Caffeine is the most popular drug in the world, and North America is no exception. In fact, 90% of North American adults consume caffeine daily, most of it in the form of coffee. The popularity of caffeine can be attributed to its effect on the body as a stimulant, increasing heart rate, metabolism, mental functions and alertness. How does caffeine wake us up? Caffeine is absorbed about 45 minutes after ingestion by the stomach and the small intestine, and, depending on an individual’s rate of metabolism, it can be detected in the body 6-8hrs after ingestion. Many of caffeine’s stimulatory effects are mediated in the brain by increasing levels of dopamine (stimulant), epinephrine (stimulant) and serotonin (increases positive mood), and caffeine has the added ability to block the neuromodulatory molecule adenosine. Caffeine can bind to the receptor for adenosine, thereby blocking adenosine’s inhibitory effects on brain function and allowing increased mental function and alertness. However, the effects of caffeine are only temporary because caffeine is metabolized by the cytochrome P450 system in the liver.

(Continued on page 2)

Risks of high caffeine ingestion include:
- Increased production of stomach acid and stomach ache
- Increased risk of peptic ulcers, erosive esophagitis, and GERD
- Heart arrhythmias
- Anxiety
- Dehydration
- Addiction/Withdrawal and Overuse

Benefits of caffeine ingestion include:
- Improved alertness and reduced fatigue
- Increased metabolism and lipolysis (fat burning)
- Improved short term memory
- Increased ability to perform physical exercise
- Reduced progression of baldness (high dose topical applications)
- Reduced risk of Parkinson’s disease in men
Caffeine: Benefits and Risks (cont.)

Why can some people drink a cup of coffee right before bed and still go to sleep?

Tolerance. People who drink coffee on a regular basis can develop such a tolerance to caffeine that it loses its strong stimulatory effects. This can be explained at the microbiological level by taking a closer look at the relationship between the caffeine molecule and the adenosine receptors of the brain. Recall that caffeine binds to adenosine receptors; in time, the body develops a mechanism to stop caffeine from completely blocking adenosine. When someone ingests caffeine on a regular basis, the body increases its numbers of adenosine receptors so that caffeine cannot saturate all of them. Once this upregulation of adenosine receptors takes place, the stimulatory effects of caffeine are stunted, and caffeine tolerance is developed. In heavy coffee drinkers, caffeine tolerance develops very quickly; in fact, it can happen in as little as 24 hours of consistent intake. Keep in mind that the caffeine intake of most Americans exceeds 200mg/day. So, once you build caffeine tolerance, you can drink a cup of joe with dessert and still sleep like a baby.

Caffeine Addiction/Withdrawal

Because caffeine use is so high, the risk of caffeine addiction is high as well. Caffeine is a physically addictive substance, so if you stop using it, you might experience withdrawal symptoms, such as headache, irritability, inability to concentrate, and stomach aches. "These symptoms may appear within 12 to 24 hours after discontinuation of caffeine intake, peak at roughly 48 hours, and usually last from one to five days – representing the time required for the number of adenosine receptors in the brain to revert to ‘normal’ levels, uninfluenced by caffeine consumption (1)."

Caffeine overuse

According to the Diagnostic and Statistical Manual of Mental Disorders, the overuse of caffeine can cause four caffeine-induced psychiatric disorders: caffeine intoxication, caffeine-induced anxiety disorder, caffeine-induced sleep disorder, and caffeine-related disorder not otherwise specified (NOS). Caffeine intoxication, which can be induced by the ingestion of over 400mg of caffeine in a short duration, can result in restlessness, nervousness, excitement, insomnia, flushing of the face, increased urination, gastrointestinal disturbance, muscle twitching, a rambling flow of thought and speech, irregular or rapid heart beat, and psychomotor agitation. Extremely high doses equivalent to 80-100 cups of coffee in a short period of time can even cause lethal cardiac arrhythmias. To avoid the negative effects of caffeine overuse, be mindful of how much coffee you’re drinking per day.

References


Daytime Drugs and Restless Nights

Carrie Goodson, L1

Caffeine can be a great aid for waking up in the morning or for counteracting the natural “afternoon dip” in energy. Many people also drink caffeine hoping to delay their inevitable need for sleep. Unfortunately, heavy (or late) caffeine consumption adversely affects quality of sleep once you finally allow yourself to lie down. The half-life of caffeine in the body is generally between four and six hours, and sleep can be affected by as little as 200mg of caffeine; therefore, the general recommendation is to avoid consumption of caffeine five to seven hours before bedtime.

Further bad news: alcohol decreases sleep quality. The “nightcap” as a sleeping aid has a long history - following a brief period of stimulation, a small amount of alcohol serves as a sedative. Unfortunately, sleep acquired in this way may last only three to four hours (meaning less deep sleep), and alcohol can exacerbate minor sleep disorders including insomnia, sleep apnea, and snoring. Sources say this negative affect on sleep is induced because the metabolism of alcohol causes arousal.

(Continued on page 3)
Late caffeine consumption can cause:
- Restlessness
- Difficulty falling asleep
- Increased body movements
- Lighter sleep
- Shorter periods of sleep, specifically deep sleep, which is the most necessary and beneficial type of sleep

The cyclical phenomenon of caffeine and sleep is clear:

<table>
<thead>
<tr>
<th>Caffeine consumption</th>
<th>Lower quality sleep</th>
<th>Tiredness</th>
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Tips for increasing your sleep quality:
- Avoid napping for longer than 20 minutes during the day. Longer naps will make you feel more tired.
- Avoid caffeine 5-7 hrs before bedtime.
- Avoid using alcohol as a sedative before bedtime.
- Exercise regularly, but vigorous exercise is best in the morning or late afternoon.
- Do not eat large meals near bedtime, but don’t go to bed hungry either. Complex carbohydrates will trigger serotonin, so these are best if you must eat before sleeping.
- Associate your bed with sleep, not wakefulness—don’t study or watch TV while in bed.
- If you have trouble falling asleep, try deep-breathing techniques.


COFFEE
Jeff Marino, L2

In medical student circles, it’s as prevalent as Facebook—and even more addicting.

Many of us started drinking coffee in college; in fact, some of us can even remember the onset of the addiction. For Melissa Hirsu (L2), it was Organic Chemistry. Others, however, joined the coffee camp of more than 100 million Americans somewhat later in the game. Michelle Durham (L2), who began drinking coffee in medical school, had previously steered clear of it because she thought it had a bad aftertaste. She now claims that she drinks it because she actually likes the taste—especially at her favorite coffee shop, which features brews from places such as Colombia, Mexico, and Guatemala.

The Rush
“I just drank some espresso this morning, and I’m crawling out of my skin,” an anonymous L2 medical student recently shared with me during the break between classes. Not everybody feels that way, though. Take Durham, for example, who says, “I don’t even know if it gives me a boost. Even if I drink a cup late (when I am at the library), within an hour I’m still sleepy and ready to go home.”

Why do some people feel it, while other people don’t? Body weight is a factor in determining caffeine sensitivity, but so is genetics. Caffeine is metabolized by the cytochrome P450 oxidase system in the liver; people with variants in the genes for those enzymes have differences in the speed at which their bodies break down and eliminate caffeine. Cigarette smokers also tend to be able to handle more caffeine than non-smokers due to, it is surmised, nicotine’s ability to rev up the enzymes that break down caffeine. The bottom line: The longer the caffeine remains in the body, the more likely the person is to get the jitters.

(Continued on page 4)
COFFEE (cont.)

Health risks and benefits

Despite the high numbers of coffee drinkers, surprisingly few people are aware of the health risks and benefits of drinking coffee. Perhaps this is because medical researchers have yet to come reach a consensus regarding caffeine. While the verdict is still out, some trends seem to be emerging.

“We know it speeds up metabolism and can help lose weight,” says Dr. Roca. Additionally, coffee may also actually help protect against several chronic diseases: Parkinson’s disease, liver disease, and type 2 diabetes. The problem is that the benefits are seen only at levels high enough to put people at risk for cardiac arrhythmias or gastroesophageal reflux disease. Furthermore, coffee consumption appears to be associated with several risk factors for cardiovascular disease, such as high blood pressure, high cholesterol, and high plasma levels of homocysteine.

Under certain circumstances, coffee’s cholesterol-raising effects appear to be mediated by cafestol and kahweol, molecules that are extracted from coffee during brewing. Unfiltered coffees—Scandinavian boiled coffee, Turkish coffee, and French press coffee—contain relatively high levels of these beneficial chemicals; while filtered coffee, percolated coffee, and instant coffee contain significantly less. The levels of cafestol and kahweol in espresso are high, but the small serving size makes espresso an intermediate source of these chemicals. So it appears that how you brew your coffee makes a difference.

Cutting back

When asked about coffee’s prevalence within the medical school environment, Dr. Roca responded by saying, “The role of coffee is directly related to role of sleep deprivation and the role of reactive hypoglycemia—it’s used to medicate poor lifestyle choices. If people could eliminate junk food and get adequate sleep they would likely be more able to concentrate. But unfortunately, even though they think [coffee] is a necessity, it actually trains people into lifestyles that can be very difficult to change in the future.”

So how can you cut back?

- Decrease Size: Studies show that 100 milligrams—just a 6-ounce cup of a typical automatic-drip coffee—is enough to produce a lift. The 16 oz “grande” size can contain 4 times the caffeine.
- Change Blend: Try a decaffeinated blend. To qualify as decaf, a coffee must have 97% of its caffeine removed, resulting in an average of only 5 mg of caffeine per 5 oz cup.
- Bean Type: The arabica bean tends to have less caffeine and more flavor than the robusta bean.
- Switch to Dark Roast: Roasting burns off some of the caffeine, resulting in a lower caffeine content for dark roasts despite the stronger flavor.
- Quicken brewing time. In general, the longer you brew, the more caffeine you get out of the beans. So steer clear of the Scandinavian boiled coffees, Turkish coffees, and French press coffees. Try a espresso drink instead (see below). Also, be aware that cold-brewed coffee is generally more caffeine-rich than hot.
- Try espresso. Contrary to its reputation, espresso actually has less caffeine than brewed coffee, due to its dark roast and speedy brewing time.
- How about a cup of tea? A cup of tea contains between 30 and 90 mg of caffeine, depending on the variety and the steeping time.

Question of the Month to Dr. Roca—What is Rhodiola Rosea?

What kind of plant is Rhodiola?
Rhodiola is considered to be an adaptogen because it helps the body adapt to both acute and chronic stress events. In acute stress events, it helps the body by increasing β-endorphins (the “feel good” molecule). In chronic stress circumstances, it can counteract cortisol and reduce the depletion of stress chemicals (catecholamines) in the bloodstream.

Where is Rhodiola traditionally found?
Rhodiola is widely distributed in cold, high altitude climates in Eastern Europe and Asia. It has been used by local peoples to help with depression, altitude sickness, fatigue, and enhancing work performance.

What are the active molecules in Rhodiola?
There are more than 20 active ingredients in rhodiola. The most significant ones are p-tyrosol, salidroside, and rosavin (the constituent to which the extract is standardized).

How do you feel after taking Rhodiola?
Many people feel like they are in excellent athletic shape. They feel as though they were used to working out for a long while.

How do you take Rhodiola?
It works after even one administration, but you can still take it for weeks at a time. We don’t know whether or not the body becomes tolerant of the effects of long term usage so it is recommended that one takes routine breaks in usage. A suggested regimen of 360 to 600 mg of Rhodiola extract standardized to 1% rosavarin for two weeks, stay off one half to one week, and then resume the regimen for another two weeks. Individuals who stayed on Rhodiola for 4 weeks did not show any improvement in mental functioning or performance.

Are there any side effects?
Rhodiola works by acting as a MAO inhibitor (an antidepressant) to some degree. Therefore, interactions with medicines such as SSRIs, migraine medications, and antihistamines as well as any alcohol, aged cheese, MSG, and glutamine may result in side effects. The potential consequences are speculative. Some have reported irritability and insomnia after prolonged use of Rhodiola. Rhodiola may also reveal hidden mania in a person with undiagnosed bipolar disorder.

What can Rhodiola Do?
- Enhance exercise performance
- Improves endurance
- Enhance memory and recall during test taking
- Protect cells from the effects of carcinogens
- Have a beneficial response to cooling stress on the heart
- Have a beneficial response to stress-induced catecholamine injury in the heart
- Prevent of arrhythmias
- Enhance the effectiveness of some chemotherapy drugs
- Reduce fatigue, insomnia, irritability in response to intense physical or intellectual strain
- Reduce the level of C Reactive Protein in blood
- Increase the level of ATP in mitochondria in the brain and muscle tissue

IMIG Update—Whole Foods Health Screening

On January 20th, IMIG members volunteered at the Whole Foods stores in both New Orleans and Metairie, LA. Volunteer activities included measuring blood pressures, blood glucose levels, and body mass indices. IMIG members Michelle Durham (L2), Carrie Goodson (L1), and Jeff Marino (L2) created informational handouts on cholesterol, diabetes, smoking, obesity, and hypertension. Each handout contained a background, statistical information, and holistic approaches for each condition. IMIG faculty advisor Dr. Henri Roca (lower left photo) was at the New Orleans location to answer any questions from the visiting customers. The event was very successful, and IMIG hopes to do more screenings at Whole Foods and other locations this year.

More Updates!

IMIG is going to have a Cultural Awareness Day on February 28th. Medical students from various ethnic backgrounds will present holistic modalities of medicine from their representative country. Lunch will be served! IMIG is also going to have an Easter Egg Hunt Fundraiser in April. Further details to come! Photos courtesy of Becke Rings (L1), Carrie Goodson (L1), and Stephen Quinet (L2).
Thank you…
We would like to offer thanks to the American Medical Student Association Foundation’s EDCAM program, Whole Foods Company, the Wholistic Wellness Network, LSUHSC Family Medicine Department, and our faculty advisor, Dr. Henri Roca who is Chief of LSU’s Section of Integrative Medicine and a Holistic Area Resource Person of the American Holistic Medical Association.

Wellness Tip of the Month
Nigel Baron, LSUHSC Wellness Fitness Center Manager

Keeping your New Year’s Resolution – 5 easy tips!
One key point to keep in mind is that your resolutions toward any change in diet or exercise should become a lifestyle change.

- **Make sure your goal is attainable.** Trying to lose 30 lbs in a month is not attainable through any healthy means. Keep it realistic - a healthy range of weight loss within a month is 6 - 8lbs.

- **Make sure you are able to measure your progress.** Stepping on the scale is not the way to do it! If you do not have access to getting a full fitness assessment, try on an old pair of jeans.

- **Make sure that you always have healthy snacks available.** Cut up fresh fruit and veggies and bag them.

- **Make sure that you speak with a professional healthcare provider.** If you have health concerns, make sure you see your doctor before beginning any exercise program.

- **Post it.** Post your goals on a sticky note and place it where you will be reminded of it everyday - on your bathroom mirror, in your car, and at work. This will help keep you on track.

Editor:
Mamina Turegano, L2 Medicine

Assistant Editor:
Lauren Hebert, L1 Medicine

Contributors/Helpers:
Nigel Baron, LSUHSC Wellness Fitness Center Manager
Carrie Goodson, L1 Medicine
Jeff Marino, L2 Medicine
Justin Meunier, L2 Medicine

Faculty Advisor:
Henri Roca, MD,
Chief of Section of Integrative Medicine,
Department of Family Medicine

Donations can be made out to the LSU Foundation. Please specify LSU Section of Integrative Medicine on the comment line. Send donations to 2364 Constance Street, New Orleans, LA 70130.