



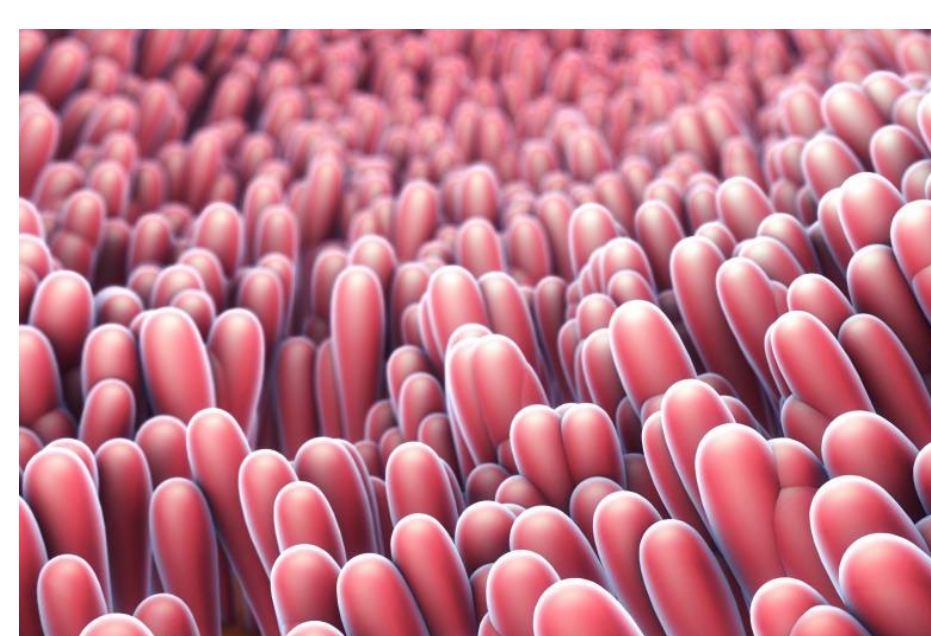
# Breaking Down Barriers: The Palmitoylation of Claudin Proteins

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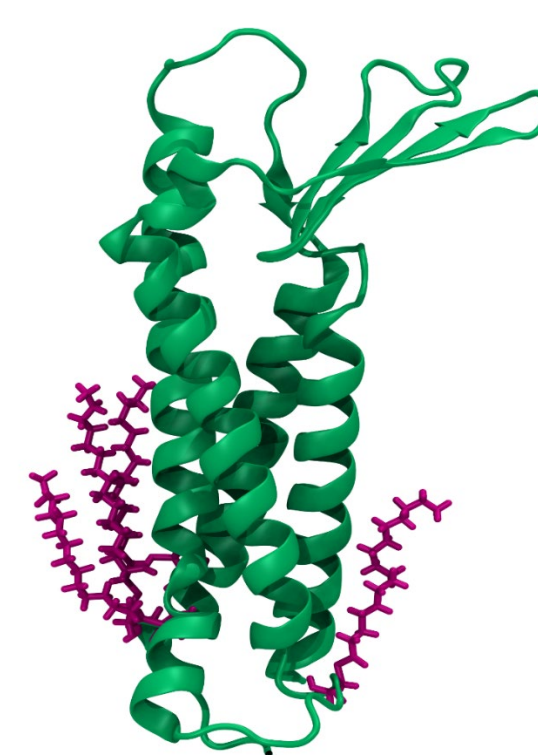
## Introduction

- Claudin 15 is a member of the claudin family that resides in the small intestinal villi.
- This claudin regulates the absorption of nutrients that are ingested such as lithium, chlorine and sodium.
- When this claudin does not perform as it should it results in many bowel diseases and nutrition issues as it causes an influx or deprivation of key nutrients.



## Aim

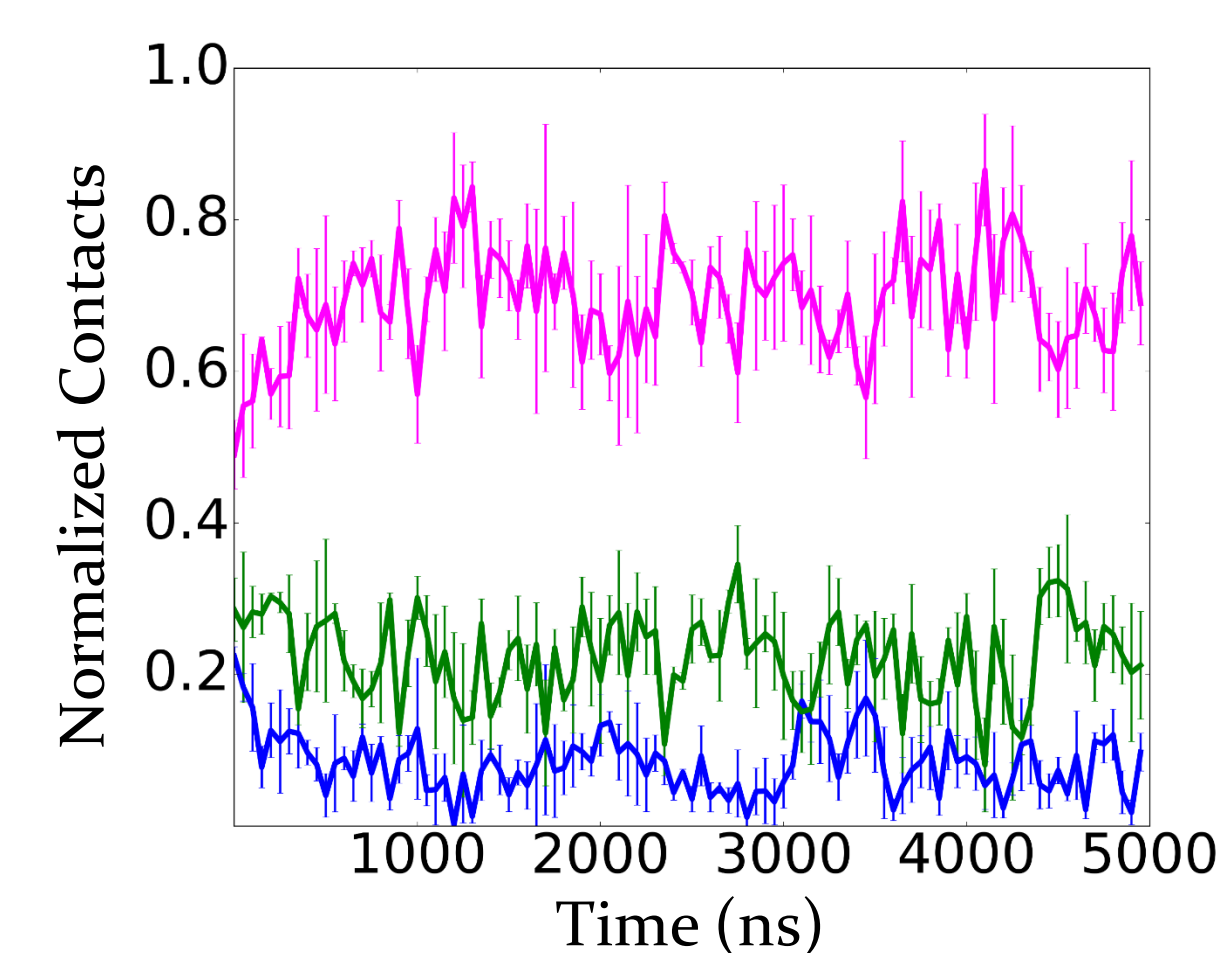
- Palmitoylation is the process of attaching fatty acids onto these claudins which in turn change the characteristics of the proteins such as selectiveness.



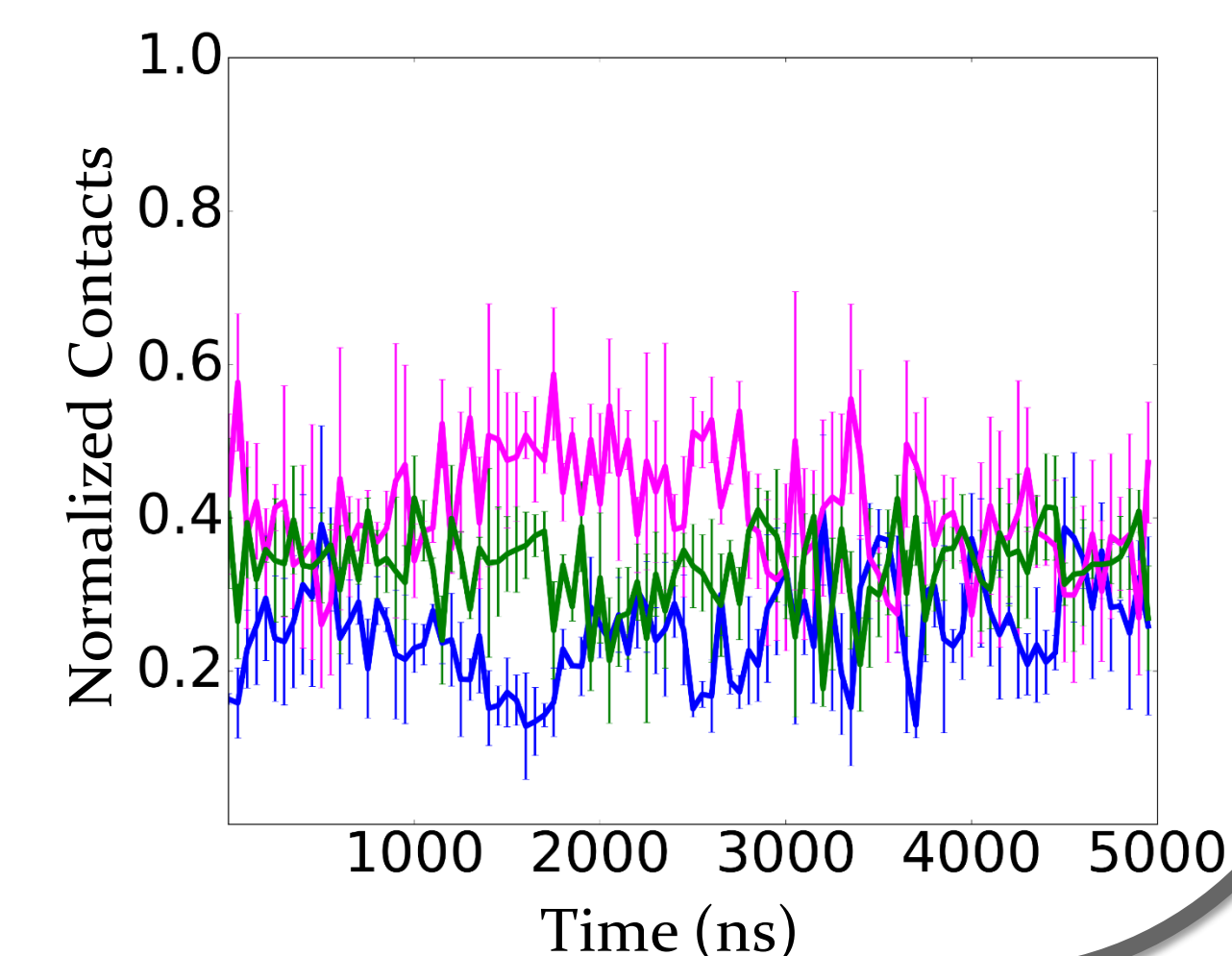
Claudin 15  
Palmitoylated

- This research has studied how palmitoylation affects claudins and the membranes they reside within.
- We believed that if palmitoylation occurs on the claudin then the membrane and characteristics will be altered as well.

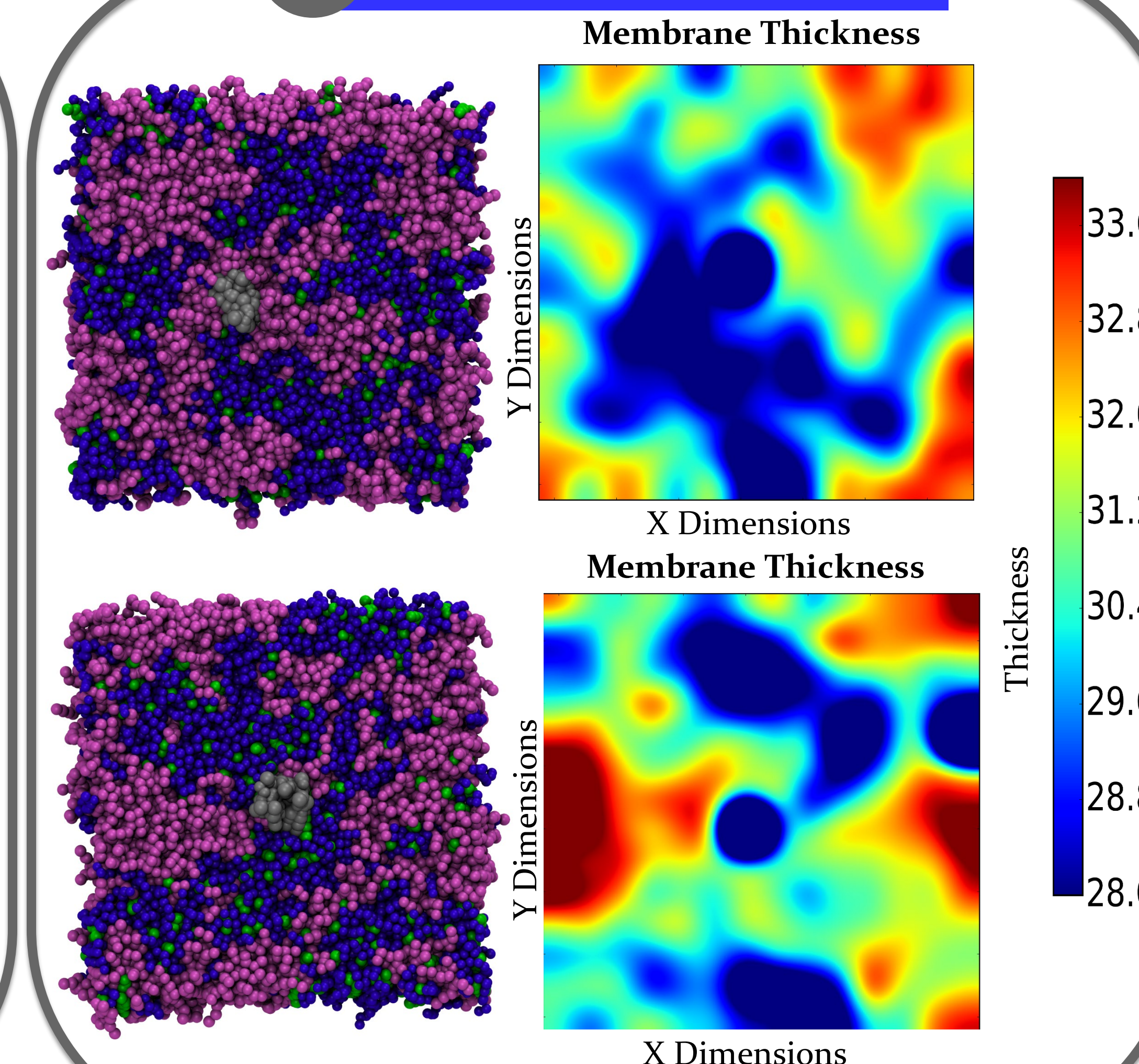
## Analysis



Lipid Components After Palmitoylation



## Results

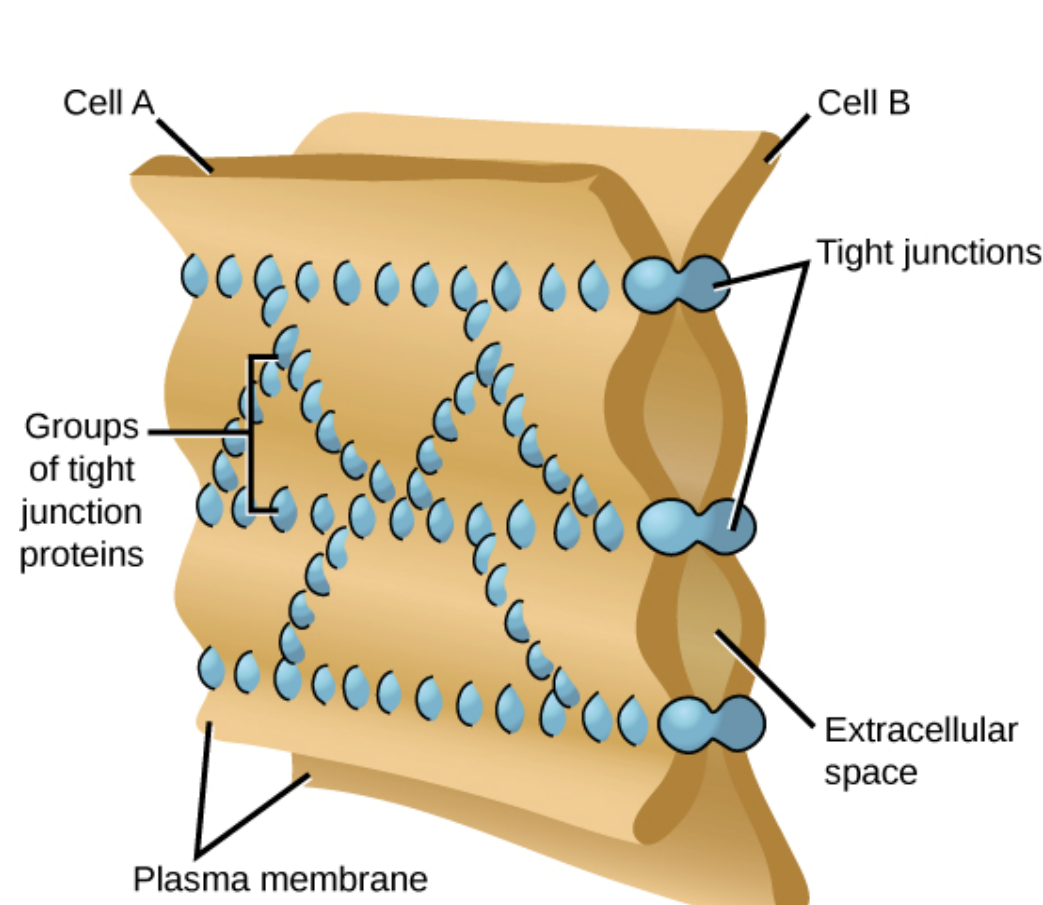


## After Palmitoylation, Saturated Lipids Reside Around Claudin 15



## Background

- Claudins are a family of proteins that reside in membranes.
- They serve as a physical barrier in the intercellular space by creating tight junction to form membranes and regulate the flow of molecules through them.
- Each area in the body has a certain claudin specific to that region.

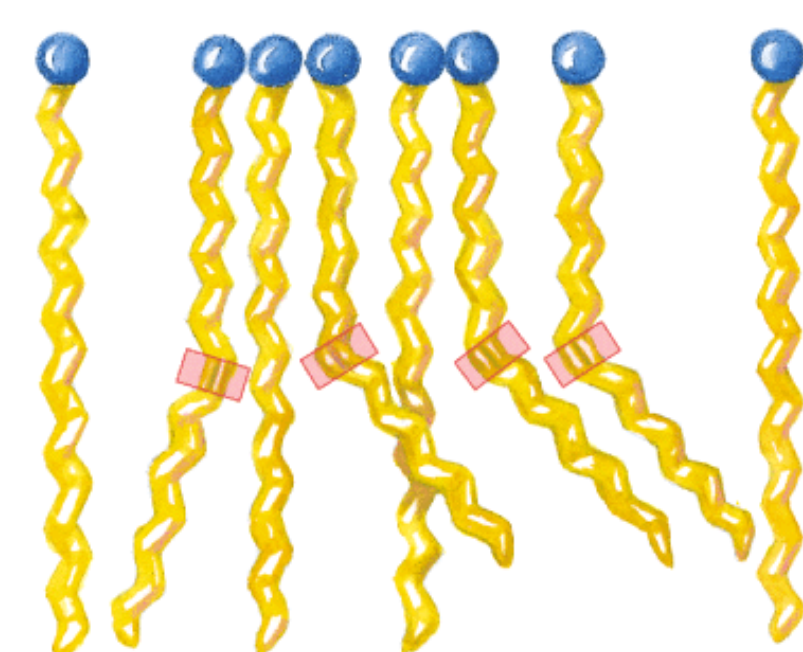


Claudin 15



## Method

Saturated and Unsaturated Lipids

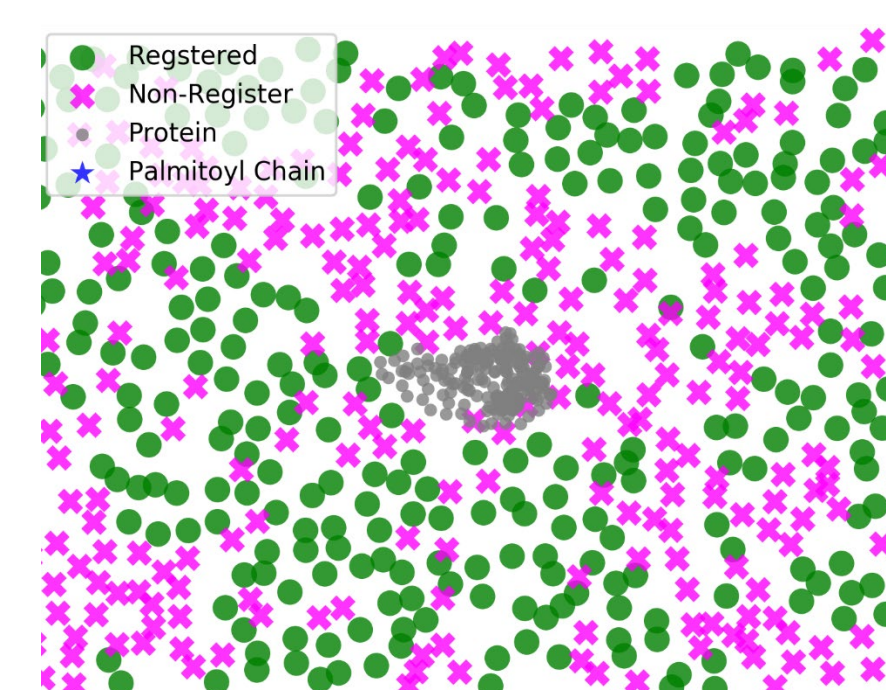


- We used the molecular dynamics computer software Gromacs in conjunction with Visual Molecular Dynamics software.
- With Gromacs we were able to simulate real membranes and how they reacted with molecules in the paracellular space through Newtonian equations of motion that the computer conducted.
- We used a membrane consisting of cholesterol, DPPC and DOPC to resemble a real membrane with saturated and non saturated lipids.

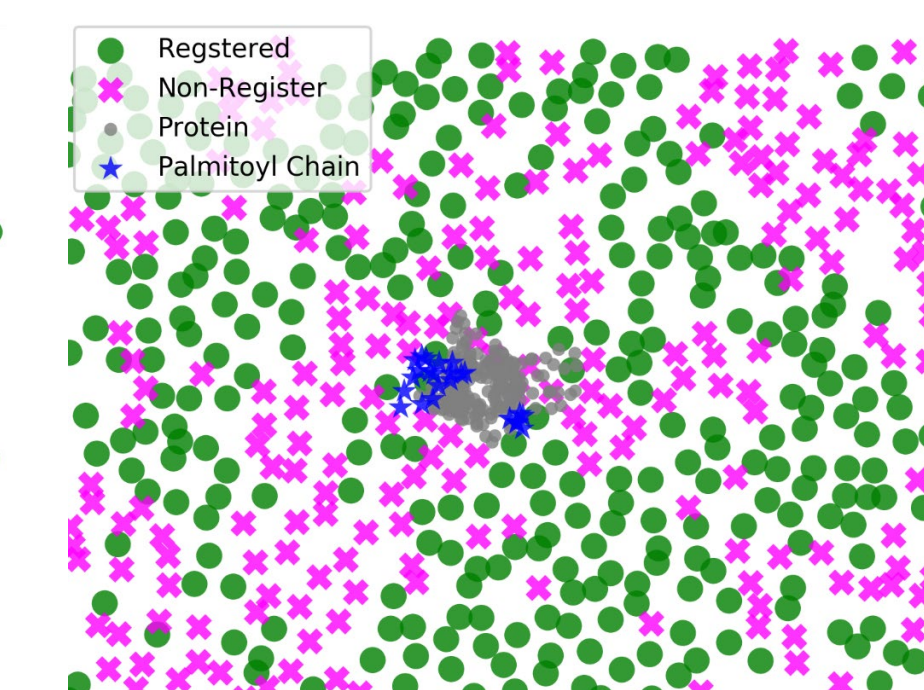
## Conclusions

- We found that after palmitoylation occurs, the saturated lipids in the membrane tend to reside closer to the protein more than before.
- These results show that after palmitoylation the membrane tends to resemble those within the human body.
- This means that we can alter the degree of palmitoylation, as in this experiment, that will also alter the membrane they reside within.

Non Palmitoylated Scatter Plot



Palmitoylated Scatter Plot



## Acknowledgment

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## References

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