A Concise Treatise on Natural Remedies

General Disclaimer

The information presented in this textbook is intended for informational use only *and does not replace recommendations from licensed healthcare professionals. No information in this book is meant to diagnose, treat, prevent, cure, mitigate, alter, or manage a disease state or any health condition. Never take any supplement or consider any health advice during pregnancy unless a physician recommends it; the effect of dietary supplements on the developing fetus is at best unknown and in many cases, leads to miscarriage or severe harm to the fetus. The information presented herein is not to be used as a substitute for recommendations given by a licensed physician or any other healthcare professional. Qualified and licensed healthcare professionals should be consulted before initiating any self-treatment, changing diet, or exercise regimen. This area of science is in constant flux, and information presented herein is more likely to change in the future and even become obsolete. Readers are encouraged to verify all the information presented herein on their own.*

A Concise Treatise on Natural Remedies

By

Antoine Al-Achi

Cambridge
Scholars
Publishing

A Concise Treatise on Natural Remedies

By Antoine Al-Achi

This book first published 2020

Cambridge Scholars Publishing

Lady Stephenson Library, Newcastle upon Tyne, NE6 2PA, UK

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

ISBN (10): 1-5275-5001-X
ISBN (13): 978-1-5275-5001-8

To the memory of my father Elias Antoun Al-Achi
and my mother René Nassif Tadros Al-Achi

To my family, friends, colleagues, and students

To Pamela, Elias Gabriel, Anthony Williams,
John Peter, and Bailey

TABLE OF CONTENTS

IMAGE/PHOTOGRAPH CREDITS

All images and photographs appearing in this book are printed with permission from © Photographer Karen Bergeron Shelton; © Altnature, Alternative Nature Herbals P.O. Box 26 Slayden, TN 37165, USA; www.altnature.com.

ACKNOWLEDGMENTS

No real and worthy effort can be made in isolation. To that end, I am grateful for all the support my family gave me throughout the time I was preparing this manuscript. I am also thankful for all the significant contributions that others have made in research, reviews, and opinions in this area of science. If you get any benefits from this book, rest assured this is because of all those marvelous thinkers whose work I have had the privilege to read and present to you herein. I also would like to acknowledge the profession of pharmacy and pharmaceutical scientists in particular for their recognition of the plant kingdom as being a vital source for past, present, and future medications. I would also like to acknowledge my employer, Campbell University (Buies Creek, North Carolina), for being a wonderful place in which to work and to pursue knowledge. I am truly appreciative of all their support and encouragement. As a word of gratitude to Cambridge Scholars Publishing, editors, and staff, for bringing the idea of this book to fruition. I am grateful to Ms. Rebecca Gladders for working with me since day one to bring this text to completion. I offer sincere thanks to Ms. Amanda Millar for typesetting the manuscript and to Ms. Sophie Edminson for her graphic design of the book cover. Many thanks go to Ms. Sue Morecroft for her valuable proof editing of this text. Thank you.

PREFACE

This book reveals the future by watching the past. It seems that man and nature are meant for each other forever, in particular when it comes to health issues. Getting sick is part of life. Staying healthy is the ultimate goal, as everything depends on one's health. Before the industrial revolution in the early 20th century, man depended on natural sources for his treatments. With the rise of new and very powerful medicines, natural agents began to lose their importance among the medical establishment and the common people alike. To that end, natural medicine withdrew to the alleys and narrow roads of folkloric medicine, but secretly rose again to the surface toward the end of the last century. Medical doctors expressed their disbelief and astonishment in a publication written in the prestigious New England Journal of Medicine (Eisenberg DM et al. Trends in alternative medicine in the United States, 1990-1997: Results of a follow-up national survey. NEJM 1993; 328(4):246-52), accounting for how their patients found help for their illnesses elsewhere. The survey that these medical doctors carried out revealed indeed that the people never, in reality, abandoned their natural medicines. They just merely stopped telling their healthcare providers that they were using them (in this survey, 72% of those who used complementary therapies did not communicate their use with their physicians). Many other researchers later on confirmed what was found in this survey and reinforced it.

So, why did I want to author this book? The answer to this question goes back to a course I took at Northeastern University (Boston, Massachusetts) while I was pursuing a Ph.D. in Biomedical Sciences in the mid-1980s. The course was entitled "Immunobiology." It was taught by a highly respected professor in the area of immunology. This course was a revelation, allowing me to delve into the area of the unknown. The journey was fascinating. One thing that stuck in my mind from that course was the phrase "a black box." I learned that the field of immunology had a lot of them, and immunologists tried to "connect the dots" despite them. In this text, I journeyed into the unknown and the business of connecting the dots, with full knowledge that these black boxes existed in my way. This book is a modest attempt to describe the accumulating scientific data available to us, linking the inflammatory process to many chronic health disorders, including cancer, diabetes, and cardiovascular diseases. It is important to

note here that I used the word “linking” without claiming causation. When two events are linked in space and time with each other, it does not necessarily mean that one is the cause and the other is the effect. The evidence so far shows that sometimes inflammation occurs after the disease is fully developed; in other cases, it precedes the disease development, and in some situations, it coexists with the disease. Regardless of the situation, inflammation plays a role in chronic diseases. Furthermore, since inflammation is a natural protective effect on its own, the mechanisms by which it is led to undesirable pathways may be numerous and unrelated. I aimed to facilitate an understanding of this phenomenon and perhaps to reach a unified hypothesis that might explain this phenomenon, despite its diversity. In my attempt to do so, I had to sift among the many abbreviations and scientific names of numerous chemical and biological entities that compromise this area of science. For a beginner, this would equal learning a foreign language. I do not claim that this text provides all the answers in this area of natural practices for you. This science is in constant influx and requires life-long learning to fully comprehend its complex nature. While my objective was to be as comprehensive as possible, I endeavored to be focused on my mission in finding the link between inflammation and degenerative diseases. I hope I have succeeded in this way. Whenever possible, I encourage the reader to study the original articles that I used while researching this topic. Significant and important discoveries have been made by pioneers in this field that grew our understanding of the importance of inflammation and its roles in chronic diseases. These valuable references are listed in the back of this text. Although the Internet provides important information on almost any subject, I tried to limit my use of Internet sites, and focus my investigation on primary research, review articles, and an occasional textbook on this subject. By this, I could assure myself that I was getting the information from its primary source firsthand. Finally, this text is about immunity, inflammation, and various chronic diseases and about how these three interrelate to each other in an intricate web of complexity and diversity. It is also about natural healing practices and how they affect the process of inflammation by altering immunity. The immune system existed way before we discovered synthetic drugs and chemicals. However, this system has interacted with nature, particularly botanicals, since humans have lived on this planet. Our immune system and botanicals have co-existed together forever. The immune system has learned how to respond to them. One of the objectives of this treatise is to reveal how botanicals affect our bodily system, in particular, the immune system and inflammation.

I suggest that the reader starts at the beginning of this text as each lecture builds on the ones before it and provides much of the background information needed to facilitate reading the lectures that follow it. I hope that this text continues the dialogue that many other scientists have already started in recognizing inflammation as a culprit in chronic disease development. Diagnosing and treating chronic inflammation at an early stage may not only break the chain of the development of many chronic diseases but also reduce the economic burden imparted on society by reducing the high cost typically associated with chronic disease management and treatment.

I have been teaching botanical and alternative medicine at the college level since 2003. Scores of health science students have taken my course, and for the most part, they enjoyed and appreciated the information provided to them during the lectures. Thus, I tailored this text to match the way I taught this material to college students. The book is structured to deliver lectures. Please note that I call them lectures and not chapters. One main difference between the two models is that the lecture style builds on repetition. Ideas and facts are repeated throughout the text to fit and to emphasize a particular point. By repetition, the student learns. This fact is well known among college educators. If you are reading this book outside a college environment, you will get the same benefits as college students. The way this book is written makes it easier for you to recall facts, something I find difficult after I finish reading a book for leisure. For example, you will learn about black cohosh being an emmenagogue. This fact about this herb is peppered throughout this book. (By the way, if the word “emmenagogue” is new to you, it will be defined later, multiple times in this treatise.) The information you are going to read in this volume comes from numerous sources. I consulted primary sources (research articles), secondary resources (review articles and textbooks), and personal information I gathered from experts in this field, through attending symposia, and general college education in the pharmacy field. As a pharmacy-trained graduate, I went back to the roots of my profession. These roots are rich in natural remedies, the old “pharmaceuticals.” Throughout this text, I attempted to use the common name of the plants, occasionally followed by their scientific name. For example, Mayapple is a poisonous plant from which an anti-cancer drug, Vepeside is extracted. The drug is used to treat lung and testicular cancer. The scientific name of Mayapple is *Podophyllum peltatum*. The first portion of the scientific name refers to the genus of the plant, and the latter part of the name is the species. By the way, *Podophyllum peltatum* is the American variety of this plant. The Himalayan type is known by the scientific name *Podophyllum*

hexandrum, which is a different species of the same plant. (Many other plants provided us with useful medicines. Examples of those are taxol that was discovered from the yew tree and the product Viadent that originated from the bloodroot plant.)

This book is educational. College professors who teach in this area of medicine can find it useful for adopting it to their courses. However, regardless of how convincing is the information presented herein; one must not attempt to apply the modalities learned without first consulting with a licensed physician. Even though herbs are, for the most part, considered foods, they can cause severe adverse events and even death if they are misused. This caution is, in particular, vital if you are taking prescription or over-the-counter medications. Also, children and pregnant or nursing women must not take these dietary supplements unless prescribed by a qualified, licensed clinician. The information presented herein is not intended to diagnose, treat, prevent, cure, or manage disease states (make sure to read the *General Disclaimer* found in this book). It is intended to empower the reader to become a better healthcare consumer in their choices of nutrients and lifestyle decision making. Having a physician who can help with these decisions and hopefully acting as a coach is highly desirable and strongly encouraged.

Some of the lectures are more comprehensive than others. Some are compact and short in their length. However, others are more technical. The length of a lecture neither correlates with its importance in this field nor with its complexity. For example, the lecture on tonics is relatively short and less technical than the lecture dealing with inflammation; yet herbal tonics are collectively perhaps one of the essential classes in natural healing. Moreover, I have included within the text references which readers are encouraged to review on their own as they provide a wealth of additional information on this subject. These references serve to cover the entire textbook as facts may be repeated often in various locations of this text. This book is by no means comprehensive. It offers but a small view of this vast ocean of natural medical practices.

Finally, this text reflects my knowledge's footsteps through observations and learning. I am neither a medical doctor nor a botanist. The only botany course I have ever taken was in 1973, when I began attending a pharmacy program. I am a trained pharmacist who chose to become a scientist (Ph.D.). Moreover, I decided to adopt education and scientific/medical/pharmaceutical research as my calling in life. Early on in my pharmacy career, I learned the importance of the plant kingdom's role in our life. I found that the

pharmacognosy courses I took in the pharmacy curriculum were exciting and informative. My professors in these courses provided us, the students, with course handouts full of information on a high number of medicinal drugs that were originated from the plant kingdom. Medicinal plants, in my view, are little pharmaceutical factories that manufacture substances to sustain our life with nutrients and medicines. Most of these plants can grow in our backyard, and all that they demand is good soil, sun, fresh air, and water. The word "officinale/officinalis" encountered in some of the plant names signifies that the plant was once cultivated in medicinal gardens run by religious persons during the medieval period. Most of the countries in the world rely heavily on these plants for their health. In the developed world, the pharmaceutical industry taught us that "for every ill, there is a pill." My goal from writing this text is to present an alternative paradigm to this dogma.

LECTURE ONE

NATURAL REMEDIES: THE BEGINNING

The basics

Natural remedies are part folklore, part science, and part belief. The challenge is that often, one would not know which of the three is operative at a given moment. Natural health modalities are not new. They have been in practice since humans have experienced pain and sickness. Written records about medicinal plants date back at least 5,000 years to the Sumerians, who described the use of medicinal plants such as laurel, caraway, and thyme (Pan, 2014). Archeological discoveries have revealed that the practice of herbalism dates back some 60,000 years ago in Iraq and 8,000 years ago in China (Pan, 2014). Natural medicine includes the field of herbalism. Herbalism may be defined as a traditional medicinal or folk medicine that is based on the use of plants and their extracts (Pan, 2014). In the US, herbal use remains popular, albeit it has declined slightly over ten years (2002-2012); it dropped from 18.9% in 2002 to 17.9% in 2007 and 2012 (Wu, 2014). According to the World Health Organization, about 75%-80% of the world's population still uses herbs to manage disease states (Tovar, 2009) (Anitha, 2016). And, specific patient populations suffering from degenerative diseases may use them extensively (e.g., about 70% of patients who have multiple sclerosis use natural modalities, often without communicating with their physicians concerning their use) (Riccio, 2010). This lack of communication between the patient and the physician is, unfortunately, pervasive (Mansoor, 2001) (Purohit, 2013-a). For example, the US National Health Interview Survey of 2007 showed that only 51.8% of the women using complementary therapies revealed such use to their obstetrician/gynecologist. And, 35.8% of them were using these modalities at that time (Harrigan, 2011-b).

The utilization of alternative health practices is very common among those who do not have easy access to conventional medical care (Ayers, 2012). It is estimated that there are about 350,000 species (250,000 to 500,000) of existing plants (including seed plants, bryophytes, and ferns) (Chatterjee, 2014) (Pan, 2014). In South Africa alone, where traditional healing is popular, around 30,000 flowering plant species are found, and they account for about 10% of the world's higher plant species (Street, 2013). Only 10% of the known species of plants on Earth are used for medicinal purposes (Chatterjee, 2014). Wild medicinal plants are continuously subjected to careless harvesting due to the increasing demand that resulted in threatening the biodiversity within a region (Street, 2013). Unfortunately, an alarming number of plants are becoming extinct at a much faster rate due to human intervention and recklessness. In a recent report, Humphreys et al. (2019) have revealed the extinction of some 571 seed plants (256 before 1900 and 315 between 1900 and 2018) in addition to numerous other extinctions of amphibians, birds, and mammals (Humphreys, 2019). Thus, natural medicine has at its disposal an arsenal of therapeutic modalities, including over 35,000 plant species that are employed for medicinal purposes containing some 4,000 active constituents such as polyphenolic compounds (flavonoids), terpenes, and alkaloids (Anekonda, 2005). The following are examples of some aromatic botanical constituents found in essential oils (Elshafie, 2017): (1) α-thujene (dill, balm, caraway, lavender, marjoram, oregano, and sage); (2) camphene (mint, hyssop, lavender, marjoram, oregano, sage, and thyme); (3) sabinene (dill, parsley, basil, caraway, marjoram, and sage); (4) myrcene (dill, parsley, mint, balm, basil, caraway, fennel, hyssop, lavender, marjoram, oregano, and sage); (5) β-pinene (dill, parsley, balm, basil, caraway, fennel, marjoram, oregano, and sage); (6) cis-3-hexenyl acetate (parsley, coriander, and mint); (7) α-terpinene (mint, balm, hyssop, marjoram, oregano, and thyme); (8) p-cymene (dill, parsley, mint, balm, caraway, fennel, lavender, marjoram, oregano, sage, and thyme); (9) (*d*)β-phellandrene (dill, parsley, balm, basil, caraway, fennel, hyssop, lavender, marjoram, oregano, sage, thyme, and vervain); (10) trans-β-ocimene (dill, parsley, mint, basil, caraway, hyssop, lavender, marjoram, and vervain); (11) γ-terpinene (parsley, mint, balm, fennel, hyssop, lavender, marjoram, oregano, sage, thyme, and vervain); (12) terpinolene (balm, basil, hyssop, marjoram, oregano, and thyme); (13) Linalool (mint, balm, basil, caraway, hyssop, lavender, marjoram, oregano, sage, thyme, and vervain); (14) nonanal (coriander and mint); (15) limonene (mint, balm, basil, caraway, hyssop, lavender, marjoram, oregano, sage, thyme, and vervain); (16) trans-p-mentha-2.8-dien-1-ol (mint); (17) α-terpineol (parsley); (18)

carvomenthyl acetate (mint); (19) bornyl acetate (mint, caraway, lavender, marjoram, and sage); (20) E-2-undecenal (coriander); (21) 1-undecanol (coriander); (22) cis-carveol (mint and basil); (23) α-pinene (dill, mint, balm, basil, marjoram, oregano, sage, thyme, and vervain); (24) trans-carveol (mint, hyssop, and sage); (25) carvone (dill and coriander); (26) α-phellandrene (dill, parsley, fennel, lavender, marjoram, and oregano); (27) β-caryophyllene (mint, balm, basil, caraway, hyssop, lavender, marjoram, oregano, sage, thyme, and vervain); (28) dodecanal (coriander); (29) trans-β-caryophyllene (parsley, mint, balm, basil, caraway, hyssop, lavender, marjoram, oregano, sage, thyme, and vervain); (30) α-humulene (mint); (31) cis-pinane (basil, caraway, lavender, and oregano); (32) D3-carene (fennel, lavender, marjoram, and oregano); (33) α-terpinene (balm, hyssop, marjoram, and oregano); (34) o-cymene (anise, balm, basil, caraway, hyssop, lavender, marjoram, oregano, sage, thyme, and vervain); (35) p-cymene (caraway, fennel, lavender, marjoram, oregano, sage, and thyme); (36) 1,8-cineole (balm, basil, hyssop, marjoram, oregano, sage, and vervain); (37) cis-linalool oxide (anise, basil, and fennel); (38) (-)-citronellal (balm, sage, and thyme); (39) iso-borneol (balm, marjoram, and thyme); (40) camphor (balm, basil, lavender, marjoram, and sage); (41) iso-pinocamphone (basil, hyssop, lavender, marjoram, oregano, and sage); (42) trans-pinocamphone (balm, caraway, hyssop, and sage); (43) terpinen-4-ol (balm, basil, hyssop, lavender, marjoram, oregano, sage, and vervain); (44) myrtenol (basil, hyssop, lavender, marjoram, sage, and thyme); (45) (E)-citral (vervain and oregano); (46) isobornyl acetate (caraway, lavender, marjoram, and sage); (47) bornyl acetate (caraway, lavender, marjoram, and sage); (48) thymol (balm, marjoram, oregano, and thyme); (49) α-copaene (basil, hyssop, marjoram, oregano, and vervain); (50) β-elemene (balm, basil, caraway, and vervain); (51) β-caryophyllene (balm, basil, caraway, hyssop, lavender, marjoram, oregano, sage, thyme, and vervain); (52) β-cedrene (balm, basil, hyssop, lavender, marjoram, oregano, sage, and vervain); (53) α-humulene (balm, basil, hyssop, lavender, marjoram, oregano, sage, and vervain); and (54) caryophyllene oxide (balm, lavender, oregano, and sage) (Elshafie, 2017).

It is interesting to note that many plants that have been used for centuries in Europe are still in use today for similar therapeutic effects (e.g., anti-tumor activity) (Teiten, 2013). The demand for these treatments is on the increase, and major medical centers in the West are adapting to this call. For example, the Ohio State University Center for Integrative Medicine has established a “nutrigenomic program” for cancer patients. In this protocol, the center uses dietary supplements such as omega-3 fatty acids,

magnesium oxide, and cinnamon extract in an integrative cancer care setting (Varker, 2012). Another application of natural supplements is in the area of improving the quality of life in end-stage cancer patients (Ichim, 2011). For example, the administration of vitamin C (a water-soluble vitamin found in fruits and vegetables) intravenously (10 g twice/day) or 4 g orally daily for one week was shown to significantly improve the quality of life in these patients (Ichim, 2011). This outcome is perhaps not surprising as vitamin C plays significant roles in the physiology of various bodily functions. Among these functions, vitamin C can (Tsiligianni, 2010) (Mistry, 2011) (1) act as an antioxidant as it quenches a variety of reactive oxygen species and reactive nitrogen species in aqueous environments, (2) influence various metabolic and immune system functions, (3) maintain connective tissues, in particular, in collagen synthesis, (4) reduce the risk of chronic obstructive lung diseases (COPD is closely associated with lung carcinogenesis) (Lecture Three), (5) participate in bone remodeling, (6) facilitate proper wound healing, and (7) prevent anemia (Tsiligianni, 2010) (Mistry, 2011).

Our ancestors learned to heal their maladies with whatever they found locally in their environment. This was based initially on a trial and error sort of approach. Later, and as they became more familiar with their environment, they adopted a perhaps more advanced way of finding remedies. They observed how animals behaved when they became sick. They watched the type of plants animals sought during sickness and whether the animal recovered after using the shrub. As human beings became more advanced in their thinking, their approach to finding appropriate remedies became more scientific. At this time, our ancestors began to recognize certain features in plants that were thought to be closely associated with their medicinal effects. This recognition of features in plants for medicinal value became known as the doctrine of signatures as developed in England during the Middle Ages, in the 16th century (Richardson-Boedler, 1999) by Paracelsus von Hohenheim (1493-1541) (Pearce, 2008) (Petrovska, 2012). This doctrine was so popular that it was applied in the medical system found in the Levant following the Ottoman Empire (Lev, 2002). Plants have certain features that make them almost unique, and some thought these features were “visible marks” from “God the Creator” (Panese, 2003) (Saupe, 2007) (Saupe, 2008). These features can be related to certain shapes, colors, or other characteristics/symptoms the patient may experience (Lev, 2002) (Gurib-Fakim, 2006) (Pearce, 2008). For instance, Theophrastus (circa 372-288 B.C.) linked orchids to being an aphrodisiac using this doctrine, and the idea persisted in the writings of Paracelsus (1493-1551) and Linnaeus (1707-1778) (Pearn,

2012). Take, for example, carrots that can assume different colors depending on whether the pigment compounds called carotenoids are lutein (yellow), carotene (orange), lycopene (red), or anthocyanin (purple) (Massimo Iorizzo, 2016). Of note, sea buckthorn berry juice has the most complex mixture of carotenoids (α-carotene, β-carotene, β-cryptoxanthin, lutein, lycopene, and zeaxanthin) (Hernández-Ortega, 2012). The color of foods may signify the beneficial power that the food possesses. The following are colors along with their associated potential medicinal values (Minich, 2019): (i) red foods are useful for attenuating inflammation (think about inflammation as localized fever); they contain antioxidants manifested with the red-food carotenoids (e.g., astaxanthin and lycopene) and modulate the immune system (e.g., astaxanthin and vitamin C) (an excellent natural immunotherapy product for astaxanthin is made by ValAsta®, a company located in Charleston, South Carolina, USA); (ii) orange foods are useful for reproductive health; these are abundant in carotenoids that possess endocrine-regulating activities, and they play a role in fertility, such as ovulation; (iii) yellow foods are valuable for digestion; they are naturally rich in fibers to support a complex microbiome and assist in maintaining gastrointestinal health through gastric motility and proper digestive secretions; (iv) green foods are useful for cardiovascular health; they are high in a variety of nutrients that address the cardiovascular system (vitamin K, folate, magnesium, potassium, and dietary nitrates); and (v) blue-purple foods help with cognition; they contain polyphenols (e.g., epigallocatechin gallates, resveratrol, and curcumin) (Wang, 2014) which support learning, memory, and mood; the nutrients in these foods are flavonoids, procyanidins (monomeric and oligomeric forms), flavonols (i.e., kaempferol, quercetin, and myricetin), phenolic acids (mainly hydroxycinnamic acids), and derivatives of stilbenes (Minich, 2019). Generally speaking, the flavonoids are recognized as anthocyanidins (berries of various colors: blue, purple, and red), flavanols (found in tea and red grapes), flavones (such as those found in green leafy vegetables), flavonols (common to all plants), flavanones (found in citrus), and isoflavones (obtained from soy) (Yang, 2008-a). The anthocyanidins (the sugar-free equivalents of anthocyanins) are anti-inflammatory agents found abundantly in nature (blackcurrant, black elderberry, blueberry, black soybean, cherry, chokeberry, jaboticaba peel, mulberry, and red cabbage microgreen (Lee, 2017). Various anthocyanins are recognized in nature including cyanidins, delphinidins, malvidins, pelargonidins, peonidins, and petunidins (Lee, 2017). It is estimated that, on average, the daily consumption of isoflavones in Asia per person is about 25 g of soy protein or 100 mg of isoflavones (Messina,

2006). It is interesting to note that for elderly Japanese women living in the US, their consumption of isoflavones from food is much lower; their mean intake of dietary soy isoflavones was about ten times less (10.2 mg per day) than that consumed in Asia (Rice, 2001). Clinical evidence suggests that soy isoflavones are useful in controlling menopausal symptoms, such as hot flashes, especially when a significant amount of genistein is present (Messina, 2014). Studies (a cohort of 73,223 Chinese women) have documented that the consumption of soy food was inversely correlated with the risk of pre-menopausal breast cancer (Lee, 2009). Soy isoflavones exhibit anti-estrogenic properties and may be considered useful to be included in a breast cancer prevention program (Douglas, 2013). In a cohort of Japanese men (36,177) and women (40,484) aged 45-74 years, the intake of isoflavones was associated with a decreased risk of lung cancer if the person never smoked, but this association was not significant in smokers (Shimazu, 2010). Higher intakes of isoflavones were not associated with gastric cancer prevention in either Japanese men (39,569) or women (45,312) aged 45-74 years (Hara, 2012). Similar results were reported for colorectal cancer, where no association was found between the intake of isoflavones (miso soup and soy food) and the risk from this cancer (Akhter, 2008). For endometrial cancer prevention, major studies from the US (Hawaii) (46,027 non-hysterectomized post-menopausal women) and Japan (49,121 Japanese women; aged 45-74 years) did not show a significant protective association with the intake of food-containing isoflavones (legumes, soy, or tofu) (Ollberding, 2012) (Budhathoki, 2015). However, reduced risk of endometrial cancer was associated with the total isoflavone intake, daidzein intake, and genistein intake (Ollberding, 2012). Isoflavone intake, and genistein, in particular, has also been reported to improve the cognitive function in people. This improvement in brain function was postulated to work via two different mechanisms; one by an estrogen receptor-mediated pathway and another through the inhibition of tyrosine kinase (Lee, 2005). Incidentally, genistein is considered to be a phytoestrogen because of its chemistry. It is structured to resemble 17beta-estradiol and can antagonize this endogenous hormone as well (Sakai, 2008). In general, phytoestrogens are plant components which may be classified into isoflavones, flavones, and lignans (Suthar, 2001). As a phytoestrogen, genistein has applications in many diseases including menopausal symptoms, osteoporosis, and cardiovascular ailments (Suthar, 2001). Moreover, the effect of genistein on immunity was found to be cell-dependent; as such, it potentiates the cytokine production from T cells while enhancing the cytotoxic effect of cytotoxic T and natural killer cells (Sakai, 2008).

Image 1-1. Common lungwort. © *Photographer Karen Bergeron Shelton;* © *Altnature.*

Another more specific example of this doctrine of signature is the plant common lungwort (Image 1-1) (*Pulmonaria officinalis*) that has white spots on its large oval leaves resembling an ulcerated lung. In addition to consuming the leaves raw in salads, the plant was considered useful for conditions related to the respiratory tract. The plant contains several active ingredients, such as polyphenols, flavones, and proanthocyanidins (Neagu, 2018). Folkloric applications of common lungwort include the management of upper respiratory tract conditions such as a cough, pharyngitis, laryngitis, and asthma. The therapeutic benefits of the plant are probably due to its expectorant and antibacterial properties (Neagu, 2018). A glycopeptide in common lungwort was found to render blood much thinner and thus it was thought to be useful in the prevention of strokes and heart attacks (the number one killer in the US). People who are

prescribed anticoagulant medications (such as warfarin) ("thinning the blood" is known medically as an anticoagulant effect) by their physician need to exercise caution in using this herb as it can enhance the anticoagulant effect of medications. Some trace minerals and elements found in the leaves are considered essential for red blood cell formation, which renders this plant useful for anemia. Many medicinal plants are known to possess an anti-inflammatory action (Al-Achi, 2004), and common lungwort is one of them. In addition, external use of extracts obtained from the plant may be useful to soften and soothe the skin (an emollient action) and to shrink tissues upon contact (an astringent effect). (Astringents are mild protein precipitators, which upon contact with tissues, shrink the tissues and close minor wounds to stop bleeding.) When applied to the skin, extracts made with this herb can produce localized redness because of an increase in blood flow (an anti-irritant effect) (Al-Achi, 2008).

The well-known *Panax ginseng* is another example of the doctrine of signatures. The roots of this Chinese plant resembled a man-shape, which led to the belief that it might be useful for the entire body (a general tonic), or it resembles a phallic shape, which leads to its use as an aphrodisiac (Nair, 2012). It is interesting to note that the word "Panax" means "all-cure" (Ho, 2010). Indeed, the roots are useful in situations when the patient is recovering from an illness. Some use this herb when they are experiencing physical or emotional stress (acting as an adaptogen). Medical science recognizes stress as the primary contributor to chronic disease development, and adaptogens work by combating the stress effect through strengthening major organ systems. The pharmacological action of ginseng can be summarized as one affecting the central nervous system, being neuroprotective, having immunomodulatory activity, and protecting against tumor development (anti-cancer effect) (Hui, 2009). The active ingredients in *Panax ginseng* are the ginsenosides (Al-Achi, 2012-d). These components in ginseng exert anti-cancer, anti-inflammatory, antioxidant, and vasorelaxation effects (Lü, 2009). Ginsenosides are found almost exclusively in Panax species and more than 150 naturally occurring ginsenosides have been identified in different parts of ginseng (Ziarati, 2013). Think about this herb as a balancer. For example, some of its ginsenosides can elevate blood sugar levels, while others decrease it (Sievenpiper, 2004). People who use extracts of ginseng may experience a hypoglycemic effect (reduction in blood sugar) (Luo, 2009). For instance, ginsenoside Rh2 in *Panax ginseng* was shown to produce hypoglycemia following an intravenous injection in diabetic rats. The mechanism by which Rh2 exerted this hypoglycemic effect was postulated to be related

to the release of acetylcholine from the nerve endings that stimulated muscarinic M (3) receptors in the pancreas to release insulin (Hui, 2009). Consequently, diabetic patients need to exercise caution in using ginseng along with their hypoglycemic medications. Similar to common lungwort, the roots of ginseng produce an anticoagulant effect, which makes the administration of *Panax ginseng* with anticoagulant drugs dangerous (it might lead to spontaneous bleeding). It is interesting to note that despite the herb's anticoagulant effect, it was documented that it could lower the blood concentration of warfarin, and hence limit the drug's therapeutic potential. Besides, patients with high blood pressure should refrain from consuming *Panax ginseng* with beverages containing caffeine (most, if not all, energy drinks contain caffeine or a natural source of caffeine such as the guarana plant. Surveys have shown that younger age individuals in the US tend to drink more energy products than older adults) (Anonymous, 2016-c) (Park, 2013). This consumption of energy products by the youths may lead to a further upward escalation in blood pressure or can cause hypertension (Anonymous, 2016-c). Perhaps the most interesting example of the doctrine of signatures is stinging nettle (*Urtica dioica*). The stems of this nettle have small projections that resemble human hair. Thus, a folkloric practice was adopted by some to rub the juice of the stems and leaves over the scalp as a treatment for baldness (commercial products are available on the market, occasionally combined with saw palmetto oil, for such use). In fact, a combination herbal formulation containing *Achillea millefolium* aerial part extract, *Ceratonia siliqua* fruit extract, *Equisetum arvense* leaf extract, *Matricaria chamomilla* flower extract*, Urtica dioica* root extract, and *Urtica urens* leaf extract was shown to *downregulate* interleukin 1-α (IL-1α), a growth inhibitory agent that directly influences the hair follicles (Pekmezci, 2018). This plant is also used for its anti-inflammatory action. An important application in this regard is the extensive use of stinging nettle (Image 1-2) in the management of benign prostatic hyperplasia (BPH) (Kregie, 2018). Inflammation is a common condition found in prostate histological samples obtained from men with BPH. Fifty per cent of men aged 51-60 years old and 90% of those who are 80 years or older show histological evidence of BPH (Ghorbanibirgan, 2013). The inflammatory conditions contribute to the BPH development through decreasing apoptosis (i.e., programmed cell death) or by inducing prostate growth (St. Sauver, 2008).

Image 1-2. Nettles. © *Photographer Karen Bergeron Shelton;* © *Altnature.*

Folklore medicine matured over centuries into various modalities while it maintained its roots almost unchanged. Practitioners of natural medicine are as diverse as their number; however, they all share a fundamental belief (Boon, 2004). Concisely stated, natural medicine is based on the foundation that healing comes from within and not from without. In other words, what heals us comes from within us. Thus, the function of natural treatments is to activate this healing power that comes from within to restore balance (Gurib-Fakim, 2006). Homeopathy, naturopathy, chiropractic, Ayurveda, Traditional Chinese Medicine (TCM), and similar modalities all share this fundamental belief. Natural medical modalities, as such, are fundamentally different in their approaches from those adopted by allopathic medicine (medical doctors and their systems). The allopathic medical doctors treat patients by administering medications to combat a

disease state. Accordingly, healing occurs because of the treatments, and not because of some magical force acting from within. This central dogma that differs significantly between the two wings of medicine cannot be reconciled (Wilkinson, 2001) (Sohn, 2002) (Kurtz, 2003). However, there is a call by the allopathic community to be more accepting and inclusive of these natural modalities with a willingness to learn more about them (Sohn, 2002).

Natural medical practitioners may use their modalities alone without combining them with conventional treatments (alternative practices), by combining them along with traditional therapeutic approaches (complementary methods), or by adopting protocols to combine both conventional and natural therapies (integrative medicine) (Boon, 2004) (Gurib-Fakim, 2006). In general, complementary health approaches are said to represent "a group of diverse medical and healthcare interventions, practices, products, or disciplines that are not generally considered part of conventional medicine" (Peregoy, 2014). The main difference between complementary and integrative medicine is that in integrative practices, the physician follows protocols that include both types of treatments, whereas, in complementary medicine, the patients are advised to complement their drug treatments with natural ones extemporaneously. For example, a patient with BPH may choose to take stinging nettle along with his prescribed finasteride, a drug typically used in the treatment of BPH. In this case, the patient is using a complementary way in his healthcare choices. Surveys showed that about 5.45% (in 2011) of the US adult population used CAM therapies as a substitution to save money on prescription medications; uninsured persons practiced this substitution at the highest rate (11.9%) (Wang, 2015). An integrative way of practice is when the physician who prescribes finasteride also treats the patient with stinging nettle according to a previously established protocol. A patient who refuses to take finasteride and opts to use only stinging nettle to treat his BPH condition is utilizing alternative medicine in his healthcare. Such a practice can be dangerous and may lead to unnecessary suffering and even death. Stinging nettle was shown in clinical studies to significantly reduce the International Prostate Symptom Score (IPSS), serum prostate-specific antigen (PSA), and prostate size (Ghorbanibirgani, 2013). However, and despite these findings, using stinging nettle as the *sole* treatment for BPH and ignoring, otherwise, a physician recommendation is not a wise practice to follow. Incidentally, other examples of herbal supplements that may help with BPH symptoms, albeit they remain not thoroughly investigated, are pygeum, rye grass pollen extract, and saw

palmetto (Edwards, 2008). Patients who opt to use herbal supplements for BPH should inform their physician about such use.

According to a national health survey conducted in the US in 2012, American adults spent out-of-pocket $28.3 billion on complementary and alternative medicine (CAM) practices. The study also revealed an expenditure of $1.9 billion on children's remedies in this area of medicine (https://nccih.nih.gov/news/press/cost-spending-06222016). According to an earlier report, the national health survey of 2007 discovered that most CAM users (86%) utilize these modalities solely for wellness (51%) or wellness and treatment (35%) (Upchurch, 2015). Seventy per cent of all the expenditures on CAM therapies (from the 2007 survey) were spent by the top 25% of the CAM users (Davis, 2012). People with coexisting physical and mental illnesses use CAM therapies more often than those with physical disease alone (Alwhaibi, 2015). A typical user in the West of integrative and complementary treatments is a female, relatively younger (in her thirties), who is wealthy, and suffers from a chronic disease (Al-Achi, 2008). In the US, among adult patients with moderate mental distress, a typical user of CAM was an educated, employed female, who lived in the Western part of the country, younger in age, with functional limitations, and who had more than four ambulatory care visits during the past year (Rhee, 2017-a). Moreover, adult women who suffered from migraines or severe headaches used CAM (mainly herbal supplements, therapeutic massage, and chiropractic/osteopathic) more frequently than men in the US (Rhee, 2017-b). The main reasons why patients with headache/migraine use CAM therapies were for overall wellness, improving general health, and reducing stress (Zhang, 2017-b). In addition to the health benefits that CAM therapies bring to those who practice them, surveys showed that the utilization of some CAM therapies also helped in reducing absenteeism from work due to illness (overall average annual absenteeism was 3.7 days vs. 1.2 days with acupuncture and 2.4 days with naturopathy) (Rybczynski, 2017). The use of CAM therapies also varied by ethnicity; US ethnic groups (American Indian, Alaskan Native, and white adults) were more likely to use CAM remedies than US Asian or black adults (Barnes, 2008). Only less than 6% of US adults utilized acupuncture for health benefits (Zhang, 2016), and the use of naturopathy was even lower (<1%) (Hawk, 2012). Surveys indicate that only 1.1% of women use acupuncture, and they do so while still using conventional health services (Upchurch, 2008). The primary factors influencing the choice to use acupuncture by US adults were awareness, cost, and insurance coverage (Zhang, 2012-b). In South Korea, a typical CAM user was also a female, but of advanced age, and with a higher

education (Seo, 2013). Women, in general, are more likely to use dietary supplements concurrently with their prescription medications than men (Tovar, 2009). Also, women with multiple chronic illnesses are more likely to use CAM therapies than men (Alwhaibi, 2016). Surveys also revealed that female CAM users, compared to male users, had a college degree (bachelor-level), made less than $75,000 annually, and were divorced/separated or widowed. The main reasons female CAM users adopted these modalities were for wellness or disease prevention (Zhang, 2015).

Data obtained from the US National Health Interview in 2002 indicated that 62% of adults had used CAM therapies in the past 12 months if prayer for health reasons was included. Without prayer, the prevalence of CAM use dropped to 36% (Barnes, 2004). Studies also indicate that perhaps up to 90% of the US population uses dietary supplements for *medicinal reasons* (Tovar, 2009). The 2002 report counted the following ten CAM modalities to be popular among the users (in descending order of popularity): prayer specifically for one's own health, prayer by others for one's individual health, natural products (herbs), deep breathing exercises, participation in a prayer group for one's personal health, meditation, chiropractic treatment, yoga, therapeutic massage, and diet-based therapies (Barnes, 2004). A typical user of CAM in 2002 was a non-black/non-Hispanic female (40-64 years old) with an average income of $65,000 or higher (Tindle, 2005). For African-Americans, a typical user of CAM therapies (biofeedback, energy/Reiki, folk medicine and alternative medical systems, manipulative and body-based therapies, and prayer) had a higher income, lived within a smaller size family, had some graduate education, and lived in the Northeast, Midwest, or West region of the US. Although this typical user had more routine visits to primary care providers, the user was less likely to engage in preventive health practices (except for exercise, which was frequent) (Barner, 2010). Concerning health complaints, the user suffered from depression or anxiety, neck pain, and some limitations to daily living activities (Barner, 2010). Most people use CAM therapies as a single modality, 20% of adults combine two CAM treatments, and only 5% utilize more than two therapies (Neiberg, 2011). Of interest, most CAM users report their health status to be “excellent” and that “it is better than the previous year” (Nguyen, 2011). Although in recent years many insurance companies began to cover in part some complementary modalities, it remains that most companies still refuse to compensate for these modalities even when a medical doctor suggests them (Nahin, 2016-b). Thus, the burden of cost is shifted almost in its totality to the patients who spend billions of dollars annually on these

treatments. Out-of-pocket expenses do not deter the user from seeking such remedies. In 2012, the US adult population spent $6.7 billion and $52 billion out-of-pocket on vitamins/minerals and CAM, respectively (John, 2016). For example, colloidal silver (a dispersion of silver in water in the form of colloidal particles 1 nm to 0.5 μm in size) has become very popular in recent years due to its effectiveness *topically* as an antiseptic to treat minor burns, wounds, and skin infections. Homeopathic products (Lecture Two) of colloidal silver are often sold on the market. Although some people may ingest this solution, the US Food and Drug Administration has issued warnings against such use. One of the frequent adverse events associated with the use of colloidal silver internally is argyria (argyrosis), a condition by which the skin turns bluish-gray. Unfortunately, once argyria develops, it is irreversible (Anonymous, 2019-b). This mineral/metal (a mineral is an inorganic crystalline substance that is found in nature) is not essential for health and should be avoided due to its potential harm.

Concerning the overall expenditures (in 2012) on CAM therapies in the US (ages 4 years to adults), more was spent on visits to complementary practitioners ($14.7 billion) than for purchases of natural product supplements ($12.8 billion), or self-care approaches ($2.7 billion) (Nahin, 2016-a). And for those who are 50 years of age or older, 31% of them have used CAM therapies during the past 12 months (Johnson, 2016-a), although the odds for using CAM therapies were lower for the age group 50-64 years old (Mbizo, 2016). Those who used CAM as treatment also sought more conventional modalities than those who used it for wellness (Davis, 2011). On the other hand, those who pursued CAM therapies were often restricted from accessing conventional healthcare services due to cost or being uninsured (Su, 2011). The modalities that were most commonly used by older adults (50 years or older) were (in descending order) botanicals, chiropractic, therapeutic massage, and yoga (Johnson, 2016-a). Adults with functional limitations used deep breathing exercises the most, and their use of meditation, massage therapy, and yoga increased significantly from the year 2002 to 2007 (while their use of Atkins' diet significantly decreased during the same period) (Okoro, 2013). In the US, those who were born during the period 1925-1945 (the Silent generation) were less likely to use CAM modalities than the baby boomers (born during the period 1946 to 1964) despite the fact that the Silent generation had twice the rate of chronic diseases compared to the baby boomers and more painful conditions (Ho, 2014). Among the reproductive-age US women (18-44 years old), 67% reported using CAM therapies (including vitamins) in the past 12 months (42% without vitamins) (Johnson, 2016-