

*"...for the purposes of popular discourse, it is not necessary for homeopaths to prove their case. It is merely necessary for them to create walls of obfuscation, and superficially plausible technical documents that support their case, in order to keep the dream alive in the imaginations of both the media and their defenders."*

*--Ben Goldacre*

*If homeopathy works, then obviously the less you use it, the stronger it gets. So the best way to apply homeopathy is to not use it at all.*

*--Phil Plait*

# “Alternative Medicine” - Homeopathy -

Supplementary Material for CFB3333/PHY3333  
Professors John Cotton, Randy Scalise, and Stephen Sekula



HAVE YOU EVER BEEN  
GIVEN A PLACEBO?

# What is a “Placebo”?

- From Martin Edward's piece, “Placebo,” in The Lancet (Volume 365, Issue 9464, 19–25 March 2005, Pages 1023):
  - *“From the Latin 'I shall please', placebo entered ecclesiastical English in the 13th century, but did not appear in medical parlance until the late 18th century. Hooper's Medical Dictionary of 1811 defined the term as 'any medicine adapted more to please than benefit the patient'.”*

Simply put, a “Placebo” is a medically inert substance (e.g. water, saline, sugar) given to a patient as if it were an effective medicine. Doctors making house calls would use this as a diagnostic tool – if the patient called back the next day and was the same or worse, it was a potentially real disease.

# What is “The Placebo Effect”?

- This is when a patient responds to placebo as if they had been given real medicine
  - they feel better, or the disease clears up in about the same amount of time as people on real medicine
  - this is a real effect, but its power comes from the BELIEF and EXPECTATION that the placebo is real medicine. Degree of belief determines outcome.
  - affects vary – typically 20-30% of people response positively to placebo

# Placebo and “Degree of Belief”

The more culturally significant the placebo, the more positively the patients responds.

For instance:

- Craen et al. (“Placebo effect in the treatment of duodenal ulcer”, Br. J. Clin. Pharmacol. 1999, 48(6), 853-860) found that patients who got 4 placebo interventions each day over 4 weeks recovered at a rate of 44.2%, while those getting 2 a day recovered at a rate of 36.2%. (*a 22% increase in recovery rate*)



# Placebo and “Degree of Belief”

- Blackwell et al (“Demonstration to Medical Students of Placebo Responses and Non-Drug Factors”, The Lancet 1:1279-1282, 1972):
  - inert pills, colored red and blue, will be classified by US participants (who are told one is a stimulant and one is a depressant) more often as red = stimulant and blue = depressant.
  - a similar study in Denmark in 1996 repeated the cultural effect



# More resources on Placebo

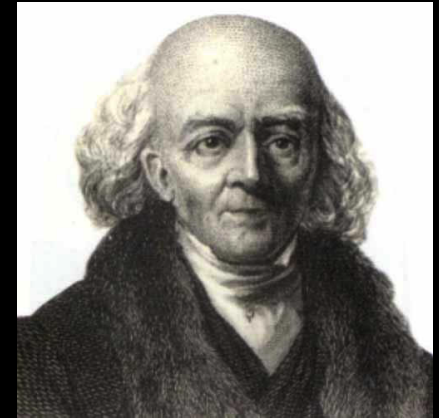
- See Daniel Moerman, “Cultural Variations in the Placebo Effect: Ulcers, Anxiety, and Blood Pressure”. *Medical Anthropology Quarterly*. Vol 14, Issue 1. 2008.
  - lots of good resources in the bibliography!

# BEN GOLDACRE ON HOW TO DISCERN GOOD AND BAD HEALTH ADVICE (from TED)



# Homeopathy

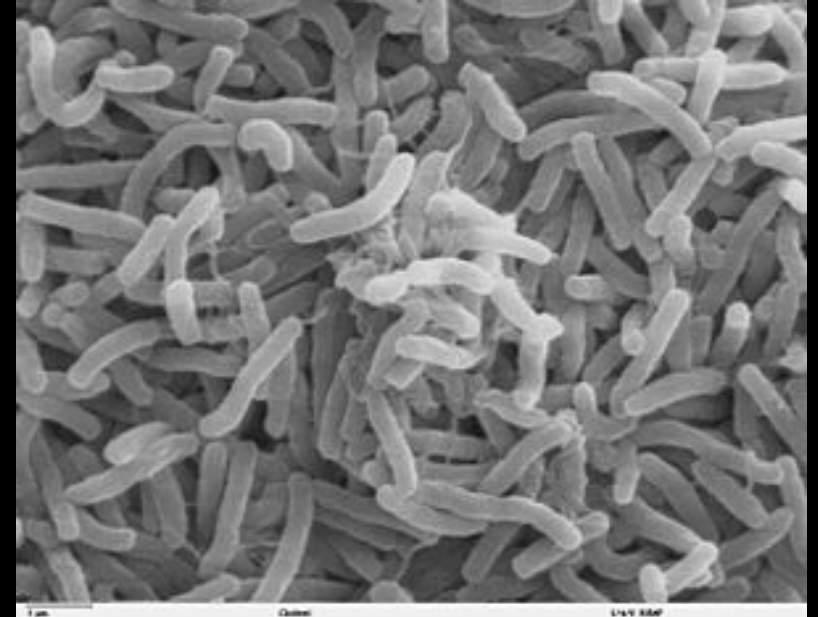
- Originated in the 19<sup>th</sup> century with German physician Samuel Hahnemann (1810)
- CLAIM: “Like cures like”
  - without regard to the CAUSE of disease, any substance that induces the same SYMPTOMS of a disease can cure the disease itself
    - prior to “The Germ Theory of Disease,” (ca 1890) this was just as plausible as any other medical proposal
- CLAIM: “Potency of homeopathic medicine is achieved by DILUTING the active ingredient. DILUTION = POTENCY.”





# A Linguistic/Historical Aside

- Homeopathy:
  - proposed in 1810
- The Germ Theory of Disease
  - first demonstrated practically by John Snow in the Soho, London cholera outbreak of 1854
- Prior to the germ theory . . .
  - Cholera treatments involved bloodletting, etc. - often dangerous to the patient and didn't treat the underlying cause. Mortality rate was 50-60% in conventional hospitals in 1831 Cholera outbreak.
  - homeopathic hospitals claimed a lower mortality rate – about 20%
  - modern oral rehydration + antibiotic treatments have <1% mortality rates.



# A Linguistic/Historical Aside

- Homeopathy vs. “Allopathy”
  - “Allopathy” means “standard medicine” - it was a term coined by Hahnemann himself.
  - By creating a single word to label standard medicine, homeopathy can appear to be an equally valid alternative
    - this has carried through to the modern homeopathy movement, and allows them to look equal to medicine.

# WHO MAKES THE CLAIM TODAY?

(lots of people – go web surfing)

((here are some famous ones))



<http://www.oprah.com/oprahradio/Homeopathy>

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# Homeopathy

By Dr. Mehmet Oz



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Since it was introduced first in the late 18th century, homeopathy has been appreciated by some of world's most famous and respected individuals. Dr. Oz talks with Dana Ullman, author of *The Homeopathic Revolution: Why Famous People and Cultural Heroes Choose Homeopathy*, about the basic principles behind this alternative form of medicine.

Homeopathic remedies are made from substances that, in undiluted form and in very small doses, cause symptoms similar to the disease or illness they aim to treat. "We find a medicine in nature that will mimic the symptoms of the body, that will mimic what efforts the body is trying to heal

itself," Dana says. For example, he says homeopathic doses of arsenic can be used to treat the food poisoning-type symptoms caused by an arsenic overdose.

While this logic is often cited as contradictory—and controversial—by conventional medical practitioners, Dana says it's a central part of homeopathy because symptoms are viewed as the body's effort to restore health, not as something "wrong" with the body. "Homeopathy is entirely based on augmenting the body's own immune and defense system, and it's the only system of medicine, ultimately, that respects the wisdom of the body and then seeks to mimic that wisdom," he says.

WHAT DO HOMEOPATHIC  
MEDICATIONS LOOK LIKE?



## Homeostasis Labs Sleep Relief Homeopathic Medicine

[Write the first review](#)



Homeostasis Labs

SKU #843046

50.0 TB

0.06 LBS

**\$9.99**

As of Nov. 8, 2012,  
price dropped to \$7.99!

FREE standard shipping eligible. [Details.](#)

Add to

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### Product Details

### Ingredients

### Directions

### Warning

Homeopathic medicine. Achieve harmony. 100% natural. Safe. With no side effects. Carton made with power. HPUS indicates that the ingredient is officially included in the Homeopathic Pharmacopeia of the United States and the manufacturer has followed all guidelines set forth. Statement of Identity. Nishiti.

Obtained from the CVS Pharmacy Website, retrieved 30 April 2012.  
This homeopathic medicine is available for purchase >100 years after  
the cause of disease was revealed. For comparison, 50 tablets of  
Tylenol PM are \$8 at Walmart.

Overview

**Ingredients**

Directions

Warnings

Reviews

Active Ingredients: Arsenicum Album (30C), HPUS; Coffea Cruda (30C), HPUS; Nitricum Acidum (30C), HPUS; Rhus Toxicodendron (30C), HPUS; Selenium (30C), HPUS; Zincum Metallicum (30C), HPUS. Inactive Ingredients: Lactose, Magnesium Stearate (Vegetable Source), Stevia Leaf Extract.

Above is the ingredients list for this “sleep relief” homeopathic medicine. What does it mean? What does “30C” mean?

The homeopathic potency scale:

- 1:1: the “Mother Tincture” (the original, undiluted active ingredient)
- “1X”: active ingredient is diluted (e.g. with distilled water) by a ratio of 1:10. This is called “Low Potency”
  - “2X”: active ingredient is diluted once 1:10, then AGAIN 1:10, for a dilution factor of 1:100
- “1C”: active ingredient is diluted by a ratio of 1:100
  - “2C”: active ingredient is diluted 1:10000
  - “12C”: active ingredient is diluted  $1:10^{24}$
  - “30C”: active ingredient is diluted  $1:10^{60}$  (This is called “high potency”)

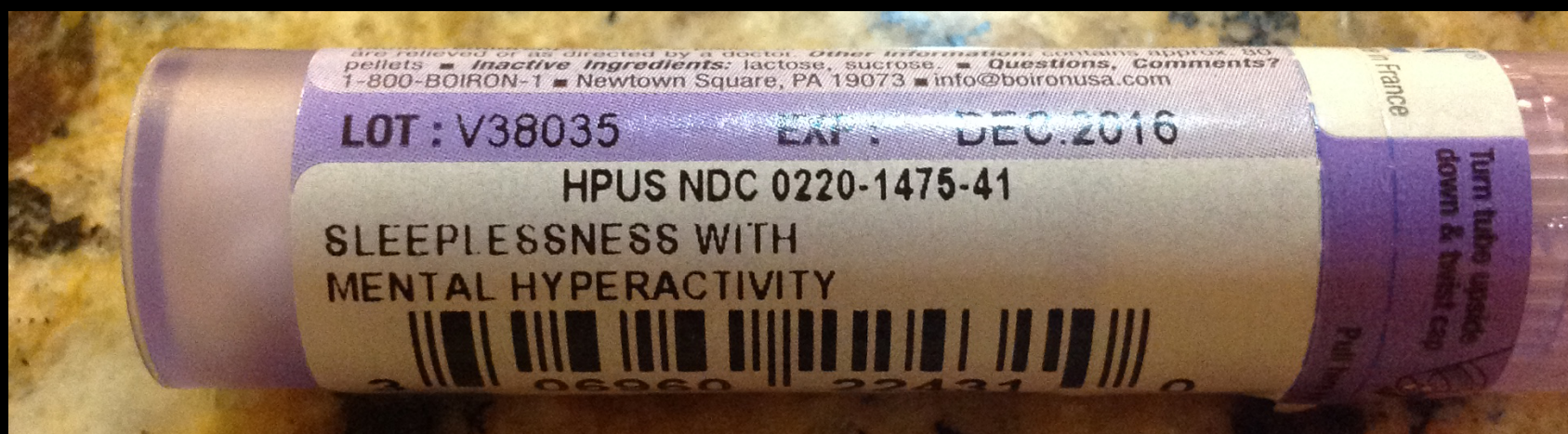
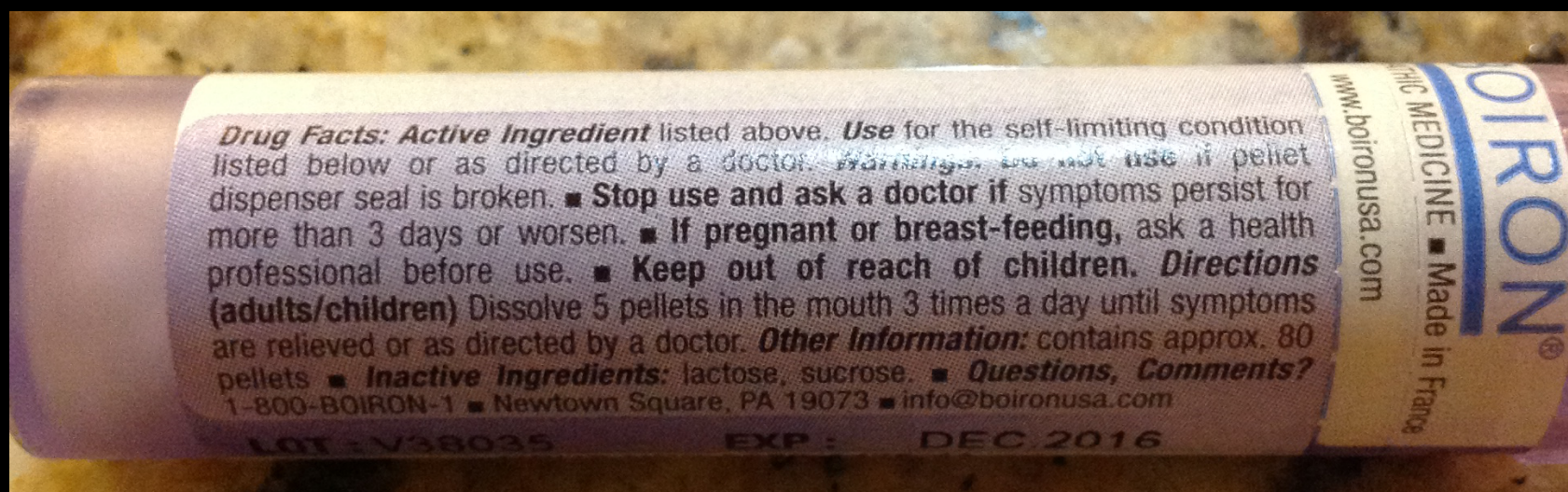
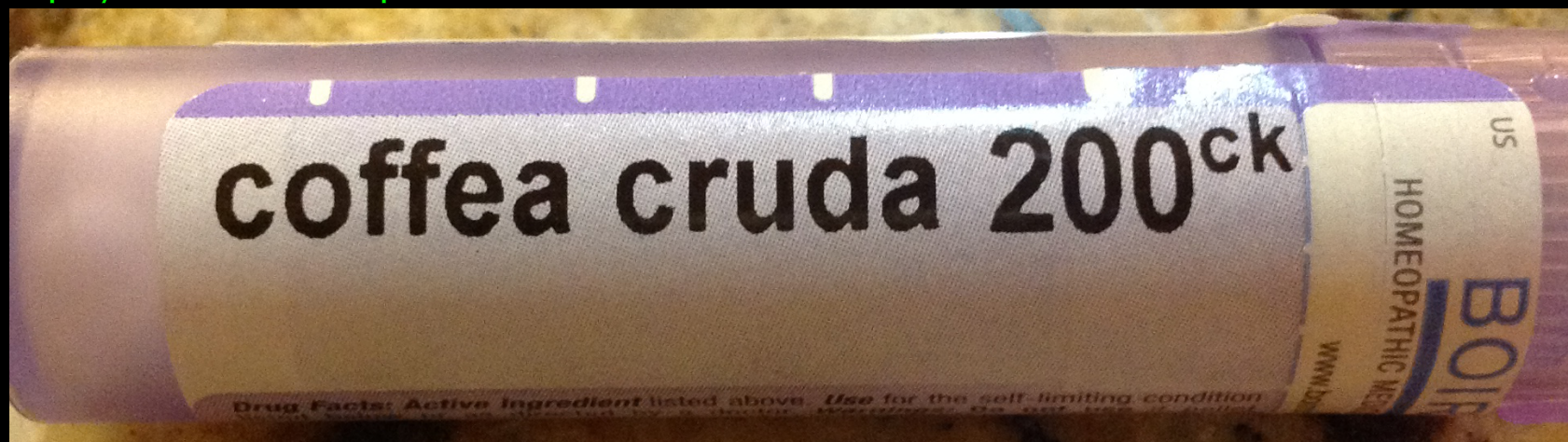


The homeopathic sleep remedy we have in class today is 200C Coffea Cruda, and the whole bottle and pills weigh 0.3 ounces, or 0.019 lbs. It cost me \$10 at Whole Foods.

By comparison, 5 lbs of pure sugar at Walmart costs about \$3







QUESTION:

How many molecules of water are present in a typical, everyday container?

# Some Physics and Chemistry



# Water Memory?

- CLAIM: water “remembers” the properties of the active ingredient
  - so, even if there are no molecules left the water confers the properties of the substance to the patient
- This claim tries to couch itself in the language of quantum physics, or something like that
  - there is no evidence from the ~100 years of experiments on atoms to suggest that when molecules of one substance briefly encounter another, they encode the chemical properties (e.g. electrons and their orbital positions) permanently.
  - in fact, apart from chemical bonding or an applied electric or magnetic field (the only way to alter the electron orbits of an atom or molecule), there is no evidence that anything like this can occur. If a bond is broken, the constituents always return to their original states

# Any Evidence?

- Because of physics and chemistry, we expect the effects of homeopathic medicine to be no different than placebo
- More than 100 studies have been done on the efficacy of homeopathy against placebo – too many to list in one place
  - “Meta-Analyses” and Reviews have been done to try to come to a full picture of these studies, combining them and assessing the weight of the outcomes

*“Homeopathy has been the subject of at least 12 scientific reviews, including meta-analytic studies, published since the mid-1980s....[And] the findings are remarkably consistent:....homeopathic "remedies" are not effective.”*

*[Ramey, David W. "The Scientific Evidence on Homeopathy," Health Priorities, Volume 12, Number 1, 2000.]*

# The Ethics of Homeopathy - I

- Homeopathy peddlers make claims like “all natural” and “non habit-forming”
  - In the light of science, these claims are true: the homeopathic “remedies” contain no actual active ingredients and are therefore perfectly inert and safe.
  - That also makes them ineffective remedies
- The placebo effect, however, is real
  - so, if homeopathic remedies induce a placebo effect and make a patient feel better (or causes them to heal faster), shouldn't doctors be allowed to recommend them and shouldn't people be allowed to buy them?

# The Ethics of Homeopathy - II

- Let's consider the placebo effect
  - depending on the circumstances of the disease and the degree of belief of the treatment, the placebo effect results typically in about 20-30% of people.
  - that leaves about 70-80% of people without any kind of treatment. Is that ethical?
  - if doctors, medical professional organizations, or regulators are allowed to recommend homeopathy (placebo) to patients, then we as patients are essentially paying doctors and pharmacists to lie to us to make us feel better. Is that ethical?
- Let's consider the "Nocebo" effect
  - Placebo is VERY powerful. A person can believe so strongly that they are taking a powerful medicine that they can experience WITHDRAWAL symptoms! Cramps, headaches, sleeplessness, vomiting, etc. This is part of the documented "Nocebo" effect.
  - In light of the Nocebo effect, are homeopathic remedies guaranteed safe and non-addicting? Is that ethical?

And now . . .

the part of the lecture where  
we intentionally overdose on  
“homeopathic medicine”



# The Homeopathy Overdose

- In an effort to educate the public on the fakery of homeopathy, protestors (including scientists) have taken to deliberately overdosing on homeopathic medication to demonstrate it has NO EFFECT.
- The James Randi Educational Foundation (JREF) has offered \$1 million to anyone who can repeatably and demonstrably prove homeopathy is better than placebo (or, heck, who can even discern from a group of unlabeled vials containing clear liquid which one is the homeopathic remedy). No one has yet claimed the prize.

A view of the world we might live in if  
pseudoscience and antiscience were allowed to  
work side-by-side with medical science:

*“Homeopathic A&E,” from the sketch comedy  
program “That Mitchell and Webb Look”*

# Takeaway Messages

- There is a push for strong “evidence-based” medicine because of the popularity of “alternative,” “new age,” “homeopathic,” or “naturopathic” medicine (“quack medicine”)
- Even dentists are having to fight pseudoscience in their profession
  - pseudoscience claims of the cause of facial pain as being due to bad organs elsewhere in the body (kinesthesiology) or “bad teeth”; pseudoscience claims about microcavities in the jaw bone that CANNOT be detected by x-rays (how do they detect them, then?) but which MUST be drilled and backfilled at tremendous cost to the patient and insurance. Read “The Whole Tooth” by John Dodes.
- There is no “white knight” that will ride in and save you from medical deception and lies. You must think critically and creatively. Pseudoscience and antiscience can make you sick – heck, they can kill you. At the very least, they can cost you a lot of money.