Cannabinoids and Health

Module 16

Lecture 3: Where do we go from here?

Why do cannabis products appeal to people as an alternative medicine?

- Perhaps a big part of the reason is that cannabis DOES NOT fit the current drug development rubric
- DISTRUST of Big Pharma?
- News reports indicating enormous profits for drug companies while drug prices soar?
- Perhaps it is reports that come out after approval and sales of a drug suggesting either harmful effects (e.g., opioids) or lack of efficacy (e.g., opioids, anti-depressants)
- Perhaps people are tired of being told exactly what to take and how to take it… and then told to take another medicine to mitigate the side effects of the first one
- Can you think of other reasons?

Democratization of medicine?

- There does seem to be a populist flavor to the movement to have access to cannabis as an alternative medicine
  - People want to be **empowered** when it comes to making these decisions
- People also need to feel empowered in terms of participating in the research that is sorely needed
- “Citizen science” is catching on – but is there a citizen science initiative for research on cannabis?

WHAT IS CITIZEN SCIENCE?

Citizen science occurs when ordinary people like you help to conduct real scientific research. By participating in citizen science projects, you can contribute to our understanding of our world and make it a much better place.

You don't have to have an advanced degree to contribute, and it's something you can do in your spare time. Check out a few of the amazing results of citizen science projects below, and learn how you can join in the fun!

DATA

50 million classifications were received by the GalaxyZoo project in its first year, contributed by more than 150,000 people!

PAPERS

More than 60 scientific papers have used Cornell Lab citizen science data collected by bird watchers since 1997.

DISCOVERIES

Foldit players discovered the structure of a protein-cutting enzyme produced by an AIDS like virus in monkeys...in just three weeks.

A FEW WAYS YOU CAN PARTICIPATE:

Donating money: The easiest way to contribute to a project is to give money via a crowdfunding site like Microryza or directly to a project, like Monarch Watch.

Set and forget: Another easy way to be a citizen scientist is to install a program called BOINC on your computer and let it crunch data while you write your emails.

Web-based: Way more fun is actually doing the science yourself: you can listen to bat calls at Bat Detective, or sift through ocean images at Subsea Observers

"There are a lot of smart, educated, thinking people who are not in the tenure track who have a lot to contribute to the world."

- Jessica Richman, uBiome

WHAT DO I GET OUT OF IT?

An education! Learn about your favorite topics in depth while contributing

Fun! You never know what you might find.

A sense of purpose. Online games and reality TV are great for winding down; citizen science projects provide a way to put your spare time to use in a meaningful way.

FIND OUT MORE AT:

WWW.CITIZENSCIENCECENTER.COM

Moving Forward

- The primary goal of this class was to educate people about the risks and benefits of cannabis products so that they can make informed decisions
- While legalized access to cannabis as an alternative medicine has skyrocketed, basic education about product formulations, doses, route of administration has been entirely lacking
- Better education will lead to better outcomes – which is the rationale for this course work!!
- All of you recognize that there is much work to be done on the research side to fill the gaps in this education
- You also now recognize the barriers and difficulty in getting that work done within the current system

What Are Some Important Questions?

- Is CBD effective for various problems (sleep, anxiety, pain, opioid use reduction, etc.)?
- Is the combination of THC and CBD effective?
- What doses? What ratios? What are the side effects?
- How are the effects different for different populations (anxiety patients vs. pain patients, men vs. women, young vs. old)?

Filling the Gaps

- One possibility for filling in these gaps is to empower people to be **PART** of the research – to contribute as a “citizen scientist”
- To that end, we will first review some important aspects of clinical science
- We will also provide a link for you to participate in cannabis research as a “citizen scientist” if you are interested in doing so

What are the important components of good research?

- Randomization to condition is important because it means that the groups will likely be equal on variables that are not relevant to the study
  - For example, if you consciously choose one of three products (CBD, THC+CBD, or THC) your expectancies and biases may influence your choice making if difficult to know if any effects are due to the action of the product **OR your expectancies**
  - Making a random choice protects against expectancies and other nuisance variables that might influence the results
- Sample size is important – the bigger the sample size, the more likely it is that the study will arrive at the correct answer

What are the important components of good research?

- Sampling – who will participate in research?
  - Need samples that are representative of different groups of groups of people
  - Recreational users, people with anxiety, chronic pain patients, older adults
- Research design
  - Carefully considering what the different experimental conditions should be (THC vs CBD vs THC+CBD; different ratios of THC to CBD like 1:1 vs 1:2 vs 1:10?)
  - Between subjects (different people in each condition) or within subjects (same person tries different things)

What are the important components of good research?

- Measurement
  - How do you know what people have taken? How much? Which route of administration? What other measures are important? (e.g., history of psychosis, other drug/alcohol use
  - Make sure the measures reliable and valid

- Data analysis
  - Use statistical tests appropriate to the question
  - Have enough statistical power to test your hypotheses
  - Report results accurately and completely

Citizen Scientist Cannabis Research Initiative

- We have developed an online, citizen scientist initiative to answer some basic questions about the effects of cannabis
- It is anonymous – no identifying information is collected
- It will only be as good as the data that participants provide – careful observations, careful and honest answers are critical to learning more about the effects of cannabinoids
- The website will allow participants to randomly pick a type of cannabis product (e.g., a mix of THC to CBD) that they will test for four weeks, answering questions about their health before and after the four weeks
- After four weeks, they repeat the process with a different type of product
- Participants can then identify and stick with the product that works best for them
- If enough people participate, we should learn quite a bit about the effects of products available in state markets

Cannabis Research Initiative for Citizen Scientists (CRICS)

- People can sign up to be a citizen scientist and contribute information, all of which will be anonymous
- We will also make the dataset available to anyone (citizen scientists or scientists)
- Participants will also have access to the dataset so they can ask questions and answer their own questions with data
- We will also post and update summary statistics and figures on this website and to the Coursera course so participants can monitor the progress and outcome of the studies
- If you are interested in participating please go to the website www.colorado.edu/CRICS

In closing…

- We hope that you learned what the science has to say about cannabis (even if there is much more to learn in the future)
- We hope that you can use this information to help yourself and/or help others
- And finally, we hope that this shared research effort leads to new insights in terms of the risks and benefits of cannabis
- Be sure to check back with the course website as we will continue to update it with new studies, new information, and new analyses from the CRICS