Dr. Oz's questionable wizardry

December 31 2013, by Joe Schwarcz

Miracles are pretty rare events. Except on television's Dr. Oz Show, where they appear with astonishing frequency. Oz of course doesn't claim to raise the dead or part the Red Sea, but he does raise people's hopes of parting with their flab. And he's certainly not shy about flinging the word miracle about. But it seems miracles fade as quickly as they appear. Raspberry ketones, acai berries, and African mango, once hyped as amazing "fat busters," have already given way to newer wonders.

Granted, Dr. Oz—or more likely his producers—do not pull miracles out of an empty hat. They generally manage to toss in a smattering of stunted facts that they then nurture into some pretty tall tales. Like the ones about chlorogenic acid or Garcinia cambogia causing effortless weight

loss. The former piqued the public's interest when the great Oz introduced green coffee bean extract as the next diet sensation. Actually "chlorogenic acid" is not a single compound but rather a family of closely related compounds found in green plants, which perhaps surprisingly contain no chlorine atoms. The name derives from the Greek "chloro" for pale green and "genic" meaning "give rise to." (The element chlorine is a pale green gas, hence its name.)

It was an "unprecedented" breakthrough, Oz curiously announced, apparently having forgotten all about his previous weight-control miracles. This time the "staggering" results originate from a study of green coffee bean extract by Joe Vinson (2012), a respected chemist at the University of Scranton who has a long-standing interest in antioxidants, such as chlorogenic acid. Aware of the fact that chlorogenic acid had been shown to influence glucose and fat metabolism in mice, Vinson speculated that it might have some effect on humans as well. Since chlorogenic acid content is reduced by roasting, a green coffee bean extract was chosen for the study.

In cooperation with colleagues in India who had access to volunteers, Vinson designed a trial whereby overweight subjects were given, in random order, for periods of six weeks each, either a daily dose of 1,050 mg of green coffee bean extract, a lower dosage of 700 mg, or a placebo. Between each six-week phase there was a two-week "washout" period during which the participants took no supplements. There was no dietary intervention; the average daily calorie intake was about 2,400. Participants burned roughly 400 calories a day with exercise. On average there was a loss of about a third of a kilogram per week. Interesting but hardly "staggering." And there are caveats galore.

The study involved only eight men and eight women, which amounts to a very statistically weak sample. Their diet was self-reported, a notoriously unreliable method. The subjects were not really blinded since the high-

dose regimen involved three pills and the lower dose only two pills. A perusal of the results also shows some curious features. For example, in the group that took placebo for the first six weeks, there was an eight kilogram weight loss during the placebo and washout phase, but almost no further loss during the high-dose and low-dose phases. By the time, though, that critics reacted to Oz's glowing account, overweight people were already heading to the health food store to pick up some green coffee bean extract that might or might not contain the amount of chlorogenic acid declared on the label. As for Dr. Oz, he had already moved on to his next "revolutionary" product, Garcinia cambogia, unabashedly describing it as the "Holy Grail" of weight loss.

We were actually treated to the Grail in action. Sort of. Dr. Oz, with guest Dr. Julie Chen, performed a demonstration using a plastic contraption with a balloon inside that was supposed to represent the liver. A white liquid, supposedly a sugar solution, was poured in, causing the balloon, representing a fat cell, to swell. Then a valve was closed, and as more liquid was introduced, it went into a different chamber, marked "energy." The message was that the valve represents Garcinia extract, which prevents the buildup of fat in fat cells. While playing with balloons and a plastic liver may make for entertaining television, it makes for pretty skimpy science.

Contrary to Dr. Oz's introduction that "you are hearing it here first," there is nothing new about Garcinia. There's no breakthrough, no fresh research, no "revolutionary" discovery. In the weight-control field, Garcinia cambogia is old hat. Extracts of the rind of this small pumpkin-shaped Asian fruit have long been used in "natural weight loss supplements." Why? Because in theory, they could have an effect.

The rind of the fruit, sometimes called a tamarind, is rich in hydroxycitric acid (HCA), a substance with biological activity that can be related to weight loss. Laboratory experiments indicate that HCA can

interfere with an enzyme that plays a role in converting excess sugar into fat, as well as with enzymes that break down complex carbohydrates to simple sugars that are readily absorbed. Furthermore, there are suggestions that Garcinia extract stimulates serotonin release, which can lead to appetite suppression.

Laboratory results that point toward possible weight loss don't mean much until they are confirmed by proper human trials. And there have been some: fifteen years ago a randomized trial involving 135 subjects who took either a placebo or a Garcinia extract equivalent to 1500 mg of HCA a day for three months, showed no difference in weight loss between the groups (Heymsfield et al. 1998). A more recent trial (Kim et al. 2011) involving eighty-six overweight people taking either two grams of extract or placebo for ten weeks echoed those results. In between these two major studies there were several others (Onakpoya et al. 2011), some of which did show a weight loss of about one kilogram over a couple of months, but these either had few subjects or lacked a control group.

Basically, it is clear that if there is any weight loss attributed to Garcinia cambogia, it is virtually insignificant. But there may be something else attributed to the supplement, namely kidney problems (Li and Bordelon 2011). Although incidence is rare, even one is an excess when the chance of a benefit is so small. So Garcinia cambogia, like green coffee bean extract, can hardly be called a miracle. But it seems Dr. Oz puts his facts on a diet when it comes to fattening up his television ratings.

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Provided by McGill University