Holistic/Natural Medicines' Views on "Why You Should Avoid Coffee"

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Coffee is an economic mover and shaker, second only to crude oil in its dominance of the global commodities market. Coffee exports, currently valued at over twenty billion dollars annually, are at record levels, although the surplus production has contributed to a two-year downward trend in prices that has squeezed the incomes of smaller producers. In the U.S., coffee shops are the fastest growing "niche" in the restaurant business, and Starbucks is the country's third largest restaurant chain (without even counting the more than twenty-four thousand coffee shops operated by Starbucks International). As a leading purveyor of value added coffee products, Starbucks net earnings (estimated at almost twenty-five billion dollars in 2018) have surpassed the monetary value of global coffee bean exports.

Per capita consumptions of coffee are highest in countries such as Finland and Brazil, but Americans lead the world in total consumption, downing one hundred and forty-six billion cups of coffee per year. Roughly two-thirds of American (64 percent) drink at least one cup of coffee per day. Interestingly, employed adults consume more caffeinated beverages (including coffee than unemployed adults. National studies looking broadly at dietary caffeine intake have showed that two-thirds of daily caffeine comes from coffee (with tea in second place), and – perhaps explaining Starbucks astronomical revenues – over half comes from "store-bought coffee"

A FALSE FRIEND

Coffee contains more than eight hundred volatile compounds, including caffeine and chlorogenic acid (coffee's primary polyphenolic compound). Caffeine is toxic to some insects and animals, notably herbivores. In humans, caffeine is a psychoactive substance and a central nervous system stimulant. In an upbeat video about coffee on the Smithsonian website, Sir Hans Kornberg (biochemistry professor at Boston University) explains the caffeine molecule's stimulant effects as follows: ordinarily, something called "cyclic AMP" (a derivative of ATP, the primary molecule required for cellular energy) tells a cell's machinery to "get moving" when enough cyclic AMP has been made, "natural mechanisms" come along and call a halt to cyclic AMP production. Caffeine, however, overrides these natural mechanisms, removing the brake and allowing uninterrupted production

of cyclic AMP. This "amped-up" production of cyclic AMP has been a known biological action of caffeine for decades. In lay terms, it means that coffee and caffeine "will cause the body to 'forget' that it is tired."
Many coffee drinkers celebrate the "alertness, elevated mood, wakefulness, increased speech and motor activity and decrease(d) appetite" that are the temporary hallmarks of their beverage of choice (and indeed, of all stimulants, whether natural or synthetic). The French author, Honore de Balzac, is reputed to have been a major coffee habitué, consuming up to fifty cups a day when in the throes of writing his literary masterpieces. As Balzac's coffee habit implies, caffeine's ability to stimulate "pleasure and reward" centers in the brain makes it highly addictive, over time, an individual will need to take in ever more caffeine to achieve the same effects. Coffee's ability to keep drowsiness at bay provides a short-term solution that creates a long-term problem.
Despite Balzac's example, the founder of a modern company that trains Fortune 500 companies on emotional intelligence claimed in Forbes in 2012 that coffee is actually a "silent killer of success". To explain this assertion, the Forbes author described a variety of undesirable caffeine-induced effects, including hyper-arousal,; irritability, anxiety and other forms of emotional hijacking of behavior, rapid shallow breathing that "deprives the brain of the oxygen needed to keep your thinking calm and rational; and decreased quality of sleep. With regard to the latter, he also noted that "caffeine has a six-hour half-life, which means it takes a full twenty-four hours to work its way out of your system. A blogger/writing for coffee fans concurs, admitting that coffee's ability to keep drowsiness at bay "provides a short-term solution that creates a long-term problem."

EFFECTS ON BODY AND BRAIN

Caffeinated coffee is a "potent pharmacological agent" that can cause numerous harms. Patients are encouraged to "gradually detoxify this drug from their bodies and lifestyle, drinking herbal teas, beverages made from roasted chicory or simply warm water and lemon juice. (Note that decaffeinated coffee is not a desirable endpoint; it is neither entirely caffeine-free nor free of the other phytochemicals in coffee that can produce strong physiological effects.)
After ingestion, caffeine is widely distributed throughout the body, "promptly" getting into all the body tissues and crossing the blood-brain, blood-placenta and blood-testis barriers. Caffeine is a methylxanthine – a type of molecular

compound that functions simultaneously as a stimulant "that can increase heart rate and blood flow" and as a relaxant "that can open blood vessels and loosen muscular tissues. The stimulant property of methylxantines is "one of the main reasons people often feel their hearts racing after consuming a lot of caffeinated foods or drinks."

Selected effects of regular consumption of caffeinated coffee

Depletes adrenals
Depletes epinephrine and norepinephrine neurotransmitters
Spikes and then lowers blood sugar
Increases heart rate and increases (or lowers) blood pressure
Exhausts gastric juices
Decreases thymus gland size and circulating antibodies
Promotes fibrocystic breast changes
Depletes minerals
Interferes with the calcium-phosphorus ratio
Induces vitamin B1 deficiency
Crosses the placenta and breast milk to the fetus and infant

Depletion of the adrenal glands and compromised nutrition and digestion are some of the many harmful effects of caffeine. The adrenal glands govern the production of key hormones - including sex hormones, stress hormones such as cortisol and the neurotransmitters epinephrine, norepinephrine and dopamine.. Coffee has extremely negative effects on this intricately balanced system. Coffee's artificial stimulation of the adrenal glands and especially cortisol "means that every time you drink coffee, you're activating the body's fight-or-flight response, putting your nervous system "on constant red alert", whether or not there is any actual stress. Normally, cortisol levels are high in the morning to help an individual "rise and shine for the day", but when routine coffee consumption drives up cortisol artificially, it changes the pattern. Cortisol ends up being low in the morning instead of high – prompting the person to reach for a morning cup of coffee and perpetuating the topsy-turvy cycle until, finally, more severe adrenal fatigue sets in.
Research has shown that coffee and caffeine affect utilization and absorption of key nutrients, for example, depleting magnesium and reducing absorption of iron. As a diuretic, caffeinated coffee also contributes to calcium excretion to such an

extent that it “can add up to significant bone thinning.” Although some researchers rate this bone loss effect as “controversial”. One study found that elderly postmenopausal women who consumed about eighteen ounces of brewed coffee a day experienced “significantly higher rates of bone loss at the spine” compared to women with a lower daily intake. These effects on bone density prompted Colorado researchers in 2009 to recommend that premenopausal women limit their caffeine consumption to avoid osteoporosis.

A couple of years ago, reflecting the current trendiness of anything to do with the microbisome, coffee lovers greeted a study published in Science with considerable fanfare. Although the study covered an extremely wide range of “intrinsic, environmental, dietary and medication parameters.” Coffee enthusiasts pounced on the one sentence linking coffee, tea, and wine to “a healthier and more diverse community of microbes living in the gut”. The researchers attributed this association to the three beverages high polyphenol content. Others, however have suggested that coffee’s impact on the gut may not actually be beneficial. Dr. Edward Group of the global Healing Center describes numerous undesirable effects on gut health, including a reduction in the stomach acid needed for digestion when morning coffee is consumed on an empty stomach (true for both caffeinated and decaffeinated coffee); a weakening of the stomach’s protective mucosal layer; acid reflux and esophageal sphincter; relaxation of the esophageal sphincter; aggravation of the bowel disorders or an overactive bowel; and premature release of partially digested food into the small intestine, which can damage the intestinal wall and facilitate dysbiosis.

Coffee drinkers who are interested in the microbiome might also want to bear in mind the results of a novel study of “coffee machine-associated bacteria” published in Scientific Reports and summarized in Scientific American, which found that nine in ten top-of-the-line expresso machines harbored “a whole menagerie of bacteria – including some pathogenic species more commonly associated with the toilet.” (About 30% of the world’s Michelin-starred restaurants feature the brand of espresso machine examined in the study. Given the discovery of bacteria with pathogenic properties, “and the fast recovery of the (bacterial) communities after rinsing the capsule container, “the study’s author is advised “frequent maintenance” and preventing contact “of the coffee leach with other parts of the machine to avoid unintended contamination of the beverage.”

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VULNERABLE POPULATIONS

Many researchers acknowledge the association of caffeine intake with "reversible and transient physiological effects broadly and cardiovascular effects specifically," but surprisingly few are willing to pin any blame for more serious chronic health issues on coffee or caffeine. At the same time, some experts have called attention to caffeine's potentially adverse effects on sleep or cardiovascular and other functions in "special" or "vulnerable" populations – broadly defined as "pregnant and lactating women, children and adolescents, young adults, and people with underlying heart or other health conditions, such as mental illness.
Studies and meta-analysis (studies of studies) in humans have linked coffee consumption during pregnancy (including both caffeinated and decaffeinated brews in some studies) to an increased risk of pregnancy loss, preterm delivery and other adverse birth outcomes. A just published long-term study of Irish mother-child pairs that looked at the effects of maternal consumption of both coffee and tea found "robust" and statistically significant associations of maternal caffeine intake with lower birth weight, shorter birth length, smaller head circumference and shorter gestational age. Of note, "similar higher risks of adverse birth outcomes were observed for the highest caffeine intake categories from coffee and tea compared with the lowest intake categories.
Studies in rodent models suggest that caution about coffee consumption during pregnancy (and lactation) is also warranted due to potential long-term effects on offspring that are irreversible, including adrenal abnormalities. A study by investigators in Turkey – famous for its "robust Turkish coffee and strong black tea" and where approximately 60 percent of pregnant women consume caffeine – found that administration of both low and high doses of caffeine to pregnant rats affected sex steroid levels in the fetus and neonate, leading the authors to speculate about likely effects on "behavioral and neuroendocrine functions at some point in adult life."
Chinese researchers, also using a rat model, found that prenatal caffeine exposure induced "high susceptibility to metabolic syndrome" in the female adult offspring. Metabolic syndrome is the name given to a group of risk factors for heart disease, stroke and diabetes. (the risk factors include apple-shaped obesity, high blood pressure, high blood-sugar, a high triglyceride level and low HDL-cholesterol.) Somewhat confusingly, some researchers have reported that regular coffee consumption is protective for metabolic syndrome. However a recent

study from Finland (the country with the world's highest per capita coffee consumption) reported that regular coffee consumption is protective for metabolic syndrome. However, a recent study from Finland (the country with the world's highest per capita coffee consumption) reported that in individuals who are already type 1 diabetics, both "moderate' (three to five cups a day) and "high" (greater than five cups a day) coffee consumption was associated with increased odds of metabolic syndrome, and any level of consumption increased the risk of high blood pressure.

A 2012 rat study out of Iran examined caffeine as a potential risk factor for male infertility considering both in utero and lactational exposures. The researchers identified a number of significant long-term and dose-related effects on the "reproductive efficiency" of male offspring rats," including a decline in sperm density, decreased fetal viability and reductions in testosterone levels. A recent survey of "lifestyle causes of male infertility" cites numerous studies linking coffee and caffeine to poor semen quality, sperm DNA damage and prolonged time to pregnancy, although it is unclear whether these effects accrue solely from prior in utero exposure or also from adult caffeine consumption.

An international childhood cancer consortium also just reported an increased risk of childhood leukemia in the children of regular coffee drinkers. The coffee consumption threshold beyond which the researchers detected cancer effects was two-plus cups of coffee a day.

COFFEE DRINKERS FOR LIFE?

Market reports indicate that adolescents "are drinking more coffee every year and continually starting at a younger age" – setting the stage for a life-long coffee-drinking habit". Teens and young adults are responding in part to clever marketing that portrays coffee drinking as "classy and sophisticated". This marketing strategy appears to be paying off, because young workers between the ages of eighteen and thirty-four spend an estimated twenty-four to seventy-four dollars per week on coffee. The narrator of the Smithsonian's fluff video on coffee credits entities such as Starbucks for "talking about *terroir* (and) making the geography of coffee available to people" and also waxes poetic about the current wave of coffee "connoisseurship" and "refinement"; the short video also features a young college student sniffing and tasting a special brew in the manner of a fine wine.

According to the advisory committee for the 2015 Dietary Guidelines for Americans, there is a lack of consensus regarding safe levels of coffee and caffeine intake among children and adolescents. This may be due to the "dearth of caffeine research among younger consumers." A research team in Iceland is particularly concerned about the implications of teenage caffeine consumption for long-term cardiovascular health, having found that "early exposure to caffeine may lead to persistent increases in vascular resistance, which in turn is an acknowledged risk factor for the development of hypertension." Headaches are another common vascular symptom associated with coffee drinking. A study that looked at menstruation-related headaches—reported by one in four teenage girls—found that daily coffee (and cola) consumption was associated with more frequent headaches.

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Researchers have raised concerns about increased vulnerability to anxiety disorders resulting from caffeine consumption during the developmentally sensitive adolescent years. A study in rats identified "dysreulation of the neuroendrocrine stress response system" following adolescent caffeine exposure, leading to "enhanced anxiety-related behavior" in adulthood. Disturbingly, the effects persisted into adulthood "even after removal of caffeine."

RISKS OUTWEIGH BENEFITS

A number of studies and meta-analysis have reported inverse (protective) associations of coffee with a variety of diseases. The lead researcher of one of the more influential meta-analysis smilingly poses with a cup of coffee on his university webpage). The coffee lobby and even public health and medical professionals have not hesitated to use these studies to shore up their claim that "coffee is good for you." (Remember when tobacco companies built relationships with academic institutions and funded scientific studies to tout the benefits of another stimulant, called nicotine? Ironically, the companies' public relations campaigns "often (minimized)nicotine's health risks by comparing it to caffeine or coffee"!

Much of the coffee-is-beneficial research is actually of a mixed-message nature. For example, one study describes coffee as a risk factor for type 1 diabetes and rheumatoid arthritis but suggests that it is protective for multiple sclerosis and autoimmune liver disease. Another study links coffee to an increased risk of

breast cancer (among premenopausal and normal-weight women) but a reduced risk of endometrial cancer. A study looking at kidney cancer found that decaffeinated coffee consumption was associated with an increased risk of "aggressive" kidney cancer, while caffeinated coffee intake apparently reduced the risk-even though other work has pointed to caffeine as a kidney toxin. And some investigators deny any coffee-associated cardiovascular disease risk at all, while others point to likely interactions with genetics, suggesting that some individuals may be genetically "predisposed" toward coffee-induced high blood pressure. (Does this portend a genetic test for would-be coffee drinkers?)
Is it worth running the risk of losing a pregnancy, damaging one's adrenal system or impairing nutrient availability to obtain coffee's purported mixed benefits? A Wise Traditions lifestyle that emphasizes a properly prepared nutrient-dense diet, adequate sunlight, time in nature, protection from cell phones and cell towers, and avoidance of toxic pharmaceutical products will go much further toward supporting good health than gambling a ride on the coffee roller coaster.

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