

FOREST MEDICINE: THE SECRET POWER OF SHINRIN-YOKU. THE ART AND SCIENCE OF JAPANESE FOREST BATHING

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Медицина леса: тайная сила Шинрин-йоку. Искусство и наука японского «лесного купания»

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We all know how good being in forests can make us feel. We have known it for millennia. The sounds of the forest, the scent of the trees, the sunlight playing through the leaves, the fresh, clean air in the forests — these things give us a sense of comfort. They ease our stress and worry, help us to relax and to think more clearly. Being in forests can restore our mood, give us back our energy and vitality, refresh and rejuvenate us. In Japanese, we have a word for those feelings that are too deep for words: shinrin-yoku or forest bathing. In this article, I will let you know the secret power of the forests through shinrin-yoku/forest bathing.

Keywords: forest medicine, Shinrin-Yoku, immunity, stress, quality of life.

Хорошо известно, какое замечательное настроение формируется от пребывания в естественном лесу. Мы знали это на протяжении тысячелетий. Звуки леса, запах деревьев, солнечный свет, играющий сквозь листья, свежий, чистый воздух в лесах — все это дает нам ощущение комфорта. Они снимают стресс и беспокойство, помогают нам расслабиться и мыслить яснее. Нахождение в лесу может восстановить наше настроение, вернуть нам энергию и жизненные силы, освежить и омолодить нас. В японском языке у нас есть слово для тех чувств, которые слишком глубоки для слов: shinrin-yoku или купание в лесу. В этой статье автор приводит данные собственных исследований и обзор научных работ о тайной силе лесов через технику Шинрин-Йоку/купание в лесу.

Ключевые слова: медицина леса, Шинрин-Йоку, иммунитет, стресс, качество жизни.

What is Forest Bathing/Shinrin-Yoku

The forest environment has long been enjoyed for its quiet atmosphere, beautiful scenery, calm climate, clean fresh air and special good smell. Empirically, forest environments may reduce stress and have a relaxing effect; therefore, walking in forests may have beneficial effects on human health. Based on the above background, in Japan, a national health programme for forest-bathing or shinrin-yoku began to be introduced in 1982 by the Forest Agency of Japan for the stress management of workers. Shinrin in Japanese means 'forest', and yoku means 'bath'. So shinrin-yoku means bathing in the forest atmosphere, or taking in the forest through our senses. This is not exercise, or hiking, or jogging. It is simply being in nature, connecting with it through our sense of sight, hearing, taste, smell and touch. In 2005, I conducted the first forest bathing study in Iiyama, Ngano prefecture in Japan and the terms of forest bathing and Shinrin-yoku in English were first scientifically named and defined by me in this study. Because forests occupy 67% of the land in Japan, forest bathing is easily accessible. Forest bathing

/Shinrin-yoku is like a bridge. By opening our senses, it bridges the gap between us and the natural world.

Why is forest bathing/shinrin-yoku Necessary?

In 1984, the word 'technostress' was coined to describe unhealthy behaviour around new technology. Technostress can arise from all manner of everyday usage, like checking your phone constantly, compulsively sharing updates and feeling that you need to be continually connected. Symptoms run from anxiety, headaches, depression, mental fatigue, eye and neck strain to insomnia, frustration, irritability and loss of temper. Since the year 2000, we have officially become an urban species. The urban population worldwide grew from just 746 million in 1950 to 3.9 billion in 2014, according to the United Nations Population Division. By 2050, 75% of the world's projected 9 billion population will live in cities. In Japan, rates of cancer and lifestyle-related diseases such as heart disease, diabetes, cerebrovascular disease and hypertension are increasing. According to the Ministry of

Health, Labour and Welfare of Japan, the percentage of workers with anxiety and stress was more than 50% in 1982, 62.8% in 1997, 58% in 2007, and 60.9 in 2012, suggesting a major mental health problem. Moreover, according to the National Police Agency of Japan, more than 30000 people have committed suicide every year since 1998; in 2007, there were 33093 reported suicides, 14,684 of which were due to health problems including 6,060 due to depression. There is also the phenomenon known as *karoshi*, or death from overwork in Japan. Therefore, the health management of workers, especially in relation to stress-related diseases, has become a major social issue and an effective new method for prevention of diseases is needed. It is urgent to establish preventive measures against stress and lifestyle-related diseases; however, effective prevention methods have not been established.

From a Feeling to a Science

Although a national health programme for forest-bathing or *shinrin-yoku* began to be introduced in 1982 by the Forest Agency of Japan. There has not been sufficient medical evidence supporting the beneficial effects of forest bathing due to technical limitations regarding measurements, and evidence-based evaluations as well as a therapeutic menu of forest bathing have been requested. Against this background, the Japanese Society of Forest Therapy was established in 2004 for conducting the evidence-based research on the effects of forest environments on human health. The Ministry of Agriculture, Forestry and Fisheries of Japan initiated a research project from 2004 to investigate the therapeutic effects of forests on human health from a scientific perspective. Some people study forest, some people study medicine, I study forest medicine to find the beneficial effects of forest bathing/*shinrin-yoku* on human health and well-being. Because of my background, I was invited as a main member in the forest bathing/*shinrin-yoku* project in 2004.

Since 2004, I have conducted serial studies to investigate the effects of forest bathing/*shinrin-yoku* on human health. I have obtained a vast amount of data, proving that forest bathing promotes both physical and mental health by reducing stress.

1. Forest bathing/*Shinrin-yoku* can increase human natural killer (NK) activity and the number of NK cells and the intracellular levels of anti-cancer proteins, such as perforin, granzymes and granulysin. The increased NK activity and anti-cancer proteins lasted for more than 7 days, even 30 days after the trip. This suggests that if people take a forest bathing once a month, they may be able to maintain a higher level of NK activity. This is very important in terms of health promotion and preventive medicine. NK cells are immune cells and play an important role in defense against bacteria, viruses and tumors. People with higher NK activity showed a lower incidence of cancers, whereas people with lower NK activity showed a higher incidence of cancers, indicating the

importance of NK cell function on cancer prevention. Therefore, it suggests that forest bathing may have the preventive effect on cancers.

2. Forest bathing/*Shinrin-yoku* can reduce stress hormones, such as adrenaline, noradrenaline and cortisol and may contribute to stress management.

3. Forest bathing/*Shinrin-yoku* can reduce blood pressures and heart rate and may have preventive effect on hypertension.

4. Forest bathing/*Shinrin-yoku* can increase the activity of parasympathetic nerve and reduce the activity of sympathetic nerve showing relaxing effects.

5. Forest bathing/*Shinrin-yoku* can reduce the symptoms for anxiety, depression, anger, fatigue and confusion and increased the vigor. This suggests forest bathing has a preventive effect on depression.

6. Forest bathing/*Shinrin-yoku* can improve sleep quality.

7. I also found that people living in areas with lower forest coverage have significantly higher mortality rates of cancers than people living in areas with higher forest coverage.

8. Phytoncides released from trees significantly increased human NK activity and the intracellular levels of anti-cancer proteins such as perforin, granzymes and granulysin in human NK cells.

9. It has been reported that stress may induce and/or exacerbate many lifestyle-related diseases, such as cancers, hypertension, ischemic heart disease, gastrointestinal ulcer, and depression. Forest bathing can reduce stress hormone suggesting that forest bathing may have preventive effects on lifestyle-related diseases mediated by reducing the stress hormones.

What is Forest Medicine?

To explore the effects of forest bathing/*Shinrin-yoku* on human health, the Japanese Society of Forest Medicine (<http://forest-medicine.com>) was established in March 2007 in Osaka, Japan. Moreover, the International Society of Nature and Forest Medicine (INFOM) established in 2011 (INFOM, <http://infom.org>).

Based on the above studies, we have established a new medical science, Forest Medicine in 2012 [1].

Imagine a new medical science that could let you know how to be more active, more relaxed, healthier and happier with reduced stress and reduced risk of lifestyle-related diseases and cancers by visiting forests. This new medical science is Forest Medicine. Forest Medicine studies the effects of forest bathing on human health and is a new interdisciplinary science, belonging to the categories of alternative medicine, environmental medicine and preventive medicine. Forest Medicine is an evidence-based preventive medicine. Forest Medicine is developed from forest bathing or *shinrin-yoku* and forest therapy. Forest Therapy is also developed from forest bathing (*shinrin-yoku*), which is a research-based healing practice through

immersion in forest environments with the aim of promoting mental and physical health and improving disease prevention while at the same time being able to enjoy and appreciate the forest. Forest therapy is defined as a proven forest bathing (shinrin-yoku) effect.

Forest Therapy bases in Japan

Based on the above studies, the certifications of forest therapy bases in Japan were started from 2005 by the Japanese Society of Forest Therapy.

From 2008, the certifications of forest therapist and forest therapy guide were started by the Japanese Society of Forest Therapy.

Now, we have established 64 forest therapy bases in Japan from subarctic Hokkaido in the north to subtropical Okinawa in the south (<https://www.fo-society.jp/>).

How to Enjoy Forest Bathing/Shinrin-Yoku

People can enjoy the forest bathing through all five senses:

1. Sense of sight: green color, yellow color and red color, forest landscape, etc,
2. Sense of smell: special good smell, fragrance from trees and flowers,
3. Sense of hearing: forest sounds, listen to the birds singing and the breeze rustling in the leaves of the trees,

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4. Sense of touch: touching trees, put your whole body in the forest atmosphere,
5. Sense of taste: eating foods and fruits from forests, taste the fresh air in forests.

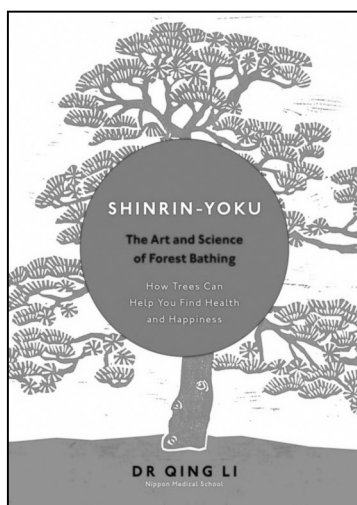
I have proposed the following ten tips for forest bathing (Li, 2012) [1-4]:

1. Make a plan based on your own physical abilities and avoid tiring yourself out.
2. If you have an entire day, stay in the forest for about 4 hours and walk about 5 kilometres. If you have just a half day, stay in the forest for about 2 hours and walk about 2.5 kilometres.
3. Take a rest whenever you have tired.
4. Drink water/tea whenever you feel thirsty.
5. Find a place you like, then sit for a while and read or enjoy the scenery.
6. If possible, bathe in a hot spring after the forest trip.
7. Select the forest bathing course based on your aims.
8. If you want to boost your immunity (natural killer activity), a three-day/two-night trip is recommended.
9. If you just want to relax and relieve stress, a day trip to a forested park near your home would be recommended.
10. Forest bathing is a preventive measure, so if you come down with an illness, see a doctor.

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He established the new medical science, Forest Medicine in 2012 and published the first Forest Medicine textbook in USA. His new book: Shinrin-Yoku (The Art and Science of Forest Bathing — How Trees Can Help You Find Health and Happiness) was published by Penguin Random House UK on April 5, 2018. The book also was published in USA under the title of Forest Bathing on April 17, 2018 by Viking Books (Penguin Random House USA).