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A Walk in The Woods

The Science of Forest Bathing

Written by Sionainn Rudek

Illustrated by Emma Beveridge

During the spring of 2021, I hiked 250 miles of the Appalachian Trail. Audrey, a good friend, invited me to join them on this epic venture. So, with no previous backpacking experience, I happily accepted the challenge. For three weeks, I lived out of my backpack, far from the modern comforts I had grown accustomed to during my 20 orbits around the sun. I slept on a thin, slowly deflating air pad, embraced the "permafunk" of my deodorant-less, shower-sparse existence, and consumed copious amounts of rehydrated Textured Vegetable Protein and Annie's Mac and Cheese. The two of us would reconvene only three times during the day: once for lunch, again when I would inevitably get lost and require Audrey's geographical guidance, and finally, to make camp in the evening. We spent most of our days alone on the trail, walking. Weather patterns and water sources consumed my thoughts, my imagination filled the hours with daydreams of cheesecake and plush couches, and my mental health flourished, blossoming alongside the spring ephemerals. I had never felt more at peace. Perhaps a detox from the pervasive weight of modern patrio-capitalist society, individualistic materialism, and hyper-productivity culture made

room for my tranquility. Or maybe my days' repetitive, meditative nature played a role in my quasi-existential ease. Could that be it? Or was there more to the story that I had yet to uncover? To fully understand my experience, I created an independent study course with Professor Cindy Frantz, a social and environmental psychology professor at Oberlin College. We met weekly to discuss scientific literature on the human psychological and physical health benefits of spending time in nature. Through my studies, I learned about the Japanese practice of shinrin-yoku, which provided the answers I sought.

Coined by the Japanese Ministry of Agriculture, Forestry, and Fishers in 1982, shinrin-yoku translates word-for-word to "forest bathing." Despite its name, this practice does not involve immersion in a body of water. Instead, it is slowing down and spending time in the forest. Participation does not necessitate a high level of fitness. Those interested in forest bathing need only visit the neighborhood park or a nearby forest, sit or move amongst the trees, and begin experiencing their surroundings with an intentional, sensational awareness.

Dr. Qing Li, MD., associate professor at Tokyo's Nippon

Medical School, vice president of the International Society of Nature and Forest Medicine, and author of the critically acclaimed book "Forest Bathing: How Trees Can Help You Find Health and Happiness," is the prolific worldwide leader in forest medicine research. He effortlessly bridges the gap between time-honored, traditional Japanese knowledge and modern scientific research. Dr. Li has found evidence to support the health benefits of shinrin-yoku known for thousands of years though never scientifically proven. These effects include: reduced blood pressure, increased relaxation, improved overall well-being, and decreased depression. Shinrin-yoku is presumably multifactorial, with positive effects stemming from immersing oneself in nature, alleviating the stresses of an urban lifestyle, and inhaling phytoncides. Phytoncides are Volatile Organic Compounds (VOCs) that produce the smells frequently associated with the forest. Trees release them to ward off harmful pests, diseases, and bacteria. According to Dr. Li, the effects of these inhaled compounds are crucial components of any forest bathing session, although routinely overlooked.

Inhaling certain VOCs has been scientifically shown to improve human health by boosting immune system function and promoting anti-inflammation and the role of antioxidants. VOCs have also decreased mental fatigue and increased brain function, relaxation, cognitive performance, and mood. Dr. Li has found that inhaling phytoncides, particularly α -pinene and β -pinene,

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significantly improves human Natural Killer (NK) cell activity. In urban areas, α -pinene and β -pinene were measured at virtually non-existent levels, while the forest levels of phytoncides were significantly higher. The data suggests that individuals must inhale these beneficial VOCs to reap the benefits of the phytoncide-induced Natural Killer cell boost. Dr. Li's research indicates that the increase in NK activity from a forest bathing session lasts at least seven days. Interestingly, he also found that forest bathing decreases the amount of T-cells, often associated with stress, in those who are estrogen-dominant while not affecting testosterone-dominant participants.

Limonene, another VOC commonly found in forests, also provides powerful health benefits. A systematic review investigating the anti-inflammatory potential of limonene found that the VOC can adjust the release of numerous cytokines, inflammatory mediators, and neurotransmitters, effectively reducing inflammation, pain, and anxiety while simultaneously increasing "pro-inflammatory mediators," quality of sleep, and mood. Limonene also hosts antioxidant properties, reduces oxidative stress, acts as a metabolic agent, improves hyperglycemia, positively affects pancreatic β -cell mass, aids in lipid blood levels, and mitigates liver fat accumulation. Experts believe that limonene also increases cell antioxidant enzyme activity and the Bcl-2/Bax ratio, which is associated with human melanoma cell apoptosis.

While a trip into the forest is preferable, if you're in a

pinch, essential oils can be inhaled and deliver similar effects to VOCs inhaled in the woods. Scientific evidence supports the link that essential oils containing limonene and pinene can supply antioxidant and anti-inflammatory properties in the airways. Inhaled terpenes, a VOC responsible for the aroma of many plants, can also deliver health benefits through pharmacological activity, such as decreased mental fatigue and improved relaxation, cognitive performance, mood, and brain function.

No wonder I felt so transcendent during my long romp in the woods; I was inundating my system with all sorts of beneficial VOCs! While I have not spent much significant, uninterrupted time in the forest since leaving the trail, I prioritize spending a few hours a week communing with the trees. When was the last time you sought out the comfort of the forest? Many of us, quite understandably, do not have the time to sit in the woods and forest bathe for two hours a week. However, forest bathing for as little as ten minutes has been shown to provide some health benefits. Spending a little time in the forest is better than none at all! When you have a moment, I hope you will head out to the woods with an open mind and a phone-less pocket, taking deep breaths of phytoncide-laden air. As Dr. Li proclaims, "the art of forest bathing is the art of connecting to nature through our senses, all we have to do is accept the invitation, and mother nature will do the rest."

