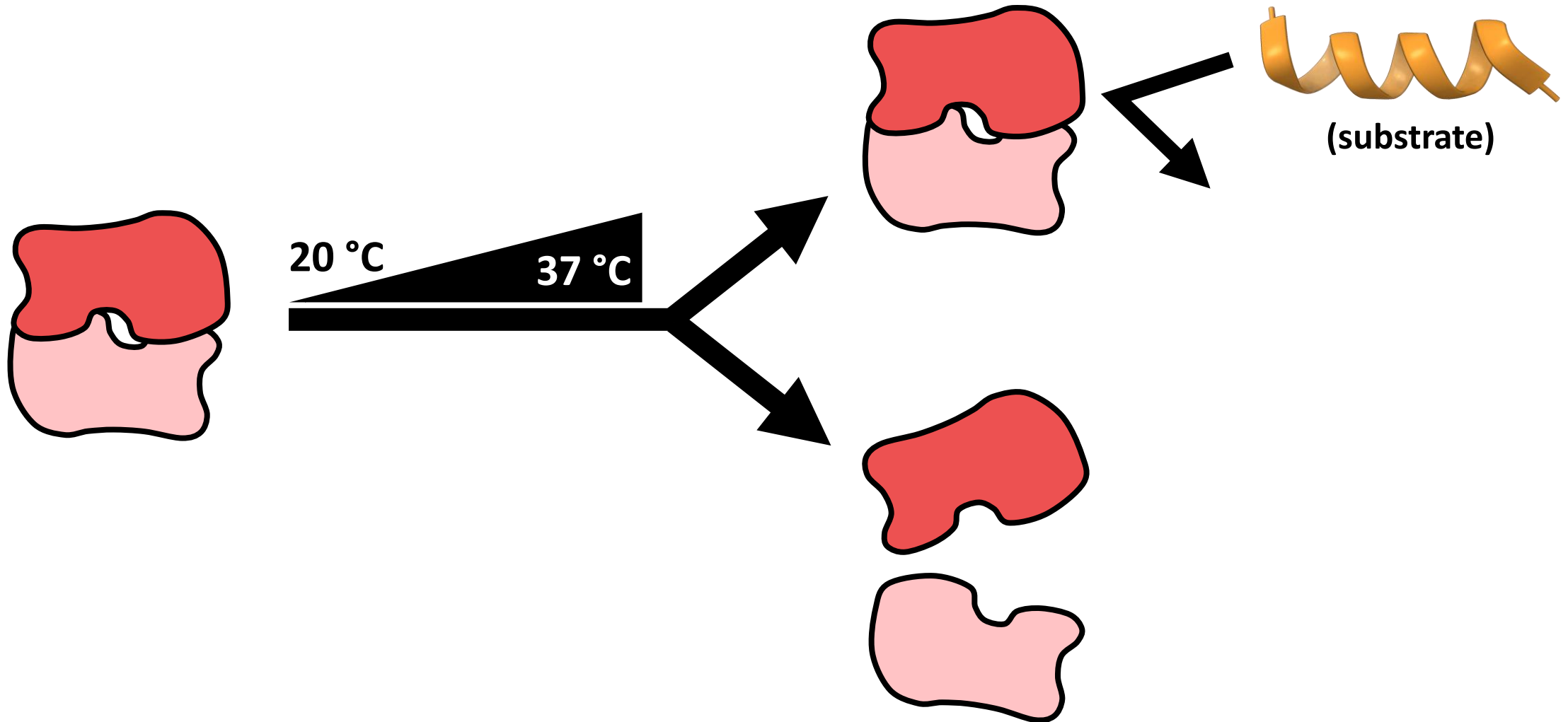
Rat PRMT1





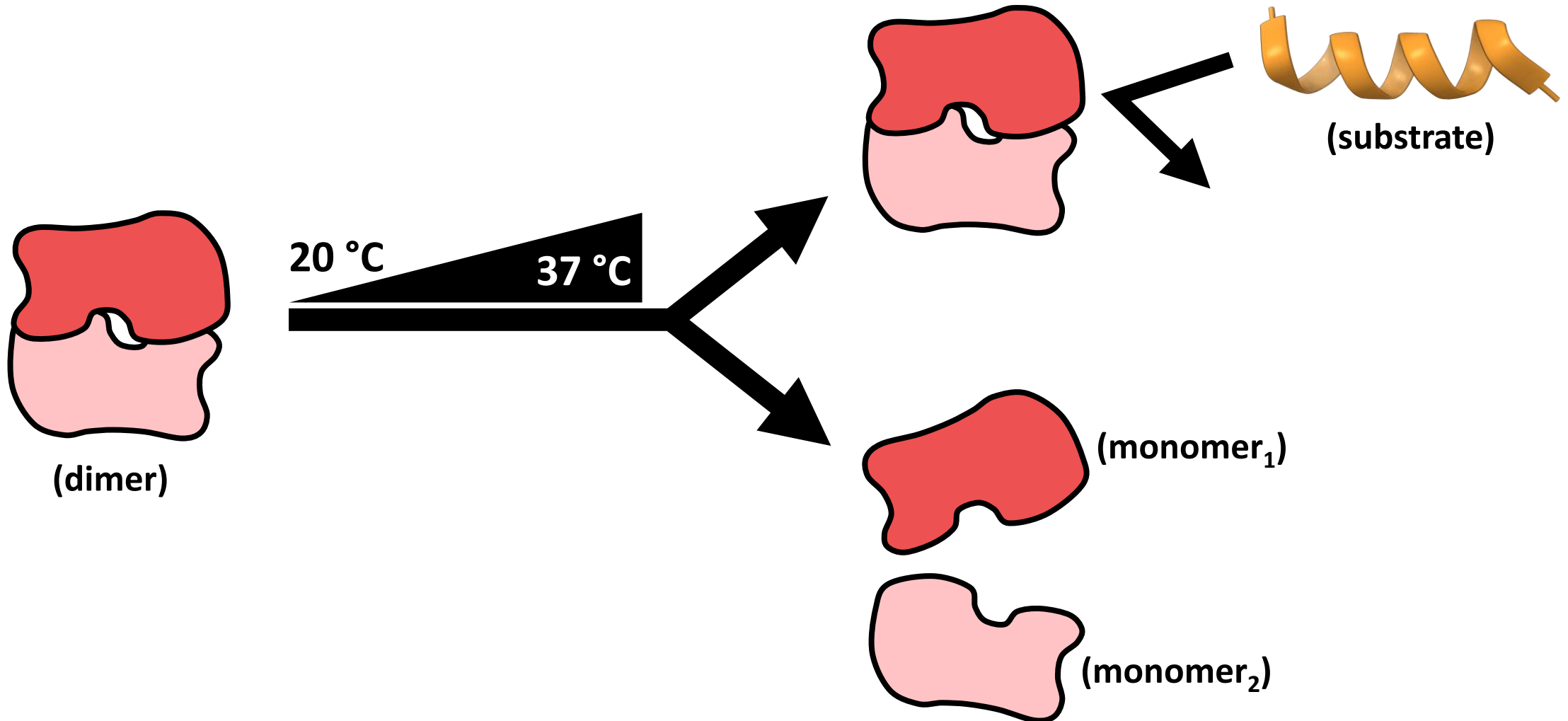
# Hypothesis: cPRMT1 substrate binding and/or dimerization may be hindered at 37°C

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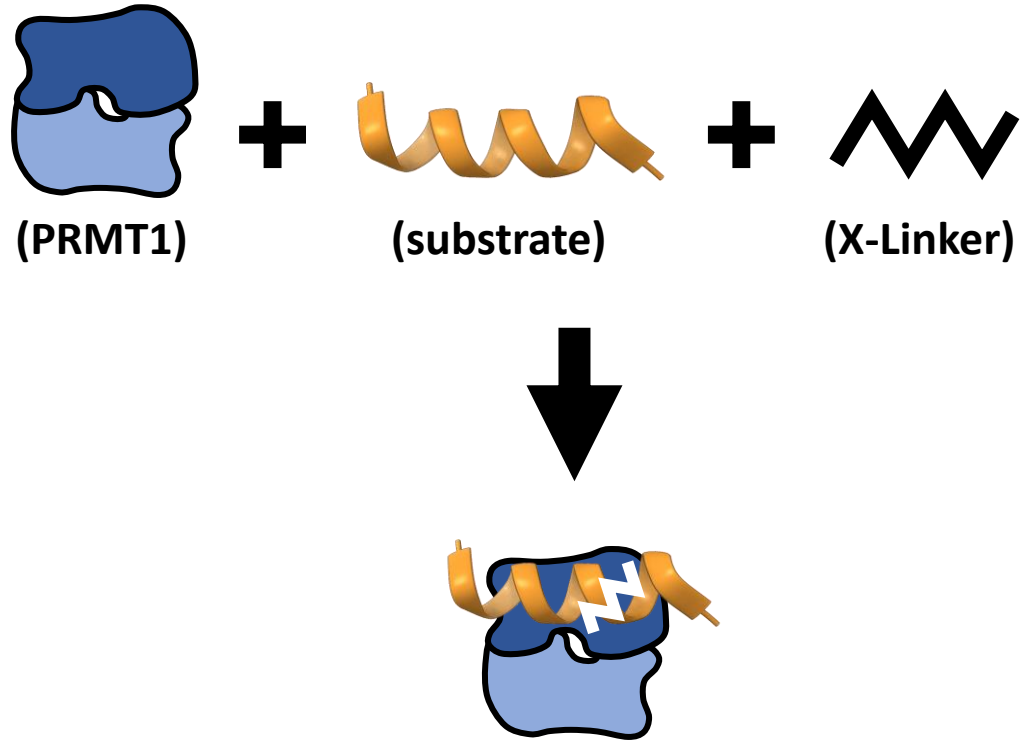
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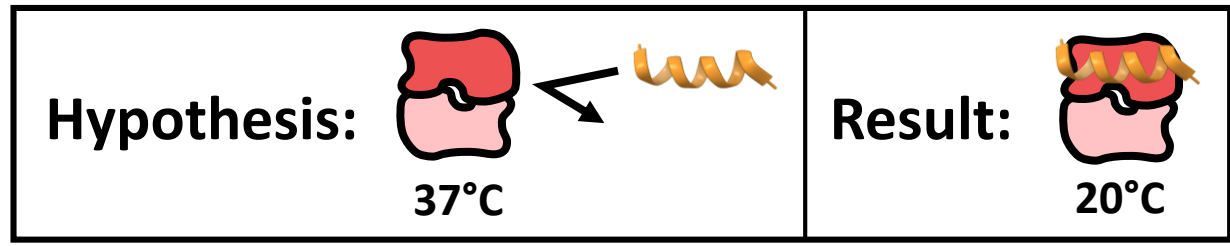
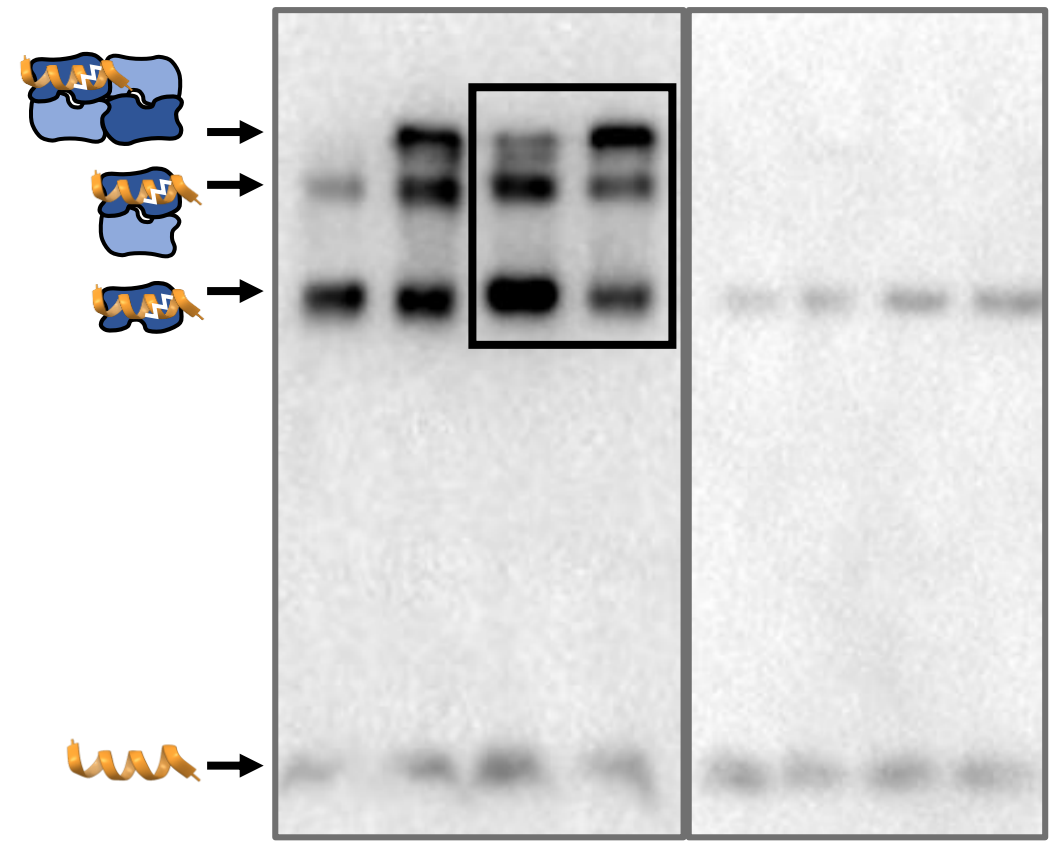


# cPRMT1 substrate-binding ability is retained at 37°C

## Crosslinking Overview

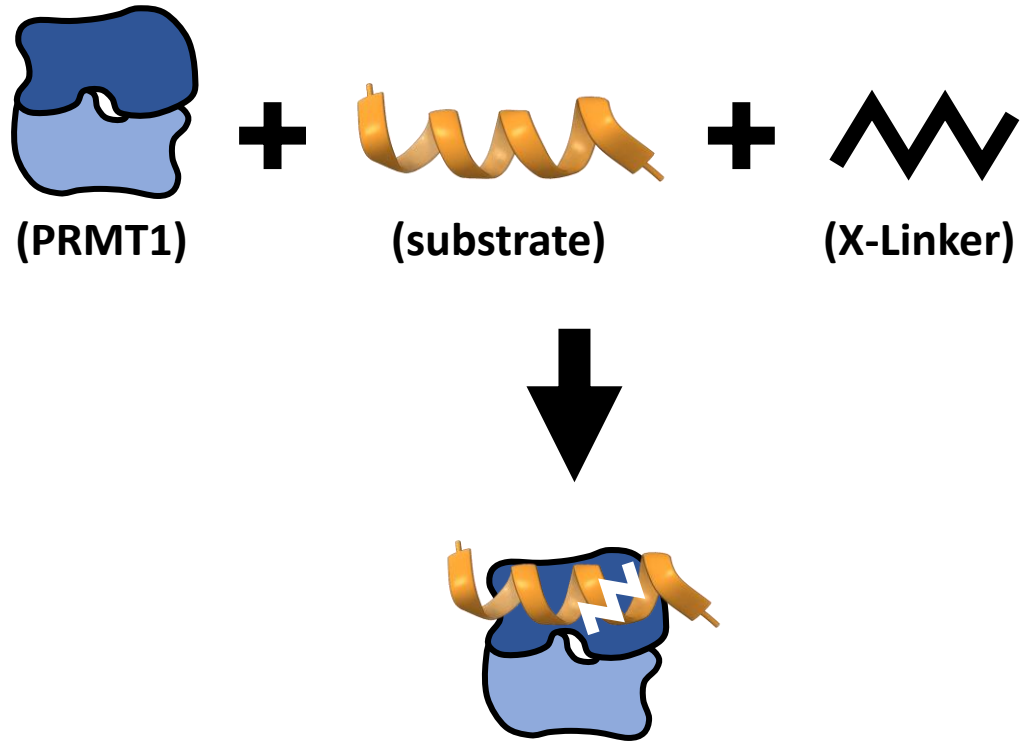


X-Linker:	+		+		-		-	
Temp:	20	37	20	37	20	37	20	37

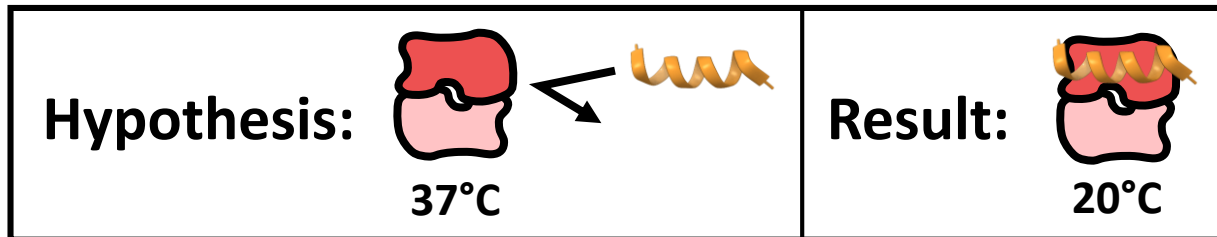
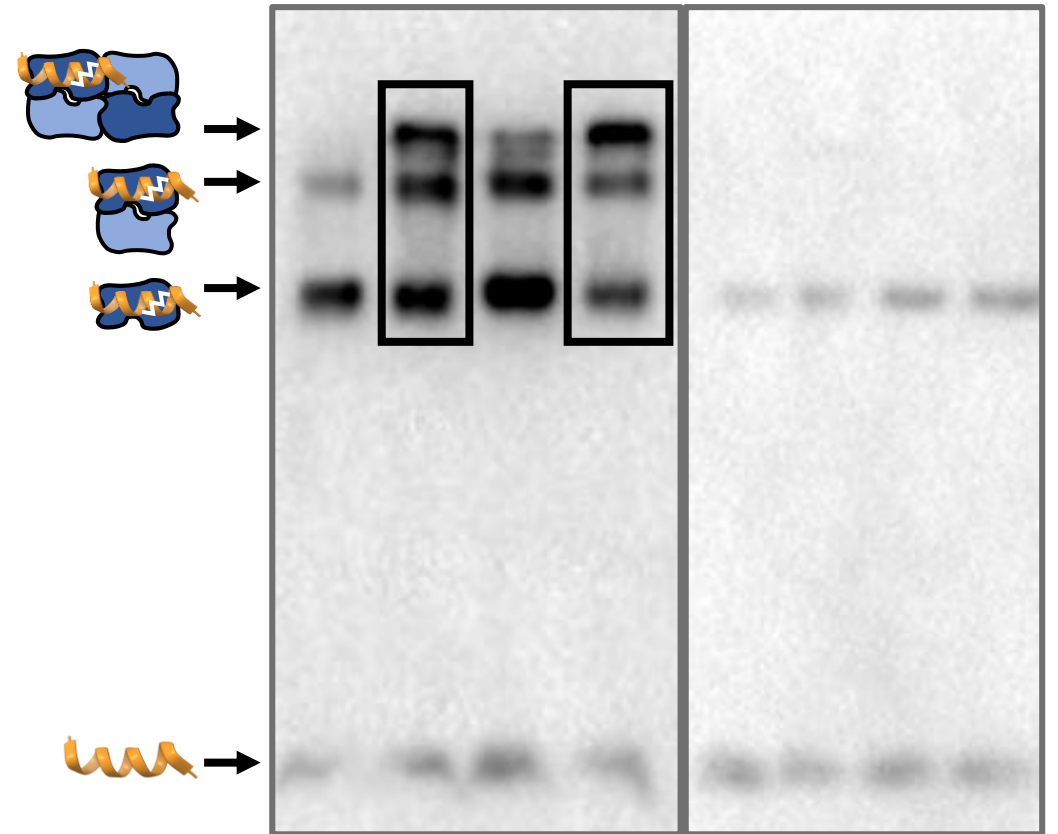


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## Crosslinking Overview

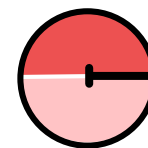
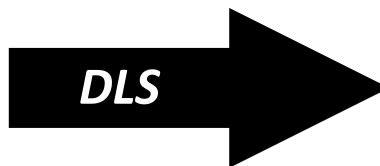


X-Linker:	+		+		-		-	
Temp:	20	37	20	37	20	37	20	37

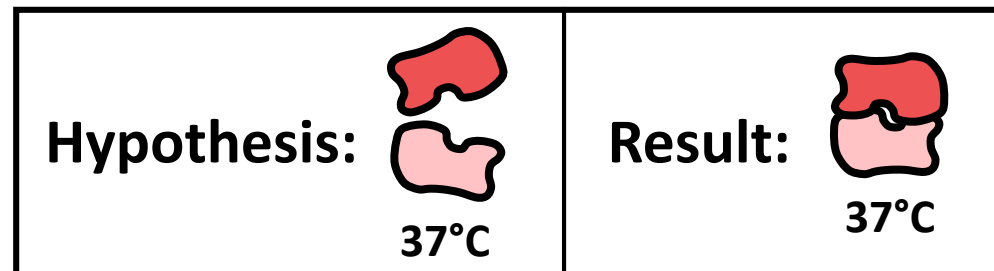
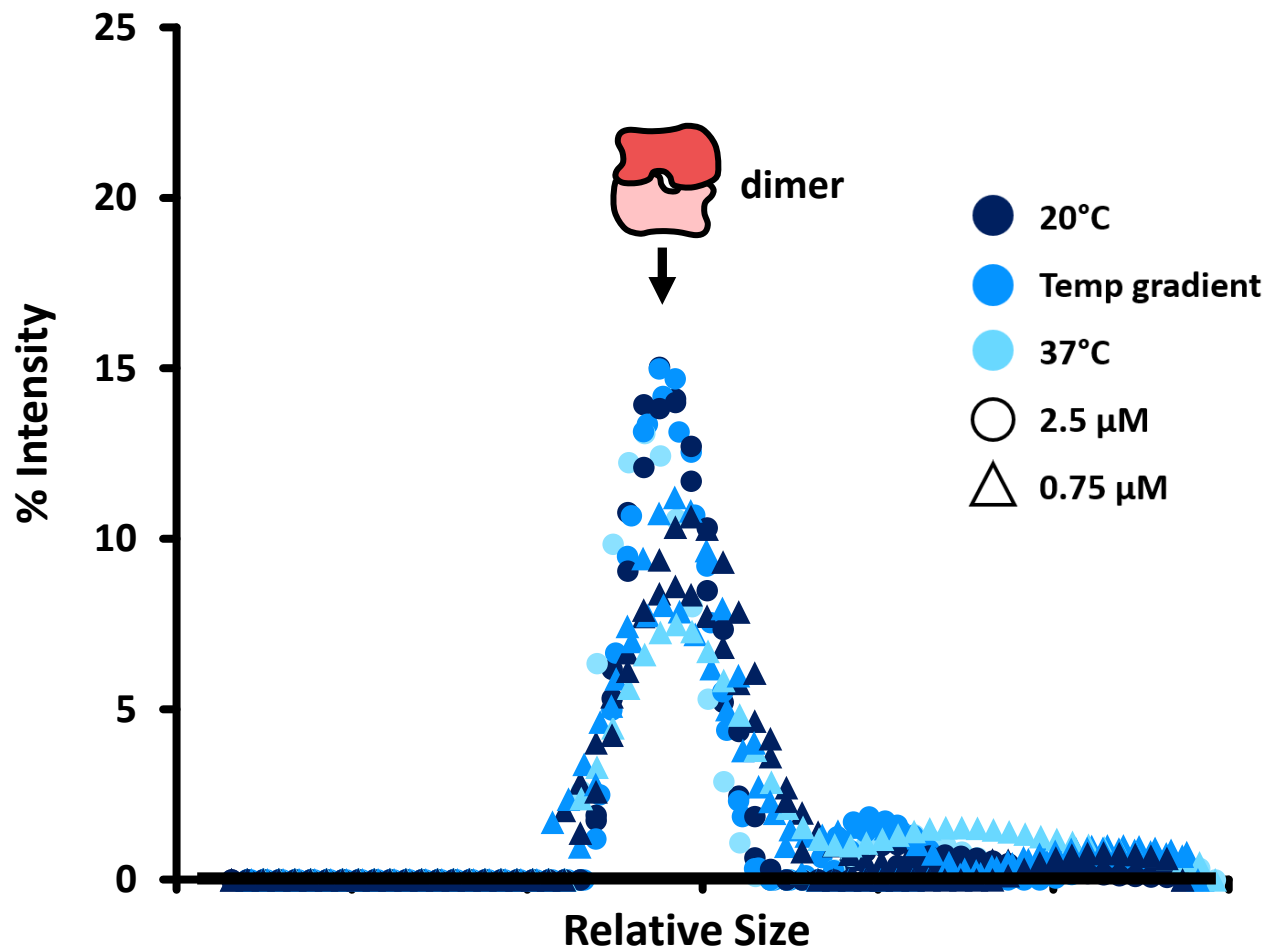


# cPRMT1 dimerization is retained at 37°C

Dynamic Light Scattering Overview:

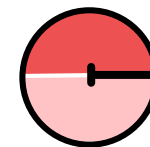
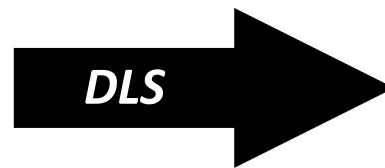


*hydrodynamic radius*  
(~size)

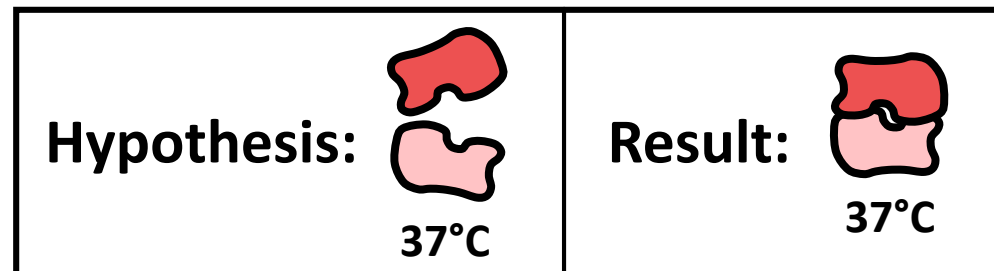
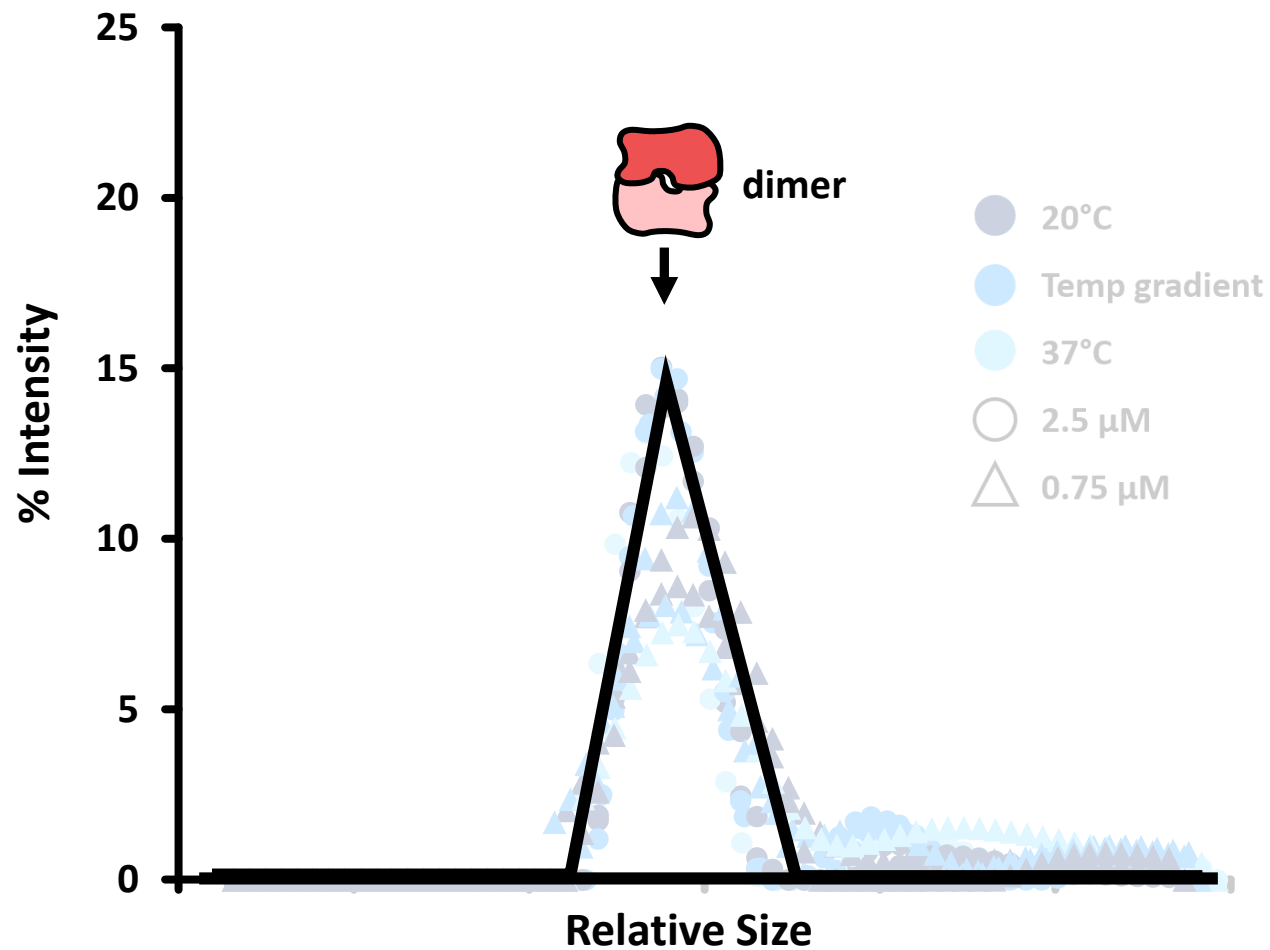


# cPRMT1 dimerization is retained at 37°C

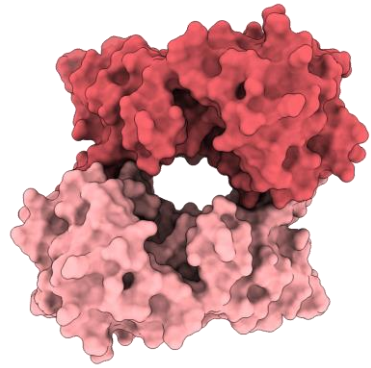
Dynamic Light Scattering Overview:



*hydrodynamic radius*  
(~size)

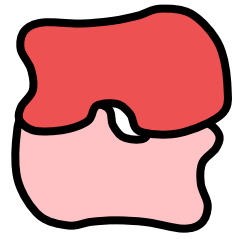


# cPRMT1's temperature sensitivity may inform mechanisms of regulation

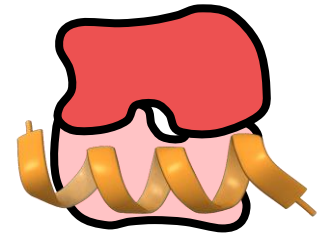


Cancer  
Cardiovascular disease

## *cPRMT1 oligomerization & substrate binding*

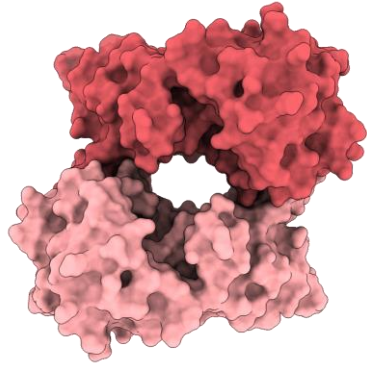


At 37°C,  
oligomerization  
is not disrupted.



At 37°C,  
substrate binding ability  
is not hindered

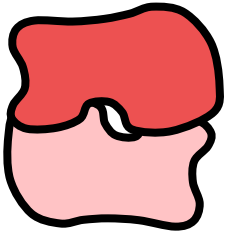
# cPRMT1's temperature sensitivity may inform mechanisms of regulation



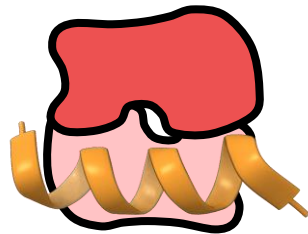
**Dysregulation**

**Cancer**  
**Cardiovascular disease**

## *cPRMT1 oligomerization & substrate binding*

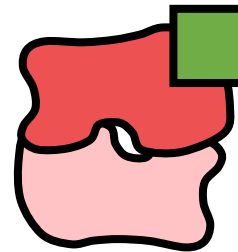


At 37°C,  
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is not disrupted.

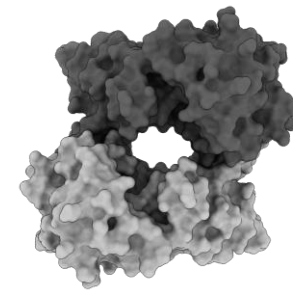


At 37°C,  
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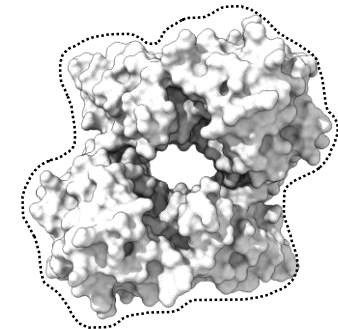
## *Potential future directions:*



At 37°C,  
test methyl-donor  
binding ability



Rat PRMT1



C. elegans PRMT1?

Structure elucidation and  
comparison through  
crystallization



# Acknowledgements

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# Peak

Summer  
Research  
Fellowship

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**UNDERGRADUATE  
RESEARCH & CREATIVE  
OPPORTUNITIES**

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## Hevel Lab Members:

Dr. Joan Hevel (advisor)

Dr. Owen Price

Drake Comer

Dagny Hunt

Zaharah Rossi

Sarah Nielson

Bella Lonardo

Danielle Weinerman