

13/9/23

• The first day working on the project

GOALS

- Begin research on subject: pharmaceuticals, specifically addiction to opioids
 - This is because I know I wanted to do something on drug addiction recovery, specifically withdrawal, however, not having a background on this meant I had to start from scratch, with background research early on
- Get a basic idea of brain receptors on the opioid / depression +
- Essentially begin earlier

references

Notes taken on:

- In bibliography
- Antisocial related drug abuse
 - Introducing how drugs affect the brain

General things learned:

- Relationship between stimulation / blocking of receptors for certain drugs
- Agonism, a substance mimicking actions of neurotransmitters / hormones
 - Opioids fall under agonists
- Certain drugs work to inhibit other parts of the brain

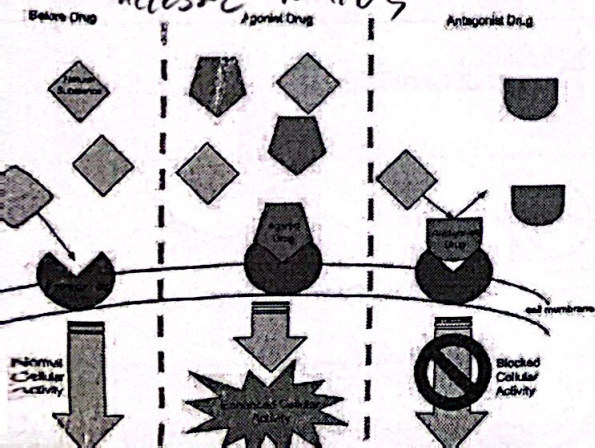
Sources used: 3

Other - The week is fairly busy, and most of the science fair planning will start in November.

With the project on drugs, it will likely be a research based project due to ethics and due care, although I would have to look into observing.

With having no background in this topic comes working with a U of C ^{prof.} likely in pharmacology or biochemistry, in order to ask questions regarding properties of certain drugs.

Wikipedia, CC BY-SA 3.0, 29 April 2014, accessed 13/9/23



Osmosis.org • Kaylee Neff, Alain Nueles, Tala Ingram, MSW, CMI, published 13/9/23

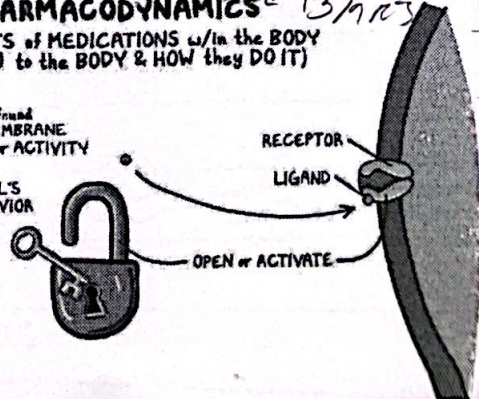
PHARMACODYNAMICS

* MECHANISMS & EFFECTS of MEDICATIONS w/in the BODY (WHAT MEDICATIONS DO to the BODY & HOW they DO IT)

RECEPTORS

- ↳ SPECIALIZED PROTEINS found INSIDE CELL or ON its MEMBRANE
- ↳ CAN ALTER their SHAPE or ACTIVITY

CHANGE in CELL'S ACTIVITY or BEHAVIOR



9/11/23 -
24/11/23

goals for the following fairly short sessions
of work, over / primary work on the
topic will be done in the following days
leading to:

- Look further into agonism / antagonism
- Finish reading article on dextromorphan /
antitussive related drug abuse, and continue
with absorbing more information on
antitussives in specific
- Look into antagonism and with drawn
specifics

So far, worked on the specific research
within the goals in short intervals through
the weeks.

Done / information which is critical:

Types of antagonism

- Chemical
 - Physiological
 - Pharmacological
- Opioids can fall into any of said
categories

Specifies on withdrawal:

• Physical / psychological dependence

Factors involve age, type of drug,
prolonged usage, etc.



Said information can be helpful on a topic on prolonged usage / time used on a specific drug, or having manipulated variable as one of the factors

ex. Variable within the study being age of the drug user for a specific drug

However, this is very simple, and upon closer inspection, does not have much information available online. The results too, are already found. Younger people will be more affected developmentally, while older adults, with compromised systems will also be profoundly affected

26/11/23

GOALS FOR TODAY:

- Find a topic via research
 - Look into specific studies to base research off
 - Withdrawal, or other factors affecting addiction
 - Possibly finding other factors of addiction
- continue background research for research project
 - Look further into the drug

critical/ useful information:

- Repeated use weakens brain's circuits
- Drugs give a "tranquil" following a new thought pattern esp. is hard to quit
- Cues/ triggers are built

POSSIBLE TOPIC:

- Pharmacotherapy, using various methods to alleviate withdrawal

↑

however, focus must be narrowed to get into the specifics of science like biochemistry

Essentially more background research on withdrawal was conducted on the drug

Found symptoms with demand (often opposite of the drug's effect)

e.g. caffeine withdrawal would be tiredness

27/11/23 - 28/11/23

Goals:

- Find topic for deadline of submission (Nov. 30)
- Look into a specific science with a variable possible to be manipulated
- Laboratory setting working with a professor

Done

Looked into one specific source (cited in bibliography)

took notes

- Microbial infections, immunomodulation, and drugs of abuse as a study

Possible topic (as of), relationship between an additive drug (in this science fair project's case, an opioid), and progression of a microbial infection

- This is because it could be simulated/variable in a lab experiment setting

Hurdles to overcome?

One of the main hurdles of being a gen & student doing a drug related experimental project would be where we are. Need to look into if micro organisms can be affected

by drug in a profoundly observable manner

• However, with this topic, disease progression would be measured

Other learned info from the article:

- Immunomodulators, modification of an immune response
- Which in turn affects disease progression, in that the immune responses are abnormal, therefore disease will be "undefended" against *per se*
- Smokers/alcoholics are more prone to hospitalization due to diseases as their immune system is weakened by the immunomodulator

Found a possible disease to see progression: AIDS, as it directly targets the immune system

29/11/23

Goals:

Find a topic

- research disease to be used
- Research which drug are microorganism to be experimented on

Dave today

- Found diseases/ microorganism experiment candidate
- Amoeba/ staph
- However, this topic fell apart due to the size between microbes and microorganisms not being large enough for infections

Info:

Work was very low, but it was concluded no profound progress can be done on the topic experimentally due to inability to record data without violating ethics and due care.

Brain tissue was my second option, but it is extremely costly and can only be kept alive a few days.

^{interacts}
Most diseases also only spread to
the brain, but affect tissue
surrounding the brain, e.g. meningitis.

Multiple sources were consulted and
at this was gathered just from seeing
micro measurements of some models
to steph

2/12/23

GOALS/ to do

- Fill out cyst planning sheet
- Find a specific study / research done from a U of C professor
- Check scholarly articles, and find one on drugs from an active professor to email

DONE TODAY

- Did not fill cyst planning sheet
- However, both professor and article to start research began
 - I decided research due to the limitations of the last idea and the professor's constraints

Article to be used:

Blocking pannexin-1 channels alleviates morphine withdrawal in rodents (Liu et al., 2017)

- Today's abstract was read, gist was the study / research was to find a method of alleviating withdrawal without affecting the drug effects.

- This is for medical settings likely, as analgesia is required for surgery, but withdrawal takes into effect

IIVFO comment:

I have little knowledge on biochem and gene manipulation, but general ideas on pannexin-1 and info in the articles paper. However, I have found some info on things like vehicle treatment and pannexin-1, as well as gene expression. This article will likely become what I base my research upon, and likely, I will message Professor Tuan Tang to ask for info.

3/12/23 - 4/12/23

TO DO

- Fill in CYSE planning sheet, with the topic idea
- Find topic idea with the article
- Email prof. Tom Tracy and associates

DONE:

- Filled in ~~the~~ planning sheet to be given to science fair coordinator Ms. Friesen
- Found topic to be used, Alleviating withdrawal ~~in~~ without disrupting drug effects via blocking peripheral channels in non opioid drugs
- Procedural extra info will be detailed in other documents
- Emailed prof Tom Tracy at U of C to work with, will come up with possible questions to ask.
- Possibly will see other U of C postgrads working in pharmacology/pain studies

Thoughts on what will be done over
next weeks:

~~It will probably~~

- Reading article and annotating sources/
writing bibliography on information
- Receive better understanding of panx-1 and
procedure via this, as I will likely
be on the busy side in the
coming weeks
- Continue with logbook / other background
work like registration on CYSF platform

Prof. Tuan Tran reply on Dec 13.

After some back and forth on schedules,
member of Prof. Tran's team, Siem,
a Md whom is studying for premed
will join the ^{next} ~~work~~ on Dec 27.
5:30.

For the past weeks, it has mostly
been analyzing the article to best
prepare to ask questions

Things done:

- continued researching and looking into articles researching and highlighting key areas of this research

↑ Notes should be taken on a doc to keep track of definitions, and submitting as part of project

OTHER:

The meeting itself was Dec 29, not the 27, leading me to miss it. However, it worked out and was rescheduled to January 5th

MORE:

- Begun on procedure and overview of project plan
- Procedure has some project info, but research / experimental procedure is not done yet

Dec 30
2023

GOALS:

- Finish procedure for project + other procedure (during research)
- Continue with research/notes

DONE:

Finished all procedure (including outline and research procedure)

This is included in project, and inputted into the CTF platform

Procedure dictates how research will be done, and shown to Prof. Truong and ~~the team~~ his associate, Sierra

Jan B
2024

GOALS

- Began prior research document rather than compiling notes on a pdf
- Add hypothesis
- Continue with research and write definitions

DONE:

- Began prior research doc
 - Added terms like para, expressions, etc.
- Continued to add various terms relevant for research on this day

notes: I plan to do more the day after, such as preparing questions for the meeting.

4/1/23

GOALS:

- Prep questions for tomorrow's meeting
- Use document to back questions and make them relevant and not surface level
- Look at definitions to create questions

DONE:

- completed goals (prep questions)

Ended up with 5 main questions with more I can think of during the meeting w/ Prof. Tracy and Dr. Sierra

Added area at bottom for notes on answered questions

5/12/24

THINGS DONE:

- Met w/ Prof. Tim Truog and Dr. Sierra Stokes-Heck

Questions were answered however as I asked more relating to the topic, I essentially couldn't sort the answers, but instead wrote a bit on how my questions were answered, my steps moving forward, and what to think about.

Especially in scope as I learned just browsing scholarly articles which are very specific.

NEXT STEPS:

- Email about benzodiazepines, specifying the work they mentioned was being done on them

- Refine procedure based off new information.
 - Research to come up with 1/2 main guiding questions in my search, and why this withdrawal alternative is beneficial for benzodiazepines
- Be very specific

6/1/24

• Emailed Prof. Franc and Dr. Stokes-Hicks about benzodiazepines and work done in them

7/1/24

THINGS TO DO

- Enter basic project info
- Enter ethics and due care

DONE

- Added basic project info and simple title (to be changed later)
- Filled ethics and due care form 2A
 - Added brief gist of project and what will be done
- Looked at changes to platform

8/1/24

• Work at school during lunch

done

Main Issue:
evaluating
clarity of
problems

• Added 3 primary questions with
clear terms

• Researched why this is so relevant
(and the issue) with benzodiazepines

Found article on how dependence
is leading

later:

Added more definitions

(drugs) ex. ~~from~~ opioids, probenecid
depressants (class), ~~the~~ benzodiazepines
(drugs)

As well as adding benzodiazepine
withdrawal syndrome and aspects to
add into the problems of withdrawal

7/1/24

Goals/ things to do in this work:

- clarify how clear the work regarding questions are with Ms. Friesen
- Write / ~~finish~~ finish definitions and the identified problem

benzodiazepine withdrawal syndrome

- How is it so deadly, especially when people are prescribed this?

- Why is it common?

- How is it so different from other drug withdrawal?

Look into probenecid and the other drug that blocks ~~probenecid~~

(I would assume it is blocking and not genetic deletion, as they are described as being blocked)

Essentially finish and clarify these. Write a paragraph on ~~reference~~ the media & some text issues with current withdrawal

DONE/ completed:

• Did not have chance ^{to} look into
probenecid and metformin

• However, I looked into issues with
current withdrawal treatment for
depressant drugs, which involves using
depressants to slowly decrease dosage

• Added info to the issue and
into on benzodiazepine withdrawal
syndrome

symptoms, dangers, current
treatments, issues

★ Finished the EMIT forms but

not main issues. However, stuff
with the problems has been written

10/1/24

GOALS / to do:

- Create paragraph about problem
 - Add jobs too
- Analyze opioid mechanisms (find articles on google scholar with ~~the~~ any specific mechanism)

Start research doc
with opioid mechanisms

ie Write ~~an~~ procedure to better
fit in iterations after
(ex. only benzodiazepines and
opioids)

Procedure items to add:

• Look into opioid mechanism →
if there is info about it with
depressants? Write it down

• Write about probenecid

DONE

• Finished paragraph on problem

↑ Used statistics and specifically cited them on why it's so important to solve the issue at hand

• Begin rewriting research procedure (how to find mechanisms)

↓
• Costly guiding questions to research step by step)

Made conclusions about information on whether before

procedure:

• How should the information be organized?

• Should I do $\text{---} \rightarrow \text{---} \rightarrow \text{---}$?

or work on multiple at the same time?

11/1/24

THINGS TO DO (things to do out so) FINISH PROCEDURE



How to go about organizing
my research

begin research with docs created
from research

more research and data docs
will be created for each
relevant mechanism found

other things:

The first thing I would like to
research is how opioids connect
to painkillers specifically, by
analyzing the article for non-procedure
information today. Then, compile
my information and look into ^{what}
doc (even with ^{just} membrane / ATP
and opioids)

List keywords for searches
ex. mechanism, opioid, painkillers

DONE:

'Finished procedures but did not complete research due to outside factors

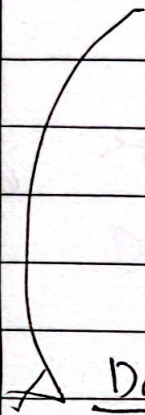
↑ procedure will not be followed to a T, instead it can be a very good guide to work on research

* TBD: Start opioid mechanism dev

12/11/24 -
~~12/11/24~~

T O D O

- Use article to find opioid mechanisms
- Find article to research withdrawal properties



Done

- Researched pharmaceutical article abstract, but realized most info was all to prove the theory, then procedural steps in a specific experiment to confirm the notion that was discovered in experiments to analyze

- Essentially, much of the information could only be relevant with understanding of the property if a similar experiment is conducted with benzodiazepines

15/1/24

To Do:

Begin continue research and find a document / article to cite



Continue w/ foreign terms

• Prepare to write hypothesis using gathered information

• After completing opioid mechanism research, I would like to start hypothesis and work on benzodiazepine mechanism case review and sources from Dr. Stokes-Meck

DONE:

• Found ~~an~~ opioid mechanism article by prof. Tracy as my first source

• Added unfamiliar terms to terms

• Also added relevant information

16/1/29

TA PD:

cont. on research during school hours
and add terms, slowly chip away
at article to conclude information on
research

↑ Add some specific citations

DONE:

Essentially just added onto research,
however I will need to add
citations + more info.

Notes:

I would probably have to crunch
for fine more, as I have
about a month until the
database closes

18/1/24

GOALS:

- Properly add and cite any sources, and combine them into APA format

ex. paraphrasing research

- Continue with article research, addition of terms.

Other - expand on ~~the~~ the problem, and expand on the most important terms

DONE: Begin compiling research sources into one doc. and slowly adding

(Done half of this, I would like to finish this on a later date)

11
11/17/23

TO BE DONE:

- complete citations doc and add citation placeholders
- Use this as comment for future research
- Add citations to this & documents and at end, add specific

DONE:

Finished these tasks of citing sources so I put down proper doc citations

2/11/23 /
22/1/23

21.

TB/DONE:

Cont. exploit research, get more of
sec conclusions

↑ Also add to potassium
K ATP channels

DONE:

Added on to research, primarily on
unfamiliar terms like potassium
channels

22. TO DO:

- Try to finish this article's research,
or get another page of notes
and prep to conclude

↪ basically continue w/
yesterday

23/1/24

DID TODAY:

- Finished first part of opioid mechanisms

I went to: finish a few parts of mechanisms after finishing non-CMSF related activities, cont. opioid mech research

- Did not get to central withdrawal mechanisms

- Added all notes 1st form

- Also did research in familiar terms like potassium channel

~~Also did~~

11/24

TO DO:

- Begin withdrawal research
- ~~research~~
- separate it from opioid mechanism research

Today I began the second half of the article on withdrawal rather than the opioid use mechanism.

It primarily discussed the fact withdrawal was "compensatory", meaning it attempted to make up for the mechanisms opioids affected. I primarily took notes like usual, but I separated it from opioid mechanisms.

I'm not quite sure if I should conclude that part, I plan to conclude the mechanisms as a whole, but it may be helpful

25/11/24

TO DO:

- conclude on last episode mechanisms from that article

- cont. writing notes on withdrawal

DID:

- did not conclude as I feel as though it would be a better use of my time to do it later

- continued writing notes on withdrawal, adding terms, citing sources, etc

6/2/23

- continued opioid withdrawal mechanisms
- Added research as pt. form
- Re-organized research
- Added research terms

Essentially continued where I left off from my sickness / time off

7/2/23

- Finished article and began a new article / withdrawal mechanisms

- Compiled some major AMP receptors
- Added new research terms for areas of the brain to do with withdrawal

2/24

THINGS DONE:

- Finished the second article and took notes
- Took some definitions (will not be used, but used as a guide of definitions like GABA)
- Started a new article on opioid receptors
- Inputted my method and problems to CYSF platform

12/2/24

- Created acknowledgements
- Did a bit of research

13/2/24

- Created a few documents -
 - Questions to user
 - Benzodiazepine review
 - Citations for benzodiazepines
 - Emailed Professor Tran

of using research overlap to determine applicability

- Write questions to answer and viewed some past CYSF projects
- Found benzodiazepine mechanism research
- Added more to opioid research

1st/2/24

- Began mesolimbic system research
- Cont. opioid research
- Found a useful definitions of terms piece of text

• Added a few drafts of opioid symptoms

• Added more mesolimbic system definitions

• 17/12/24

• Finished details to notes of mesolimbic system.

• Added new location:
locus coeruleus

• Sorted ~ few more definitions and citations

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~~BZD day~~ 18/12/24

- Last day doing opioid research
- Completed writing notes on article, and added relevant definitions a presenter may need to know

19 BZD day

- Gathered articles to cite (plan to use a lot of sources to get the full picture)

- Compiled some relevant locations for the future
- Wrote notes and read through articles

Today I began researching benzodiazepines.

20/2/24

Continued researching

benzodiazepines

Reworked hypothesis

Ordered foil

Notes: A few more of interest
are the opposite effects
of dopamine and GABA
GABA \uparrow = dopamine \downarrow despite similar

21/2/24

Compiled many more articles

Finished adding notes and

completed 2 articles

of research definitions

and possible correlations

21/2/24

Today we had a meeting during
~~the~~ lunch for a U of C
mentorship opportunity.

I primarily asked about timeline,
and finishing my project in a

23/2/24

- Added / sorted more benzodiazepine citations and definitions
- Begun and finished an article

24/2/24

- Completed benzodiazepine research by finishing final article
- Added diagrams and other charts
- Begun to think about mechanisms

eg. how would I word
~~~~~?

My next steps are researching until March 1, then doing the written oral postdoc.



25/2/24

• BEGINNING to research  
mechanism overlap

• Today I began this research  
not only starting a doc, but  
compiling a few things

• Locations of mechanisms  
• Relation to ATP /  
pinnexin-1

• Also added key terms, etc  
a solid foundation for the  
next 4 days

• Added some mechanisms of opioids +  
pax1



26/2/24

- Cont. Mechanism overlap research
- completed compiled articles



Added more articles to complete

- Took notes + sent email to prof. on Peripheral NS questions

27/2/24

- Finished GABA and opioid overlaps  
both increase dopamine somehow  
(Mesolimbic system)
- Began on the LC, the noradrenergic



12/12/24

• Did components of ~~respiratory~~<sup>LL</sup> system  
} did not finish

however

• cont. research, notes, and adding terms

Notes: Today my tri-fold came in! However I do not

ADDED more to the ATP and BZD mechanisms

considered overlap of opioids



29/12/24

- Completed all but 1 compiled articles
- Finished 100% NE and systems of overlap

Kind of / 96% finished AYP related BZD mechanisms

Notes: Tomorrow I will finish, then begin on the platform's written portion (e.g. introduction)

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1/13/24

Goals:

- Finish introduction
- Finish basic opioid mechanisms / use symptoms (separate in 2, symptoms and neurological mechanisms)

Try to begin BZD mechanisms

Done:

Introduction, started opioid mechanism



3/3/24

Cont. reviewing my research  
and notes

↑ Edited method +  
problem  
↑

Added depth to how this  
issue affects minority  
groups

NEED TO FINISH  
QUICKLY

Finish  
rece

Ab  
sh

Car



4/3/24

Finished flow opioids act on receptors

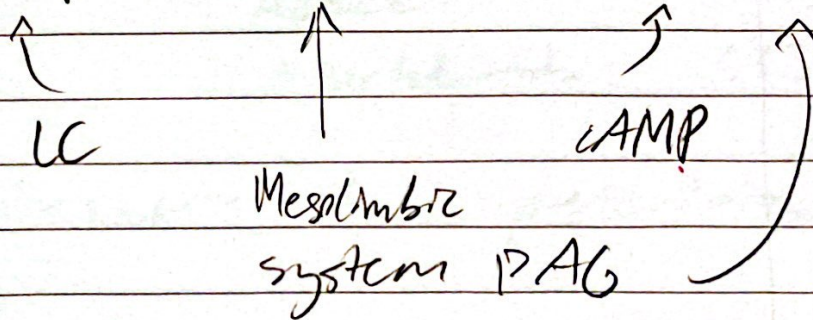
↑ Added images and other

Also completed writing basic info about opioids

Other: Only have 8 days to finish  
I want to finish each location  
the mechanism tomorrow

5/3/24

Completed mechanisms in locations



Also edited a few things and  
uploaded it into the CYSF platform



1/3/24  
Cited all sources, added dates  
and names when needed

Added citations to CYSF  
mechanisms

- Finished / started writing about  
ATP and benzodiazepine relations

- Edited method

2/3/24

Completed benzodiazepine  
mechanism location  
/ specific research

Inputted both into CYSF  
platform

Each location, and HAW  
reference develops

- Finished ATP and benzodiazepine  
and overlap mechanisms



4/13/24

• Fully finished discussion, no topic



Edited and added a few more smaller mechanisms

4/13/24

- Finished conclusion and application
- Created a model on how benzodiazepines, ATP and protein blockage works

(Used google sites & had in charge)

Tomorrow I will record my presentation

- Redrew added a new banner/project image



1313129

- created cues for presentation
- practiced video presentation

↑  
Recorded (10 mins)

↑  
Added full project to docs  
for later use