Why and how forests affect human health

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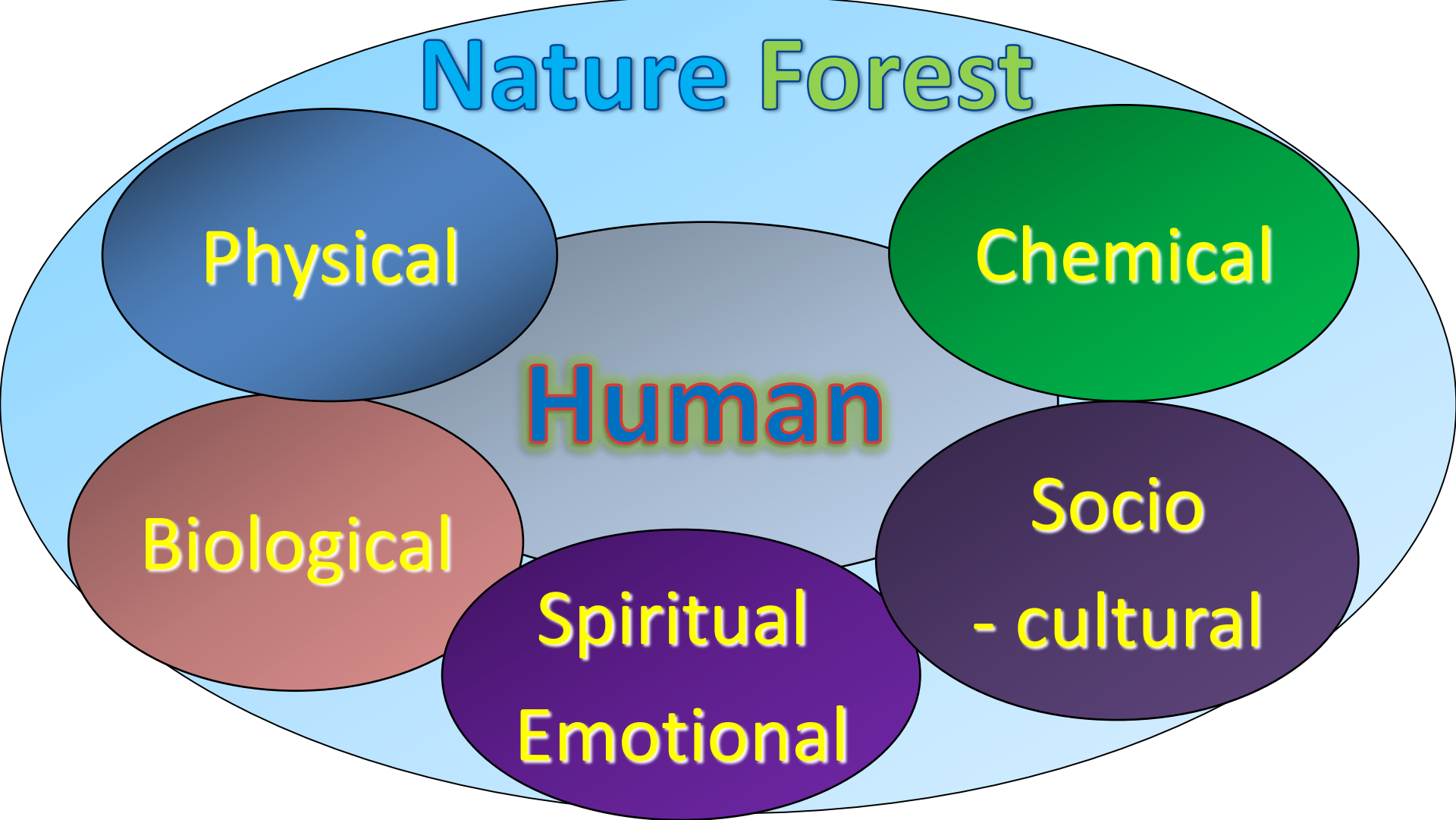
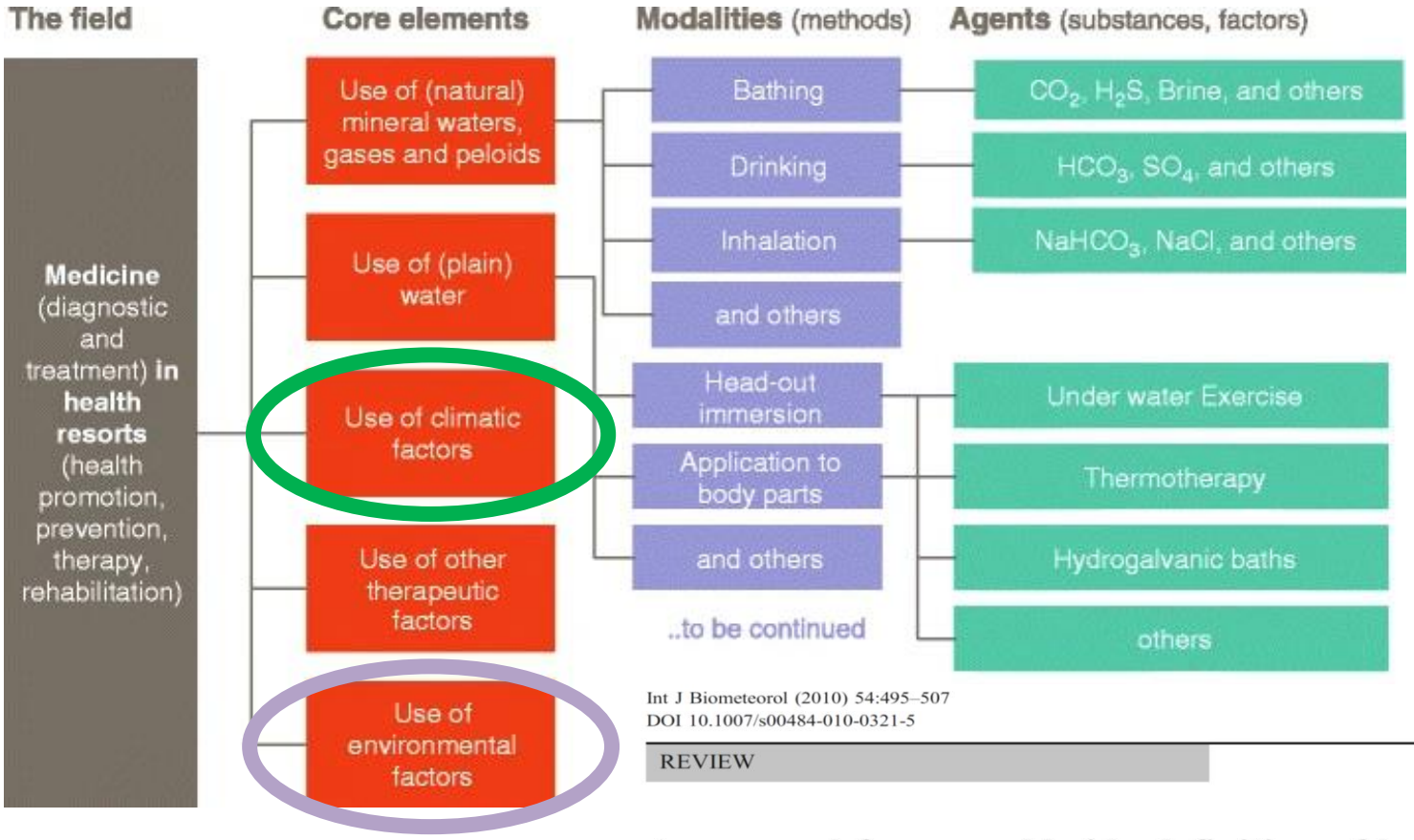
The «healing» effects of natural environments / forests on human is a historical and «inherited» phenomenon

The lost "Harmonization of the rhythm between human and environment"

- **Although we are now living in a society characterized by urbanization and artificialization, our physiological functions are still adapted to the nature**
- **Because of this discrepancy between our body requirements and our manner of living, our stress levels are always very high and our sympathetic nervous system is excessively stimulated**
- **In many cases, lowering elevated stress levels to a point where the body can function properly is an immediate necessity (Miyazaki et al., 2011)**


It is a well-known fact that most of the people like to visit and spend time in natural areas such as forests, and what they look for is relaxation, get rest and ease feelings of stress.


Nature Forest
Physical
Chemical
Human
Biological
Socio
- cultural
Spiritual
Emotional



Int J Biometeorol (2010) 54:495–507
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REVIEW

A proposal for a worldwide definition of health resort medicine, balneology, medical hydrology and climatology

Christoph Gutenbrunner · Tamas Bender · Pedro Cantista · Zeki Karagülle

Types of climate therapy

CLIMATE		THERAPY
• Forest	→	Forest therapy
• Sea	→	Thalassotherapy
• Mountain	→	Mountain therapy
• Cave	→	Speleotherapy
• Lake	→	Limnoterapi
• Desert	→	Desert therapy

Why and how forests affect us

- **SKIN** → Tactile stimuli
  Temperature + Humidity + Wind + Sunlight + Air pressure
- **EYES** → Visual stimuli
  Landscape + Vegetation + Flowers + Sunlight
- **EARS** → Auditory Stimuli
  Sounds of wind + birds and other creatures + water, and «Sounds of Silence of forest»

Why and how forests affect us

- NOSE → Olfactory stimuli
  Fragrances + Volatile Compounds + Aromatic Hydrocarbons + Pollens + Humidity +Temperature
- LUNG → Respiratory stimuli
  Aerosols + Chemicals pO_2, + Ozone + Pollens + Humidity and Temperature

Why and how forests affect us

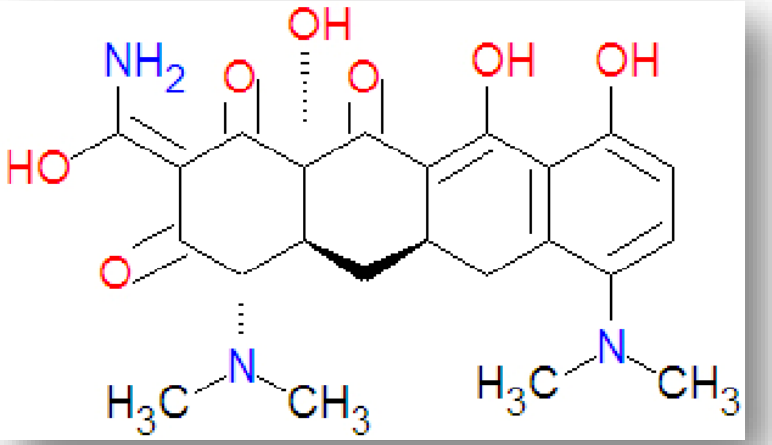
Stimuli	Receptors	Mechanisms
• Visual	• EYES	Neuro, Immuno, Cutaneous & Mucosal, Endocrine & Metabolic
• Olfactory	• NOSE	
• Tactile	• SKIN	
• Auditory	• EARS	
• Respiratory	• LUNGS	

Effects of Olfactory Stimuli; Forest Aroma

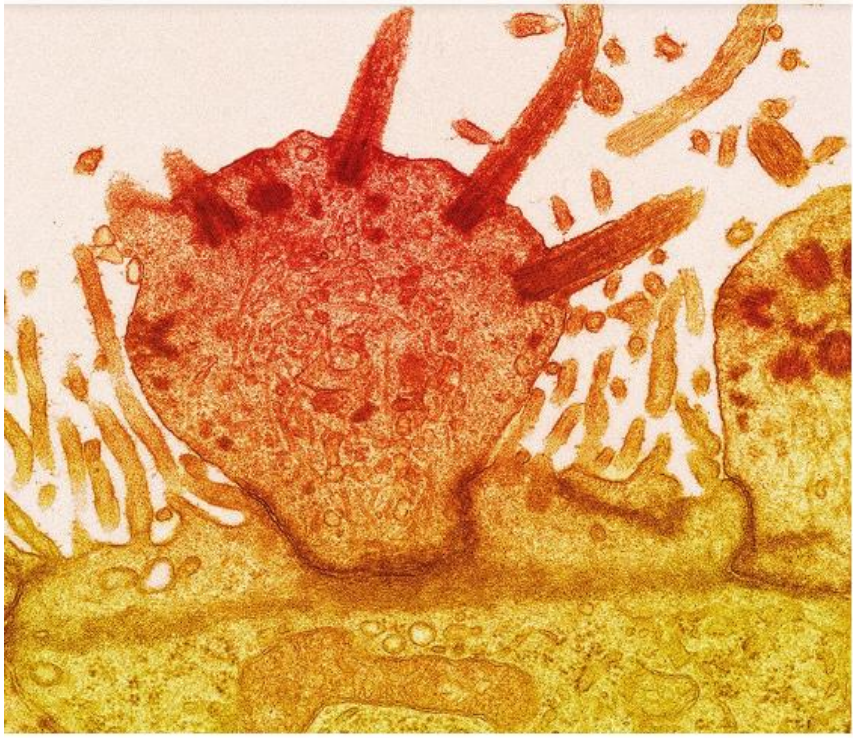
- **People are estimated to be able to discriminate between anywhere from 10,000 to more than one trillion different smells.**

Phytoncides

A walk through the «Smells of the Forest»



New research; Olfactory receptors are not unique to the nose!



A coloured transmission electron micrograph of an olfactory neuron (orange). Credit: Steve Gschmeissner/SPL

Smell

outlook

Beyond the nose

Nature Portfolio

Sponsorlu ·

The hundreds of receptors that give us our sense of smell have been found to have important roles in other parts of the body, and the prospect of targeting them with drugs is growing.

Effects of Olfactory Stimuli; «Forest Aroma»

- **Immune function ↑**
- **NK cells ↑**
- **Relaxation**

A walk in the forest,

«Forest Bathing»

Smelling

Phytoncides

Effects of visual stimuli, landscape, green

A walk in the forest, «Forest Bathing»

- Physiological Relaxation
- Salivary cortisol↓
- Heart rate↓
- Blood pressure↓

Effects of auditory Stimuli; Sounds in the forest

- **sound of birds**
- **sound of trees**
- **sound of water**

- Sympatic activity ↓
- Salivary cortisol↓
- **Heart rate↓**
- **Blood pressure↓**

« sounds of silence» of the forest» !!!

Main beneficial effects of «Forest Bathing»

- The stress in the body is relieved
- Cardiovascular functions improved
- Immune functions are strengthened

Sympatic activity ↓
Salivary cortisol↓
Heart rate↓
Blood pressure↓
Immune function ↑
NK cells ↑

Being in natural environments, for example a walk in the forest, exerts «beneficial effects» on human body

Health & Well-being with nature/forest

- The lost “harmonization of the rhythm between human and environment” can be regained by nature/forest therapy
- The "desirable" state of natural well-being can be approached by exposure to natural environments / forests

Regain the lost "harmonization of the rhythm between human and environment" ??

- **Medicine and tourism are the key sectors that can play essential role in developing and providing effective forest therapy services**


Thank you!