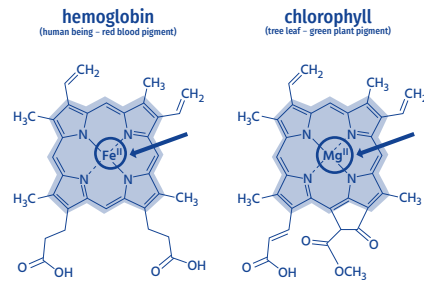


Dear Users, please read the instructions carefully as they contain important information.

## Directions for Use

## Chemical (Molecular) Properties

On a microscopic level, both life-preserving body liquids, are almost identical. The human red blood pigment **hemoglobin** strongly relates and compasses with the green pigment of leaves of trees **chlorophyll** and differentiates on a molecular basis mainly through the **Fe<sup>II</sup>** from **Mg<sup>II</sup>** implemented in the center of the chemical arrangement of benzene rings.



## Vision

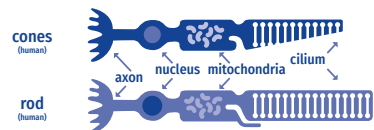
Stay, view, and perception of fresh green reduces the human stress level as color vision (→ **red-green perception**) is adjusted for easy distinguishment of ripe fruits and quick recognition of blood.

## Perception

Able to distinguish the finest shades and sensitive to a broader range of electromagnetic wavelengths, **chemical molecules** in trees receive and transmit information about the quality, quantity, and direction of light. **Photoreceptors (phytochromes (red), cryptochromes (blue), and phototropin (UV))** regulate development and transform light signals in growth incentives.

**Receptors: Tree and Human**  
 phytochromes (light and dark red) → photopsin (red)  
 cryptochromes (blue) → rhodopsin (blue)  
 phototropines (UV)

**ATTENTION:** Comparable to human beings five receptors, concentrated in cones (→ **6 million**) and rods (→ **120 million**) of the eye's retina, plants dispose of eleven. Overall located in leaves, stem, tendrils, shoots, and wood, remaining below the earth, roots, represent their most light-sensitive part.



## Feeling

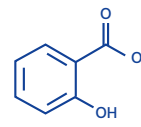
Able to sense sights and recognize glances of others as interfering touches, a present "**touch gene**" in plants allows the realization of stimuli and perception of human presence.

## Smell

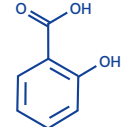
Nose concentrated human smell rests on inhale of particles, passing through receptors in the **olfactory channel**, that captures present molecules and forwards sensed signals to the brain.

Billions of **odorous nerves** are sensitive to volatile substances and responsible for informational self-registration of the organism in plants. Overall **BVOCS (biogenic volatile organic compounds)** are receptive for environmental information, allow inter- and cross-species communication, and transmission of warning signals.

Trees taste **salicylic acid** (C<sub>7</sub>H<sub>6</sub>O<sub>3</sub>) and smell **methyl salicylate** (C<sub>8</sub>H<sub>8</sub>(OH)(CO<sub>2</sub>CH<sub>3</sub>)), having analgesic and antipyretic effects on human beings.



**methyl salicylate**  
(C<sub>8</sub>H<sub>8</sub>(OH)(CO<sub>2</sub>CH<sub>3</sub>))



**salicylic acid**  
(C<sub>7</sub>H<sub>6</sub>O<sub>3</sub>)

## Taste

Taste receptors for chemical substances allow roots for **explanatory movements** to probe the soil for nutrients.

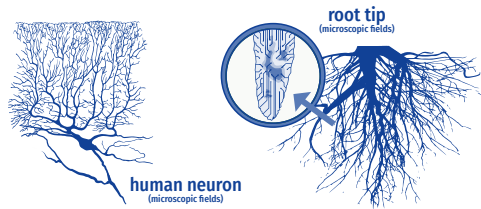
## Hearing

Essential for human intraocular sound perception, **myosin** dedicates movement in plants. Trees dispose of audio sensitive membranes that recognize heat and vibration of pressure and sound waves, relevant for **reproductive processes** (→ pollination by bumblebees), **preventative perception** and **assessment** of potentially **dangerous situations** (e.g. drought signals), directional plant growth and root orientation (→ aligned to low tones).

## Touch

Responsible for building **body vitality**, roots intelligently seek nutrients essential for the trees' survival. Microscopic root hairs perceive and **distinguish directions** (→ up, down, left, right). They feel and sense **electromagnetic fields** and **frequencies, chemical and electrophysical messages** to select minerals, trace elements, and water molecules.

Able to care, evade, and distinguish between self and others, they dispose of **swarm intelligence** comparable to an active (human) brain.



## Root Brain

Shaped by action potentials and highly active zones, constantly creating and strengthening new connections, the root system of the trees shows microscopic cell similarities to synapses and neuronal networks in the human brain.

Besides the verified presence of **actin filaments** (→ **transport proteins**, as well as responsible for human and animal muscular movement and contraction), available **neurotransmitters** (like **acetylcholine, serotonin, dopamine, GABA, glutamate**), and other substances allow intracellular communication and information exchange. Roots contain a weakly radioactive liquid that allows **collaborative interaction** through whole forests and nourishment of younger species (**wood wide web**).

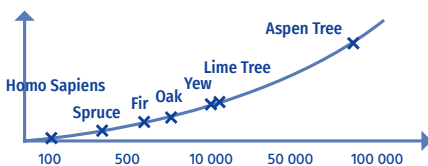
## Memory

Entailing **orientation** and **proprioception** (→ information about the inner state), trees and plants remember stressful situations (eg. temperature extremes). Able to store memories in their body and bypass them to their offspring (→ **epigenetic inheritance**), plants are capable of learning and calling on previous experience and able to constructively promote their existence intelligently.

## Time

Being sophisticated, social organisms, a tree movement happens in a **different vital rhythm, speed, and temporal scale**, wherefore they are perceived from an anthropogenic perspective as visually immovable, still or low reactionary. Trees adjust their movements and react in regards to a different dimension of time, as they exist comparable to human beings (**80-100 years**) 7 to 80 times as long (→ **table below**).

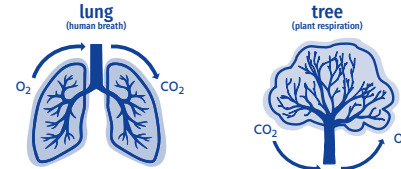
Human Beings	
Homo Sapiens	up to 100 years (< 100)
Tree Species	
Spruces	up to 300 years (< 300)
Firs	up to 600 years (< 600)
Oaks	up to 700 years (< 700)
Lime trees / Yews	up to 10 000 years (< 10 000)
Amer. Aspen Tree	up to 80 000 years (< 80 000)



## Respiration

Inhaling tree-produced oxygen (O<sub>2</sub>) from the air and exhaling carbon dioxide (CO<sub>2</sub>), the **human action of breathing** works contrary to the tree's process of **photosynthesis**.

The structure of the lungs pose similarities to the natural composition of the branches of the tree and can be merged into one unit and entity in a systemic natural cycle.



## Breath

**Stomata** on the backside of leaves (→ comparable to human lungs) absorb carbon dioxide (CO<sub>2</sub>) and release oxygen as a metabolic residue (contrary to human respiration).

Purifying the air, **ozone, nitrogen, and sulfur oxide** are filtered, while potential hazardous substances are **dissolved, neutralized, and removed**. Pure and oxygen saturated air remains (**ATTENTION!** 1 adult tree = oxygen for 15 human breath).



## Advantages of Trees

Trees contribute to their environment by providing oxygen, improving air quality, climate amelioration, conserving water, preserving soil, and supporting wildlife.

→ **climate regulation:** reduction of temperature  
 → **oxygen production:** ensure human breathing  
 → **air purification:** filter and removal of potentially hazardous substances

→ **utilization of carbon dioxide (CO<sub>2</sub>)**  
 → **evaporation and transpiration:** from soil and leaves  
 → **prevention of soil erosion**  
 → **protection of light:** shadowing and shade creation

## Interactions

## Health Effects

The presence of trees affects mental wellbeing, strengthen the human immune system, and organ activity. Inhaled tree-produced terpenes exchange with the human immune system through the atmosphere and influence the production of messenger substances.

Human-plant exchange further results in:

• **stress reduction:** decrease of the adrenalin and the stress hormone cortisol

• **blood pressure and pulse:** lowering of the blood pressure adjustment of pulse

• **strengthen the human immune system, lung capacity and elasticity of arteries:** tree-produced phytoncides activate human beings natural killer cells to prevent cancer, tumor, and virus-infections and have an anti-inflammatory effect

• **increase mental wellbeing:** overall sensorial perception and immersion in the presence of nature increase mental performance

• **enhance body defenses and organ health**

• **quickened healing:** antipyretic and analgesic effects through plant-produced methyl salicylic

## Cellular and Muscular Effects

• **sympatholytic effect:** relaxation and regeneration through reduced activity in the sympathetic nervous system and increased parasympathetic (= vegetational) nervous system activation

• **expands reproduction and vitality:** stimulates the rise of the life-prolonging corticosteroid hormone **dehydroepiandrosterone (DHEA)**

• **muscles and vessels:** promotes muscular strength and positively affects the level of **blood sugar** and **vascular elasticity**

## Further Recommendation

Share breath with the forest and enter an unseen connection between plants and humans.

## T(h)ree Minutes

© Christina Noitzmüller

**Further Information:** cdslab.uni-ak.ac.at/three\_minutes

**State of Information:**  
 June 2020

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