

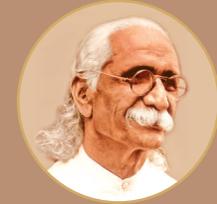


SCIENTIFIC RESEARCH DEPARTMENT

KAIVALYADHAMA S.M.Y.M. SAMITI,

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Swami Kuvalayananda
(1883-1966)

A great pioneer in the field of Scientific Research in Yoga and the Founder-Director of Kaivalyadhama Institute.

“Yoga has a complete message for the humanity. It has a message for human body. It has message for the human mind and it has also a message for the human spirit. Will rich men with their money and young intelligent and healthy men with their selfless service, come forth to help the Kaivalyadhama to take this message, to the farthest corners of the world”.

—Swami Kuvalayanandaji

INTRODUCTION

Kaivalyadhama's quest of propagating yoga for the humanity dates back to 1924 onwards when first ever laboratory for scientific research in yoga was established by its founder director Swami Kavalayananda. The research work done so far has attracted worldwide acclaims and rave appreciations from the personalities of the caliber of Pandit Motilal Nehru, Mahatma Gandhi, Indira Gandhi, Lieut. Col. K. G. Gharpurey (Ex. Surgeon General, Govt. of Bombay), Dr. W. Burrige (Prof. of Physiology, Lucknow University), Dr. Wenger (California University), Dr. Bagchi (Michigan University) and Dr. Ctibor Dostalek (Charles University, CZ) and many other eminent personalities.

From the beginning until recent times several Committees consisting of eminent scientists were appointed by the Govt. of India to comment on the research work going on in this department. All have appreciated its excellent research endeavors. One of such Committee headed by Dr. Basunarayana, the Dean of Patna Medical College and Vice-Chancellor of Patna University records:

“The centre should be developed into training centre where students from different parts of India, who possess scientific and/or medical back ground, could be trained..... so as to form a nucleus of research workers in the field”.

Yoga is now universally recognized as a scientific discipline by modern scientists. Apart from its predominant spiritual values, its contributions towards value education, and maintenance of health, as well as, its role in the treatment of stress related psychosomatic and other chronic disorders are being acknowledged worldwide.

In view of numerous scientific studies, Yoga has ceased to be mysterious or mystifying. Its ample scientific bases do not permit any scope for the misconceptions or the misunderstanding about it. Late Swami Kavalayanandaji, who was a great visionary and a pioneering exponent of experimental studies on Yoga, had a major contribution of scientific investigations in the field of Yoga. He had cultivated an immense interest in and unquenchable thirst for carrying out the experiments on Yogic practices in-

cluding *Kriyas*. He had also volunteered himself as a subject for many experiments. This reflects his deep insight into the scientific nature of Yoga. As early as in 1917, the year he established Kaivalyadhama in Amalner (Maharashtra) he had used some simple instruments like Kymograph to study physiological changes in *Uddiyana* and *Nauli*. Later in 1924, when Kaivalyadhama was shifted from Amalner to its present location in Lonavla, he established a well-organized Scientific Research Department (SRD) in Kaivalyadhama's premises.

Along with his colleagues and in collaboration with medical specialists, he conducted a number of physiological, radiological and bio-chemical investigations in the field of Yoga.

In 1957 American scientists, Dr. Wenger (California University) and Dr. Bagchi (Michigan University) came to India and carried out a number of neuro-physiological studies on Yogis, in this institution.

Laboratories in the department are well equipped with modern scientific instruments to carry out fundamental and applied research work in Yoga.

AIMS AND OBJECTIVES

1. To investigate various Yoga practices on scientific lines by using modern sophisticated equipments and techniques employed in physiology, bio-chemistry, psychology, neuropsychology, Physical Education and allied disciplines.
2. Developing methods/technique of various yogic practices and make efforts at standardizing the same on the basis of scientific investigations.
3. To critically review the literature on Yoga in order to understand

yogic concepts available in related texts for facilitating scientific investigation on Yoga.

4. To collect the published scientific work on Yoga done in SRD and elsewhere and to prepare monographs, abstracts and bibliographies of yoga articles.
5. To project and disseminate the scientific information on Yoga through publication, participation in conferences and also by organizing seminars and workshops.
6. To implement research findings and suggestions for updating the

theoretical and the practical training aspects of Yoga, imparted at Gordhandas Seksaria College of Yoga and Cultural Synthesis, as well as, in the Yoga camps organized by Kaivalyadhama.

7. To collaborate and co-ordinate with Philosophico-Literary Research Department and Yogic Hospital of our institute and also with other research institutions and agencies to facilitate generation and promotion of the scientific information relating Yoga practices.

VISION

To discover, establish & evolve scientific bases of Traditional Yoga through Fundamental and Applied Research for the world community.

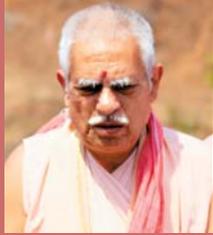
MISSION

- To wed Modern scientific methods and Philosophical aspect of Yoga so that even “the man on the street” is helped towards Social Renaissance.

- To unveil the practical side of psycho-physiological aspects of Yoga for the welfare of the common man through educational, therapeutic and research related endeavors in Yoga.

DEPARTMENT STRUCTURE





Swami Maheshananda
Director of Research



DR. PRASEEDA MENON
Research Officer



DR. SUCHITRA DODDOLI
Research Assistant



Prof. R.S. BHOGAL
Assistant Director of Research



MR. SANJAY SHETE
Research Assistant



MR. SANDEEP WANKHEDE
Yoga Demonstrator



MR. D.D. KULKARNI
Research Officer



MS. ANITA VERMA
Research Assistant



MRS. PRATIBHA RAJBHOJ
Research Assistant



DR. SATISH PATHAK
Research Associate



DR. GARGI NAIDU
Consultant



MR. NAVNATH KADU
Technical Assistant

RECOGNITION

- Scientific & Industrial Research Organization (SIRO), Department of Scientific & Industrial Research, Ministry of Science & Technology, Government of India, has accorded recognition to Kaivalyadhama, since 1988.
- The institute has been recognized by the University of Pune, as a Research Centre since 1984. Looking to the commendable research activities of the institute, the University of Pune, has granted a permanent recognition to it, from the year 2007.
- Kaivalyadhama has been approved by the Central Government for the purpose of clause (ii) of subsection (1) of section 35 of the Income-tax Act, 1961 with effect from 1.4. 2008, in the category of “Other Institution, partly engaged in research activities”.

COLLABORATION

- Jnana Prabodhini Institute of Psychology, Jnana Prabodhini Bhavan, 510 Sadashiv Peth, Pune 411030
- Kridakul, Jnana Prabodhini Nigdi, Pune

- International Society for Scientific Interdisciplinary Researches in the Field of Yoga, represented by the President Prof. Predrag K. Nikic, New Belgrade, Serbia
- Project based collaboration with INS Shivaji, Naval College
- Shruti Foundation, New Delhi.
- Regional Resource Training Center on Ageing, Anugraha, Delhi
- Genomebio Technologies, Baner, Pune
- Advanced School of Career Education, SSN Institutes, Chennai
- K. E. M. General Hospital, Mumbai.

AWARENESS

This division works in promoting Awareness of Yoga, importance of holistic health and ideal nutritional needs. The focus is also to enable the common man to know health related benefits of Yoga.

RESEARCH ADVISORY COMMITTEE

The research projects/activities are reviewed time to time by the Scientific Research Advisory Board which

represents a broad and expert coverage of medical and yoga sciences. The Kaivalyadhama Research Advisory Board is chaired by Dr. Naresh Chandra, Pro-Vice Chancellor, Mumbai University and Principal, Birla College, Mumbai. The members are nominated by the Director of Research, Scientific Research Department, for a 3-year term.

The responsibilities of the Scientific Advisory Board are:

1. To advise the Secretary of the Institute on any matter which may affect the quality and execution of research projects within the Institute.
2. To assist and guide researchers in the development and implementation of research projects.
3. To advise on the disbursement of the institute's research and infrastructure budget.
4. To encourage and assist researchers and management to apply for appropriate research grants.
5. To advise on opportunities for collaborative research endeavors.

ETHICAL COMMITTEE

Foremost important in any research institution would be the ethical committee that would approve the projects that follows all the ethical norms during the intervention and

project period. The Indian Council of Medical Research (ICMR) has published detailed **guidelines** on the composition and responsibilities of IECs and has established ethical **guidelines** for biomedical research

on human subjects (Published in 2006). On the basis of the guidelines given by ICMR the scientific research department had formed its institutional ethics committee.

RESEARCH

BIOCHEMISTRY



Biochemistry is a science pertaining to the chemical constituents of living cells and the reactions and processes, they undergo. Knowledge of biochemistry is essential to medicine, as well as, to all life sciences. In our laboratory various biochemical tests are conducted to study the effect of Yoga practices on human health. The laboratory is equipped with all basic instruments, as well as, some modern advanced diagnostic instruments.

The services of laboratory are used for the Research Projects, as well as, for the routine diagnostic purpose. The patients visiting health care centre also avail the facilities of laboratory for the routine checkup such as Complete Blood Count, Lipid Profile, Blood Glucose Level, Kidney Function Tests and Thyroid Function Test.



PHYSIOLOGY



Physiology is the science of body functions. It is the study of mechanical, physical and biochemical properties of living organisms. The physiology laboratory of scientific research department was established to see the physiological changes due to the practice of yoga. The services of laboratory are used for the Research Projects, as well as, for the patients visiting health care centre.



PSYCHOLOGY



The psychology laboratory was established with a view to see the effect of yoga practices on various processes like motivation, memory, learning, perception, personality, social orientation, and self-development, as well as, psychophysiological bases of Yoga. The facilities of laboratory are used for

various research projects and also for the patients visiting the Institute. Psychological counseling is also provided to the patients visiting health care centre. The counseling aims to help people manage their difficulties and transform & sublimate personal problems into their own personal growth.



PHYSICAL EDUCATION



Physical education aims to develop physical competence, fitness and knowledge of movement and safety, as well as, the ability to use these to perform a wide range of activities associated with the development of an active and healthy lifestyle. This section has got various equipments viz. Skinfold caliper, Goniometer, Stabilimeter, Flexomeasure, Harvard steps, Body fat monitor etc. The equipments are used to assess various

parameters such as flexibility, cardiovascular endurance, balance, grip strength, body fat percentage, health related physical fitness before and after yoga practice.



HIGHLIGHTS ON THE RESEARCH FINDINGS ON YOGA PRACTICES

- **Madhavdas Vaccum:** *Uddiyana & Nauli* practice induces negative pressure due to suction force in the GI Tract. The resulting vacuum, developed during *Nauli* is termed as MADHAVDAS VACCUM, is different from that associated with the anti-peristalsis that occurs when enema is administered. The anti-peristalsis is absent in the case of *Nauli*. The isolation of the recti and the elevated position of the diaphragm increase the functional capacity of the abdomen. This increased capacity reduces the intra-abdominal pressure and allows the colon to dilate under internal gas-pressure. This helps to prevent constipation & facilitate an easy excretion of waste materials.
- **Bhugarbh Samadhi:** The project on 'Pit burial *Samadhi*', intended to find whether there is any such reality as *Samadhi* in a pit, revealed that the adept yogi could stay in the underground pit, under a fully controlled condition, only for 18 hours in comparison to a normal person (with no yoga exposure), who could stay for 12-14 hours. The tolerance to increasing concentrations of CO₂ in the pit was the main controlling factor in prolonging the stay inside the airtight pit. Yogis normally being regular in practice of *Pranayama* develop an ability to withstand CO₂ better than the non practicing lay individuals. Four experiments done on the problem revealed that there was no *Bhugarbha Samadhi* as such in the strict sense of the term. The long held misconception of *Bhugarbha Samadhi* was thus busted.
- **Jivana Yantra or Vitalizer:** It is an instrument designed by Swami Kuvalayanandaji to enhance the strength of chest and lungs for optimum respiration. It serves as curative measure to treat abdominal, circulatory and respiratory disorders.

- **Significance of Nostrils in Breathing:** Breathing through both nostrils is unequal in normal healthy individual. Opening of nostril depends on psycho-physiological state of the person such as whether a person is active physically & mentally, emotionally disturbed or otherwise. When a person is calm and cool, lazy, sleepy etc. with low physical & mental state the left nostril is dominant. On the other hand, when a person has hunger pangs or physically active his/her right nostril is dominant. For the first time, the existence of uni-nostril breathing and rhythmic cycle of alternate opening and closing of left and right nostril, every one to two hours, was established scientifically in this department. The project on 'Ida and pingala' revealed that 85% of the subjects showed uni-nostril breathing pattern, while 15% had more or less equal force of breath pattern (equi-potentiality) in right and left nostrils. It was also proved that if a *Yoga danda* (a short crutch) is applied under an armpit with a little pressure the contra-lateral

nostril opens up and the nostril on the **ipsilateral side** starts closing. Balanced physical and mental state may be attained by using *Yoga danda*. Normally, we are not aware of this uni-nostril dominance.

- **Gastric Tone as Influenced by Mental States & Meditation:** The emotional disturbances like anger, frustration etc., in the form of fight & flight, get manifested on the tone, size, shape & mucosal pattern of the stomach while meditation helps to overcome these influences far better way than the ordinary rest or sleep.
- **Muscle Activity in Asana & Exercise:** Muscle activity increases when yogic postures are performed in isometric or isotonic contraction while yogic postures performed as *Yogasanas* in a relaxed manner leads to a decreased muscle activity.
- **Heart Control and Yoga Practices:** It was believed that yogis could stop heart at will but the experiment showed that in *Uddiyana* and *jalandhara bandha* there can be a temporary suspension in heart beat period.

ECG studies, conducted on 6 different occasions for Heart stoppage project, revealed that the subject could stop his heart for 3 to 5 seconds during his heart control maneuver.

- **Stress Recovery:** The recovery from induced physiological stress in *Shavasana* and two other postures (resting in chair and resting supine posture) was compared. Twenty one males and 6 females (age 21-30 yrs) were allowed to take rest in one of the above postures immediately after completing the scheduled treadmill running. The recovery was assessed in terms of Heart Rate (HR) and Blood pressure (BP). HR and BP were measured before and every two minutes after the treadmill running till they returned to the initial level. The results revealed that the effects of stress were reversed in significantly shorter time in *Shavasana*, compared to the resting posture in chair and a supine posture.
- **Bronchial Asthma:** This department undertook the first research project on the clinical

application of yoga in the management of Bronchial Asthma. In two projects, out of 160 asthmatics, practice of vastra dhauti, in conjunction with relaxative asanas was found to be extremely useful in 60% patients. In 104 asthmatics, the haemoglobin level and lymphocyte count was found to have increased while total leukocyte count had decreased after 4-6 weeks of yogic practices. These changes in the blood constituents probably contribute to the immunity of the body.

- **Diabetes:** In diabetes project almost 80% patients, having moderate to mild intensity of the disorder, showed improvement in insulin sensitivity and glucose tolerance after 6 weeks of practice of asanas, with an emphasis on the relaxative nature of their performing technique. Recently, a study was conducted in this department to evaluate efficacy of Yoga practices on fasting HbA1c, plasma TNF- α , body mass index, blood pressure and pulse rate in patients with Type 2 diabetes mellitus. The findings of this study

showed therapeutic and preventive role of selected yoga practices in reducing the metabolically triggered inflammatory response through balancing HPA-immune axis, and improving the biochemical and physiological domains in Type 2 diabetes mellitus patients. Thus integration of such yoga practices, in day to day lifestyle of Type 2 diabetes mellitus patients, may be beneficial in preventing the progression of the disorder and its associated complications.

- **Obesity :** In Obesity project, out of 68 obese patients the residential patients in the age range of 25-70 years, showed more beneficial effects of yoga therapy for one month towards reduction in lipid profile, blood pressure, heart rate, body fat percentage, body weight and hip girth when compared with non-residential patients and those who participated in aerobics for one month. Residential group also showed improvement in health related fitness variables such as peak expiratory flow rate, flexibility, abdominal muscle strength and endurance as

compared to non-residential and aerobics groups. Body weight (from 2-8 kg), anxiety and body fat percentage were reduced in all the three groups but more remarkably in residential group.

- **Antioxidants:** Reactive oxygen species are known to aggravate disease progression. To counteract their harmful effects, the body produces various antioxidant enzymes, *viz*, superoxide dismutase, glutathione reductase etc. The study conducted at this department revealed that Yogic exercise enhanced the levels of Superoxide dismutase and reduced glycosylated Hb and glucose levels in the experimental group as compared to the control group. This indicates that yoga practices help in enhancing antioxidant defense mechanism in diabetics by reducing oxidative stress.
- **Suicidal Tendency in adolescents :** According to a study conducted on Indian adolescents, it was concluded that yoga practices have shown positive changes in psychological, physiological and biochemical

attributes of suicidal tendency and mental-ill-health. Suicidal thoughts can be reversed or turned down with the regular practice of yoga which bestows a positive outlook and an objective response pattern of the individual towards the critical events in their life situations.

- **Yoga for Police Personnel :** Job in the police force is regarded as one of the most stressful jobs in the world which leads to various stress related disorders such as hypertension, diabetes, and coronary heart disease. A one week residential Yoga and diet program conducted in Kaivalyadhama for police personnel showed potential benefits in restoring cardiovascular health by reducing lipoprotein levels.
- **Yoga for school teachers:** Teaching has now become a very demanding occupation with a lot of stresses for the teacher who has various deadlines to meet and a lot of responsibilities to shoulder. A recent study showed that 10 days of yoga practices which include

Yogic postures, regulated breathing, relaxation techniques and meditation, can decrease occupational stress, improve the sleep and increase the feeling of being rested in the morning and can also decrease the time taken to fall asleep in Kendriya Vidyalaya Teachers.

- **Yoga for Railway drivers :** The profession of railway engine drivers, especially in metropolitan cities in India, is very hectic and full of uncertainties that bring more stress due to night work and long irregular working hours, which may increase risk of cardiovascular diseases. A research study carried out in railway engine drivers has demonstrated that

Yoga practices are potentially beneficial for regression of inflammatory process by reducing CRP levels in a representative sample of apparently healthy middle aged railway engine drivers.

- **Micronutrient absorption:** Micronutrient deficiency leads to impaired physical and mental health, primarily in children. Micronutrients are extremely important in preschool and adolescent children in view of the rapid physical and mental growth during this period. According to a research study carried out in adolescent children, Yoga training improved micronutrient absorption in adolescent rural residential school children.

SCIENTIFIC RESEARCH DEPARTMENT



Kaivalyadhama Shreeman Madhava Yoga Mandira Samiti (K.S.M.Y.M. Samiti)

Since 1944, K.S.M.Y.M. Samiti is continued to look after the activities (*research, training and treatment*) of the parent institute through the following departments:

- **Scientific Research Department:** Since 1924, conducting *radiological, barometric and kymographical, biochemical, psycho-physiological, and therapeutical studies including health and fitness in relation to Yoga.*
- **Philosophico-Literary Research Department:** Since 1924, preparing **critical editions** viz., *'Yogiyajnavalkya Smriti and Goraksa Satakam,' 'Vasistha Sambita,' 'Hathapradipika,' 'Gheranda Sambita,' 'Siva Sambita,' 'Hathapradipika Jyotsna,'* etc., **Monographs, Yoga-Kosha, Yoga Concordance** etc. along with other philosophical researches.
- **G.S. College of Yoga & Cultural Synthesis:** Since 1951, offering Diploma Course in Yoga with the recognition of N.C.T.E, Govt. of India. Through its extension service wing, it also trains many executives, professionals, teachers and common people with the knowledge of Yoga. Apart from this, the college conducts B. A. (Yoga Shastra), a three year degree course affiliated to Kavi Kulguru Kalidas University, Nagpur. Also, Certificate course in Yoga (C. C. Y) twice a year, Diploma in Yoga Therapy (D. Y. T) for one and a half year and Advanced Teacher Training Certificate Course in Yoga (A. T. T. C. Y) of 30 day duration is offered at the college.

- **S.A.D.T. Gupta Yogic Health Care Center** (devoted exclusively to the treatment of various diseases through Yoga, has been functioning at Kaivalyadhama since 1924. To augment the benefits, ***Naturopathy, Ayurveda & Panchakarma sections*** have been added to its activities. It also publishes a Newsletter to propagate the recent activities of the institute and the message related to yoga therapy).

From the beginning until recent times several Committees consisting of eminent scientists were appointed by the Govt. of India to comment on the research works going on in this department. All have appreciated its excellent research endeavors. One of such Committee headed by Dr. Basunarayana, the then Dean of Patna Medical College and Vice-Chancellor of Patna University records:

“The centre should be developed into training centre where students from different parts of India, who possess scientific and/or medical back ground could be trained.... so as to form a nucleus of Research Workers in the field”.

Today, Kaivalyadhama is actively functioning in many countries through its offshoots. Some of them are at Mumbai (1932), Rajkot (1943), Bhopal (1990), France (1989) and U.S.A (1990).

In all circumstances and conditions we always remember the Rev. Swami Kuvalayanandaji's inspiring words, - *“I have brought up this institution out of nothing. If it goes to nothing I shall never mind, but YOGA should not be diluted.”*