

# Lab Now Testing For Pathogens, Cannabinoids; High-CBD Strain Becoming Available to Patients

By Fred Gardner

Two plant strains relatively rich in cannabidiol (CBD) have been identified by an analytic-chemistry lab recently established to serve the medical cannabis industry in California.

CBD is a cannabinoid with intriguing medical potential that gets bred out of cannabis when the breeder's goal is high THC content (as it has been in California for generations). It has long been assumed that available strains contained less than 0.1 percent CBD.

The availability of cannabis that is approximately 5 percent CBD by weight will enable doctors and patients to test its effectiveness in treating various conditions.

*High-CBD cannabis might prove palatable to many people who dislike the effects of high-THC cannabis.*

Because CBD is not psychoactive, high-CBD strains bred to be low in THC might prove palatable to many people who dislike the effects of (currently available) marijuana.

Such high-CBD strains might enable patients who need large doses of cannabis to ingest pharmacologic doses of these strains while remaining functional. According to Jeffrey Hergenrath, MD, "Patients with cannabis-sensitive cancers, seizure disorders, and inflammatory bowel disease, to name a few, could all benefit with a higher blood level of cannabinoids than is convenient with our high-THC strains. For them, availability of a high-CBD strain could be life saving."

## Steep Hill

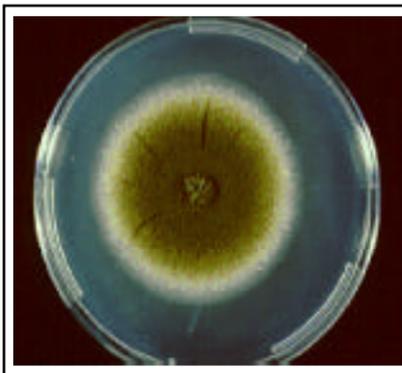
In December 2008, emboldened by the election of President Barack Obama, the founders of a lab in the East Bay doing business as "Steep Hill Medical Collective" notified dispensary operators that they had begun testing cannabis samples for something no one wants to find on their medicine –pathogenic mold– and something everyone wants to find out about –THC and CBD content. The lab also routinely tests for CBN (cannabinol, a breakdown product of THC that indicates time in storage), and is adding a test for bacteria (e coli and salmonella).

Running Steep Hill are two former growers, David Lampach, 33, and Addison DeMoura, 35, who decided to find different niches for themselves within the industry. They spent a year



David Lampach (left) and Allan Frankel, MD, examine a chromatogram showing the amount of THC, CBD and other compounds present in a cannabis sample. Lampach is co-founder of the Steep Hill test lab. Frankel, a cannabis specialist based in Venice, CA, intends to track patients' responses to various strains.

## Bad News, Good News



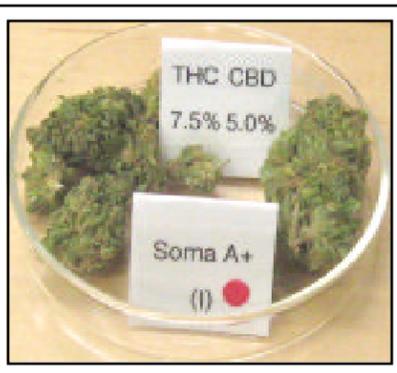
**ASPERGILLUS FUMIGATUS** mold seen growing on a nutrient medium in a petri dish can be harmful to patients with weakened immune systems. *Aspergillus* is present in soil and has been detected in some cannabis intended for medical use.

learning how use the sophisticated testing apparatus and refining their procedures under the tutelage of a sympathetic university-connected chemist.

Lampach, who put up the original funding, operates the gas chromatograph-mass spectrometer (GC/MS) and flame ionization detector (GC/FID). DeMoura is liaison to the dispensaries, many of whose operators are eager to take part in the testing program.

Software customized by Kind Computer Services will enable the lab to handle 100 or more samples per day. It will be up and running by July.

The lab has been refining its proce-



**BUDS HIGH IN CANNABIDIOL (CBD)** are from "Soma A+" plants grown indoors in San Francisco. Feedback from analytic lab will enable growers to develop strains with various CBD-to-THC ratios by conventional selective breeding methods.

dures by testing eight to 10 samples a day provided by Oakland's Harborside Health Center and Sebastopol's Peace in Medicine dispensary. Harborside proprietor Steve DeAngelo has backed the project from its inception. "If you're calling for regulation, you've got to get ready for inspection by public health authorities," DeAngelo says.

Another backer, Morpheus of the Cornerstone Research Collective in Los Angeles, says, "This is a wonderful experiment that is taking place in California –but somebody has to keep an eye on what's being provided to patients."

Promoting quality control is a mis-

*Input from the lab has already resulted in growers improving their operations.*

sion shared by the "Clean Green" organic certification program, the Medical Cannabis Safety Council and other industry groups. As longtime activist Michele Nelson puts it, "the whole industry is in a transition towards professionalism."

The Steep Hill lab has found levels of mold, notably *Aspergillus Fumigatus*, that bear witness to unsanitary production methods. Almost 3% of samples tested this spring were found to contain *Aspergillus* and the pounds from which they came were returned to vendors by the dispensaries.

"Some people will have to clean up their acts," DeAngelo says. "It can't be the whole family and friends sitting around with all the dogs in the living room. We're putting out the message: 'Clean up your trim areas, clean up your storage areas, do not have cannabis curing in an area that's exposed to animals. Set up a clean room and put on different clothes when you go in. Wear gloves. Wash your hands. In other words, remember that your product is medicine and treat it as medicine.'"

Input from the lab has already resulted in growers improving their operations, according to Rick Pfrommer, Harbor-

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# CBD: a Treatment for Breast Cancer?

By O'Shaughnessy's News Service

When California Pacific Medical Center took a half-page ad in the *San Francisco Chronicle* to announce a public forum on October 7, 2008, it may have been the first time in history that a hospital pitched its cannabinoid research program to prospective patients. "From Water Bottles to Marijuana Derivatives," the text called out, "Latest Discoveries about Breast Cancer."

The ad convinced about 100 women and a few men to skip the second Obama-McCain debate on TV and attend the CPMC forum.

William Goodson, MD, gave a brief talk advising his listeners to avoid carcinogens in the environment –a difficult task, given the quality of our air and water. Goodson singled out Bisphenol A, a hormone-disrupting chemical that can leach out of plastic in water bottles, baby bottles, and the lining of "tin" cans. Glass makes the safest container, he said.

"Marijuana derivatives" referred to work being done by two PhD biologists, Sean McAllister and Pierre Desprez, who have been testing pure, synthetic Cannabidiol (CBD) as a treatment for breast cancer. McAllister said that clinical trials could begin in two years if all went well.

He emphasized that CBD is non-toxic and has no known adverse effects: "That's a really nice starting point when you're trying to inhibit cancer," he said. Many of the women in the audience were all too familiar with the miserable effects of chemotherapy and radiation. Many had used marijuana to fight nausea and restore appetite.

Desprez had spent more than a decade studying metastasis, the process by which cancer cells escape from a primary

tumor and seed secondary tumors at different sites in the body. He found that cells in aggressive tumors –unlike cells in tumors that remain localized– express large quantities of a gene called Id-1.

The normal role of the Id-1 gene is to promote the rapid development and differentiation of embryonic cells; by birth these genes have switched off. But in metastatic cancer, the Id-1 gene somehow reactivates and directs cells to grow and travel throughout the body. Desprez calls Id-1 "the orchestra conductor" of this process.

Desprez proposed [Coppe et. al., 2004, *Clinical Cancer Research*, v10, 2004-2051] that clinicians might use Id-1 level as a "diagnostic marker" to indicate the extent to which a cancer has spread. (When cells are not expressing Id-1, the patient can be advised that the tumor is less likely to spread. When cells are expressing high levels of Id-1, treatment can be planned accordingly.)

*The Id-1 gene presented a direct therapeutic target.*

Of potentially greater significance, the Id-1 gene presented a direct therapeutic target. Would turning it off block metastasis? Would turning it off destroy cells that had already metastasized? And how do you go about turning off Id-1 expression?

These questions led Desprez to collaborate with McAllister, a CPMC Research Institute colleague who had been testing CBD for anti-cancer effects and



Sean McAllister observes the effects of CBD on aggressive cancer cells.

reported promising results.

McAllister and Desprez observed the effect of CBD on aggressive cancer cells as the cells chewed through an extracellular matrix in a Petri dish. (The cancer cells are trying to reach nutrients on the other side, just as they would try to reach nutrients in the bloodstream by chewing through tissue in the body.) Assays showed that the presence of Id-1 gene diminished as more CBD was applied – and fewer cancer cells survived and invaded.

McAllister said at the breast cancer forum that Id-1 appears to promote the invasiveness of many types of cancer, and treatment with CBD might be a generally effective way to switch it off.

## Update Spring '09

In late April O'Shaughnessy's visited McAllister at his lab at the CPMC Research Institute, which is in a renovated industrial building South of Market. He expressed hope that the federal government's stimulus package might improve his chances of getting a grant from the National Institutes of Health to keep test-

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