Natural Remedies Never Become Medicine—Fact or Fiction?

A common theme is the idea that natural therapies cannot be patented into medicine. Is this true?

June 25, 2018 By Danielle Penick

It was a short walk from the dietetics building where I studied for both of my nutrition degrees at Florida State University to the office of chemistry professor Dr. Robert Holton. This name didn't mean anything to me initially, but I later discovered that a significant part of my education was subsidized by the work of this man. He is the reason FSU is able to wear the title as home to one of the largest cancer discoveries of all time with the creation of Taxol (paclitaxel).

It all started in 1962 when a USDA botanist, Arthur Barclay, was in an old-growth forest in Washington State near Mount St. Helens. He was collecting plant samples for a National Cancer Institute study, to screen approximately 35,000 plants for potential anticancer activity. He came across bark from a Pacific Yew tree (Taxus brevifoid) and had no idea history was about to be made. Several years later scientists Monroe Wall and Mansukh Wani, who were also involved in the project, discovered the extracts of the trees bark possessed cytotoxic anti-tumor properties. They called it Taxol and studied its effects on cancer in mice. After successful outcomes in rodents this moved on to clinical trials in humans.

Pacific yewPhoto by Jing on Pixabay

Clinical trials were delayed however, because the production of Taxol quickly became limited as scientists found that the bark of a nearly 200-year-old 40-foot Pacific Yew tree yielded barely any of the extract. It required four to six trees to produce one treatment of Taxol, which ignited a major environmental controversy. This motivated scientists to solve the environmental issue by isolating the compound from the bark extract for synthesizing in a lab. It took years, but the active ingredient was eventually isolated and the scientists published their results in the Journal of the American Chemical Society in 1971. The paper was soon noticed by chemistry professor Dr. Robert Holton from my alma mater. It was a combination of trying to help solve the environmental crisis and his fascination with this complex chemical structure, that Holton began devoting his attention to synthesizing Taxol to get it on the market.

Yew-turn

The synthesis of this complex compound hit numerous roadblocks and it took decades before it was able to be synthesized. To make matters worse prospects for drug commercialization looked bleak. Finally, in 1993, Taxol was brought to the market by FSU partnering up with Bristol-Myers Squibb. Soon it was recognized as an effective cancer drug for treating cancers such as ovarian, breast, certain forms of lung, some pancreatic, among others. The product quickly became a huge commercial success and resulted in later chemo cousin of Taxol—Docetaxol, which is still used

today.

FSU's synthesis of Taxol made the large-scale production of the drug possible. Holton's work generated around $350,000,000 for the university, which is still the largest income royalty ever generated by a university-licensed technology in the United States. It was all possible with enormous effort of scientists in government facilities and in commercial labs to produce the high selling cancer drug, eventually generating over two billion dollars in a year! Taxol is one of the most successful examples of a plant becoming medicine—a tree bark extract made into a chemotherapy drug!

A look into the history of medicine

Natural remedies were all we had prior to modern day medicine and they have been the backbone of traditional healing throughout the world. Among some of these remedies are ones that gave way to some of the most important pharmaceuticals we have today. People have been treated with whole forms or extracts of flowers, barks, herbs, and beneficial microbes. However they were given based on observation or experience because they were being used long before the scientific method existed. We also didn't have the technology then to produce nature into medicine like we do today. But as technology has improved the use of synthetic products has increased due to environmental supply concerns, lower production costs, time effectiveness, higher quality control, and strict regulations.

Despite synthetic chemistry as a tool to discover and create drugs, the role of natural sources in disease treatment and prevention is still massive. Mother Nature is currently a key source of pharmacologically active compounds for drugs. Greater than 60% of all anti-cancer drugs in clinical use originate from either natural products or medicines derived directly from natural products, such as plants, marine organisms, and microorganisms. At this point in time there are many medical compounds prescribed by Western doctors that have come from Mother Nature as a result of being made into medicine once shown to be effective. Lets take a look at more natural therapies made into medicine.

Other natural sources used for oncology drugs—plants and soil microbes Graphic by Danielle Penick

Natural sources for antibiotics

Many antibiotics have been cultivated from the earth, including the world's first antibiotic, Penicillin. This was discovered by Alexander Fleming, a bacteria scientist in London, when he returned to work from vacation one day. He noticed some bacterial colonies in Petri dishes he left out had stopped growing. He carefully analyzed the dishes under a microscope and discovered a mold growing on them. Fleming detected that the mold prevented the growth of other bacteria. This mold was known as Penicillium. A decade later, Ernst Chain and Howard Florey isolated and purified Penicillin, the first true antibiotic and it was the first tool to completely cure people of deadly infectious diseases. More discoveries are being made from other forms of natural sources for antibiotics such as soil microbes. Coincidently my husband is also doing research on how natural compounds (derived from ants) can be used as a source for future antibiotics.

Plants into painkillers (white willow, yesterday's aspirin)

Legend has it, German chemist Felix Hoffmann was searching for a medicine to rid his fathers rheumatic pains. It was well known that willow bark had pain relieving properties as it originated from Europe and parts of China. It was then traded to Egypt, Sumer, and Assyria where people chewed on the bark or drank tea to mitigate swelling, pain, and fevers as far back as 400 BC. The active compound was known as salicylic acid and was eventually isolated by several chemists from the white willow bark. This synthetic salicylic acid came to the market due to the product being less expensive than deriving it from it's natural source. It was also a replacement for a less irritating form and reduced the wasteful methods from extracting it directly from the plant.

But this new product still had many unpleasant side effects as it was known for being a gastric irritant and had an intense bitter taste that limited its usefulness. Many people were simply not able to tolerate it. Hoffmann, who worked at Bayer, was able to produce a better synthesized version of it called acetyl salicylic acid that had less side effects. It was named Aspirin and introduced on the market in 1899. The World Health Organization classifies it as an essential medicine today—the first semi-synthetic pain drug was also based on a natural product.

Fecal transplants and parasites

Perhaps one of the strangest examples has been the development of fecal transplants for use as treatment in medicine. The last hospital I worked at even performed them regularly! Stool is exchanged from a healthy person to someone with a common infection called Clostridium difficile or better known as C. diff. This has been demonstrated in well-constructed studies as highly effective at treating recurrent C. diff. This is a bacteria which can be harmful causing severe, recurring, and potentially fatal bouts of diarrhea to life-threatening inflammation in the colon.

We don't yet understand gut microbes well enough to treat C. diff with probiotics. So we have literally found that transferring stool from a healthy person to an unhealthy person is the best way to rebalance the gut microbiome. When people take antibiotics for infections the ecosystem of bacteria present in their large intestine gets altered. Sometimes some potentially harmful bacteria can grow unchecked after taking them. We have approximately 500-1,000 different species of

bacteria present in our large intestine—this is the equivalent to the amount of native species of trees present in Canada and the US combined! When bacteria from a healthy donor are placed back inside the intestines of a sick person they can restore the diversity of bacteria and chase out harmful C. Diff bacteria (that's not to say you should not take antibiotics if prescribed to you as these can be potentially lifesaving despite the possible risk of other side effects—always talk to your doctor).

There are even researchers at Duke University who are currently studying parasites as a possible treatment for inflammatory diseases like Crohn's disease. People have been self medicating with this for years and that has caused science to look into this as a legitimate treatment. So even the strangest of natural therapies may become medicine once science demonstrates its effectiveness.

Photo by Seksak Kerdkanno on Pixabay

Closing thoughts

With a cancer diagnosis comes much curiosity about what treatments exist and which are best for you. Depending on the websites you visit, who you talk to, or what book you read, you may hear many different opinions or personal testimonies about what you should do or what has worked for others. Some advocate for conventional therapies only, natural therapies only, or even a blend of the two.

A common theme for treating cancer is the idea that natural therapies in the form of juicing, supplement protocols, topical salves, essential oils, herbs, homeopathy, the alkaline diet, a diet free from sugar, or other specific diet should be used because they cannot ever be patented into medicine. You may even hear things like “pharmaceutical companies will never study alternative medicines or natural cures because there is no money to be made, they can’t be patented, or even that there is a global scheme to suppress their use.” But once you understand how something becomes medicine you begin to see how many drugs we take are indeed from natural sources, but they just took rigorous testing to come on to the market.

In many cases natural remedies become commercialized into a pharmaceutical drug due to its populations becoming threatened due to unsustainable harvesting techniques as seen with the Taxol supply crisis. Natural sources are often slow growing or even endangered which provide severe difficulties to meet market demands. Scientific activity is often aimed at finding, isolating, identifying, and copying natural products for these reasons. The natural habitat of plants needs to be honored when collecting the wild and season dependent chemical makeup of plants. This may provide small windows of collection such as the flowering season for example. Available plant compounds often vary on quality and composition of harvest time, soil composition, altitude, actual climate, processing, and storage conditions.

Western medicine or conventional medicine is often labeled as toxic or poisonous or it’s labeled as chemical and synthetic. But it is important to note that even vitamins are semi-synthetic and everything, including water, is a chemical. There are side effects to synthetic products, but the same applies to natural products as well. And whether a chemical is natural or synthetic our bodies are not able to distinguish the difference.

However, the contrast between medicine and natural therapies is that there are much stricter guidelines and regulations for substances marketed as drugs than for substances marketed as supplements or herbs. Drugs have far more evidence for both safety and effectiveness before hitting the shelves. Once developed, drugs and proposed drugs, must pass a series of rigorous tests to evaluate safety and effectiveness in animals and then in humans. Large supplement companies can be drawn to the easy profits of selling products without having to pay for expensive clinical trials.

The difference between alternative medicine and conventional medicine is not natural versus unnatural, but rather what is demonstrated to work versus unproven or disproven to work. Nature

continues to provide us with ample amounts of valuable resources for drug development. Once proven effective, nature really can be patented into products in our medicine cabinet or our local hospital.

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