

# FOREST BATHING

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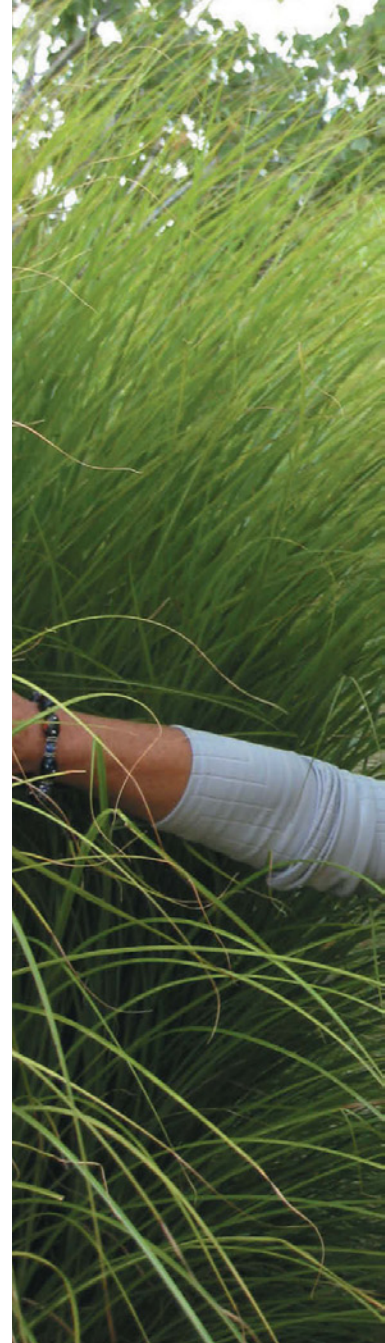
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**SHINRIN-YOKU**, which translates roughly as “forest bathing,” was originally introduced by the Forest Agency of Japan to promote walking and health. It has since become a popular practice. A study by Li et al. (2007) found that “green exercise”—physical movement in a natural setting—increased the activity of natural killer (NK) cells, a part of the immune system that fights cancer. This, in turn, helps to boost stress resistance. Li attributes some of the stress reduction to the presence of phytoncides (wood essential oils), antimicrobial volatile organic compounds emitted from trees to protect them from rotting and insects. Li et al. (2008) compared the effects of walking in a forest with walking in a city. A high concentration of phytoncides was detected in forest air; in contrast, almost none were present in the city air. The study found that only the forest walking increased NK activity and number and decreased the concentration of adrenaline (a stress indicator) in urine. The effects of the forest walks were found to last at least seven days. A larger-scale study by Park et al. (2010) of 260 people at twenty-four sites across Japan found that the average concentration of salivary cortisol, an indicator of stress, was 13.4

percent lower in people who walked in and viewed a forest area than in people performing a similar activity in urban settings.

Research on green exercise is not limited to Japan. In a UK study of more than 1,850 participants, researchers found that people who took part in walks in a country park with woodlands, grasslands, and lakes had significantly better mood and self-esteem outcomes than those who walked for the same amount of time in an indoor shopping mall. For example, 92 percent of the park walkers reported a decrease in depression, whereas 22 percent of mall walkers actually reported an increase in depression (Mind 2007). A study in the United States by Berman, Jonides, and Kaplan (2008) focused on outcomes of memory performance and attention span. Researchers compared people who walked for one hour in nature—including in the winter—versus in a city environment, finding a 20 percent improvement in both memory and attention span. Berman noted, “People don’t have to enjoy the walk to get the benefits. We found the same benefits when it was 80 degrees and sunny over the summer as when the temperatures dropped to 25 degrees in January. The only difference was that the participants enjoyed the walks more in the spring and summer than in the dead of winter” (Louv 2011,29).

Being outdoors in sunlight is important for the body’s production of vitamin D, which is critical for bone health. A study by Sato et al. (2003) found that elderly stroke patients who received as little as fifteen minutes per day of sunlight exposure had 84 percent fewer hip fractures than those not regularly exposed to sunlight. Sunlight exposure in children can help to prevent rickets and, possibly, myopia (Bowcott 2010; McBrien, Morgan, and Mutti 2008). Active interaction with nature—gardening or yard work, for example—has additional benefits. A study by Turner et al. (2002) found that women fifty years of age and older who gardened or did yard work at least once a week had higher bone density readings than those who performed other types of exercise, including jogging, swimming, and aerobics. Some research on rats has found that *Mycobacterium vaccae*, a bacterium commonly found in soil, triggers the release of serotonin, a hormone that decreases anxiety and depression, elevates mood, and improves cognitive function (Jenks and Matthews 2010; Lowry et al. 2007). While this study has yet to be conducted with humans, the findings have intriguing implications for how active engagement with soil and other natural materials could play a more direct physiological role in people’s health.







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