# Nutrition Science or Pseudoscience? It Can Be Hard to Tell!

Distinguishing sense from nonsense when our health and money are at stake

November 13, 2018 By Danielle Penick

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Everyday we see nutrition headlines and are bombarded with good marketing on TV and online. Almost everyone seems to think they are nutrition experts and people who mean well can unfortunately provide tons of misinformation. But is it really a big deal if these people aren't following the evidence? As a registered dietitian (RD) it is my job to follow the scientific evidence and it's also my ethical responsibility. But outside of my legal and moral obligation, I'm here to tell you following misinformation can be a big deal.

A significant difference of those who profess to be the nutrition "experts" is many of these "experts" often ignore the research that conflicts with their beliefs and cite the research that aligns with them (this is called cherry picking). Whereas people following the evidence attempt to look at all of the scientific data to make recommendations. The title 'nutritionist' or 'health coach' are also not always legally protected terms and can be misused. Theoretically anyone can call themselves one overnight—even if they didn't go to school for it. Even experts in the field don't always follow the evidence unfortunately. It's no wonder most of us are confused about food and health.

Finding evidence-based nutrition information is a lot like finding a good mechanic, good hair dresser, a good dentist, or medical doctor. The key is finding one that keeps up with the latest research and can distinguish the facts from fiction.

But why is evidence-based information so important anyway?

We usually find a website that supports our personal beliefs, but it might not be what the evidence really supports. Because of biases, we are often unable to objectively assess the truth of our ideas. Until recent history we have not had a reliable method for testing this—but now we have the scientific method!

The goal of science is to find what's true through an evidenced-based method that doesn't use personal testimony or what we think is true to find the answers. It's the only successful method for discovering facts instead of what a person or random website tells us. This takes the guess work out as many people can sound extremely convincing and may appear evidence-based, when in fact they use many science sounding words or will quote a single or few poor quality studies

(instead of looking at what the entire scientific consensus finds). There are always outlier studies that find different conclusions, which is why it's important to look at the whole body of evidence. One way to think about this, is there is an average athletic performance for adults in the US, but an olympic athlete or a quadriplegic person would be considered outliers. If you looked at just these degrees of athletic performance, you would not have an accurate representation of the average adult in the US. This is why nutrition information can be incredibly confusing.

What exactly is science?

The definition of science is the observation, identification, description, experimental investigation, and theoretical explanation of phenomena. Scientific research is transparent and collaborative. It begins with ideas and not conclusions. Conclusions only come after the rigorous scientific process has been completed properly. The real advantage of science is that it shows us the world as it is, not as what we wish it to be.

Now we have a method for rejecting bad ideas and to allow for the accumulation of knowledge. The scientific method is superior to other methods because it is testable. But that's not to say science is always perfect either. But by and large it is an incredibly powerful tool. This method allows us to follow the evidence, discard disproven ideas, and to hold on to ideas tentatively and evolve as we find out more. Most people love science and hold it with high regard until the evidence contradicts our personal beliefs. Science is also a process that can take a long time. Many of us simply don't always have the time to wait for the answers.

So what is pseudoscience exactly?

Recently in anticipation for this post I reached out to fellow dietitians, friends outside of the field, and the general public on multiple social media platforms to get feedback and perspective on what people think pseudoscience is. What I found interesting is there was a single common parallel with responses mostly and a few other themes. Most people reported marketing most often, followed by misleading information. Here's exactly what they had to say…

"Slick marketing…like an informercial."

"Making claims on poorly designed studies." "Taking a study and making claims beyond its scope." "Interpreting study results in ways that are misleading in order to promote a point of view or product." — Julie Lanford of Cancer Dietitian

"Pseudoscience to me is something that makes sense in theory and is often supported using anecdotal statements. Often marketed using buzzwords that are jargon and sound science-y." — Leia Flure of Moderation Maven

"When people and groups profit from scaring consumers in order to sell products and tests that are not medically reliable, verified, or necessary." — Leah McGrath

"Not evidence based."

“Deliberate misinformation delivered as fact or use of unproven and non-scientific methods that are held up as equal or superior to science.”

“Taking something that has some truth and exaggerating it’s health effect or claim.”

Replication was also a common theme:

“Using studies to mislead the public when a study isn’t replicated, or writing a headline or article that doesn’t tell the whole story.”

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Pseudoscience is defined as a claim, belief, or practice that is presented as scientific and uses scientific sounding words, but doesn’t follow the scientific method or standards of science. For example homeopathy, the flat earth movement, or that the alkaline diet/water will cure your cancer.

Pseudoscience begins with preconceived conclusion and attempts to defend and confirm them at all costs. Preconceived ideas aren’t a problem, but preconceived conclusions are never a part of science. A hallmark of pseudoscience is that it never allows for new evidence to challenge it’s beliefs and it holds it’s own belief system despite new facts, thus it does not progress.

What can happen if you follow pseudoscience?

The vast majority of us cannot tell the difference between good science and bad science (or pseudoscience). This means that most of us have to form our own conclusions and make decisions about our health without knowing much of the evidence. Instead we rely on how we feel and this can have a powerful impact on our health outcomes or on our wallet.

It can cause real harm. Like having people forgo evidence-based treatments for unproven or disproven therapies that can reduce your lifespan or reduce the risk for a cancer cure. It can cause irreversible damage to your health. Some nutrition interventions can interfere with medications or medical treatments. It can also cause you to spend unnecessary energy, time, and money, promote a false sense of hope and be misleading. Knowing what a reliable resource is can prevent you from these outcomes.

So how can you tell the difference? Nutrition pseudoscience red flags.

Below are some tips for identifying pseudoscience and can be good indicators to avoid the hype and marketing.

1. Products or people who use grandiose claims.

    If it sounds to good to be true it probably is. Did they "find a cure for cancer?" Just because someone is popular, makes a lot of money, or has done something for years doesn't make them a reliable resource.

2. Using a lot of jargon.

    If people use big complex words and don't try to break it down in simple to understand terms it's likely they don't really understand what they are talking about or are trying to sound smart and sell you something. Scientists are constantly trying to make complex topics into easy to understand words or sound bites for the public.

3. "Experts" or doctors who promise far better health if only people subscribe to his or her dietary advice or specific protocol.

    Ex: Jilly Juice, the Gerson diet, or "vitamin B17".

4. Personal testimonials (especially if this is their best argument)!

    This is perhaps one of the biggest tells! It is the complete opposite of science and many people or companies inevitably resort to personal claims or stories because they don't have any other way of convincing people to buy their stuff or their services. They lack the evidence and stories have a very strong effect on us. We are social creatures who like to connect with people or things. But remember, buyer beware!

5. Use of fake non-medical diagnosis.

    Examples are "adrenal fatigue", "leaky gut syndrome", "chronic lyme disease", "candidiasis hypersensitivity", "brain fog" or "leaky brain" etc… These are not confirmed medical diagnoses! You could be "treating" something you don't actually have!

6. Use of non-evidence-based therapies.

   Science rejects these because there is no evidence they work. For example, colonic irrigation, detoxing, homeopathy, faux allergy testing, hair mineral analysis, mega doses of vitamins and minerals or cocktails of IV's. Also crystal healing, cupping, ear candling, genetic testing for food recommendations, stem cell therapies, food as medicine, and any food sensitivity testing (this is not to be confused with food allergy testing).

   Wait?! Before I move on, I know what you are thinking about food as medicine probably so I feel the need to address this topic. Hippocrates is famous for being quoted "Let food be thy medicine and medicine be they food". Hear me out though. I do believe research has shown food has a powerful impact on health and disease prevention. However, food will not replace the need for dialysis in someone with end stage renal disease for example. Food is powerful, but it doesn't substitute the need for evidenced-based medicine. But that's a whole other blog post for another time. I could eat the healthiest of foods, but without medicine I could still die.

7. Demonizing many foods or food groups.

   Do they say that gluten is evil for all, or lectins are the villain, or that nightshades are awful. There is little to no evidence to back up these claims and attached to the words are links debunking them. Food should be enjoyed and not feared (of course unless you have a true food allergy like Celiac's disease). I would like to add that being a vegan or vegetarian is not included in this as it is a personal choice that many choose for moral reasons. I myself was a vegetarian for 8 years, but I didn't stop eating meat because I thought a small amount of meat could not be included in a healthful diet. I'm referring to people who cut out many foods or food groups because they say it is harmful to your health in any amount.

9. Conspiracy on big Pharma or "xyz" industry is out to get you.

   Like any industry there are problems and they are all a business and seeking to make a profit. But there's even big yoga, big supplement, and big organic or big fill-in-the-blank .

10. Pressure to buy something.

    You might find yourself on a website that has a supplement store or product they are promoting. If you feel pressured to purchase something this could be a red flag.

11. Use of the label alternative or holistic can also be a sign of pseudoscience.

    Many well known medical treatments originated with anecdotal observations. When those observations are rigorously tested with essentially the same results each time, recommendations are updated and new treatments get integrated into the standard of care for conventional treatment. Alternative or holistic treatments, on the other hand, lack consistent research results to support their use. Yes, you may see alternative treatments that are advertised as "clinically proven." However, the studies being cited are often small and published in low quality research journals. Most of the time, though, alternative treatments are sold (literally and figuratively) based on anecdotal evidence, testimonials, and success stories.

But did the treatment really work or could improvement be attributed to something else, like the natural course of the illness? So many people swear by different remedies for colds, but a cold usually lasts about a week no matter what you do. And sometimes just taking a pill helps us feel better, even if the pill has no active ingredient (hi, placebo effect!).

There is some gray area here, as we all have our own professional experience on which we draw, and the lines can get blurry with emerging research. Some people are more open to recommending new treatments based on promising results, with the hope of being ahead of the curve. Others (like myself) would prefer to wait until those results are consistently demonstrated in multiple, well designed studies. Some day some alternative treatments may be validated and become medicine, but in the meantime, relying on such treatments can be a gamble to your health and wallet, especially if replacing proven medical treatment. I've written about this here and here. However these providers may offer some benefit by being able to spend more time with their patients, but their practices could be a waste of money.

12. Use of fear-mongering language.

    Do you feel like you and your family are going to get cancer tomorrow because someone told you we are eating so many toxins in our food and need this detox stat? Or that your body is too acidic and you need to alkalize it right away? Or that sugar feeds cancer? Gluten and lectins are evil! GMOs cause cancer (which I discuss here). There are many examples, but you get the idea.

13. Use of emotional words or claims.

    Is someone claiming that a certain over the counter product "saved their life and they wouldn't be alive today without it" or did they tell you that it dissolved their cancer overnight?

14. Claims of Exclusivity. "Miracle", "Proprietary", or "Secret"

    Unfortunately there really is no such thing. If it was truly a miracle drug or a hidden secret or recipe we would know about it.

15. Scientifically "proven" claims.

    In the world of science, nothing is scientifically proven. There is only evidence to support a conclusion. Often when this term is used it is a misuse of the phrase and may be a mistake, but it is a red flag. You probably won't ever hear a medical doctor use this phrase and you definitely won't hear a scientist saying it.

16. Magical bullet thinking with quick fixes.

    Anything promising to fix or cure something in x amount of days or weeks is something I would run away from…fast!

17. Person or company works in isolation.

    Do they work alone and aways away from academia? For example, if a company has their own

incorporated teaching facility , it's own association, and it's own practioniers. Do they not have peer reviewed publications? A closed system prevents outside critics and academic growth. One distinct feature of science is that criticism is encouraged.

18. The proponent sells you gadgets, remedies, and supplements directly to the public.

Usually selling products that don't require strict regulation such as detox devices or specialized machines (ex: alkaline water machines). Even supplements are not well regulated and bypass strict regulations of medicine.

19. Do they promote specific diets, supplements, protocols in place of evidence-based medical treatments such as chemotherapy, radiation, or surgery?

Unfortunately there is no diet, supplement, or "natural" protocol that can cure cancer. I wish it were true. But that's why we have the field of science to guide what therapies to use in the medical field to treat and cure cancer. Once there's evidence to support a substances use it becomes medicine. I've written extensively about this here. Diets and supplements may enhance certain treatments however. Ex: ginger for nausea and vomiting.

20. Obsessive focus only on specific foods or nutrients.

Example: vitamin B17, juicing, or alkaline diet etc. …

21. One diet or protocol fits all.

What's healthy for one may not be for someone else. Everyone reacts to specific foods differently. Cancer is also not one disease, each cancer type is a different disease—this is why doctors don't have a panacea and resort to many drugs or therapies. A recent example is Jilly Juice and another that's been around a while is the Gerson diet.

22. Claims are often simplistic and dramatically certain for a complex issue.

They claim to know the "one cause of all" or the "one cure for all" of disease. Ex: all cancer is caused by mucous or an acidic environment. Simple claims are often wrong because pseudoscientists usually oversimplifying anatomy, physiology, chemistry, or biology.

23. Is your source a celebrity, unaccredited nutritionist, a journalist with no training in nutrition science with sensational headlines and misreported research, or a TV or internet doctor like Dr. Oz, Dr. Axe, or Dr. Mercola?

Don't get me wrong, there are some journalists, reporters, and editors doing it right, but you really have to know if they are reliable. Recently I wrote for SELF as they really make sure you back up your evidence by interviewing experts in the field and citing the evidence. However, avoid any celebrity or TV doctor. I personally don't follow any doctor for nutrition advice. I only follow them to learn about their perspective for medical treatments or medical research.

24. Mechanisms of action are often from "new and evolving sciences" or anything related to energy or magnets.

You may hear fancy words like “quantum mechanics” or “epigenetics and diet” or “quantum healing”. If you don’t know how something affects your health just use these words—it sounds science-y and a quick way to make something sound legit. Example: negative ions or magnetic fields.

25. Do they demonize the medical profession?

    Sure, medicine has it’s problems as does any industry, but medicine becomes medicine once the evidence supports it’s use to treat disease and sickness. It is rigorously tested using the scientific method. If something is found to work better or is found to have a major problem, the protocol is updated or is discarded.

26. Do they rebrand debunked practices?

    Example: Amygdalin was rebranded as laetrile, and then eventually as vitamin B17 despite scientific evidence disproving this as an effective medical treatment.

27. Is the focus on the body healing itself?

    Our bodies are always constantly trying to heal themselves. Often our bodies can fix things without much intervention in the way of things like cuts or a cold. However, our bodies do need help to fix complex illness or to enhance what our body is trying to do. Even if a broken bone can fix itself, you want to make sure it’s not going to be crooked or get infected.

28. Use of vague, exaggerated, or untestable claims.

    If something cannot be tested, than it cannot be disproven, even if it is not true. For example, testing for chakras or astrology.

29. Based on ancient practices or ancient tradition or ancient wisdom?

    Ideas in pseudoscience may remain unchanged for hundreds to thousands of years. Usually the older the idea is the more likely it is to be pseudoscience. The world of science is ever-changing and evolving and updating based on new information and looking at the scientific consensus as a whole. If something doesn’t change then it’s probably not following the scientific method.

30. Use of “natural” therapies.

    Most medicines come from natural sources. Currently greater than 60% of all anti-cancer drugs in clinical use originate from either natural products or medicines derived directly from natural products. Many medicines become synthesized when there are environmental concerns or only specific seasons in which sources can be collected. Natural doesn’t always make something safer and synthetic doesn’t always mean harmful. I’ve written on the topic here.

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Recommended resources if you want to better identify science from pseudoscience

So now that you know what to look out for, how to you know what might be a good resource? Melissa Joy Dobbins is one of my favorite dietitians to follow online. I listen to her podcasts regularly and a recent episode of hers had a Sound Science Toolkit (you can find this on her homepage) to help her listeners have a practical guide to use for recognizing what good science looks like.

Also any website that ends in .edu or .gov are typically trustworthy and I write about my other favorite evidence-based resources here. A book that I've read recently and enjoy is Bad Science by Ben Goldachre. He really goes into detail about what is good science versus bad science. So if you want something more comprehensive I would start there.

Closing

Personally, I was attracted to the nutrition field for many different reasons. Upon reflection I know that I was drawn to some pseudoscientific nutrition ideas myself. Some of my misbeliefs were challenged and had to be re-evaluated when I was presented with the evidence. Like my prior belief that supplements are good for everyone and that GMOs cause cancer. I've written about re-evaluating my stances when presented with the evidence here and here.

Generally we should approach nutrition or medical claims from a point of skepticism. We should evaluate who is spreading the information, if they are a reliable resource, and the strength of the evidence being reported. We need to question ourselves if the information seems too good to be true. Using some of these red flags can be a guide and I'm sure there are more examples that were not included in this piece, but it's a good place to get you started. If you aren't sure try to look at multiple evidence-based resources to see what they are reporting. Being a skeptic may not come natural, but it will get easier with practice and save you lots of money, time, and distress. It can also increase the likelihood that you will have more positive health outcomes.

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