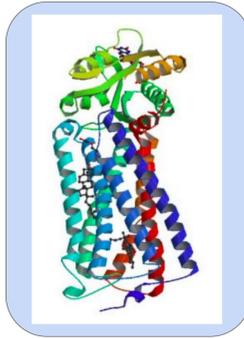


# 3D Modeling of CB<sub>1</sub> Receptor Negative Allosteric Modulation

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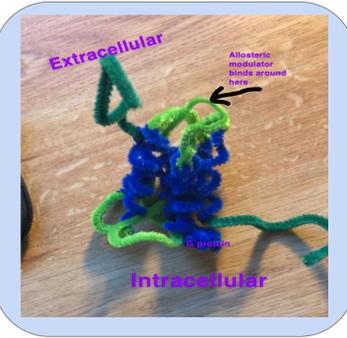
## INTRODUCTION

- The CB<sub>1</sub> receptor is a G-protein coupled receptor (GPCR) with 7 transmembrane helices.<sup>1</sup>
- Ligand binding causes conformational changes at transmembrane helix 6.<sup>2</sup>
- Negative allosteric modulation (NAM) decreases agonist efficacy.
- NAM ABM300 has been shown to remedy schizophrenia deficits.<sup>3</sup>

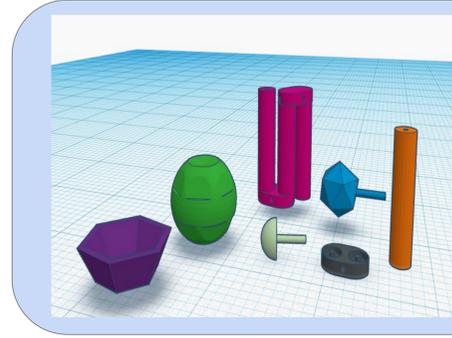


**Goal:** create a moving, 3D model exhibiting NAM of the CB<sub>1</sub> receptor to enhance visualization of the associated conformational changes

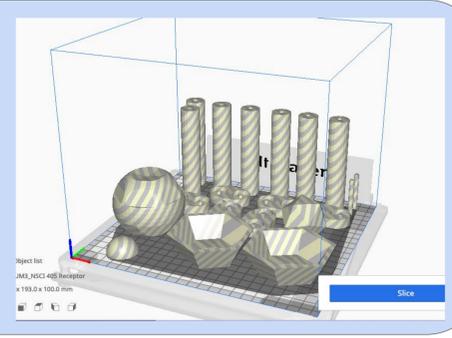
## ITERATIVE PROCESS



**Prototyping**  
Our model was conceptualized via prototyping



**Initial Print Modeling**  
Receptor details were simplified as 3D model parts were designed



**First Print**  
The first print yielded intact but ill-fitting 3D model parts

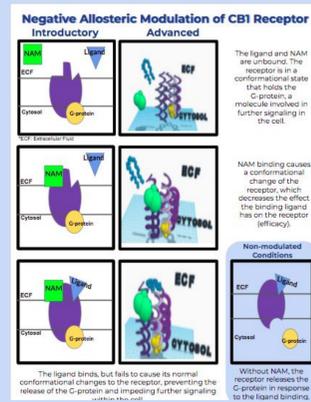
## MODEL & TEACHING GUIDE



**Final Printed 3D Model Parts**



**Final Assembled 3D Model**



**Teaching Guide**



**Teaching Guide Access**  
Scan the above QR code for access to our teaching guide.



**3D Model Demo Video**  
Scan the above QR code for a model demonstration.

## METHODS

### 1. Research

The CB<sub>1</sub> receptor and NAM was researched with various journal articles.

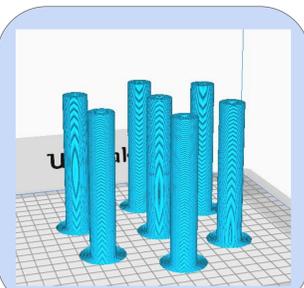


### 2. Initial Design

The CB<sub>1</sub> receptor was conceptualized using pipe cleaners and other materials from a MakerSpace making kit. Design sketches, including dimensions, were then drafted from the prototype. MakerSpace 3D printing training was completed.

### 3. Digital Design & Teaching Guide

TinkerCAD was used to digitally design the sketched model. The design was transferred to Ultimaker Cura in preparation for printing. Adobe Spark and Google Slides were used to design the teaching guide.



### 4. Printing & Assembly

Makerspace 3D printers were used to print the 3D model parts, which were then assembled.

## FUTURE DIRECTIONS

- Increase detail in the printed 3D model to more accurately represent the CB<sub>1</sub> receptor. For example, model alpha helices as spirals or the ligands as their molecular form.
- Create a 3D digital animation to enhance digital visualization of the receptor's conformational changes.

## IMPLICATIONS

- Our model aids in the teaching of allosteric modulation to beginning neuroscience students.
- Model movement enables visualization of NAM-specific conformational changes.
- Our model may aid in the understanding of schizophrenia-related mechanisms.
- Our model demonstrates CB<sub>1</sub> NAM, a process shown to remedy schizophrenia-related deficits.<sup>3</sup>

## STATEMENT OF CONTRIBUTIONS

- Jordyn: edited introduction
- Matt: wrote introduction, developed citations
- Mary Virginia: created template, revised formatting, added images and QR codes, wrote iterative process, wrote discussions, edited all entries
- Eric: wrote methods, provided images, wrote discussions
- Autumn: wrote methods, edited methods

## REFERENCES

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