

Cultivation & Growing

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Researching Cannabis Genetics: A Q&A with CJ Schwartz, Ph.D.

By Aaron G. Biros

3 Comments



Dr. Schwartz hopes to use genetic variations and marker-assisted breeding to provide cannabis as a more precise medical treatment.

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Studying cannabis genetics is a convoluted issue. Strain classification, medicinal effects and plant breeding are particular areas in the science of cannabis that still require heavy research. Marigene, a company researching cannabis genetics, is currently working with universities and research institutes to help map the cannabis genome and catalog genetic variation.

According to CJ Schwartz, Ph.D., chief executive officer and founder of Marigene, their mission is to "to classify, certify, and improve cannabis." After studying genetics and cellular biology at the University of Minnesota, Schwartz received his Ph.D. in biochemistry from the University of Wisconsin. His research in the past decade has focused on genetic variations that control flowering time, discovering the expression of a gene called Flowering Locus T leads to differential flowering time of plants and is dependent on their native locations. We sat down with Schwartz to learn more about his research and collaborative efforts.



CJ Schwartz, Ph.D.

Upcoming Events & Webinars

March 23, 2021 - 12:00 pm - 4:00 pm
Cannabis Cultivation Virtual Conference
Preliminary agenda just announced! Click the link to see the full agenda. This complimentary virtual conference returns on March 23. Four sessions back-to-back, all on the same day and free to attend. Get access to a number of cultivation experts speaking on topics from facility design to pest management and sustainability and much more.

May 4, 2021 - 12:00 pm - 4:00 pm
Cannabis Labs Virtual Conference
For five years now, we have been hosting this complimentary collection of webinar presentations, designed to help attendees better understand some of the more technical aspects of starting and operating a laboratory. We will take a deep dive into cannabis and hemp testing, laboratory accreditation, regulatory compliance and much more. Four sessions back-to-back, all on the same day and free to attend. Stay tuned for the agenda announcement and registration page coming soon!

Cannabis Industry Journal: Why are you researching mapping the cannabis genome?

CJ Schwartz, Ph.D: We seek to identify the genetic differences among cannabis strains and the genes responsible for these differences. Genetic differences are what cause different strains to have different effects. DNA allows reproducibility, consistency, and transparency for your cannabis strains.

The more information we gather about cannabis genetics, the more tools we have available to create tailored strains. Cannabis is a targeted compound. It interacts with a very specific system in the human body, similar to hormones, such as insulin. Understanding the cannabis genome will help bring legitimacy and integrity to cannabis products, and allow us to better understand how chemicals from cannabis interact with the human brain. Genetic identification can provide a method of certification to more comprehensively describe plant material.



CIJ: How did you get involved in cannabis research?

Schwartz: My interest in cannabis guided my research career. Cannabis may not be a cure-all, but it has significant and measurable medicinal effects for many patients.

To allow true development of cannabis products, we need more science! Our genetic analysis is required for normalization and acceptance of cannabis products, but also essential for future breeding efforts to develop better and more useful plants.

Our sister company, Hempgene, is applying all of the same technology and techniques for hemp research. One focus of Hempgene is to manipulate flowering time in select hemp cultivars so that they mature at the appropriate time in different environments.

CIJ: What do you hope to accomplish with your research?

Schwartz: We can develop or stabilize a plant that produces a very specific chemical profile for a specific condition, such as seizures, nausea or pain. By breeding plants tailored to a patient's specific ailment, a patient can receive exactly the medicine that they need and minimize negative side effects.

The current term describing the interaction of cannabis compounds is called the entourage effect. Interactions among compounds can be additive or synergistic. The entourage effect describes synergistic effects, where small amounts of compound A (e.g. Myrcene) vastly increase the effects of compound B (e.g. THC). Instead of flooding one's body with an excessive amount of chemicals to get a non-specific effect, cannabis plants can be bred to produce a very specific effect.

Currently our goal is to catalog the natural genetic variation of cannabis, and to identify DNA changes that affect a trait of interest. Once superior variants of a gene are identified, those variants can be combined, by marker-assisted breeding, to produce new combinations of genes. How different cannabis chemicals interact to produce a desired effect, and how different human genetics influence the efficacy of those chemicals should be the ultimate goal of medical marijuana research.



A view of some of the work stations inside the laboratory at Marigene.

We are working closely with academic institutions and chemical testing labs to gather data for establishing correlations between specific cannabis strains and desirable chemical profiles. Our closest collaborator, Dr. Nolan Kane at UC-Boulder, is working to complete the Cannabis genomic sequence and generate the first high-resolution cannabis genetic map.

We are currently accepting samples and we produce a report in roughly two to three months. For one sequencing run, we identify 125 million pieces of DNA that are 100 base pairs long. We get so much information so there is a considerable time commitment.

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About The Author
Aaron G. Biros
Editor & Publisher of CannabisIndustryJournal.com
Innovative Publishing LLC
Aaron G. Biros joined Innovative Publishing LLC full-time after graduating Tulane University in May of 2015. Graduating with a B.A. in Environmental Studies, his coursework involved environmental sustainability, conservation policy, design thinking in collaboration, social innovation & entrepreneurship, food production & health, and environmental & health risk assessments. He has two years of experience working on staff as an associate editor for FoodSafetyTech.com, writing a series of articles focused on the intersection of food safety and environmental sustainability. Aaron is now the editor and publisher of CannabisIndustryJournal.com, a B2B digital trade publication that seeks to educate the global cannabis industry on everything seed-to-sale in both recreational and medical markets. CannabisIndustryJournal.com covers news, business trends, technology, regulatory compliance and other important areas, aiding in the advancement of a well-informed and safe market.

Comments

JustinF
March 11, 2016 at 10:00 am
Nice article, informative

Reply ↓

Jeff Ullman
March 12, 2016 at 5:52 pm
Sounds great BUT how and when will anyone be able to identify what ratios work well for specific maladies when rigorous clinical trials are a decade away (at least from completion)??!

Reply ↓

CJ Schwartz
March 22, 2016 at 4:14 pm
To Jeff,
Some companies have already been focusing on two brain receptors, CDI & CB2. Trials are currently underway to gauge pain management in children and how the alleles of the two human receptor genes interact with specific cannabinoid/terpene combinations. The specific goals you speak are going to require ongoing research for decades, but we actually already have a good start. Science builds on past results and we are well on our way to developing highly specific medicine for individual patients.

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