

—“*There is actually something very powerful in what’s going on in here, and that’s worth investigating.*”



# SCIENCE-YOGA-EVOLUTION

Thesis of Mihaela Anohina

YCT 500 hours Yoga Teacher Training

2017-2019

# CONTENTS



## **MOTIVATION 4**

### **PART ONE: WESTERN SCIENCE – EASTERN PHILOSOPHY 5**

#### **1. Why We Need the Evidence? 5**

#### **2. Ancient Wisdom 6**

#### **3. Modern Researches 7**

### **PART TWO: YOGA as THERAPY 9**

#### **1. Yoga Therapy 9**

#### **2. Scientific Evidence of Effectiveness of Yoga, Depression 10**

#### **3. Working With A Person In Pain 14**

### **PART THREE: SCIENCE and MEDITATION 17**

#### **1. Vipassana Experience, Self-study With no Scientific Proof 17**

#### **2. Scientific Evidence of Effectiveness of Meditation 18**

### **PART FOUR: EVOLUTION with YOGA 20**

#### **1. Consciousness 20**

#### **2. Science into Consciousness 20**

#### **Summary and Conclusions 22**

#### **Inspirational Quotes 23**

#### **References 25**

#### **Own Development Report 27**

# MOTIVATION

*"With proper care and attempt and struggle of all her disinterested sons, by combining some of the active and heroic elements of the West with the calm virtues of the Hindus, there will come a type of men far superior to any that have ever been in this world."*

— SWAMI VIVEKANANDA, CHICAGO SEP 1894

When I was around the age of 15, I noticed that there is something in my body that through movement, also including the movement of my thoughts, can inform, guide, protect and cure me. Reading new age books made me understand that this might be called Energy. Later on I discovered that all is about knowledge and awareness. However, sharing my beliefs in that time was absolutely inappropriate. Since then, I have developed a huge interest in human relationships, connection with oneself and the meaning of life, and the Path of Yoga became the most important component of this development.

Luckily my thoughts and beliefs can be shared today, thanks to the increased interest in the practice of yoga in the West. I have noticed that some Western yoga practitioners need to remain "sober", and to balance the information they receive from the yoga practice into the conditions of the modern world, while others are busy with spiritual rituals, which make them aware that this practice might be helpful to the critical situation on Earth at this moment. Awareness in people is growing at a fast pace. Combining Western knowledge, technology and science with Eastern body and mind wisdom and spiritual tradition, created in me a new believe. **The belief that we are on the threshold of a great energy shift, an evolution of the human mind - physiologically and spiritually.** Once again, I have created a new belief for myself, which obviously was too early to be spoken. I need to know more about it and people need prof.

I am aware that the theme is complicated and maybe for very advanced yoga practitioners and neuroscientific experts. But still, I would like to challenge myself and **to find the truth about yoga benefits from the scientific perspective. My aim is to gather some of the existent research that shows the healing effects of yoga, in support of my idea that the massive interest in yoga practice and the increasing awareness can reflect on human evolution.**

## PART ONE:

# WESTERN SCIENCE — EASTERN PHILOSOPHY

## 1. Why We Need the Evidence?

*"Yoga has improved itself over thousands of years. But is important for many people, to believe in yoga, that they have understand of it from the western scientific point of view."*

— LAURA PLUMB

Our culture has its own medical system, beliefs and traditions. The worldwide interest in Yoga is extremely high - millions of people practice daily, and new yoga centers are being opened all over the world. More importantly, more and more people are interested in and want to understand the deeper nature of yoga in all its aspects - philosophical, practical, therapeutic. The culture of yoga is expanding at a fast pace in the Western world, opening our eyes about self-belief and self-care. A similar event may have occurred in the 1970's, but today the cultural mix, the open borders, the global situation on Earth, and the advanced technologies give more opportunities for yoga to spread. We are living a massive transformation of oneself, of one society and hopefully of one system. Today more than ever, individuals are looking for their true-selves. They have strong interest in self-healing, connection, consciousness and wholeness. This is a hope of purifying the world! **But is this all truth?**

According to Patanjali, Ignorance is the fundamental problem, the cause of all pain and suffering. We have come to hold the unreal for the real and Reality has become unreal. Maybe the fusion of Science and Yoga together can bring us back to the real Reality.

Many years ago Osho said "Science is knowledge without love, and that is the danger in it." Luckily nowadays science has more freedom and the practice of Yoga-less taboos. In my beliefs the synergy of both can lead us to great discoveries, from becoming aware of pain relief to playing a key role in human physiological and spiritual evolution.

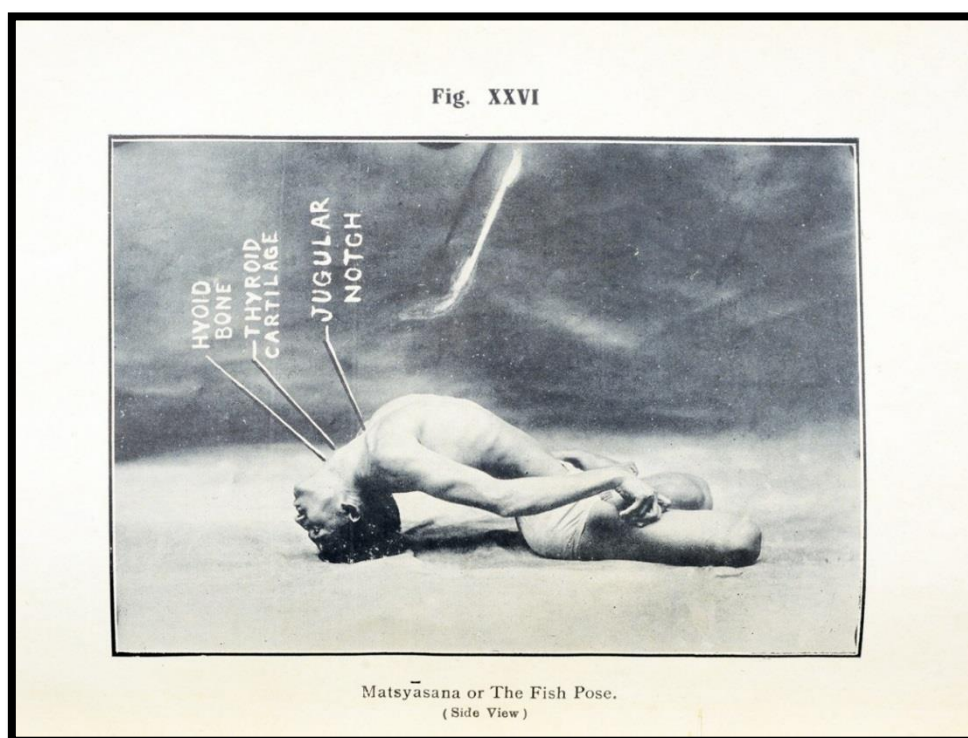
## 2. Ancient Wisdom

*"While Western science is still struggling to find explanations for such phenomenon as acupuncture meridians, kundalini awakenings, and Kirlian photography, yogins continue to explore and enjoy the pyrotechnics of the subtle body, as they have done for hundreds of generations."*

— GEORG FEUERSTEIN, THE YOGA TRADITION (2001:351)

Yoga as a healing art emerged in India 5,000 years ago as a means of relieving and transcending suffering. It combines the physical, the psychological and the spiritual. The body, the spirit and the mind are seen as one, as whole, as wholeness. We may relate the word *wholeness* to the word *health*. The root of Health comes from the Old English *hælp* "wholeness, a being whole", *hal* "hale, whole." Wholeness and health are related to each other. Yoga cultivates wholeness and healthiness. Health is not only about the absence of disease, but also about the achievement of a positive state of mind.

The ancient yogis believed that what they learned about themselves helped them to understand the world around them. They had no fancy machines or advanced technology to study the internal organs and nervous system, instead they used the observational capabilities of the body itself. They manipulated the body in every way they could think. Experimenting with various breathing techniques, they learned to control their breath, the temperature of their body, and their mind.



### 3. Modern Research

*"Melodic, pleasant vocalization, such as humming, chanting the sound of om, or the ujjayi and brahmari pranayamas help to tone the vagus nerve. At least one study, done at the Nepal Medical College in Kathmandu in 2010 has shown that five minutes of practicing brahmari pranayama is effective in lowering heart rate, systolic blood pressure, and most significantly, diastolic blood pressure, which is the measure of pressure in the arteries as the heart rests between beats. This is when the heart fills with blood and gets oxygen."*

— Eddie Stern, *One Simple Thing: A New Look at the Science of Yoga and How It Can Transform Your Life*

Swami Vivekananda was one of the first spiritual teachers to understand the importance of science and technology. He saw both science and spiritual principles concerned with truth and felt the need for bridging the gaps between the ancient truths and the western scientific approach. Swami Vivekananda was also the first to bring Vedic philosophy and religion to the west. He met with many of the well-known scientists of the time including Lord Kelvin, Nikola Tesla and J. C. Bose. Vivekananda's quest for human development was not for human development per se, but to point to its potential as a spiritual practice that makes human beings realize that they are, in fact, not human beings but divine beings.

The Indian physiologist B. K. Anand, considered the founder of modern Neurophysiology in India, recommended that the scientific studies should be categorised in three groups: **Yoga and the body, Yoga and the mind, and Yoga and consciousness**, where yogic physical practices such as *asanas*, *pranayamas*, and mudras, mainly aim at achievement of positive bodily health, and meditative practices such as meditation, and *samadhi* aim at influencing the mind and consciousness.

In 1974 at the International Congress of Physiological Sciences, the Indian Minister of Health Dr. Karan Singh announced that the Indian government would conduct a long-range study of Kundalini Yoga to look for scientific corroboration of what tradition had maintained for centuries. He raised the questions - "The link between the mind and the body is now being recognized, but the psychosomatic linkages are still imperfectly understood. Faculty is the capacity to be conscious of himself and his surroundings. What is the texture of this consciousness? What are the links between the genetic structure of man and his capacity for conscious awareness? Can manipulating the one influence the other? What are the functions of those areas of the brain that are still unexplored? Is man, in fact, evolving toward a transmutation of consciousness in much the same way as animal consciousness after millions of years on this planet evolved and developed into human consciousness? Is it possible that man is on the threshold of a new evolution? If so, what will be the concomitant changes required in the human body, particularly the brain?"

In the last two decades research on meditation has grown tremendously. In the early 2000's, neuroscientists discovered that meditation physically changes the brain. Now scientists are using modern technology to investigate the brain.

Studies show that interventions with yoga and meditation over a period of three months have one-year positive effects on participants, even when they stop practising.

Nowadays hundreds of research projects show evidence that support the use of Yoga as a therapeutic intervention for people with some chronic pain conditions. Well-designed studies using Viniyoga and Iyengar Yoga have found significantly greater improvements in reported pain and in functional abilities immediately after a course of yoga and at follow-up compared to control groups.

Review	Health condition (ICPC-2 class)	Population		Type of yoga interventions	Type of comparisons	Outcomes
		No. of primary studies incl. in SR	No. of participants			
Aljasir et al., 2010 [8]	Type 2 diabetes (T90)	5	362	Mixed yoga and yoga with dietary and herbal intake	No data	Blood glucose levels, lipid profile, body mass index (BMI), and diabetes-related complication
Anderson and Taylor, 2011 [9]	Metabolic syndromes (T99)	2	125	Restorative yoga	Waitlist, usual care	Body mass index (BMI), waist circumference, blood pressure, insulin sensitivity, blood glucose, blood lipids (HDL, LDL), perceived stress (SF-36), and food frequency
Büssing et al., 2012 [10]	Pain symptoms (A1; N1; L)	16	937	Mixed yoga (LAYT, Viniyoga, Raj, and unspecified others)	Waitlist, usual care, exercise, medication, and lecture	Effect size of pain using standardized measurements (i.e., VAS, MPQ, and CMDQ)
Cabral et al., 2011 [11]	Psychiatric disorders (P99)	10	343	Hatha, Iyengar, Kriya, Sahaja, Integrated, Meditation, and Siddha Samadhi	No data	Major psychiatric disorders (schizophrenia, depression, anxiety, and PTSD)
Dickinson et al., 2008 [12]	Hypertensive (K86)	2	63	Yoga and meditation	No comparison group	Systolic and diastolic blood pressure
Gerritsen et al., 2002 [13]	Carpal tunnel syndrome (N93)	1	42	11 yoga postures	Usual care	Pain and sleep disturbance scores
Haaz and Bartlett, 2011 [14]	Arthritis (L91)	10	243	Iyengar and Kundalini yoga	Waitlist, usual care, and no comparison group	Disease activity score (DAS), joint inflammation, functional ability (strength, balance, flexibility, and mobility), psychosocial (arthritis impact measurement scale 2 (AIMS2), HRQL (SF-36), Beck Depression Index (BDI)), and medication usage
Heiwe and Jacobson, 2011 [15]	Chronic kidney disease (U14)	1	40	Modified yoga including balancing, strengthening, and breathing techniques	Exercise	Muscular strength, grip strength, and blood lipids (triglyceride, total cholesterol, and HDL cholesterol)
Innes and Vincent, 2007 [16]	Women with menopause (X11)	7	408	Hatha, Iyengar, Sahaja, Hot, Yoga Awareness Program (Kripalu), and Integrated Approach to Yoga Therapy	Waitlist, exercise, and no comparison group	Overall menopausal symptoms, vasomotor menopausal symptoms, and sleep disturbance
Innes et al., 2010 [17]	Type 2 diabetes (T90)	25	1828	Various components including asana, Kriya, or cleansing exercises, meditation, pranayama, and meditation	Waitlist, usual care, exercise, and book/pamphlet	Insulin resistance (fasting glucose, postprandial glucose, fructosamine, fasting insulin, and fasting glycated hemoglobin), blood lipid profile (cholesterol, triglycerides, low/high-density lipoprotein, very LDL, cholesterol/HDL ratio, and LDL/HDL ratio), anthropometric measures (BMI, body weight, and body composition), blood pressure (systolic/diastolic), and medical usage

## PART TWO:

# YOGA as THERAPY

## 1. Yoga Therapy

*"Yoga must be made to suit the individual, rather than the individual adapting him or herself to the style of Yoga"*

— T.V.K. Desikachar

Much modern research on the effects of Yoga are related to chronic pain and diseases, and have shown promising results in trauma, depression, cancer, low back pain, asthma and arthritis. That confirms that Yoga is still seen as reliever of suffering, as this was the reason that Yoga came to life in the ancient time. In general all Yoga is seen as potential therapeutic and healing, but Yoga Therapy uses a holistic, individualized approach to help people with persistent pain. Yoga Therapy is performed by highly experienced yoga teachers with broad knowledge. In the 1920's Swami Kuvalyananda coined the term "Yoga Therapy." He believed in the potential to measure the physical and physiological changes that occurred through yoga practice, and made it possible to start applying the specific effects of yoga to medical conditions.

These days the evidence and support of yoga therapy are great. For instance, the American cardiologist Dr. Dean Ornish has usefully develop a Yoga-based program to reverse heart disease, which is scientifically proven and covered by the American public health insurance. However, the experts explain that there is no evidence that one style of *asana* is best, or that specific *asanas* are required for specific chronic pain problems.

A rich source of scientific evidence on Yoga Therapy is the book "*Yoga as Medicine. The yogic prescription for health and healing*" by Timothy McCall, M.D., a powerful and practical guide about the efficiency of Yoga healing.

A lot of people around me experience chronic pain. I can also say, I helped myself to come out of a deep depressive state using yoga breathing techniques and *asanas*. I remember the Standing Forward Bend pose – *Uttanasana* and Sitting Forward Bend – *Paschimottanasana*, next to several Inversions (yoga poses where the heart is higher from the ground than the head), the best way to calm my mind and to find and deepen my breathing. In that time, I have used more powerful techniques to combat my strong restlessness. I did not look for professional advice, I just followed my intuition. Yoga guided me on this journey of understanding my suffering, and to a large extent healed me. Understandably, I can't prove this scientifically, that's why I chose to look at several research done in this field.



## **2. Scientific Evidence of Effectiveness of Yoga, Depression**

There are a growing number of studies indicating that yoga can be used as a therapeutic tool. However, many of these studies are missing something to determining successful therapeutic outcomes. This type of study is based on randomized controlled trials (med. definition: a study in which people are allocated at random (by chance alone) to receive one of several clinical interventions).

A review published in 2017 in US National Library of Medicine examines 23 yoga studies aimed at improving depressive symptoms. The studies were carried out in Australia, Iran, Italy, Taiwan, United Kingdom, United States and published between 2011 and 2016. Some studies focused on the meditative aspects of Yoga while others integrated gentle exercises. Hatha Yoga was used most often, followed by Asana and Pranayama, Mindfulness-based meditation (with yoga) and Viniyoga, and then by Antenatal, Anusara, Iyengar, Kirtan Kriya and Tai chi (with yoga). The number of participants participating in the studies ranged from 14 to 136. The majority of studies had a duration of 6 weeks or longer. The goal of the review was to examine the effectiveness of yoga as an alternative treatment or complementary form of therapy.

The large examination shows the effectiveness of yoga in reducing depressive symptoms in pregnant women, among patients experiencing lower back pain, with atrial fibrillation, with post-stroke hemiparesis, and addicts. Although the majority of the studies report positive effects of yoga and depression, three studies shows no effect on stroke patients, pregnant and breast cancer patients. Two studies examined and reported positive impact of yoga on reducing depression among caregivers.

It was not evident from the review that any one type/school of Yoga was better than the other. They all reported reductions in depressive symptoms among participants in the yoga groups. While there are many aspects of Yoga, there is also a need to examine more of the styles and specific aspects of Yoga on depression.

In conclusion the review reveals that Yoga provides limited evidence and many more interventions on the subject area are needed to continue to learn and understand fully the impact of Yoga on depression. Despite the limitations, it can be concluded that the Yoga interventions were effective in reducing depression.

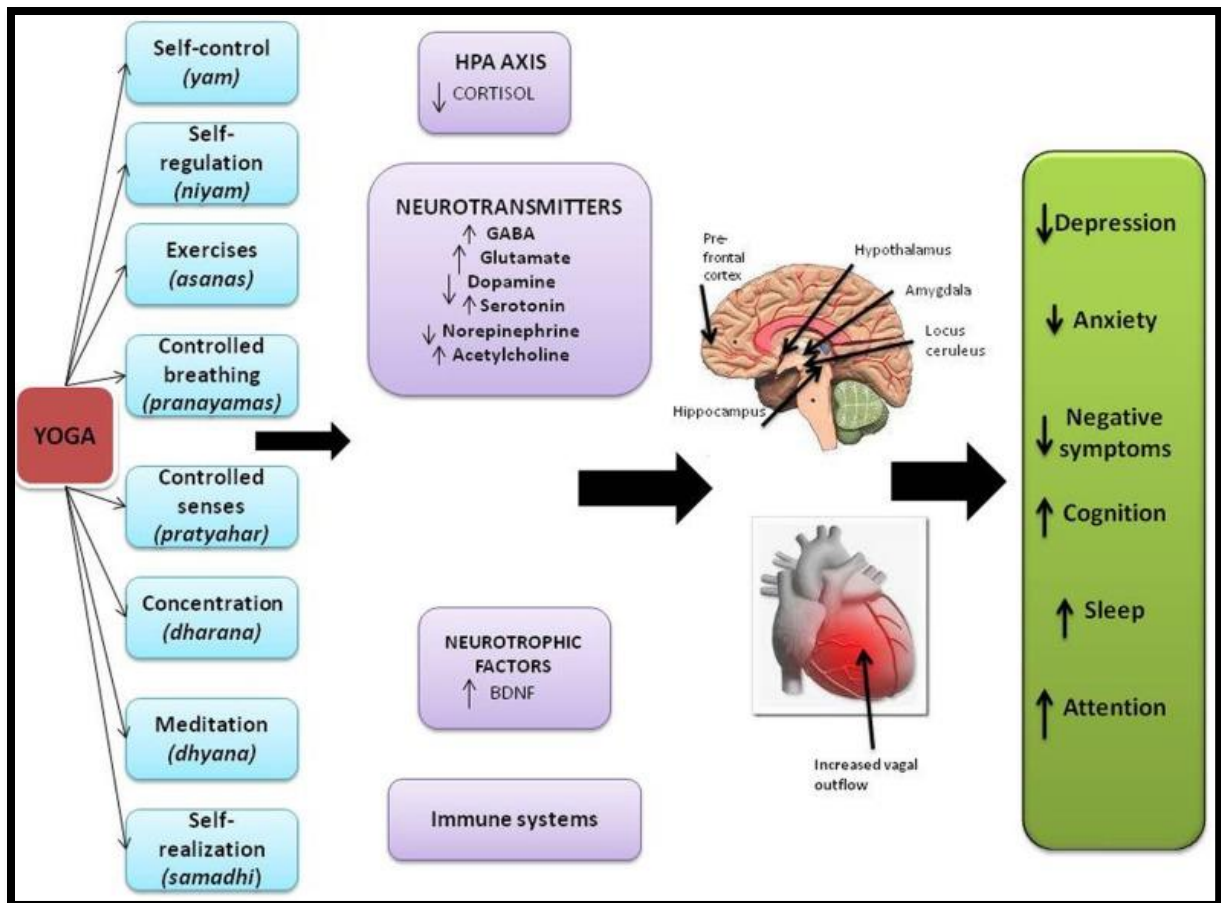
Study	Sample	Treatment groups	Intervention	Duration	Outcome measurements	Findings	RCT	Evidence level
Shahidi et al. (2011)	70 depressed women aged 60–80 years from a cultural community in Iran with Geriatric Depression Scale score > 10	Laughter yoga (n = 23), exercise therapy (n = 23), and wait-list control groups (n = 24)	Laughter yoga consisted of brief talk about something delightful, clapping hands, simple chants simulating diaphragmatic breathing, Gibberish sounds. Combines yoga, breathing, and stretching techniques	10 sessions	Yesavage Geriatric Depression Scale and Diener Life Satisfaction Scale (LSS)	Significant improvement in GDS scores in both laughter and exercise groups compared to controls but not when compared to each other	13 (not double blinded, funding information not given)	2 (Low quality RCT due to insufficient follow-up)
Krishnamurthy and Telles (2007)	69 participants (males and females), older than 60, living in a residential home	Stratified sampling and random allocation to yoga, ayurveda, wait-list control groups	Yoga consisted of 7 h 30 min weekly sessions of physical postures, relaxation techniques, regulated breathing, devotional songs, and lectures	24 weeks	Shortened version of Geriatric Depression Scale (GDS)	The yoga group showed significant decrease in depression at 3 and 6 months compared to the ayurveda group	13 (not double blinded, funding information not given)	2 (Low quality RCT due to <80% follow-up rate)
Vedamurthachar et al. (2006)	Males aged 18–55 years with alcohol dependence, admitted for the first time to the de-addiction center of NIMHANS, not having serious medical illnesses, schizophrenia, or mania	SKY – Sudarksha Kriya yoga (n = 30) therapy, continued inpatient care (n = 30)	SKY consisted of practice of three distinct breathing patterns	2 weeks	BDI scores, ACTH, and cortisol levels	Statistically significant decrease in BDI scores in the SKY group compared to controls. Greater reduction in serum cortisol and ACTH levels in the SKY group	15 (not double blinded)	2 (Low quality RCT due to insufficient follow-up)
Woolery et al. (2004)	28 volunteers aged 18–29 years, with self-reported symptoms of depression, but not on psychotropic treatment and without previous exposure to yoga	Yoga (n = 13), wait-list control (n = 15)	1 h weekly Iyengar yoga classes, consisting of training in yoga postures	5 weeks	BDI, State-Trait Anxiety Inventory, Profile of mood states, morning cortisol levels	Statistically significant decrease in BDI scores, anxiety scores, and higher morning cortisol levels in the yoga group	13 (not double blinded, funding information not given)	2 (Low quality RCT due to insufficient follow-up)

*"There is emerging evidence from randomized trials to support popular beliefs about yoga for depression, sleep disorders, and as an augmentation therapy. Limitations of literature include inability to do double-blind studies, multiplicity of comparisons within small studies, and lack of replication. Biomarker and neuroimaging studies, those comparing yoga with standard pharmaco- and psychotherapies, and studies of long-term efficacy are needed to fully translate the promise of yoga for enhancing mental health."* — Yoga on our minds: a systematic review of yoga for neuropsychiatric disorders, published 2013 in *Frontiers in Psychiatry*

What should be important for us is that nowadays numerous studies (as "Yoga for anxiety and depression" published in *Harvard Mental Health Letter* (2018)) suggest that yoga can:

- reduce the impact of stress
- increase serotonin levels
- improve relaxation and energy
- reduce resting heart rate
- lower blood pressure
- ease breathing
- increase pain tolerance.

And all these effects have an impact on people with depressive conditions.



According to the Yoga therapists, there are several health conditions shown by scientific studies to benefit from the practice of Yoga. These are listed here, followed by a list of ways Yoga heals:

- Alcoholism and Other Drug Abuse
- Anxiety
- Asthma
- Attention Deficit Hyperactivity Disorder
- Cancer
- Carpal Tunnel Syndrome
- Chronic Obstructive Pulmonary Disease (e.g., Emphysema)
- Congestive Heart Failure
- Depression
- Diabetes
- Drug Withdrawal
- Eating Disorders
- Epilepsy
- Fibromyalgia
- Heart Disease
- High Blood Pressure
- HIV/AIDS
- Infertility

- Insomnia
- Irritable Bowel Syndrome
- Menopausal and Premenopausal Symptoms
- Mental Retardation
- Migraine and Tension Headaches
- Multiple Sclerosis
- Neuroses (e.g., Phobias)
- Obsessive-Compulsive Disorder
- Osteoarthritis (Degenerative Arthritis)
- Osteoporosis
- Pain (Chronic)
- Pancreatitis (Chronic)
- Pleural Effusion (Fluid Collection in the Lining of the Lung)
- Post-Heart Attack Rehabilitation
- Postoperative Recovery
- Post-Polio Syndrome
- Pregnancy (Both Normal and Complicated)
- Rheumatoid Arthritis
- Rhinitis (Inflammation of the Nose)
- Schizophrenia
- Scoliosis (Curvature of the Spine)
- Sinusitis
- Tuberculosis
- Urinary Stress Incontinence

## WAYS YOGA HEALS

1. Increases Flexibility
2. Strengthens Muscles
3. Improves Balance
4. Improves Immune Function
5. Improves Posture
6. Improves Lung Function
7. Leads to Slower and Deeper Breathing
8. Discourages Mouth Breathing
9. Increases Oxygenation of Tissues
10. Improves Joint Health
11. Nourishes Intervertebral Disks
12. Improves Return of Venous Blood
13. Increases Circulation of Lymph
14. Improves Function of the Feet
15. Improves Proprioception
16. Increases Control of Bodily Functions
17. Strengthens Bones
18. Conditions the Cardiovascular System
19. Promotes Weight Loss
20. Relaxes the Nervous System

21. Improves the Function of the Nervous System
22. Improves Brain Function
23. Activates the Left Prefrontal Cortex
24. Changes Neurotransmitter Levels
25. Lowers Levels of the Stress Hormone Cortisol
26. Lowers Blood Sugar
27. Lowers Blood Pressure
28. Improves Levels of Cholesterol and Triglycerides
29. Thins the Blood
30. Improves Bowel Function
31. Releases Unconscious Muscular Gripping
32. Uses Imagery to Effect Change in the Body
33. Relieves Pain
34. Lowers Need for Medication
35. Fosters Healing Relationships
36. Improves Psychological Health
37. Leads to Healthier Habits
38. Fosters Spiritual Growth
39. Elicits the Placebo Effect
40. Encourages Involvement in Your Own Healing

### **3. Working With A Person In Pain**

*"Pain has effects on each of the koshas, and recovering from pain can be accessed through any of them. When we practice in this manner, we move past providing physical therapy, to being a Yoga therapist."*

— Neil Pearson, *Yoga Therapy in Practice / Yoga for People in Pain*, INTERNATIONAL JOURNAL OF YOGA THERAPY (2008)

Three months ago, I started giving Yoga lessons to people with cancer and cancer survivors. The experience of getting in touch with such a group is indescribably unique for me. It transforms me and hopefully, it helps them. As yoga teachers we should be aware of the limits of the people that are following our classes. It is essential to understand pain and a great responsibility to learn to not harm, but to help.

Physiotherapist Neel Pearson specialised in Therapeutic Yoga for People in Pain suggested that the most important strategy when working with people in pain is to listen and observe. Listen to how this person describes their pain and its effects on their life. Observe how this person moves, holds him- or herself, breathes and talks. Especially if you work as a Yoga therapist you should take an individual look at your client, being aware that there is not a recipe for the best Yoga Therapy. He also says to let your knowledge about pain guide your choices, but not to overwhelm your client. To make sure of being informed what pain is

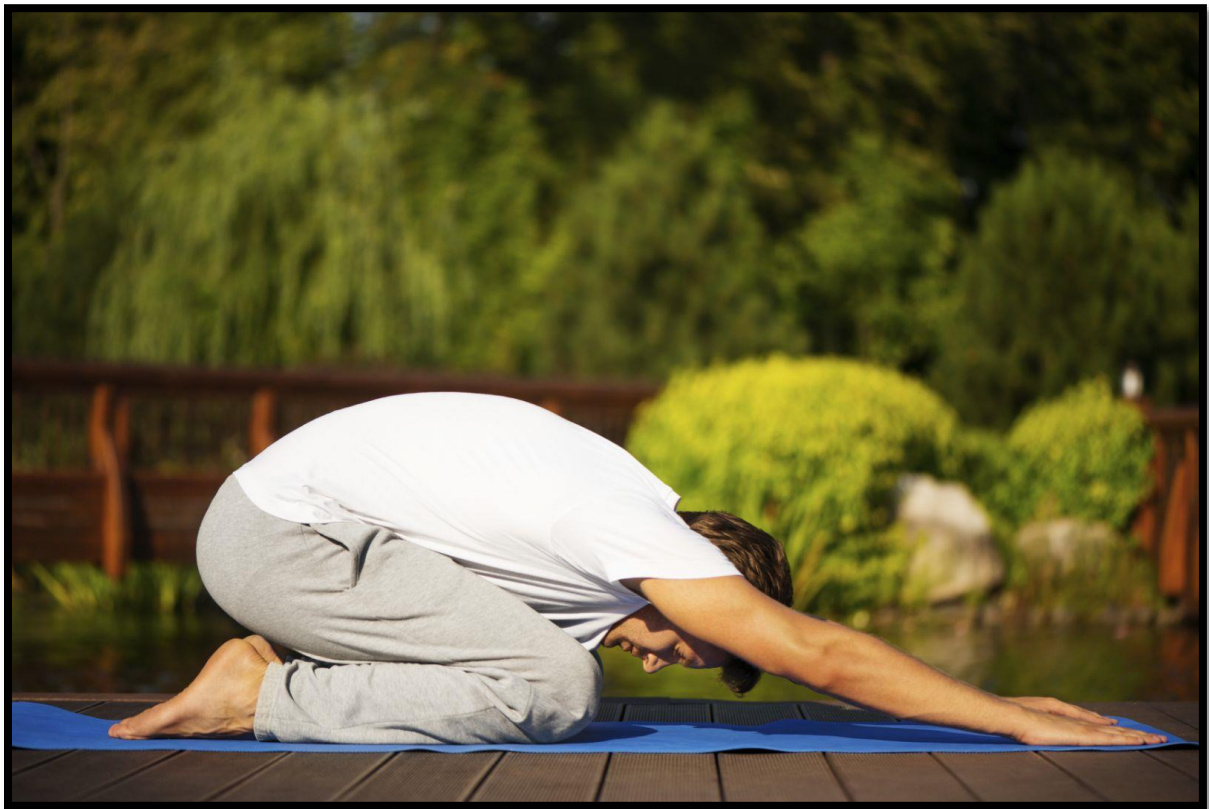
causing to the brain and the nervous system. And know that ignoring the pain or pushing through it are not approaches supported by science.

Understanding and healing pain is not only a physical work, achieved through *asanas* and meditation. The first two (steps) of the Eight Limb of Yoga - the ethical rules, are also taken in account. In the article "Yoga Therapy In Practice" Neil Pearson explains how *yamas* and *niyamas* becomes an integral part of the Yoga as therapy. He offers the following list that includes a brief thought on how one might apply each of the principles to a Yoga Therapy practice for someone with persistent pain.

(quoted from Yoga Therapy In Practice, Neil Pearson)

- **Ahimsâ (non-harming).** Teach people to be kind and compassionate to themselves as they practice *âsana*. It is important that people learn to let go of trying to prove to others that they are really trying to get better by pushing through the pain. Students can also explore the effects of the pain on their kindness toward others.
- **Satya (truthfulness).** People in pain often live in a world of what they used to be, or what they want to be in the future. Part of living the truth is to be present to what we can do now; making this our reality helps find the path to recovery.
- **Asteya (non-stealing).** Traditionally, this relates to not stealing from others. Sometimes pain can become a person's identity, which can take a major toll on both the person with pain and the people in his or her life. Guide students to explore how this new identity may steal one's own, and others', energy or resources.
- **Brahmacharya (energy regulation).** People in pain typically push through the pain in *âsana*, or they avoid activities to avoid any increase in the pain. Neither strategy will help them move forward. Encourage the student to challenge the edge of the pain, or to find the middle way.
- **Aparigrahâ (non-grasping).** Acceptance is a key ability. People in pain often seek to escape the pain, grasping for the pain-free future they prefer. Recovery may require learning how to be with the pain without reacting negatively.
- **Saucha (purity).** People in chronic pain report that it is difficult to focus their thoughts and calm their mind. Explore practices that first engage their mind, and then with practice, start to provide practices that require progressively more evenness of mind.
- **Santosha (contentment).** People with chronic pain commonly tell themselves they will only be happy when they are pain free. Explore philosophy and practices that help the student/client choose contentment independent of specific conditions or prerequisites.

- Tapas (persistence, discipline). People in pain need persistence to recover. They need discipline to practice daily and to practice strategies that assist recovery more than they practice maladaptive strategies. Encourage students to practice the techniques you teach them during their daily activities as well as in their daily sâdhana.
- Svâdhyâya (self-observation). Encourage students to learn more about their pain. Maybe they gain more knowledge of pain science, or maybe they spend time paying attention nonjudgmentally to the pain or looking at it from new perspectives. Suggest that they consider that there might be a deeper meaning to this pain.
- Ishvara pranidhânâ (surrender to the Divine). Surrender can be considered much like acceptance. Explore practices in which letting go is the best way to move forward.



## PART THREE:

# SCIENCE and MEDITATION

Back in ancient times the first mystics had studied their own inner experience in isolation. They observed a myriad of thoughts and emotions, and found out that when they stopped feeding their thoughts they become quieter and quieter. They have been able to change their state of mind from the inside out. The mystics of India called this practise *Vipassanā* (clear seeing, see things as they really are). Today we call it Meditation.

The philosophy of *Vipassanā* teaches that thoughts are nothing more than made up stories in your head. And by regular practice thoughts stop multiplying so fast.



### **1.Vipassana Experience. Self-study with no scientific proof.**

Three years ago I followed a 10-days residential *Vipassanā* (S. N. Goenka method) meditation course, which consisted of a simple code of moral conduct that serves to calm the mind: Four days of *Ānāpāna* technique (learning to fix one's attention on the natural reality of the ever changing flow of breath as it enters and leaves the nostrils) and six day of *Vipassanā* practice (observing sensations throughout the body, understanding their nature, and developing equanimity by learning not to react to them). The course required hard, serious work.

From the first moment after arriving in the residence, I had no need of using external objects to satisfy my mind. I felt calm and secure. However the heavy practice and the routine made me restless almost all of the days. I noticed that around mid-course I was no longer able to sleep in a supine position. Daily



meditation and night sleep began to blend. In fact, I only slept in a sitting position and no more than 5 hours. By the seventh day I saw a very extraordinary thing. Something like an air vibrations above one plant, several times and only above this particular plant. I was impressed! And I am still curious about this event. **I ask myself – is this the energy, the frequencies of the “real” reality, which we are unable to experience in our daily life?** Is this the *Avidyā* (ignorance, misconceptions, incorrect knowledge, misunderstandings), where we are taking the real for unreal. According to Patanjali, we have come to hold the unreal for the real and the Reality has become unreal. The so called Ignorance - the cause of all pain and suffering.

At the last evening of the course I felt a strong pain blockage in my body, during the meditation. A sensation of pain covered whole my body and every part of my body felt the same way. There was no movement or change in the sensation, nor in my posture. I felt like a big ice block in a fire colour. I was not able to go out of this sensation, and I knew I should remain there. After the gong, I had to quit the meditation and that brought me certain anger, resistance and headache. The next morning I arrived back home and I felt released, peaceful and transformed.

Over time, I found a logical explanation for the effects of this course on me. Also deeper understanding of the teaching itself. The impact of the experience got deep inside of me, where I understood some essential truths about how to lead a joyful life. In a superficial level I observed my unreactive state of mind during a period of 3 three months after the course. This brought me great benefits in my daily life, work and relationships.

## **2. Scientific Evidence of Effectiveness of Meditation**

Since the 1950s hundreds of studies on meditation have been conducted, but many of the early studies were flawed and thus generated unreliable results. Contemporary studies have attempted to address many of these flaws with the hope of guiding current research into a more fruitful path.

In the early 2000 neuroscientists discover the phenomenon called brain plasticity. Till this time it was still thought that brain is solid and can't change in its structure. It seemed that brain can change through exercise. Several studies found a whole host of structural changes in people who meditate. The default mode network (Wikipedia: DMT is a large scale brain network of interacting brain regions known to have activity highly correlated with each other and distinct from other networks in the brain) which stimulate the wondering mind was quietened down. The Amygdala reduced in size and activity, the Grey matter in the sensory regions of the brain increased. And in the field of Psychology through Cognitive Talk Therapy the subject learns to see the falseness of their own repetitive thinking.

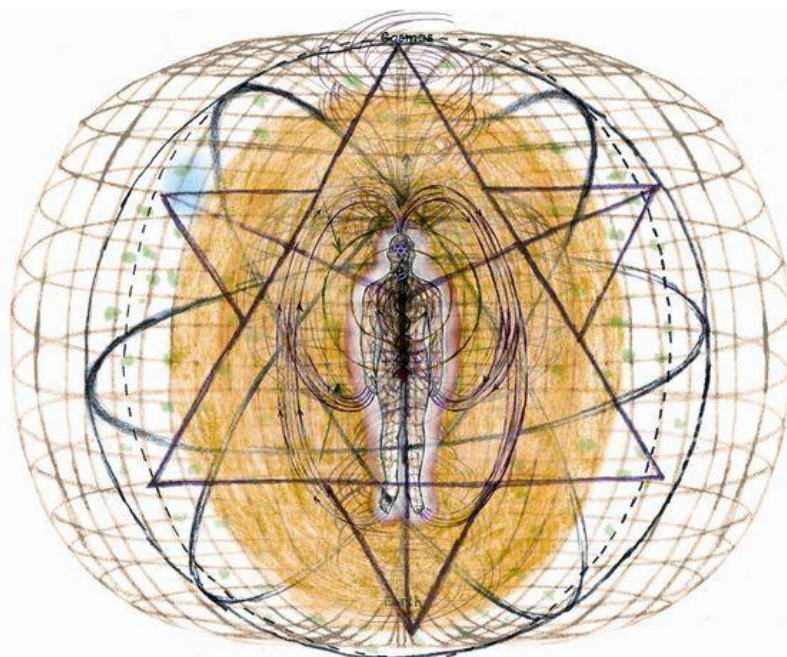
Examination of the effects of meditation can give more accurate results due to the use of modern scientific techniques. Such as fMRI (Wikipedia: Functional magnetic resonance imaging measures brain activity by detecting changes

associated with blood flow) and EEG (Wikipedia: Electroencephalography is an electrophysiological monitoring method to record electrical activity of the brain), which are able to directly observe brain physiology and neural activity in living subjects, either during the act of meditation itself, or before and after a meditation.

In 2014 researchers in Canada found the first evidence that suggests that Meditation alters cancer survivors' cells. The research shows that the telomeres (protein caps in the end of the chromosomes, which protects the chromosome from deterioration or from fusion with neighbouring chromosomes) - stayed the same length in cancer survivors who meditated over a three-month period. And the telomeres of the control group cancer survivors shortened during the three-month study. Scientists had early evidence that suggests shortened telomeres are associated with the likelihood of surviving several diseases, including breast cancer, as well as cellular ageing. And the longer telomeres are usually considered that help protect us from disease.

Study from the Max Planck Institute finds that three different types of meditation training are linked to changes in corresponding brain regions. Suggesting that the practices can change not only the structure and function of the brain, but also our behaviour. Many studies have found that experienced meditators have significantly changed brain structure and function, but relatively short-term meditation training in beginners can also shift brain function, improve well-being, and reduce symptoms of depression and anxiety.

Research (Recommendations for expanding the field of contemplative science, 2018) on some of the more controversial and less studied areas of meditation suggest that meditation may be crucial to people's psychological and spiritual development.



## PART FOUR:

# EVOLUTION with YOGA

*"Those who are engaged in yoga, are actually engaged in the practice of evolution."* — Michael de Manincor PhD, *The Science Behind Yoga* 2016

## 1. Consciousness

**Why Do We Really Practice Yoga?** This question I ask myself after achieving an inner peacefulness. **Knowing the magic of yoga practice, I thought - if one can do all this will oneself, how much we can do together? Is it all about me living happily, or is it all about a greatest common goal? What does ONE means, union, united... Yoga?** It is now clear to me that there is more than mind and spirit connected to one physical body.

Laura Plumb gives us a well-formulated answer to the real purpose of Yoga: "Exercise is important – she says - but Yoga is so much important then exercise. It give you the benefits of exercise, but it gives you benefits that goes way beyond that. Yoga, mindfulness, awareness on your breath - is infusing your body with consciousness. And Yoga purpose is to reunite us and to take us to what we call, unity consciousness. But that unity consciousness is not just mind, body and spirit. United and reintegrated. But also a sense that we are reunited with the consciousness we are. We are all consciousness. We are truly one. So each individual is part of the whole, and all the chemistry of the world and the pattern of the universe is part of us. And that is a reminder that we are connected, we are all breathing beings. And Yoga helps us remember that. Yoga is a way back to de infinite expanded consciousness. From where we coming, where we going and that is what we are."

Many yogis believe that the state of individual consciousness is just part of a collective universal Consciousness, like a wave is part of an ocean. In this sense, Consciousness is what connects all beings and things. The early scholars of Yoga philosophy, posits that the Puruṣa (consciousness) by its nature is sattva (constructive), while Prakriti (matter) by its nature is tamas (chaotic). It further posits that individuals at birth have buddhi (intelligence, sattvic).

## 2. Science into Consciousness

"Science is not only compatible with spirituality; it is a profound source of spirituality" — Carl Sagan

Consciousness is not something that scientists like to talk about much. You can't see it, you can't touch it, and despite the best efforts of some researchers, you

can't quantify it. And in science, if you can't measure something, it will be hard to explain. But in the field of the contemporary neuroscience, the idea of Giulio Tononi (IIT was proposed by neuroscientist Giulio Tononi in 2004. The latest version of the theory, labelled IIT 3.0, was published in 2014.) about measuring consciousness has attracted some highly regarded names in the science community, as Christof Koch. Many psychiatrists, neuroscientists, physicists, doctors and also Buddhists had collaborated. IIT turns out to be a modern twist on an ancient philosophical view known as "panpsychism". The theory states that every object with a  $\Phi$  (Phi, the symbol for integrated information/to measure consciousness) greater than zero is conscious. This would mean that animals, plants, cells, bacteria, and maybe even protons are conscious beings.

From the "Mind and consciousness in yoga – Vedanta: A comparative analysis with western psychological concepts" research, we understand that: Reasons are advanced to show that our latest mind-brain model is fundamentally monistic (the view that reality is one unitary organic whole with no independent parts) and not only fails to support dualism (the belief that a human being embodies two parts, as body and soul), but serves to further discount fading prospects for finding dualist forms or areas of conscious experience not embodied in a functioning brain.

Nobel scientist Roger W Sperry had this to say, "Subjective belief is no longer mere impotent epiphenomena of brain activity. It becomes a powerful impelling force in its own right. I no longer need to keep my religion and my science separate. This new outlook arose as the unforeseen, secondary result of a long search for a better answer to the age-old mind-brain problem. As things stand, I no longer need to believe, as a scientist, that I and my world are governed solely from below upward through the 'fundamental forces of physics' in a totally mindless and purposeless cosmos, indifferent towards human concerns. In our new downward-control paradigm, we are moved and surrounded in the modern world by higher, more evolved vital, mental, cultural, and other social forces. The related, so called New Age Movement of past two decades, which has increasingly challenged Judeo – Christian and other traditions of Western culture, I believe, also has its foundation in the consciousness revolution".

NYU'S Langone Medical Center have conducted the largest study that have been cared in the world. A fascinating study from 2017 about consciousness in near-death experiences. More than 2000 people were examined. 40% came back , after physical/clinical death, 10% report deep profound mystical experience, 2% - complete awareness about what was happening around them. This study has the evidence that after the body shup down his function, the consciousness remain for hours. But how long beyond that they can't say on this point. The doctors continuities investigating.

Luis Minero, president of the International Academy of Consciousness explains that when you have out of the body experience you meet your astral body which recollect emotions, experiences and so on. And that physical eye and ears are not tuned to see the astral body.

Reading farther, we find the term Contemplative Science. The science of consciousness introduces first-person methods of investigating the mind through Buddhist contemplative techniques, such as *samatha* - an detailed system of training the attention. This is the field, found by B. Alan Wallace, in which neuroscience tools, like fMRI, are used to study the effects of meditation.

## Summary and Conclusions

Yoga is an ancient healing art, a union of the body, the mind and the spirit/consciousness. A practice that removes the fluctuations of the mind, and transcend suffering. As the scientific researches proven, there is a large variety of positive effects of yoga, but in some cases no sufficient evidence for it. The confirmed changes in the brain structure, the body response and the impact on numerous diseases are part of Physiological changes in the physical body. But experts suggesting that the practices can also change our behaviour, improve well-being, and reduce symptoms of depression and anxiety. Many modern researches on the effects of Yoga are showing promising results in chronical diseases - trauma, cancer, low back pain, asthma, arthritis and so on. Some contemporary scientists believe that we are moved and surrounded in the modern world by higher, more evolved vital, mental, cultural, and other social forces.

This thesis-work aims to remark, that the growing interest in yoga practice has led to a great deal of interest from the scientific community. The fact that Yoga is shaking hands with Science, make me think that the benefits of yoga can be used in the western medical system. Already some of the GP (general practitioner) doctors are changing their status into Holistic or Medicine-free doctor, and near-dear survivors becoming scientists. Practitioners and professionals are coming together to open our eyes. To give us the opportunity to understand, learn and be aware about the oneself and about the wholeness, as something united and immensely intelligent. In my opinion, all these topics that I have addressed here are at the heart of the evolution of consciousness.

With this thesis-work I have made clear for myself that we are standing in front of the doors of the new human consciousness shift. Is time to take our knowledge about yoga and our practice to one next level. To not cover our potential behind the doors of the yoga studio and the physical effects of the yoga exercises. But perhaps, we should begin to communicate openly and intentionally with even the smallest particles of consciousness, and let Yoga guide us to the infinite expanded consciousness.

*"The religion of the future will be a cosmic religion. It should transcend personal God and avoid dogma and theology. Covering both the natural and the spiritual, it should be based on a religious sense arising from the experience of all things natural and spiritual as a meaningful unity."*

— Albert Einstein

## — Inspirational Quotes —



“Within the city of Brahman, which is the body, there is a little house. This house has the shape of a lotus, and within it dwells that which is to be sought after, inquired about, and realized. ... Though old age comes to the body, the lotus of the heart does not grow old. At the death of the body, it does not die. The lotus of the heart, where Brahman exists in all his glory—that, and not the body, is the true city of Brahman.” — Chandogya Upanishad 8:1:1



“As large as the universe outside, even so large is the universe within the lotus of the heart. Within it are heaven and earth, the sun, the moon, the lightning, and all the stars. What is in the macrocosm is in this microcosm” — Chandogya Upanishad 8:1:3



“There is not one muscle in the body over which man cannot establish a perfect control. The heart can be made to stop or go on at his bidding, and each part of the organism can be similarly controlled.” — Swami Vivekananda



“The idea of the world around us being our extended body is, to me, one of the most profound and obvious reasons for practicing the yamas, and behaviors like non-harm and kindness. Not only are the elements and people around us extensions of us, but we are extensions of them as well. There is truly no “other” out there; there is only all of us, together, as one, huge, simultaneous happening.” — Eddie Stern, *One Simple Thing: A New Look at the Science of Yoga and How It Can Transform Your Life*



“Yoga is strong medicine but it is slow medicine. Don't expect overnight cures with yoga (though for many people it does start to yield benefits right away). One major difference between yoga and many other approaches to healing is that yoga builds on itself, becoming more effective over time. This is not true of most drugs or of surgery, which often gradually diminish in effectiveness. In this sense yoga is something like learning to play a musical instrument: the longer you stick with it and the more you practice, the better you get and the more you will get out of it. A corollary to this is that yoga, by and large, is not the proper treatment for acute problems like broken bones, overwhelming infections, or surgical emergencies. These are best cared for in a conventional medical setting, TIP and indeed the treatment of such acute problems is allopathic medicine's strength.” — *Yoga as Medicine. The yogic prescription for health and healing. A yoga Journal Book* by Timothy McCall, M.D.



“The answer that yoga gives is that the mind is a neutral field in which experiences occur or are perceived. It can expand and contract to fill any space, however big or small; for example, it can expand to contemplate the nature of the universe, with its billions of galaxies and trillions of stars, or it can contract to focus on a single atom, a single cell, or the lightest sensation of touch where the breath leaves the tip of the nostrils.” — Eddie Stern, *One Simple Thing: A New Look at the Science of Yoga and How It Can Transform Your Life*



“The Western day is indeed nearing when the inner science of self-control will be found as necessary as the outer conquest of nature. This new Atomic Age will see men's minds sobered and broadened by the now scientifically indisputable truth that matter is in reality a concentrate of energy.” — Paramahansa Yogananda



S.N. Goenka - Morning chanting - Day 1

<https://www.youtube.com/watch?v=GqEWTlaweaM>

1.a) <i>Jāgo logo jagata ke, bīti kālī rāta; huā ujālā dharama kā maṅgala huā prabhāta.</i>	People of the world, awake! The dark night is over. The light has come of Dhamma, the dawn of happiness.
<i>Āo prāṇī viśva ke, suno Dharama kā jñāna; isa meṅ sukha hai, śānti hai, mukti mokṣa nirvāṇa.</i>	Come, beings of the universe, listen to the wisdom of the Dhamma. In this lie happiness and peace, freedom, liberation, nibbāna.
<i>Yaha to vāṇi buddha kī, śuddha dharama kī jyota; akṣara akṣara meṅ bharā, maṅgala oṭaparota.</i>	These are the words of the Buddha, the radiance of pure Dhamma, each syllable of them filled and permeated with happiness.
<i>Buddha-vāṇi mīṭhī ghaṇī, misarī ke se bola; kalyāṇī maṅgalamayī, bharā amṛtarasa ghola.</i>	Sweet are the words of the Buddha, each phrase like honey, yielding welfare and happiness, suffused with the taste of the deathless.

# References

## Books:

- McCall, Timothy, Yoga as Medicine: The Yogic Prescription for Health and Healing, Random House USA Inc, 2007
- Stern, Eddie, One Simple Thing : A New Look at the Science of Yoga and How it Can Transform Your Life, North Point Press, 2019
- Alter, Joseph S., Yoga in Modern India: The Body Between Science and Philosophy, 2004
- Vivekananda, Swami, Swami Vivekananda on Himself, Advaita Ashrama, 2006
- White, John, Everything You Want to Know about TM -- Including How to Do It, Cosimo, Inc., 2004
- Bhagavad Gita

## Films and Video Material:

- The Modern Science of Yoga, Uplift.tv
- Bruce Lipton – Yoga Changes Your Cellular Biology, Uplift.tv
- Sat Bir Singh Khalsa, Uplift.tv
- The Ancient Science of Yoga, You Tube
- Yoga to meditation: A look at the complementary methods for breast cancer patients to treat the whole person, Goodmorningamerica.com/wellness
- Why Do We Really Practice Yoga? Laura Plumb, You Tube
- Researchers say there's evidence that consciousness continues after clinical death, You Tube
- The nature of consciousness - Interview with Alan Hugenot, You Tube
- Susan Blackmore: The Mystery of Consciousness, You Tube
- Phi (2016), phimovie.com

## Articles:

- What is Yoga Therapy? (google search)
- INTERNATIONAL JOURNAL OF YOGA THERAPY (2008)
- Yoga Therapy in Practice / Yoga for People in Pain, Neil Pearson MSc(RHBS), BScPT, BA-BPHE,
- Scientists Think They've Pinpointed The Group of Brain Cells That Respond to Meditation
- World-First Evidence Suggests That Meditation Alters Cancer Survivors' Cells
- Different Types Of Meditation Change Different Areas Of The Brain, Study Finds, Forbes.com
- Mindfulness-based cancer recovery and supportive-expressive therapy maintain telomere length relative to controls in distressed breast cancer survivors, onlinelibrary.wiley.com
- Mindful People Feel Less Pain, Neurosciencenews.com
- Neuroscience's New Consciousness Theory Is Spiritual, Psychologytoday.com
- Scientists Think They've Pinpointed The Group of Brain Cells That Respond to Meditation, Sciencealert.com
- Swami Vivekananda's Vision of Scientific Rejuvenation of India - a cursory reading, cs.rkmvu.ac.in/~swat/media/slides-
- Yoga Journal July 1976
- YOGA AND MEDICAL SCIENCES by B.K.ANAND 1991, semanticsscholar.org

## Researches:



- Human development and transcendence: a Vivekananda view (2014) , Swami Tyagananda, Academia.edu
- Ledetra Bridges, LMSW<sup>1</sup> and Manoj Sharma, MBBS, MCHES, PhD , US National Library of Medicine/National Institutes of Health
- Exploring the therapeutic effects of yoga and its ability to increase quality of life, US National Library of Medicine
- Health Impacts of Yoga and Pranayama: A State-of-the-Art Review, US National Library of Medicine
- Yoga for anxiety and depression, Harvard Mental Health Letter (2018)
- Yoga on our minds: a systematic review of yoga for neuropsychiatric disorders” Frontiers in Psychiatry
- Future directions in meditation research: Recommendations for expanding the field of contemplative science, US National Library of Medicine
- The Efficacy of Yoga as a Form of Treatment for Depression
- Yoga for Chronic Low Back Pain: A Randomized Trial, Researchgate.net
- Effects of Yoga versus walking on mood, anxiety, and brain GABA Levels: A Randomized Controlled MRS Study, National Center for Complementary and Integrative Health
- How to increase serotonin in the human brain without drugs, Simon N. Young, US National Library of Medicine/National Institutes of Health
- 2017 ASCO Palliative Care: Yoga Can Be an Effective Supportive Therapy for People With Lung Cancer and Their Caregivers, Ascopost.com
- Research on meditation, Wikipedia
- Meditation and yoga practice are associated with smaller right amygdala volume: the Rotterdam study, Springer.com
- Scientists Think They've Pinpointed The Group of Brain Cells That Respond to Meditation, Sciencealert.com
- Future directions in meditation research: Recommendations for expanding the field of contemplative science, [www.ncbi.nlm.nih.gov/pmc/articles/PMC6221271/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC6221271/)
- Health Impacts of Yoga and Pranayama: A State-of-the-Art Review, [www.ncbi.nlm.nih.gov/pmc/articles/PMC3415184/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3415184/)
- Exploring the therapeutic effects of yoga and its ability to increase quality of life, [www.ncbi.nlm.nih.gov/pmc/articles/PMC3193654/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3193654/)
- Research on meditation, Wikipedia
- Future directions in meditation research: Recommendations for expanding the field of contemplative science, [www.ncbi.nlm.nih.gov/pmc/articles/PMC6221271/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC6221271/)
- Research on meditation, Wikipedia
- Mind and consciousness in yoga – Vedanta: A comparative analysis with western psychological concepts, [www.ncbi.nlm.nih.gov/pmc/articles/PMC3705680/](http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3705680/)

### **Main Sources:**

- Academia.edu
- The International Association of Yoga Therapists
- Researchgate.net
- National Center for Complementary and Integrative Health
- US National Library of Medicine / National Institutes of Health
- Sciencealert.com
- Health.harvard.edu
- Science Daily
- Neurosciencenews.com
- Elsevier.com
- Uplift.tv
- All to find in my Pinterest Map, [pinterest.com/fabricover/yoga-and-science/](https://pinterest.com/fabricover/yoga-and-science/)