



# SCIENCE AND HINDUISM

Professor Raman Gokal



# HINDUISM and SCIENCE

*“When I use a word,” the caterpillar said to Alice, “It means whatever I want it to mean, neither more nor less...”*

# Science

Knowledge which is human:  
facts,  
things done or performed,  
particular truths known  
by actual observation  
or authentic testimony.  
explore the physical universe  
and learn the truth

# Vedic Science

Understanding which is divine:  
scientific affirmation is possible  
but never scientific  
confirmation  
as its field of understanding  
partakes of the Infinite.

In life, what we are seeking then is not a 'fact'  
but a principle of operation of the universe  
Einstein - science eventually comes 'unstuck' in answering  
all phenomenon, which through 'experience,  
wisdom and self realisation', spirituality can answer.

# Development and Limitations of Science

- Modern science broke down the confining limitations of superstition by an intense observation and experimentation with material phenomena.
- The development of technology, instruments for observation and measurement, made the scientific revolution possible. Physical observation, experimentation and technical innovation have been primary tools of modern science.
- The primary instruments which have supported the development of science limit its growth and power of discovery.
- Science isolated and eliminated all that was not immediately verifiable or measurable through physical instrumentation. As a result, it has not succeeded in discovering the underlying reality and the process of creation which governs all phenomena in nature.



***Satya nasti paro dharma!***  
**“There is no religion higher than  
truth”.**

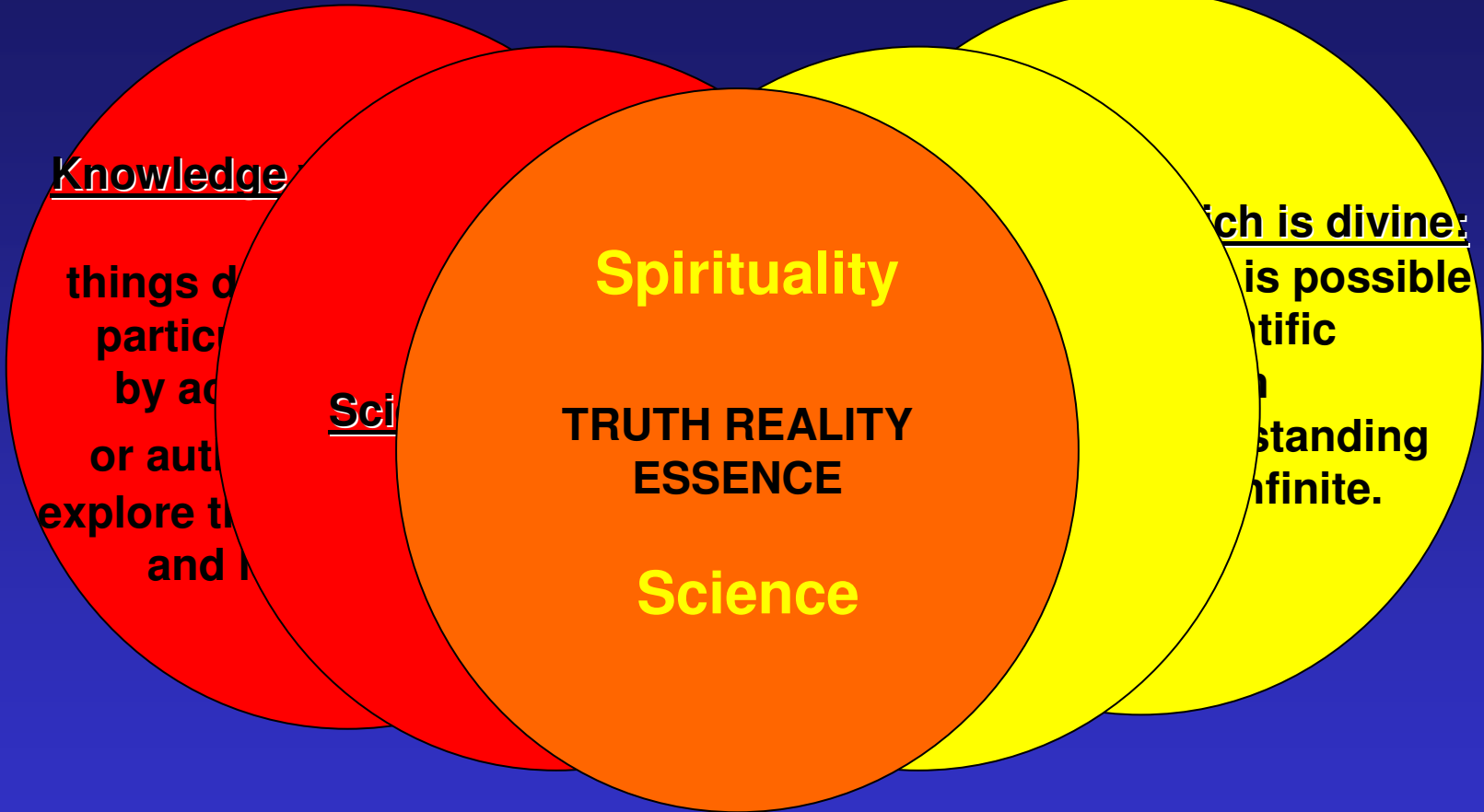
- Central to both science and spirituality is the seeking of truth and grasping the essential nature of reality.
- The goal of science is a complete understanding of the fundamental principles underlying the physical universe in all its diverse forms.
- Spirituality is the awakening of wisdom concerning how we affectively relate to each other and to the world.
- Science seeks to enlighten our minds, while spirituality seeks to awaken our hearts.
- Each is necessary for a full fruition of the other.
- Although some may consider science to be antagonistic or contradictory to their religion and spirituality, the truth is that compulsive attachment to particular doctrines and dogmas are inimical to both science and to a deeper realization of spirituality.

# Science and Vedantic Thought

- Recent scientific discoveries seem to validate the concept of Brahman. Physicists and cosmologists are close to proving that there is one source behind the physical universe, and they call this source the Unified Field.
- In a profound sense, Brahman, the Vedantic concept and the Unified Field of physics appear to be synonymous.

# Science

# Spirituality

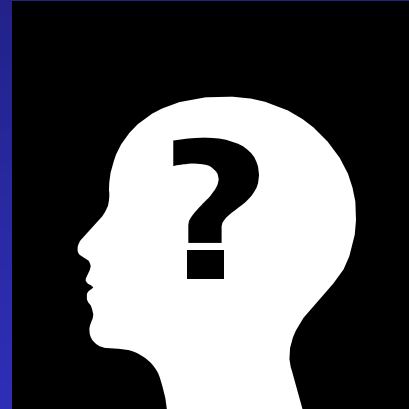


# Science and Hindus

- **Peruse the past – our very rich heritage**
- **Today – what is happening**
- **Future – what does it hold?**
  - **can we reclaim what is ‘ours’**
  - **how do we deal with new scientific advances**

# The Great Rishis

- Rishi means 'SEER': The discoverer
- Hindu Rishis were
  - philosophers
  - mathematicians
  - scientists
- They made fundamental discoveries
- All reported in the great Vedic literature



**Science  
and  
Technology  
in  
Ancient  
India**



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Mumbai 2002**

# Sage Atharvan: Discoverer of Fire

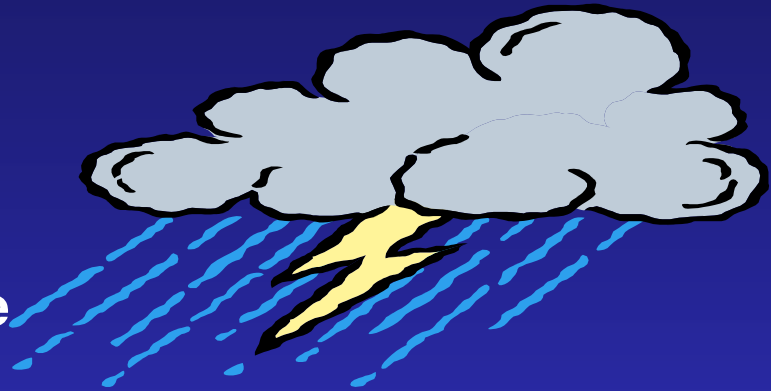
- Rishi of Atharva Veda
- 4000 BC or even earlier

“The sage Atharvan extracted the agni(fire)” - Rig VI-16-13

“The priests churn for agni as was done by Atharvan” - Rig X-21-5

**Prometheus = Pra + Mantha**

**In Sanskrit ‘by’ ‘Churning’**



Greek mythology says that Prometheus stole fire from heaven

# ARCHITECTURE

## Medhatithi : Designer of Bricks

- Bricks (ishtaka) made to construct Yajna Kunds
- Formulae for laying down of bricks-Yajur Veda (XIII)  
There are specific names of many mechanical processes and implements in the Vedas
- Grinding, pounding, filtering, preserving
- Wheel, axle, hook, spade, boiler, pressing stone, mixing bowl, fuel, pitcher with 100 holes, weaving shuttle, drum, measuring tape

### TOWN PLANNING IN MOHEN-JO-DARO

The Harappa Civilisation was in a fairly matured state as early as 3000 BC. Investigations have revealed a culture in which the finished quality of the materials employed, the high standard of their manipulation, and the stability of the construction as a whole is astonishing.

In the first place, the builders of these cities had acquired experience of town planning, as proved by the methodical manner in which they were laid out with straight streets at right angles, the main thoroughfares running almost due north and south, east and west.



Artist's impression of the original city --  
Dholavira (Kutch) 2500 BC

The residential block, the citadel, the granary, commodity market, the great public bath and many other public buildings were planned in this highly distinguished city. It possessed a network of covered drainage that was unique in the ancient world.



Mohenjodaro Sindh (3000 BC) - Scientifically  
laid city with streets, running North-South  
and East-West intersecting each other  
at a perfect 90°

The principal buildings were fairly regularly oriented having their sides towards the cardinal points. They were laid in mud-mortar, care being taken to break the joint where necessary, the entire process indicating that the Indus builders were thoroughly experienced in the technique of the bricklayer's craft.



Sewerage -- Lothal (Saurashtra)  
2500 BC

# **ASTRONOMY**

## **Dirghatama: The First Astronomer**

- Realised the importance of having an era
- Time determined by astronomical phenomenon
- Vedic sages defined
  - Lunar year                      354 days
  - Solar (Tropical) year        365 1/4 days
  - Civil year                        360 days

# Discovery of Planets

‘Star’ and ‘aster’ come from Sanskrit  
‘Str’

“He has studied the sky with  
constellations”

- Rig Veda I-68.5

- Vamadeva identifies Jupiter  
(Brhaspati)
  - Rig IV-50.4
- Vena Bhargava identifies Venus
  - Rig X-123.1

## Planetary Motion

॥ कक्ष्याप्रतिमण्डलगा भवन्ति सर्वे ग्रहाः स्वचारेण ।  
मन्दोच्चादनुलोमं प्रतिलोमं चैव शीघ्रोच्चात् ॥

(Aryabhataiya -Chapter 3, Verse 17)

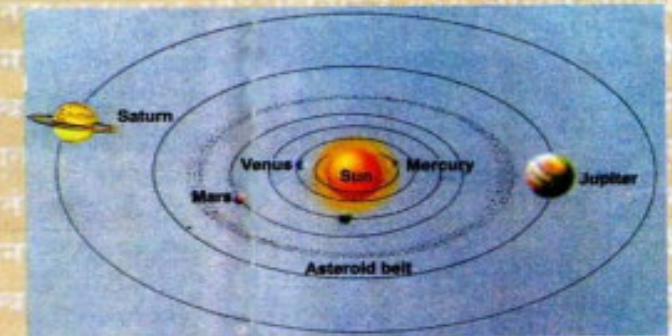
All the planets whether moving in the orbits or in eccentric circles, move anticlockwise from their apogees and clockwise from their perigees.

This law was stated in the 5th century A.D. Much before the first law of planetary motion was given by Johannes Kepler in 1609 A.D.

## Distance of Planets

The distances of planets from the sun in terms of earth to sun average distance known as Au. ( $1.5 \times 10^8$  Km) are :

Planet	Aryabhata's value	Modern value
Mercury	0.375	0.387
Venus	0.725	0.723
Mars	1.538	1.523
Jupiter	5.16	5.20
Saturn	9.41	9.54



Planetary orbits as known Today

# Acharya Charak (1000 BCE)



- He was the father of Medicine.
- His renowned work 'Charak Samhita' which is considered the encyclopedia of Ayurveda today goes in depth about his principals, diagnoses and cures that still retain their potency and truth even after a couple of millennia.
- His research led to the facts of the Human anatomy, embryology, pharmacology, blood circulation and diseases like diabetes , tuberculosis, heart disease, etc.
- Charak Samhita describes medicinal qualities and functions of 100,000 herbal plants that todays science is still doing research on.



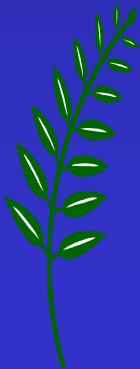
# First Medicinal Plant Symposium

- Date : 700 BC (2700 years ago)
- Venue : Regions of Himalayas
- Proceedings : Charaka Samhita
- Organiser : Rishi Bhardvaja



**“He taught the science of causes, symptoms and medication- the tripartite science”**

**-Charaka Samhita I-24**



# **Susruta:**

## **Father of Surgery**

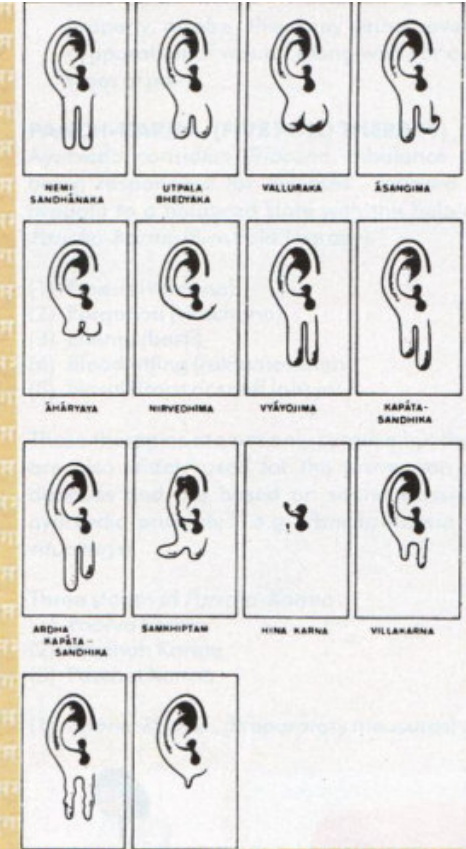
- 125 surgical instruments made from steel
- 14 varieties of bandages
- “Nil by Mouth” for abdominal operations
- Use of antiseptics (mustard, nimba leaves etc)
- Training of surgeons on dead animals and watermelon
- Classified surgical operations into 8 kinds
  - extraction,
  - excising,
  - incising,
  - probing,
  - scarifying,
  - suturing,
  - puncturing
  - evacuating fluid

# Types of Operations

- Plastic and Rhinoplastic
- Transplanting skin flaps
- Cataract crouching
- Hernia
- Fractures and dislocations
- Removal of Haemorrhoids
- Caesarean



Artistic presentation of surgery at the time of Sushruta



Types of Auroplasty

**PLASTIC SURGERY IN AYURVEDA**  
 Sushruta is regarded as the father of Indian surgery. During his time various types of plastic surgeries were performed -- Auroplasty, Nasoplasty, Labioplasty.



Stages of Auroplasty



Stages of Nasoplasty

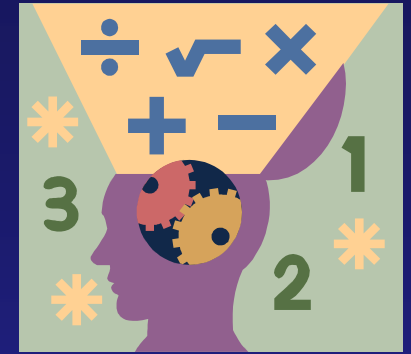
**Alexendra's invasion brought it to Greece and then to rest of the Europe**

# **Kanada: First Expounder of Law of Causation and Atomic Theory**

- **Ten books known as ‘Vaisesika Darshana’**
- **About 1900 years old**
- **First to explore the relation between ‘Cause and Effect’**
- **Identified atoms (Parmanu) as the build blocks of matter**
- **Defined chemical action (Paka)**



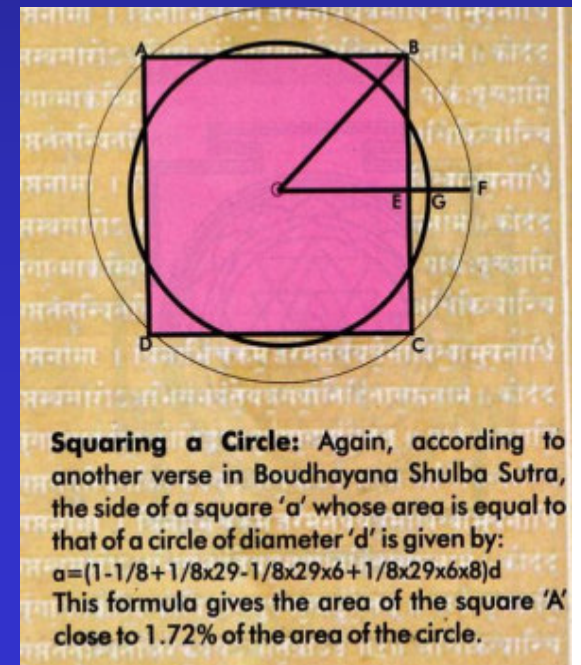
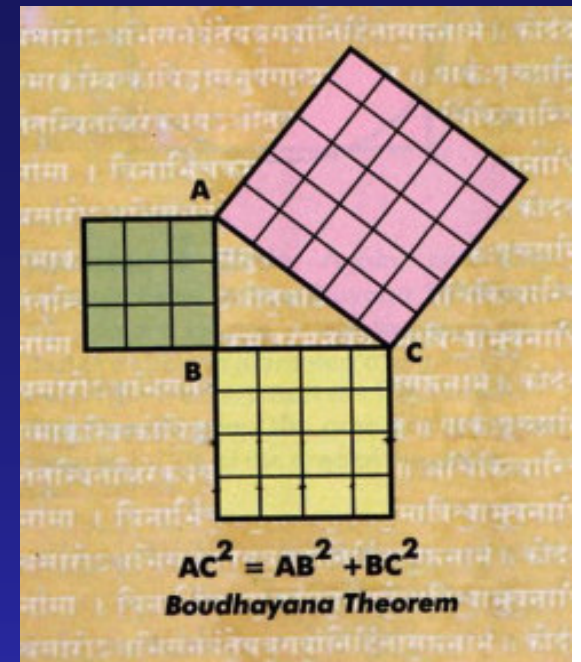
# Great Mathematicians



- Ancient India's greatest gift to the world of mathematics are the ZERO (Panini) and the elegant place value system of numeration (Pingala) and the decimal place value system
- Medhatithi- Extended numerals to billions
- Aryabhata- laid foundations of Algebra
- Lagadha - Rationalised Astronomy
- Baudhayana - The first great Geometer

# Science of Geometry

- ‘Sulbha Sutras’ - Sulb means to measure
- Bodhyana’s sutras are 2800 years old
- Used in the construction of altars for yajna
- Discovered the Pythagorus theorem before Pythagorus
- Formula to draw a circle with same area of a square
- Computed square root of 2 = 1.414213
- Aryabhata – rational approximation to  $\pi$  (3.1416)



# YOG

## Maharashi Patanjali



- The word YOG has been used in Vedas, Upanishads, Gita. Yog deals extensively with every aspect of our life according to these classics – the philosophy is to adhere to different applications of inner discipline, all of which ultimately lead to the liberation of the soul
- The roots of Yog can be traced back roughly 5,000 years
- The word Yog or Yoga comes from the Sanskrit word “Yuj” meaning to yoke, join or unite. It is the union of all aspects of an individual: body, mind and soul.
- Patanjali’s Sutras are classics. He defines Yog as ‘Chittavritti Nirodh’ (eradication of negative moods).  
Ashtanga Yog – the Eight Yogic Practices

# Maharishi Patanjali



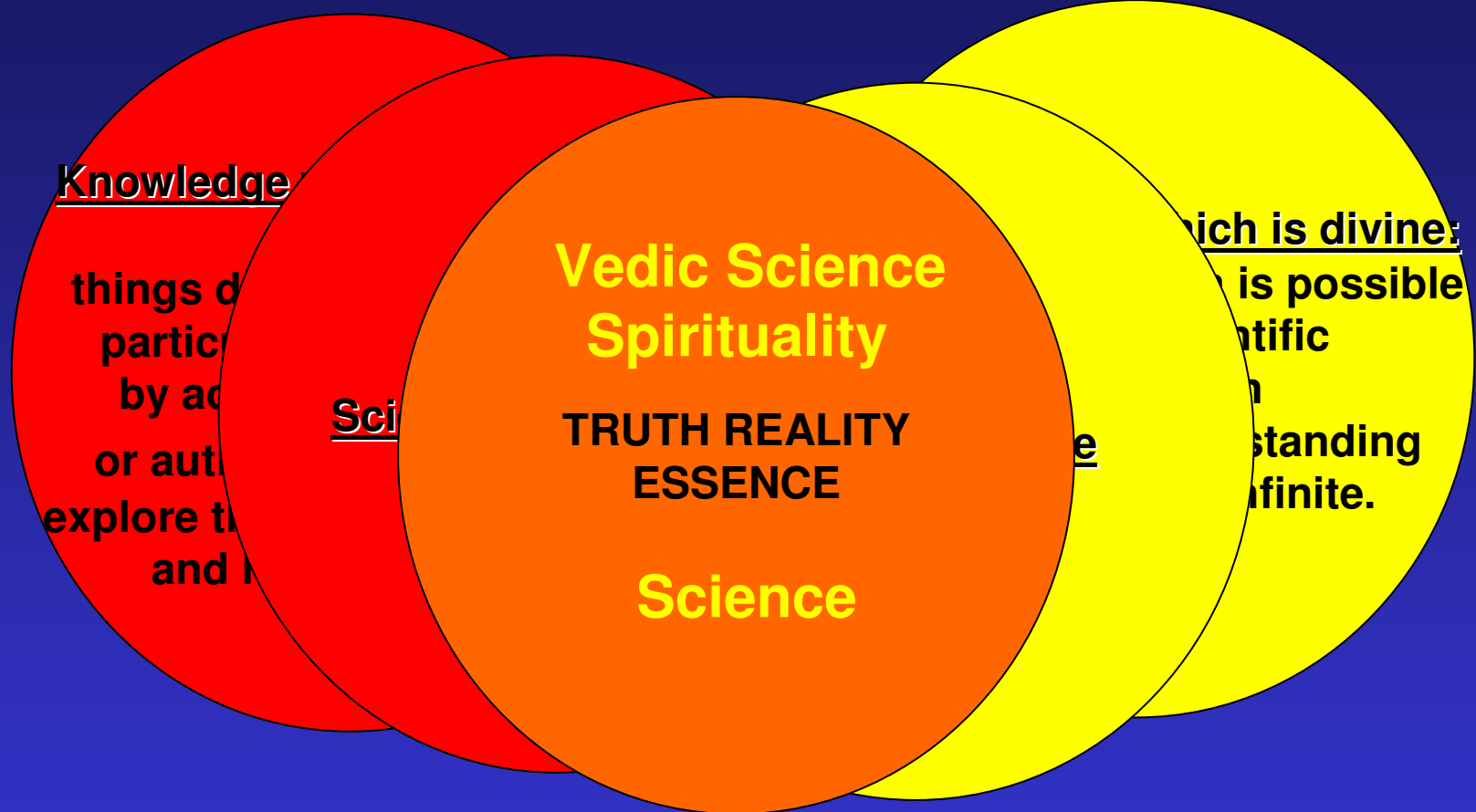
- Patañjali (पतञ्जलि) is the compiler of the Yoga Sutra, a major work containing aphorisms on the practical and philosophical wisdom regarding practice of Raja yoga . "Yoga" involves inner contemplation, a rigorous system of meditation, ethics, metaphysics and devotion to the one common soul, God, or Brahman
- Various references suggest he lived between 200 and 400 BC. Ancient texts often refer to Patañjali as an incarnation of the serpent god Ananta and he is sometimes depicted as half human and half serpent.
- Patañjali has often been called the founder of Yoga
- The *Yoga Sutra* is a treatise on Raja Yoga, They give us the earliest reference to the popular term Ashtanga Yoga, which translates literally as the eight limbs of yoga. They are yama, niyama, asana, pranayama, pratyahara, dharana, dhyana and samadhi.

# Science and Hindus

- Peruse the past – our very rich heritage
- **Today – what is happening – how modern science is merging with old vedantic thought**
  - creation/energy**
  - medicine/health**
- **Future – what does it hold?**
  - can we reclaim what is 'ours'
  - how do we deal with new scientific advances

# Modern Science

# Vedic Science

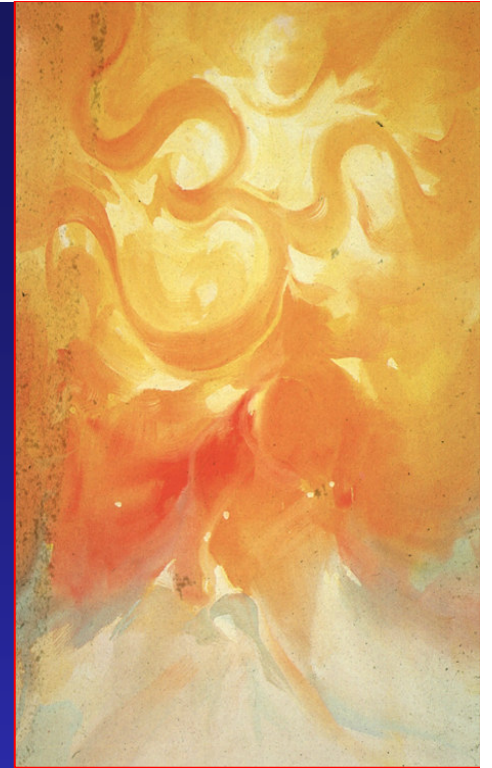
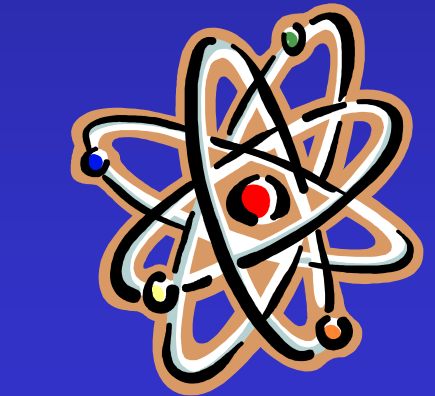


# Science and Vedantic Thought

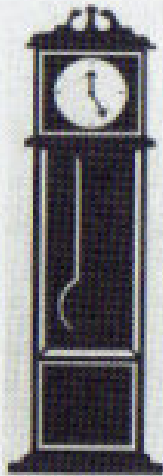
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# Creation – Vedic View

- Creation associated with the first **VIBRATIONS (ENERGY)** or ‘AUM’ or ‘OMKAR’ when creation began Big Bang.
- These ‘vibrations’ are ubiquitous in the Universe.
- We are not equipped to comprehend this ‘Greatest Vibrations’ - the beginning of the Universe with all its order, beauty, magnificence, creativity as well as chaos, disorder, destruction and dissolution.
- It is identified with the sound ‘OM’ and termed ‘OMKARA’ – it is both the primordial seed and from which the all life energy emerges.



# CREATION and WESTERN THOUGHT



**NEWTON**  
clockwork  
mechanism



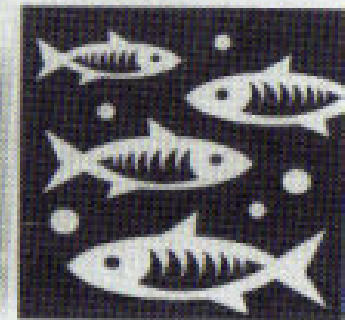
**DARWIN**  
survival of  
the fittest



**FREUD**  
subconscious  
self-centered



**EINSTEIN**  
relativity of  
space-time



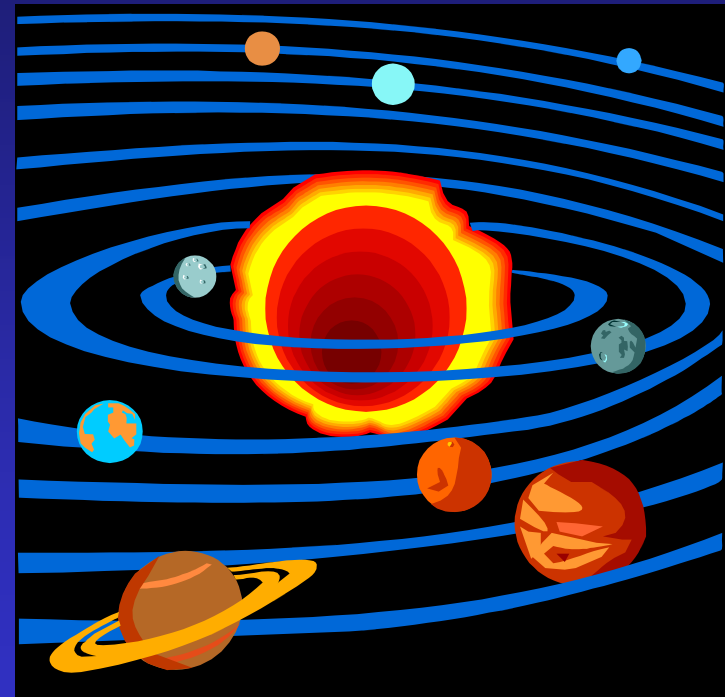
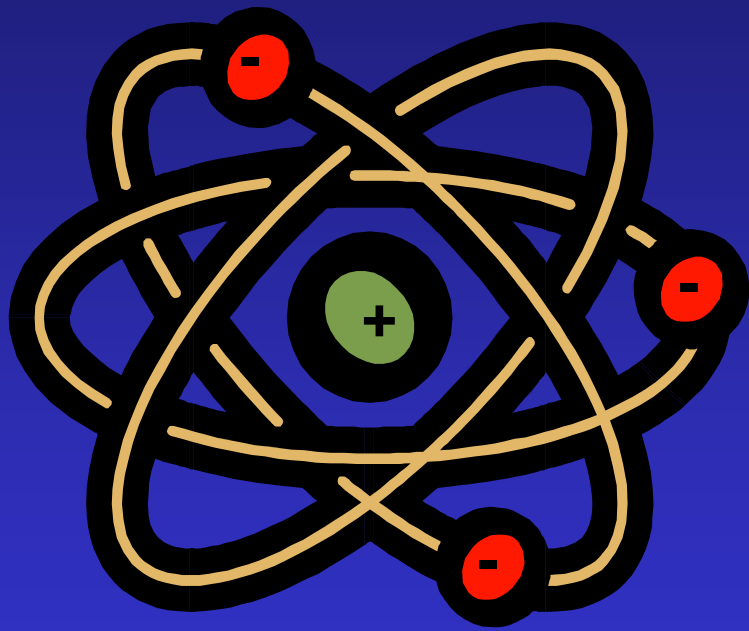
**LASZLO**  
coherent fine-tuned  
interconnected  
whole

# Today there is wave of Change....

- Today's new breed of mystics, comprising quantum physicists, cyberneticists, molecular biologists, mathematicians and computer scientists, have all largely explored the depths of frontier sciences and have somehow been introduced to the oneness of it all. The apparent gulf between science and spirituality is caused by the use of different languages. Both camps are, however, saying the same thing.
- The mystics and philosophers of the past and present have been saying - that the universe is one giant cosmic soup of energy which, depending on how we wish to observe it, will manifest into that particular reality.
- Physicists are telling us that the observer affects the observation. Science is showing that we no longer perform objective experiments. Instead, we participate in subjective experiments because our minds, thoughts and expectations will bring the results we expect.



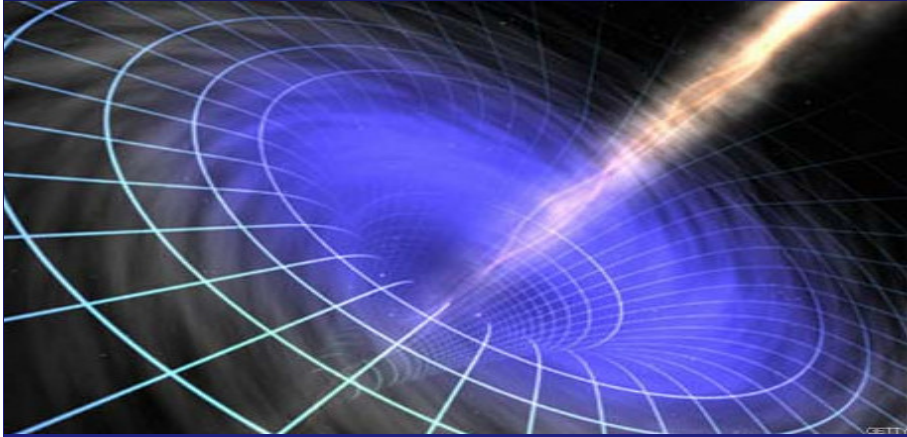
# Atom – Solar System





# The Coming Revolution

- Discoveries are being made that prove what our seers and Vedas having been saying – we humans are far more extraordinary than an assembly of flesh and bone
- We are not a chemical reaction but an energetic charge, living in this cosmic creation, which is also none other than an incredible interwoven, interconnected, underlying Energy Field!!
- ‘The Field is the only Reality’ – Albert Einstein

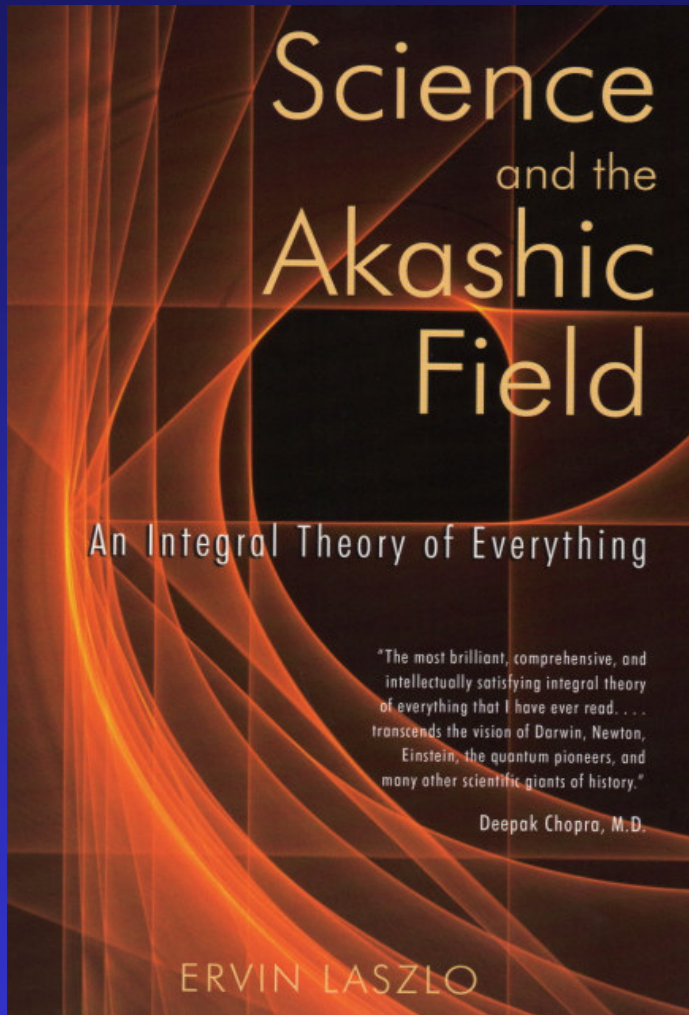


# Creation and Energy – what is this?

- Revolutionary discovery that there is an
  - interconnecting
  - information-conserving
  - information-conveying energy field
- In the west it was considered a myth
- In the east we always maintained its existence – it was called AKASHIC FIELD
- Our Vedas speak of the AKASHIC CHRONICLE (a record of everything that happens)
- The AKASHIC FIELD is even more fundamental than Gravitational field, Electro-Magnetic field, nuclear and quantum fields

# The Akashic Field

- Many ancient cultures have reported the existence of the Akashic Records or “Book of Life”.
- Akasha is a Sanskrit word meaning "sky", "space" or "ether". The Akashic Records are therefore said to be a collection of wisdom that is stored in the ether and have existed since the beginning of time.
- Quantum scientists are now recognizing that the Akasha as recorded by the ancients is really an energy field that connects all living things.
- The Akashic Field is very similar to an invisible super computer holding vast amounts of information about YOU. This field is continuously written and rewritten every day.



Laszlo states that

- ***“the universe we observe and inhabit is a secondary product of the energy sea that was there before there was anything there at all.***
- ***Hindu cosmologies have always maintained that the things and beings that exist in the world are a concretization or distillation of the basic energy of the cosmos, descending from its original source.***
- ***The physical world is a reflection of energy vibrations from more subtle energy fields. Creation and all subsequent existence, is a progression downward and outward from the primordial source”.***

LYNNE McTAGGART  
THE  
FIELD

'This important book stretches the imagination...  
We are on the verge of another revolution  
in our understanding of the universe.'

ARTHUR C. CLARKE

## AKASHIC FIELD

Small band of scientists around the world

Zero Point Field

-an ocean of microscopic vibrations in the universe

-most fundamental nature of matter

-the very underpinning of our universe

-living beings constantly exchanging information with this inexhaustible energy and connect with each other and the world

-there may be a life force flowing through the universe, variously called **COLLECTIVE CONCIOSNESS**

**-THE MOST ESSENTIAL INGREDIENT OF THE INTER CONNECTED UNIVERSE WAS THE LIVING CONCIOSNESS THAT OBSERVED IT.**



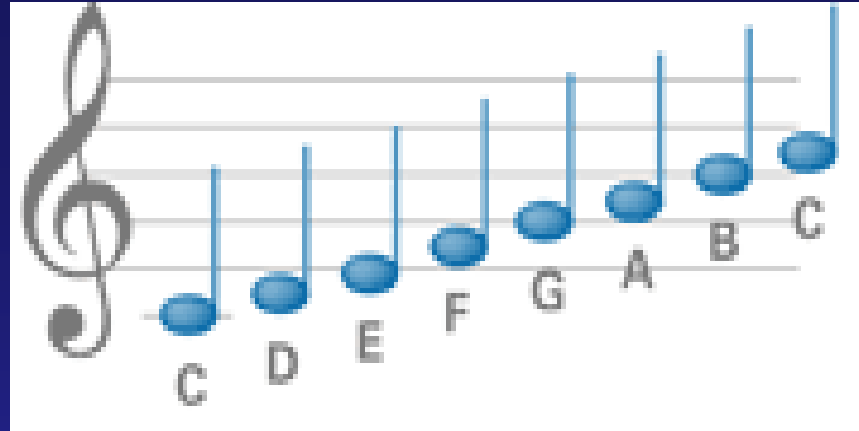
# Merging of Views...Laszlo says

- *Although it is undifferentiated, Brahman is dynamic and creative. From its ultimate 'being' comes the temporary 'becoming' of the manifest world, with its attributes, functions and relationships.*
- *The cycles of samsara [individual lifetimes] ... are the lila of Brahman: its play of ceaseless creation and dissolution.*
- *In Hindu philosophy, absolute reality is the reality of Brahman. The manifest world enjoys but a derived, secondary reality and mistaking it for the real is the illusion of maya...*

# Matter and Energy



- Astrophysics theorise that in the entire Cosmic Creation
  - 4% of material substance is visible matter (galaxies, stars, planets etc)
  - 23% is baryonic dark matter (protons neutrons etc)
  - 73% IS UNACCOUNTED FOR!!
- This appears to be ‘dark energy’ – property of space (quantum vacuum)
- It is a super dense cosmic medium, carrying light, forces of nature traversing the universe.
- Where does the sound OM fit into all this?



**The syllables for each scale degree are**

**“Sa-Re-Ga-Ma-Pa-Dha-Ni-Sa”**

**“Do-Re-Mi-Fa-Sol-La-Ti-Do.”**

**That is one octave**

# NASA's 'Musical' Note

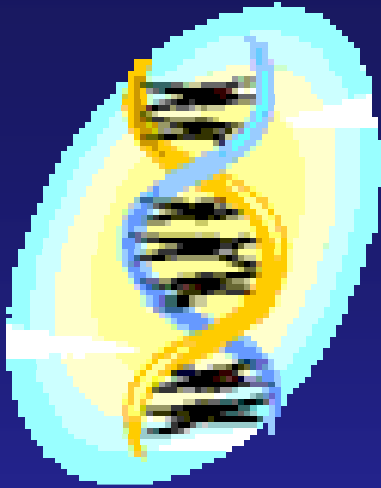
- NASA's Chandra Xray Laboratory have measured a pressure wave from the Perseus Cluster of Galaxies
- This wave translates into musical note B flat; its frequency is 57 octaves below middle C!!
- This is a million billion times deeper than limits of human hearing!!
- IS THIS THE ENERGY VIBRATION AT START OF CREATION - i.e. AUM or OMKAR ?

# Light Energy and the Soul

*“Science without religion (spirituality) is lame,  
Religion (spirituality) without science is blind”*

*Albert Einstein*

- Henry David Thoreau once wrote, “With all your science, can you tell me how it is that light comes into the soul?”
- Now we are beginning to understand what Einstein meant when he said,  $E=MC^2$ .
- We are all balls of energy (light beings) that have been slowed down to become mass but if sped up times the speed of light squared we become pure energy again.
- That’s how Jesus showed up with Elijah and Moses on the mount of transfiguration.



# Medicine and Healing: Ancient and Modern



*Artistic presentation of surgery at the time of Sushruta*

NEMI SANDHANIKA	UTTALA BHEDHANA	VALLURANA	SHANKHA
ANBHAYANA	NIRVEDHANA	VIVROHANA	KAPALA SANDHANA
ABHAYA SANDHANA	SAMBHUFFAN	HINA KAPALA	VILAKSHANA
Types of Auroplasty			

**PLASTIC SURGERY IN AYURVEDA**  
Sushruta is regarded as the father of Indian surgery. During his time various types of plastic surgeries were performed -- Auroplasty, Nasoplasty, Labioplasty.

1	4	2	3
Stages of Nasoplasty			

**Stages of Nasoplasty**

# 20th Century Medicine

- Blood Transfusion
- Penicillin In 1928 in Britain, Sir Alex Fleming
- The NHS 1947
- Recent Developments
  - Degenerative diseases, man made ailments
  - Radiology
  - Keyhole surgery
  - Searching for new drugs
  - Transplantation
  - Mapping of the human genome
  - New ways of screening for diseases and creating donor organs etc

# Issues today.....

Strategy is limited blinkered short-sighted

Cause → tissue /organ damage → symptoms

Treatment is quite often empirical (treat symptoms)  
as cause is not known

Medical Education

Disempowering of the population

No Holistic view

Strong pharmaceutical lobby, anti CAM and spiritual  
health

# **Ancient Vedic System of Health care**

- **Holistic integrative care addresses body, emotions, mind, relationships and spirit.**
- **Holistic care addresses the person who has the disease, rather than the disease the person has.**
- **We need to combine this with modern advances**
- **What one would call spirituality**

## TRIDOSHA -- BASIC CONCEPT OF AYURVEDA

Ayurveda takes cognizance of individual's constitution based on "Tridosha". The concept is basic to the Indian Medical Science of Ayurveda. It helps the physicians and the common man. A person's Prakriti (constitution) may be classified as :

1. Vata, 2. Pitta, 3. Kapha, 4. Vata-Pitta, 5. Pitta-Kapha, 6. Vata-Kapha.

	Dosha	Location	Normal Function	Ailments
<p><b>THE FIVE FORMS OF VATA</b></p>	<p><b>VATA</b> Prana Udana Samana Apana Vyana</p>	<p>Heart Throat Stomach Small Intestine Colon &amp; Organs of Pelvis Heart</p>	<p>Breathing Swallowing food speech and voice Action of digestive enzymes Elimination of stool, urine, etc. Helping circulating channels like blood vessels</p>	<p>Bronchitis, asthma Diseases of ENT and eyes Indigestion, diarrhoea Diseases of bladder, anus, testicles and diabetes Impairment of circulation</p>
<p><b>THE FIVE FORMS OF PITTA</b></p>	<p><b>PITTA</b> Pachaka Ranjaka Sadhaka Alochaka Bhrajaka</p>	<p>Stomach &amp; small Intestines Liver, Spleen Heart/Brain Eyes Skin</p>	<p>Digestion Blood formation Stimulation of higher mental functions Vision Complexion and lustre of the skin</p>	<p>Indigestion Anaemia, jaundice, etc. Psycho-somatic disturbances Impairment of vision Leucoderma and other skin diseases</p>
<p><b>THE FIVE FORMS OF KAPHA</b></p>	<p><b>KAPHA</b> Kledaka Avalambaka Bodhaka Tarpaka Shleshaka</p>	<p>Stomach Heart Tongue Brain Joints</p>	<p>Moistens food Helps blood circulation Sense of taste Nourishment of sense organs Lubrication of joints</p>	<p>Impairment of Digestion Laziness, lethargy Impairment of taste and senses Pain in joint and malfunctioning of joints.</p>

## Classification Of Diseases

॥ त्रयो रोगा इति निजागन्तुमानसाः ॥

There are three types of diseases namely innate, exogenous, and psychic according to Charaka Su. 11/45.

*Innate diseases* are caused by the morbid doshas of the body.

*Exogenous diseases* are caused by demoniac seizures, poisonous substances, wind, fire or trauma.

*Psychic diseases* are caused by non-fulfilment of desires and interaction with agreeable or disagreeable things.

### BHAISHAJYA KALPANA -- PHARMACEUTICS

Bhaishajya Kalpana is the science of formulatory medical preparation in various dosages. Kashaya Kalpana refers to the technique to formulate medicaments from fresh herbs. They are :

1. Svarasa -- Juice extracted without water or with very little water. This is in a very concentrated form.
2. Kalka (Paste) -- Herbs crushed with very little water to form a paste. This is in a less concentrated form.
3. Kvatha (Decoction) -- Dry or wet herbs boiled with water and then filtered give decoction (Kwath) lighter than both of the above, Svarasa & Kalka.
4. Heema (Cold infusion) -- Dry powder or fresh herbs kept in cold water, churned and filtered next morning give Heema and it is lighter than Kvatha.
5. Faanta (Infusion) -- Herbs added to boiling water; with immediate discontinuation of heating and kept for natural cooling and filtration produce Faanta. It is the lightest of all.

From these primary preparations many further preparations could be formed as product line extensions.

*Bhaishajya Kalpana* also refers to food recipes for patients and drug recipes for external topical use.

### Food Recipes For Diseased

To suit to the taste and health of the convalescing patients special food recipes.

Vilepi	: Soup thickly mixed with gruel.
Peya	: Soup slightly mixed with gruel.
Yusha	: Thick consistency soup.
Yavagu	: Thick gruel.
Manda	: Boiled cereal essence.
Mamsa Rasa	: Meat soup.
Kanjika	: Fermented gruel made of rice.
Takra	: Butter milk/diluted churned Yogurt.

### Drug Recipes For External Use

Gargling (Gandusha)

Nasal insufflation (Nasya)

Eye drops (Akshchyottana)

Application on eyelids (Anjana)

Scalp application (Siro basti)

Enema (Basti)

Anal suppository (Phala varti)

Urethral / Vaginal douches (Parisheka)

Vagina / General fumigation (Dhoopan)

Massage oils (Abhyang)

Several preparations can be made from *Panchavidha Kashaya Kalpanaviz*.

- |                 |           |
|-----------------|-----------|
| 1. Tail Paak    | 6. Guggul |
| 2. Ghrit Paak   | 7. Masi   |
| 3. Dhumra Paan  | 8. Vati   |
| 4. Karna Pooran | 9. Arka   |
| 5. Avaleha      | 10. Satva |

# Tridosha of Ayurveda--vata, pitta, and kapha--constitute regulatory systems

- A test of the systems analysis underlying the scientific theory of Ayurveda's Tridosha.
  - Hankey A. J Altern Complement Med. 2005 Jun;11(3):385-90.
- The tridosha of Ayurveda--vata, pitta, and kapha--constitute regulatory systems respectively controlling input/output, turnover, and storage; functions systems analysis identifies as fundamental to all open systems.
- This paper proposes independent scientific evidence for the proposed identification of the doshas and for the systems analysis on which it is based. In particular, it points to coenzyme A, a key component of fatty acid metabolism. Its universal presence in all cells implies that it is an evolutionary invariant and that the biochemical pathway on which it lies must be exceptionally significant.
- The universality of coenzyme A is therefore consistent with its identified role, and supports the systems analysis identifying the doshas. Their systems functions survive developmental transformations of evolution with recognizable continuity. By virtue of that, vata, pitta, and kapha can be identified with them in all species.

# Ayurveda for diabetes mellitus: a review of the biomedical literature

Elder C. Oregon Health and Science University, USA.

- Diabetes mellitus is a condition that is extremely serious from both clinical and public health standpoints. The traditional healthcare system of India, Ayurveda, offers a balanced and holistic multi-modality approach to treating this disorder.
- Many Ayurvedic modalities have been subjected to empirical scientific evaluation, but most such research has been done in India, receiving little attention in North America.
- This paper offers a review of the English language literature related to Ayurveda and diabetes care, encompassing herbs, diet, yoga, and meditation as modalities that are accessible and acceptable to Western clinicians and patients.
- There is a considerable amount of data from both animal and human trials suggesting efficacy of Ayurvedic interventions in managing diabetes. However, the reported human trials generally fall short of contemporary methodological standards. More research is needed in the area of Ayurvedic treatment of diabetes, assessing both whole practice and individual modalities.

# Other Research Papers

- Patwardhan B, Warude D, Pushpangadan P, Bhatt N Ayurveda and traditional Chinese medicine: a comparative overview. *Complement Alternat Med.* 2005 Dec;2(4):465-73. Epub 2005 Oct 27.
- Hankey A. A test of the systems analysis underlying the scientific theory of Ayurveda's Tridosha. *J Altern Complement Med.* 2005 Jun;11(3):385-90. Review.
- Hankey A.Related Articles, The scientific value of Ayurveda. *J Altern Complement Med.* 2005 Apr;11(2):221-5.
- Gogtay NJ, Bhatt HA, Dalvi SS, Kshirsagar NA. The use and safety of non-allopathic Indian medicines. *Drug Saf.* 2002;25(14):1005-19. Review.
- Atal CK, Zutshi U, Rao PG.Related Articles, Scientific evidence on the role of Ayurvedic herbals on bioavailability of drugs. *J Ethnopharmacol.* 1981 Sep;4(2):229-32.
- Chopra A. Ayurvedic medicine and arthritis. *Rheum Dis Clin North Am.* 2000 Feb;26(1):133-44,
- Hankey A.The scientific value of Ayurveda. *J Altern Complement Med.* 2005 Apr;11(2):221-5.

# GENES – THE GENOME

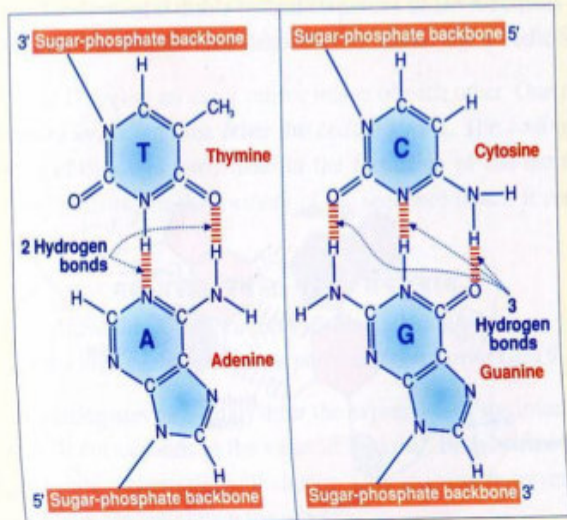


Figure 46 shows the two types of connections between the bases through hydrogen bonds

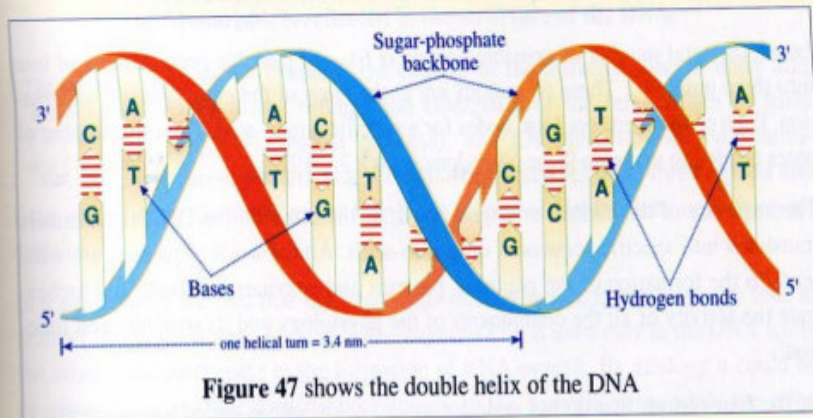
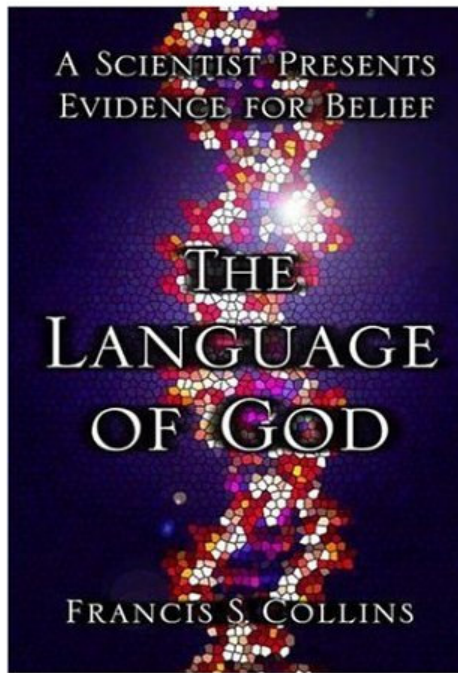


Figure 47 shows the double helix of the DNA

- The completion of the human DNA sequence in the spring of 2003 coincided with the 50th anniversary of Watson and Crick's description of the fundamental structure of DNA.
- Francis Collins directed the National Institutes of Health National Human Genome Research Institute efforts.



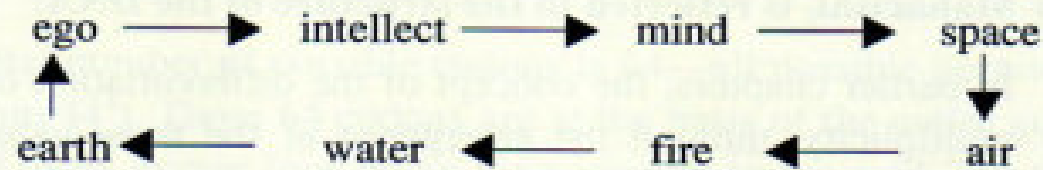
## Dr Francis Collins



- What I want to say about this I also want to say with great love and understanding for my fellow believers, who have a different view. But for me as a scientist, when I look at DNA -- our own, that of the human species -- the evidence that we are all descended from a common ancestor is overwhelming. Some might wish that not to be so. It is so.
- Collins, a former atheist, proposes that God designed the universe with such precision that humans would be the end result. Thus, Collins interweaves science, logic, and intuition to present a most powerful argument for the existence of God.
- In short, Dr. Collins provides a satisfying solution for the dilemma that haunts everyone who believes in God and respects science. Faith in God and faith in science can be harmonious -- combined into one worldview. The God that he believes in is a God who can listen to prayers and cares about our souls. The biological science he has advanced is compatible with such a God. For Collins, science does not conflict with spirituality and religion, science enhances it.

*The eight  
Prakritis  
in the DNA*

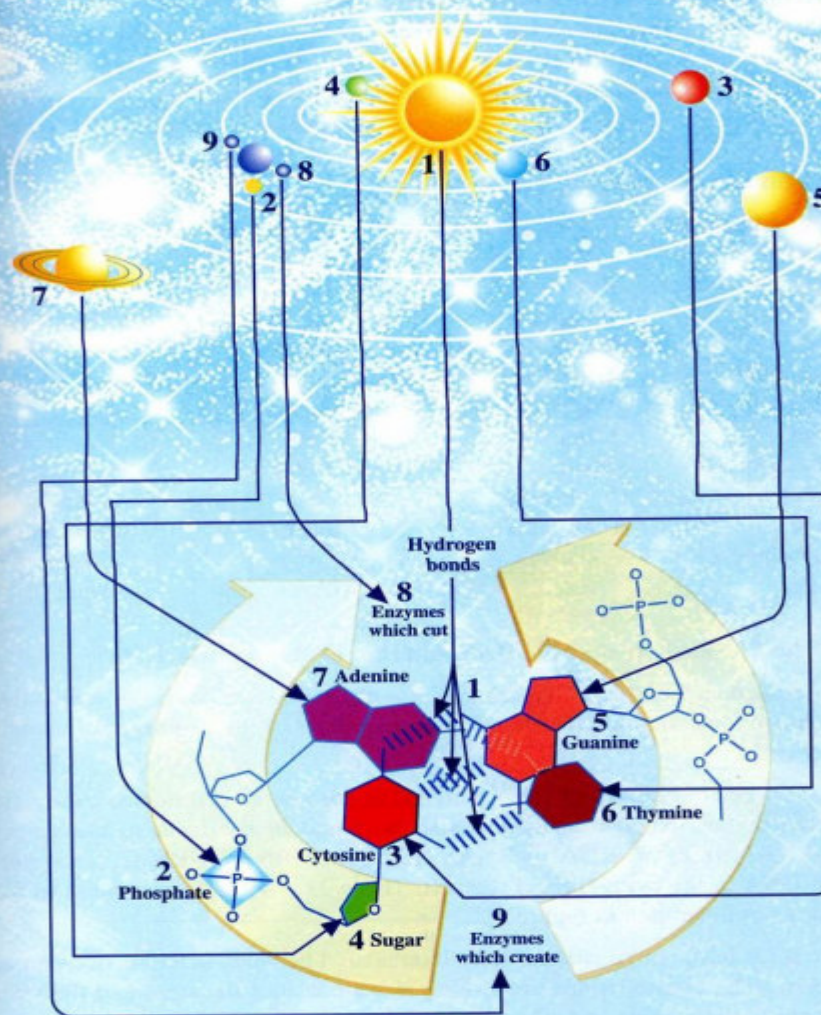
Another fundamental aspect of Natural Law is the aspect of the eight Prakritis introduced earlier in Chapter III. In Maharishi's Vedic Science, these Prakritis are seen as a loop made up of eight elements, looping back onto themselves (as shown below). These are ego, intellect, mind and space; followed by air, fire, water and earth. These elements start with ego, which is the most subtle among them, and become progressively more expressed (more manifest, more gross). Earth being the grossest aspect.



When we look at the basic structure of DNA, we find, as described previously, that it is made out of four types of nucleotides, based on four types of bases, abbreviated as C, T, A, and G. These combine with their complementary bases to form the complementary helix. The complementary bases will be: G, A, T, and C, respectively. The four bases and their complementary bases can be seen to form a loop as shown below:

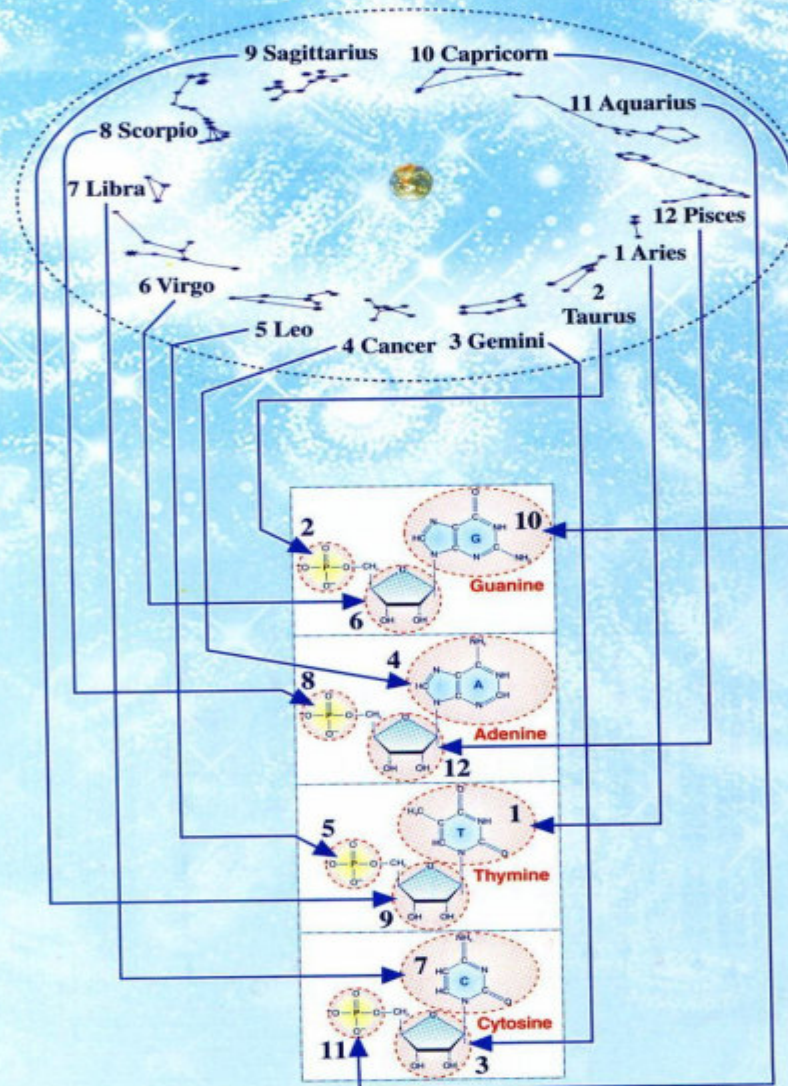


## JYOTISH: DNA and the 9 Grahas



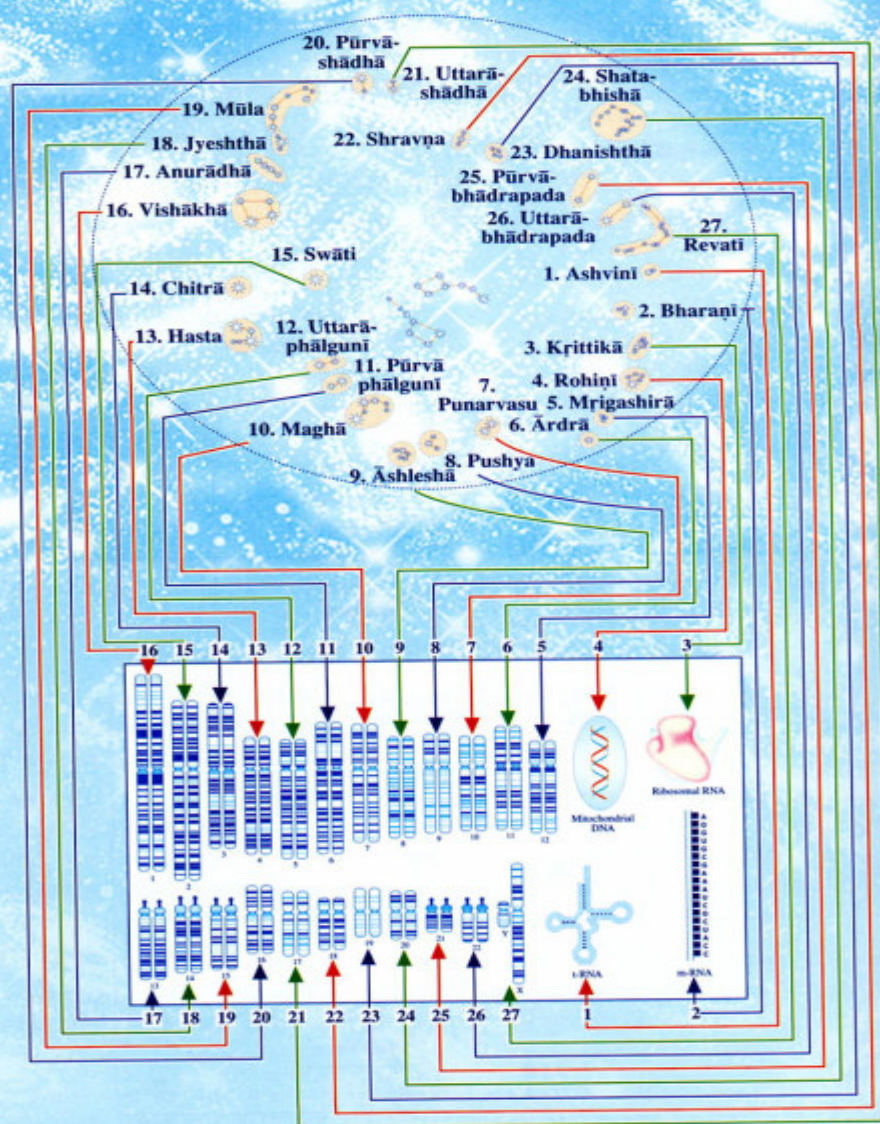
**Figure 49** shows a cross-section of the DNA with its constituents and their one-to-one relation to the planets of the solar system. The DNA revolves around a central axis made of hydrogen bonds. These hydrogen bonds correspond to the Sun. The heaviest constituent of DNA is guanine, it corresponds to Jupiter, the heaviest planet. In the same way adenine corresponds to Saturn, cytosine to Mars, and thymine to Venus. The sugar corresponds to Mercury and the phosphate to the Moon. The shadowy planets—Rahu or the ascending lunar node and Ketu or the descending lunar node—correspond to enzymes that act within the DNA and yet are not a real part of it.

## JYOTISH: DNA and the 12 Rashis

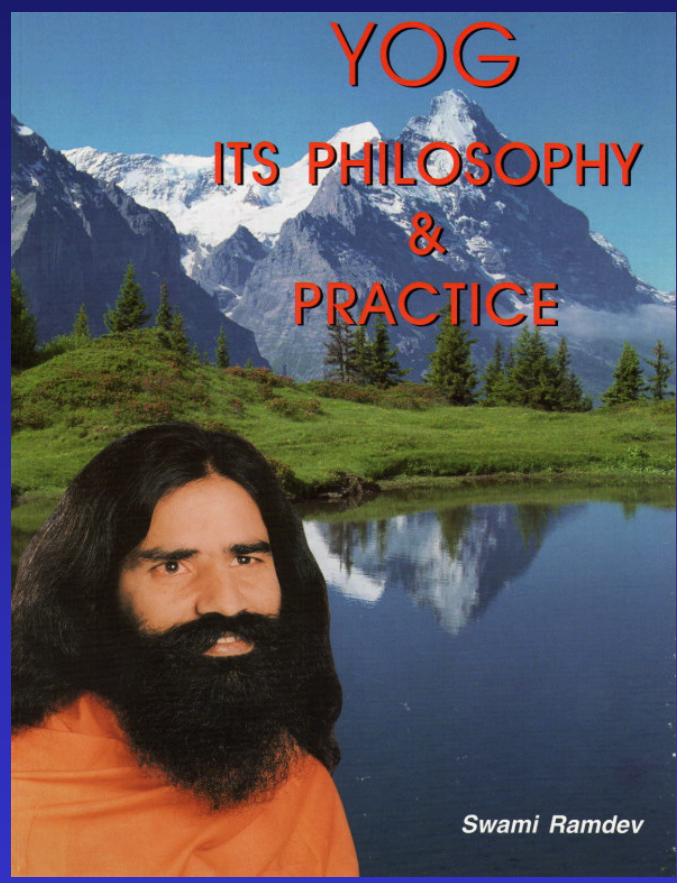
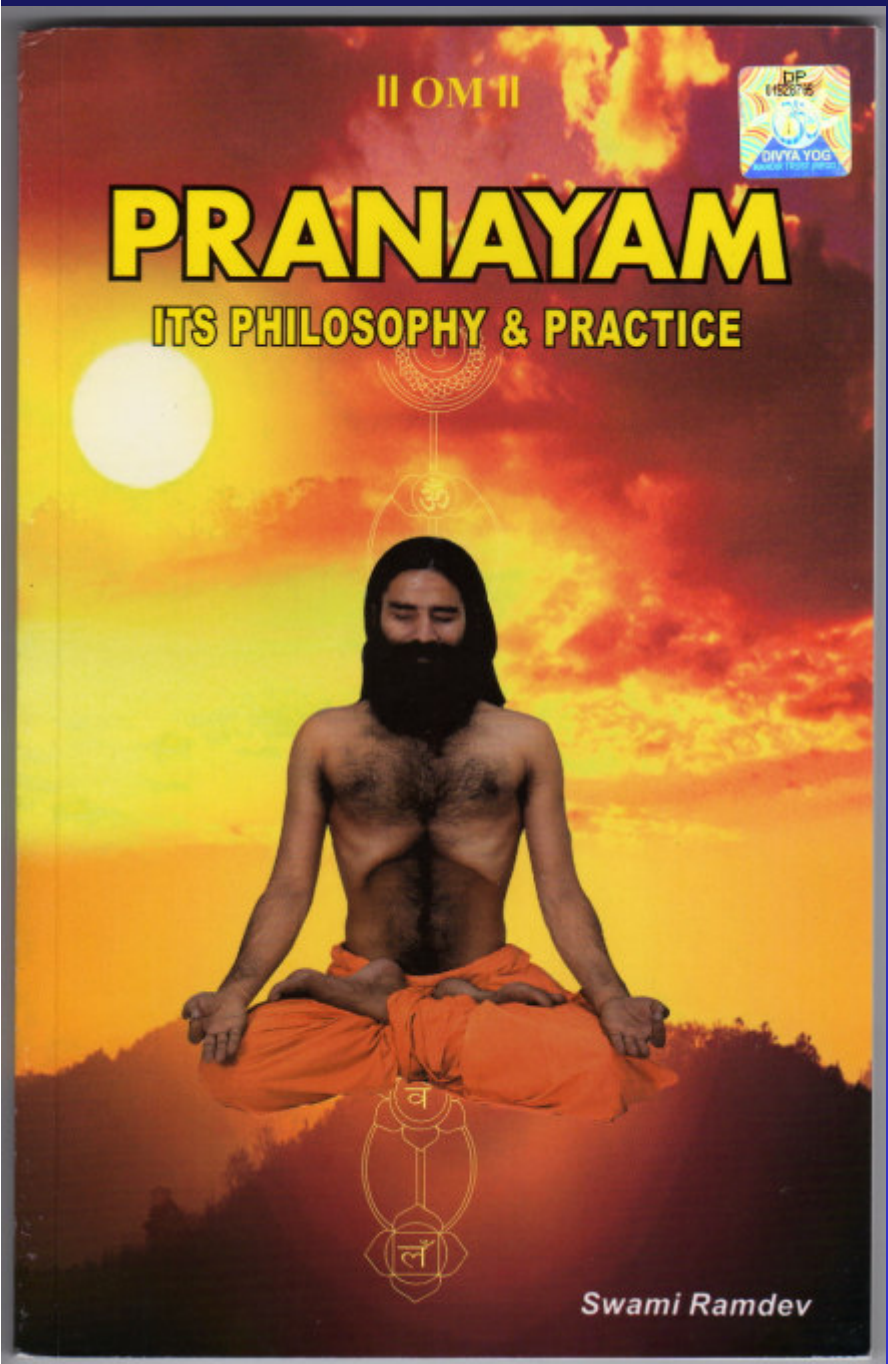


**Figure 50** shows a longitudinal view of the 4 nucleotides at the basis of the structure and function of the DNA with their 12 parts and their correspondence with each of the 12 solar constellations called Rashis.

# JYOTISH: The Nucleic Acids and the 27 Nakshatras



**Figure 51** shows the 23 chromosome pairs, the transfer RNA (t-RNA), the messenger RNA (m-RNA), the ribosomal RNA (r-RNA), and the mitochondrial DNA. Together they form 27 groups of nucleic acids found in the cell. They correspond to the 27 lunar constellations called Nakshatras.



## The Various Çakras

Name of the Çakras	Physical Appearance	Location	Element	Germ	Principal Prāṇa	Subsidiary Sub-Prāṇa	Kośa	World/ Universe	Diseases that may be caused due to improper whirling of the Çakras
<i>Mūlādhāra</i>	Pelvic Plexus	Nearly 1" inside the center of genitals and anus	Earth	<i>Laṃ</i>	<i>Apāna</i>	<i>Kūrma</i>	<i>Aṇnamaya</i>	<i>Ḑhūḥ</i>	Constipation, Diarrhea, vomiting
<i>Svādhiṣṭhāna</i>	Hypogastric Plexus	1"-1.5" above <i>Mūlādhāra Çakra</i>	Water	<i>Vaṃ</i>	<i>Vyāna</i>	<i>Dhanañjaya</i>	<i>Prāṇamaya</i>	<i>Bhuvāḥa</i>	Insomnia, Stones
<i>Maṇipūra</i>	Epigastric or Solar Plexus	Near the navel	Fire	<i>Raṃ</i>	<i>Samāna</i>	<i>Kṛkala</i>	<i>Manomaya</i>	<i>Ṣvaḥa</i>	Asthma, Arthritis, Piles, Weakness of bones
<i>Anāhata</i>	Cardiac Plexus	Heart	Air	<i>Yaṃ</i>	<i>Prāṇa</i>	<i>Nāga</i>	<i>Vijñānamaya</i>	<i>Mahā</i>	Disorder of nervous system, Gastric problem, Unconsciousness, Arrogance
<i>Hṛdaya Çakra</i> or <i>Manas çakra</i>	Lower Mind Plexus	In between both the breasts	This is not a physical part of the body, but emotional, related to the Heart.						
<i>Viśuddhi</i>	Carotid Plexus	Throat	Ether	<i>Haṃ</i>	<i>Udāna</i>	<i>Devdatta</i>	<i>Ānaṇdamaya</i>	<i>Janaḥa</i>	Boils, Pimples, Tumors, Swelling, Pus formation, Diseases of eyes
<i>Ājñā Çakra</i>	Medula Plexus	Between the two eyebrows	Desire	<i>Om</i>				<i>Tapāḥa</i>	Dropsy, Diseases of respiratory system, Palpitation in the heart
<i>Saḥsrār</i>	Cerebral	Head	Intellect					<i>Saṭyaṃ</i>	

# PRANA and PRANAYAMA

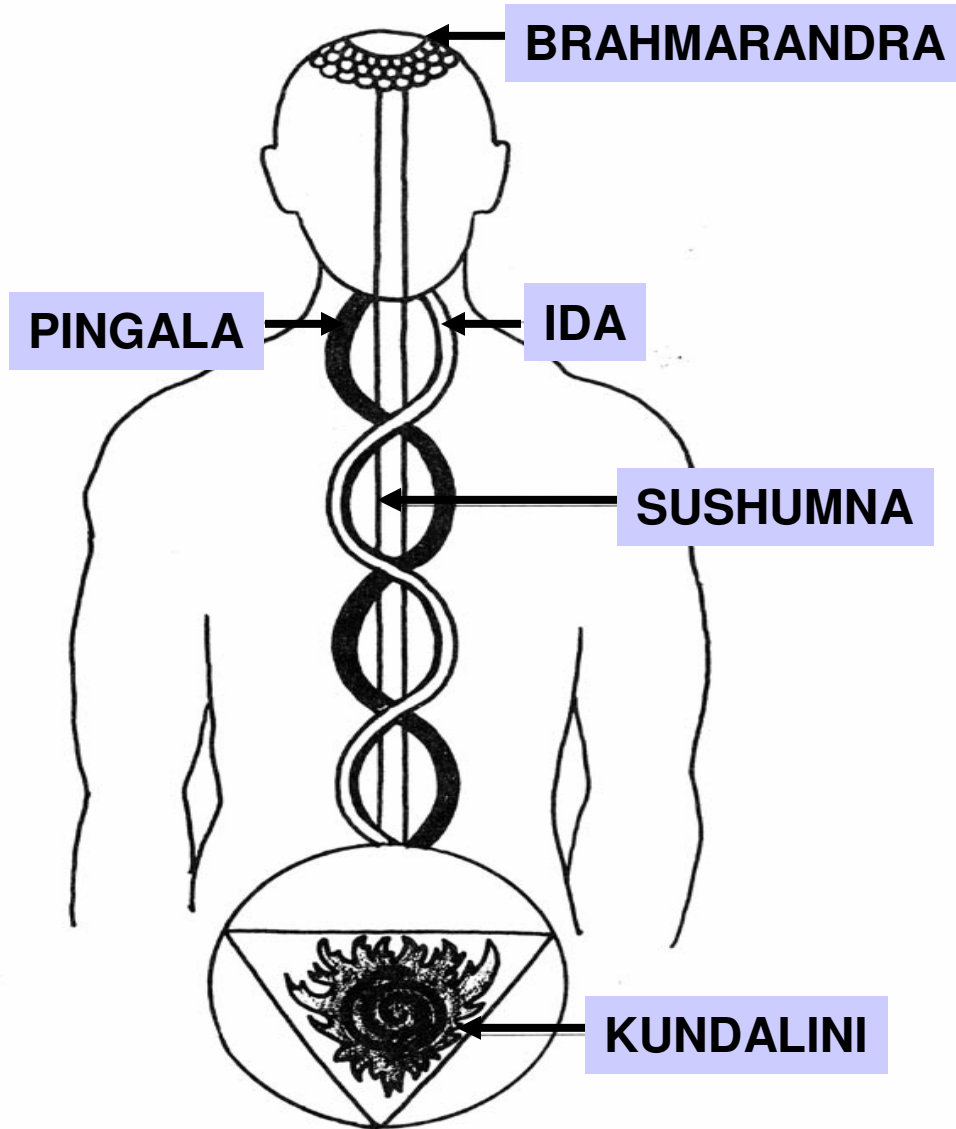
(*prana* – energy  
*ayama* – manifestation)

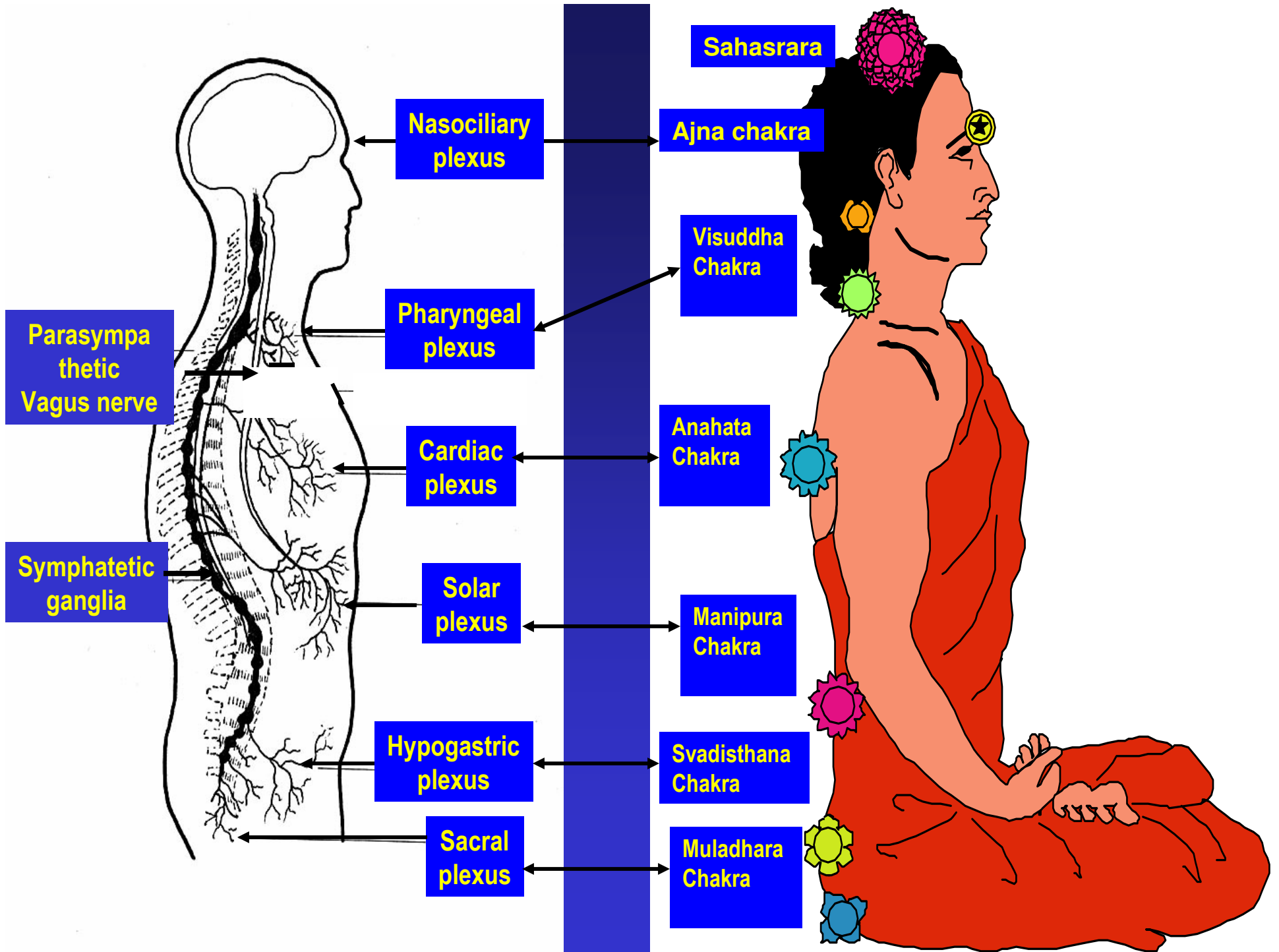
- Sum total of all forces in universe is *Prana*
- By what power is Akasa manufactured? *Prana*
- *Pranayama* is science which imparts the knowledge related to the control of *Prana*
- Breathing is one of many exercises for *Pranayama*
- Breath is the fly-wheel of the body machine
- Raj Yoga is the path for immediate mental calmness through consciousness through observation of your breathing

# Nadis, Chakras and Prana

- Ancient manuals of Yoga describe a network of **NADIS** or channels through which **PRANA** flows
- 3 most important NADIS are
  - **IDA** (Chandra) – right nostril
  - **PINGALA** (Surya) – left nostril
  - **SUSHUMNA** – along spinal column
- All 3 originate at base (**Kundalini**)
- The 3 criss cross each other
- The points of junction are called **CHAKRAS** or wheels
- 7 Chakras

# Nadis





# Breath, Nervous System & Mind

- **Reciprocity between Breath and Mind**
  - If mind is disturbed, breath is disturbed
  - If breath is made calm, mind becomes calm
- **Breath can be voluntary or involuntary**
  - it can be controlled or it will go on

**Breath is portal of entry for control of autonomic nervous system and mind**

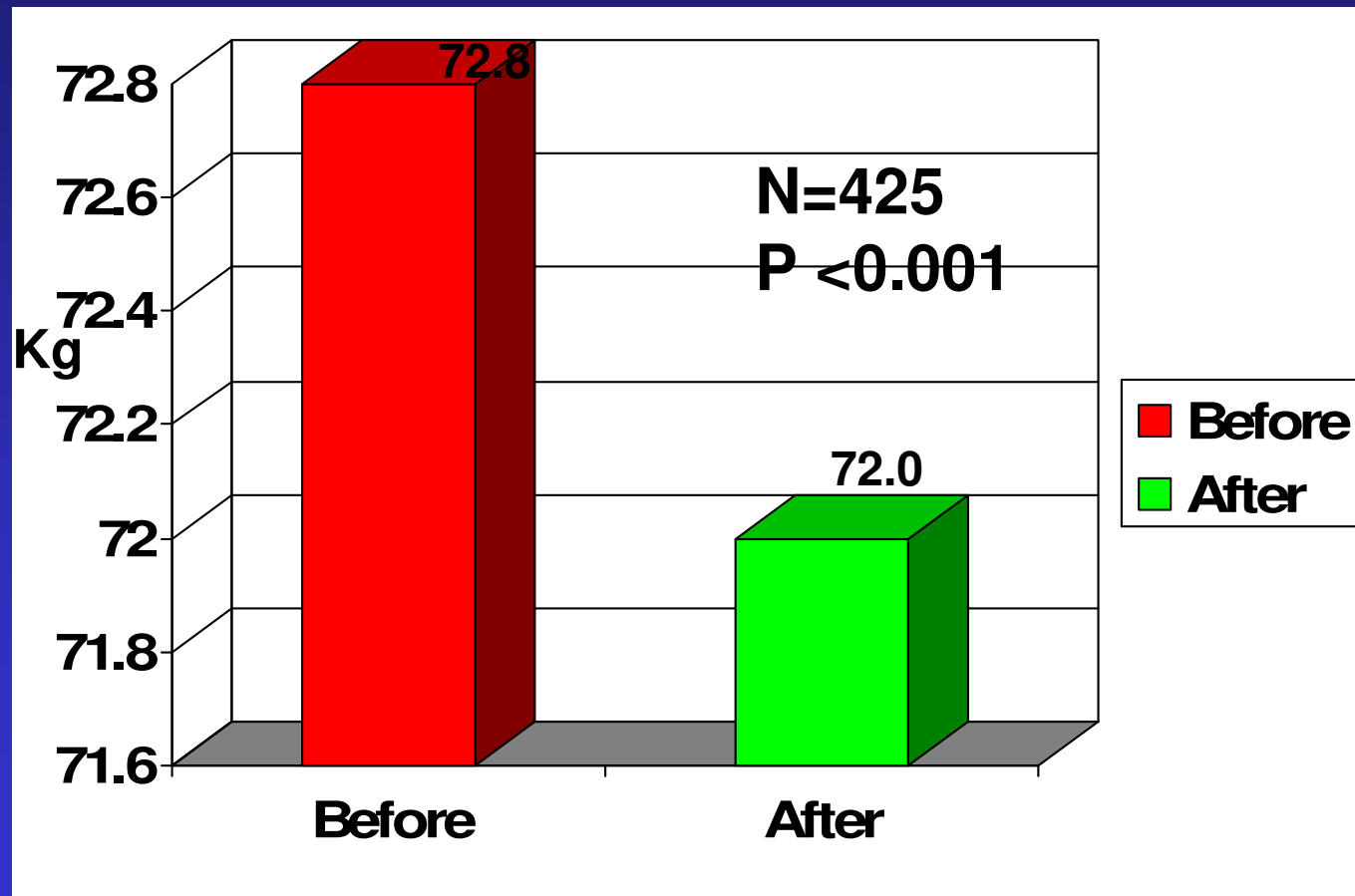
# PRANAYAM

- There are seven kinds of Pranayam that are commonly practiced
  - ⊗ **Bhastrika**
  - ⊗ **Kapalbhati**
  - ⊗ **Bahya**
  - ⊗ **Anulom Vilom**
  - ⊗ **Bhramri**
  - ⊗ **Udgith - Omkar Japa**
  - ⊗ **Ujjayi - Nadi Shodh**

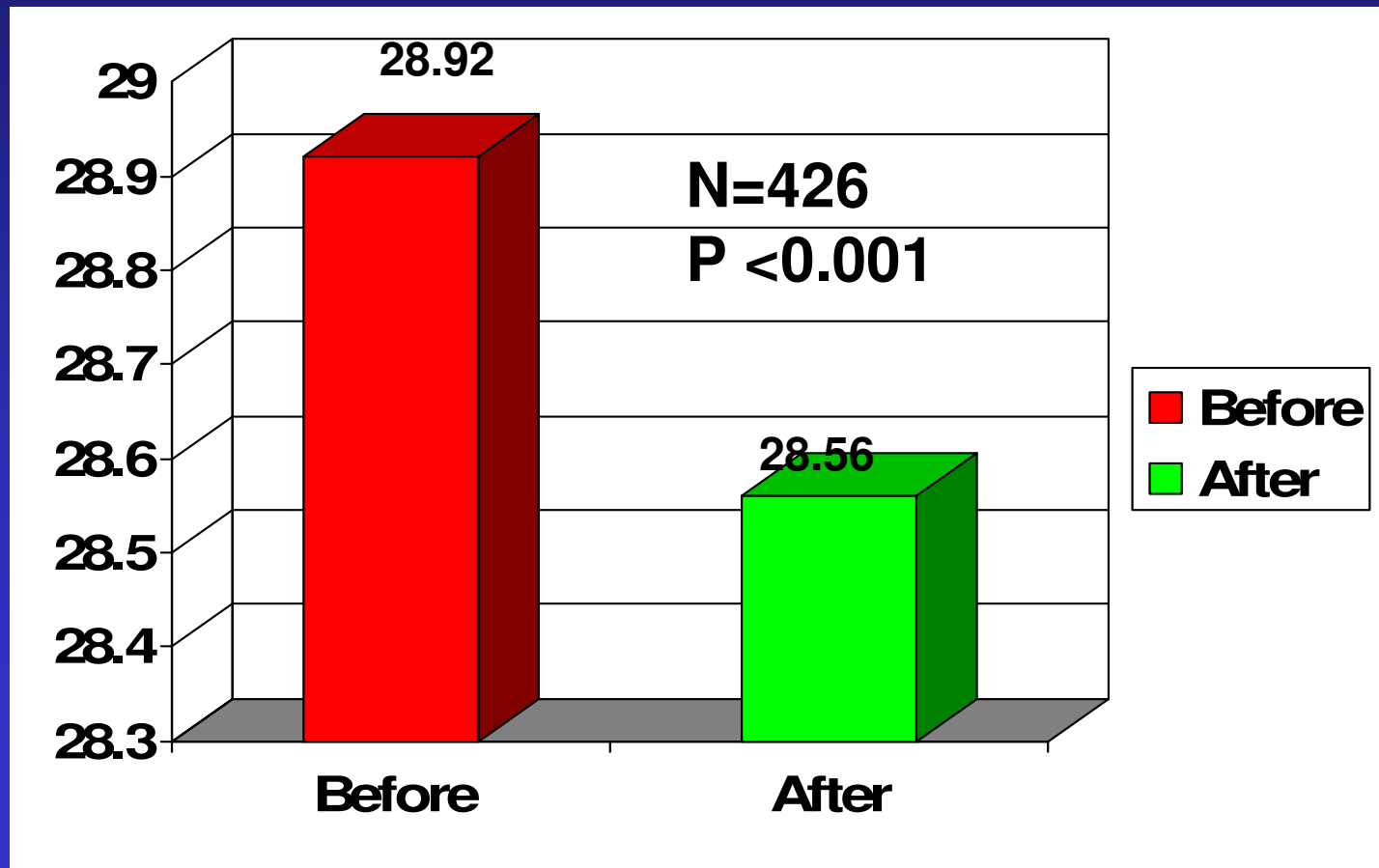
# MEDICAL ASSESSMENTS AT THE UK SHIBIRS

- Medical assessments were done after informed consent on a cohort of volunteers who had Diabetes, hypertension, obesity, lipid problems
- Measurement done at start of and 5-7 days after participation in Yog Shibir
- Measures: Weight  
Height  
BP  
Blood Sugar  
Blood Cholesterol
- 428 before and after volunteers with one or more of the above medical problems. Altogether 510 initial assessments – 82 did not return for 2<sup>nd</sup> assessment

# Mean Weight After 6-7 days Entire cohort – UK



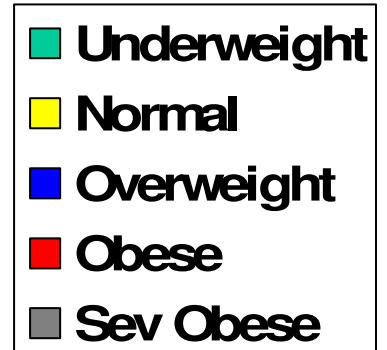
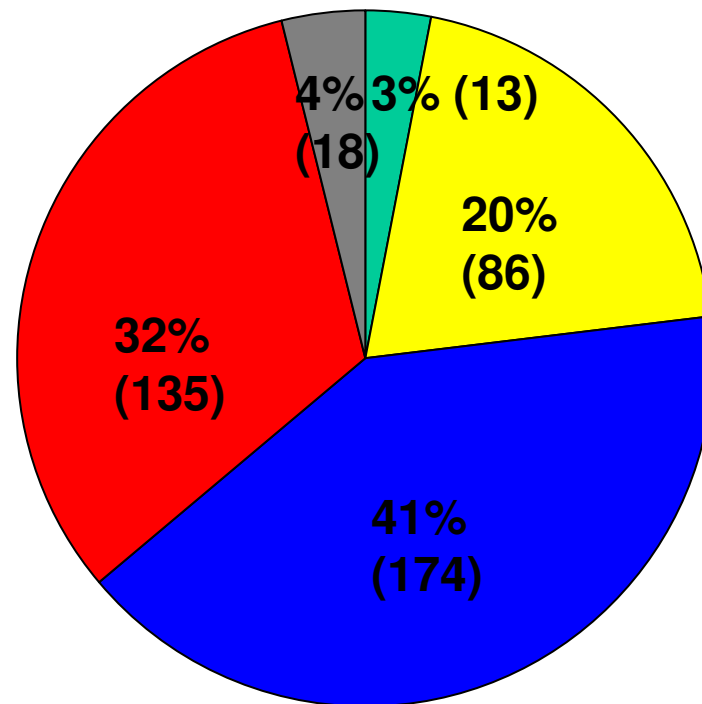
# Mean BMI After 6-7 days Entire cohort – UK



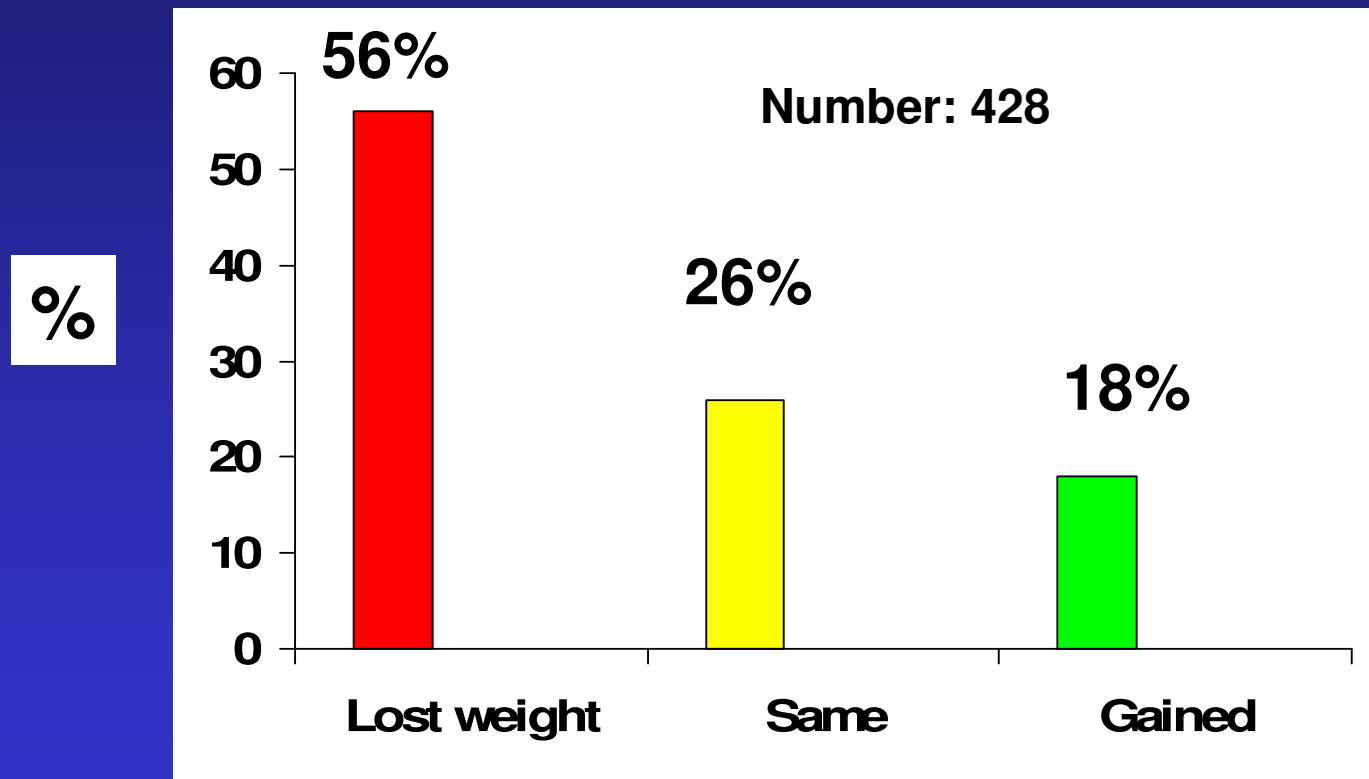
# Body Mass Index

Underweight	BMI	<21
Normal	BMI	21-25
Overweight	BMI	26-29.9
Obese	BMI	30-39.9
Severely Obese	BMI	40 or more

N = 426

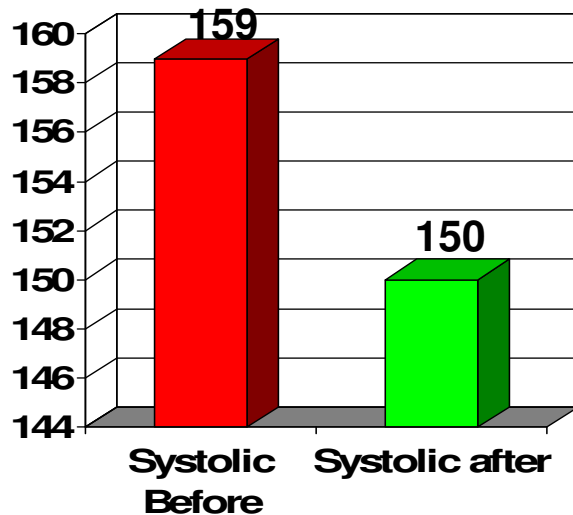


# Weight Changes after 6-7 days Entire cohort – UK



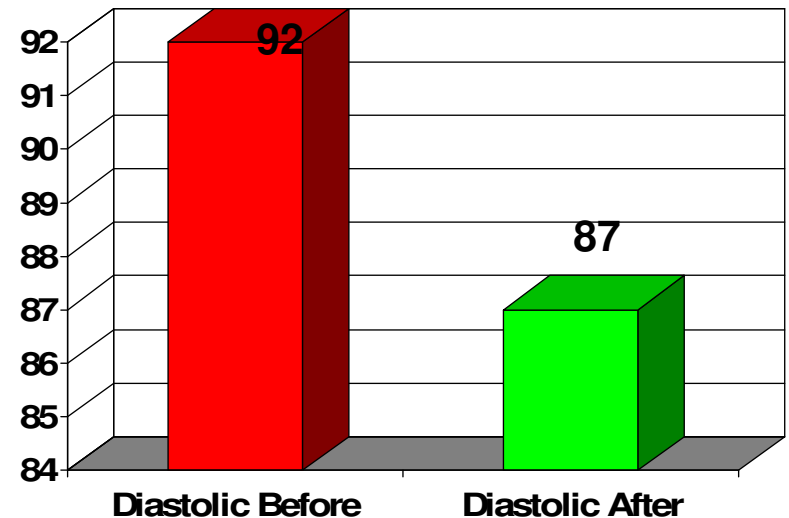
**42% lost >2kg (100 out of 238)**  
**Maximum weight loss - 9.5kg**

# Mean Blood Pressure After 6-7 days - Entire Cohort – UK



N= 428  
P <0.001

■ Systolic Before  
■ Systolic after

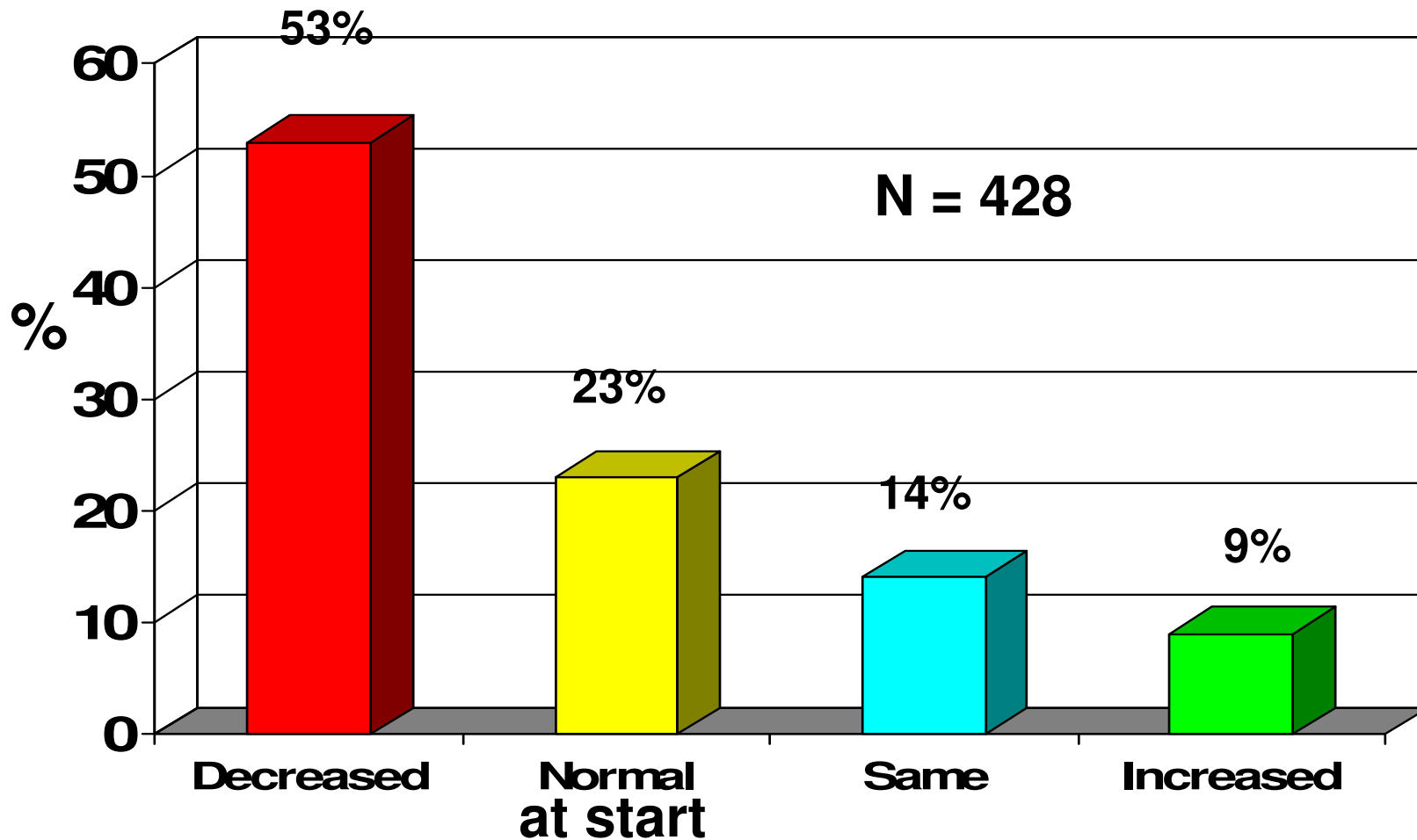


Mean BP 159/92 before

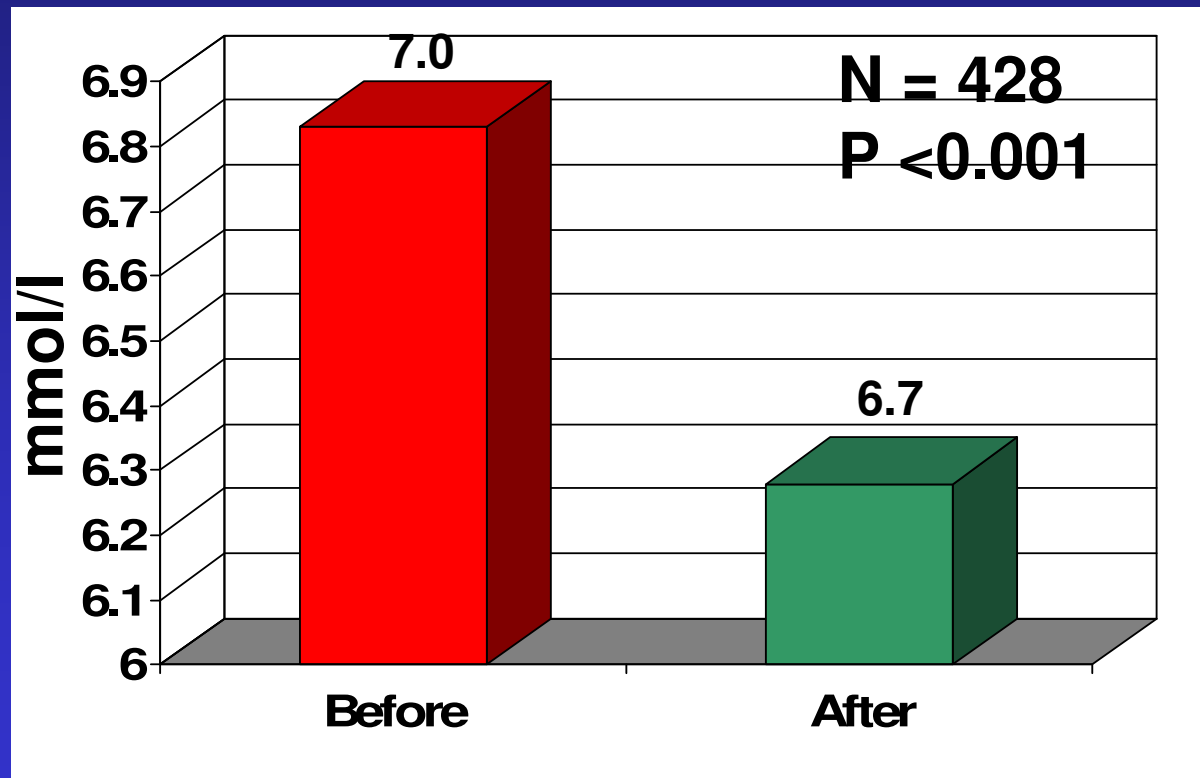
Mean BP 150/87 after

**38% of hypertensive NORMALISED**

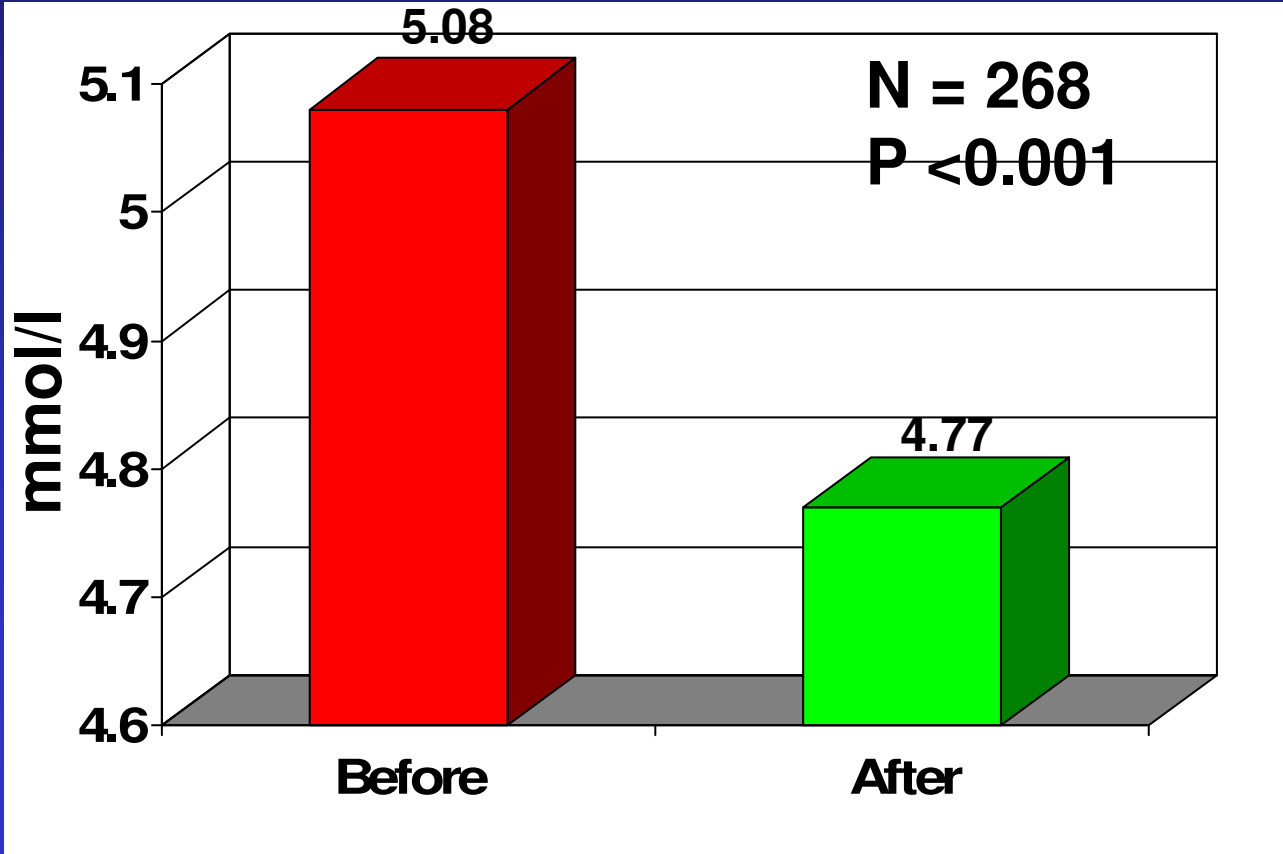
# BP Changes after 6-7 days Entire Cohort – UK



# Mean Blood Sugar after 6-7 days Entire Cohort – UK



# Mean Cholesterol Changes After 6-7days - Entire Cohort – UK

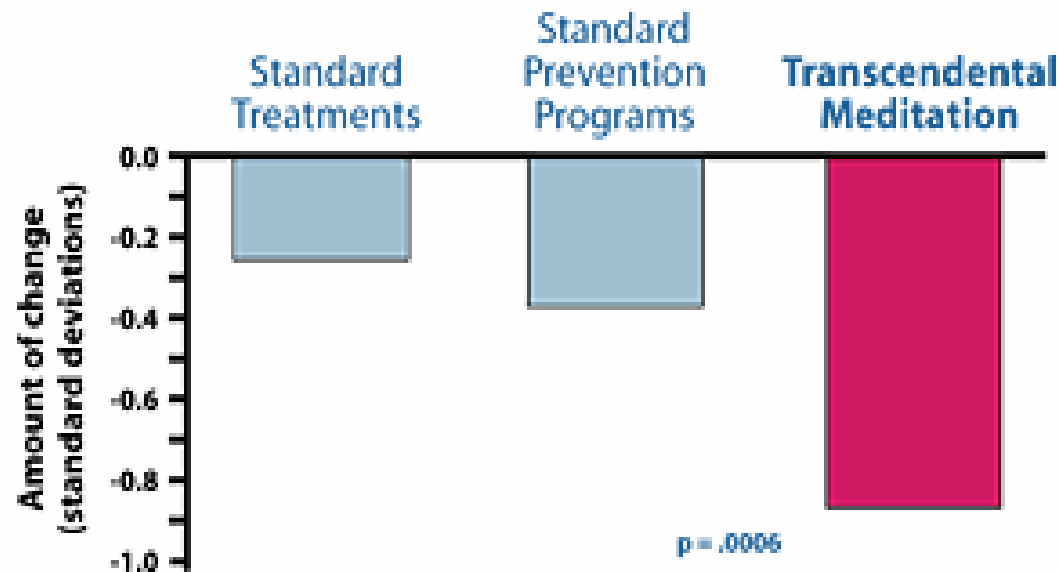


# Scientific Studies in Yoga

- Dominant EEG activity in one cerebral hemisphere correlated with predominant airflow in contralateral nostril (Human Neurobiol 1983;2:39-43)
- These are linked with rhythmic changes CV activity, cognition and concentration of key hormones (Am J Physiol 1997;272:R962-8)
- Left nostril R-hemisphere dominance indicates a 'rest' state whereas right-nostril left-hemisphere dominance marks 'active' state.
- This state can be altered by forcibly altering nasal dominance eg Unilateral Forced Nostril Breathing (UFNB), which affects ipsilateral autonomic system and the innervated organs and contralateral brain hemisphere
- Left-sided UFNB improves spatial skills; right-sided UFNB increases verbal skills (Int J Neousci 1993;73:61-8)

# Decreased Cigarette Smoking

THROUGH THE TRANSCENDENTAL MEDITATION PROGRAM



A meta-analysis of all research studies on the Transcendental Meditation program related to cigarette smoking, in comparison to meta-analyses of standard treatment and prevention programs for smoking, found a significantly greater reduction of cigarette use among those who learned the Transcendental Meditation program, even though this program does not involve any guidance about change in lifestyle or habits. **Reference:** *Alcoholism Treatment Quarterly* 11: 13-87, 1994.

# Science and Hindus

- Peruse the past – our very rich heritage
- Today – what is happening – real threats to Hindusim
- **Future** – what does it hold?
  - can we reclaim what is 'ours'
  - how do we deal with new scientific advances

# Can We Reclaim what is Ours?

- **Yoga and Pranayama**
- **Ayurveda**
- **Numbers Zero and One**
- **Mathematics and areas of Science**
- **Need to be protective of our heritage and its principles**

# Ayurveda and Legislation in UK and Europe



- **Botched 'regulation' of Ayurveda will lead to serious health risks for public 26 June 2006**

Leading academics and the Hindu Forum of Britain have condemned the Department of Health's recently formed Herbal Working Group's attempts to regulate and disempower Ayurveda, the ancient Hindu system of medicine from India.

The HFB, which has formed an Ayurvedic Working Group, alleges that there were serious health risks posed to the public as a result of the Herbal Working Group's and associated group's attempt to dilute the curricula of Ayurveda and isolate it from its Hindu roots.

*"Ayurvedic therapies are only effective when we understand the traditional knowledge of holistic treatment from the Vedas and Hindu books," commented Professor Raman Gokal, consultant nephrologist and Professor of Medicine at Manchester University, who is leading the HFB Working Group on Ayurveda. "Moreover, in India, a qualified Ayurvedic doctor is required to study at least 5 years to obtain a BAMS degree in Ayurvedic medicine during which time they undergo rigorous training in the holistic system of medicine with an understanding of the original Sanskrit texts that are necessary to acquire a firm understanding of Ayurvedic principles. The Herbal Working Group's attempts to create practitioners of Ayurveda without this knowledge base will create a generation of quacks who could pose a serious health and safety risk for people in general."*

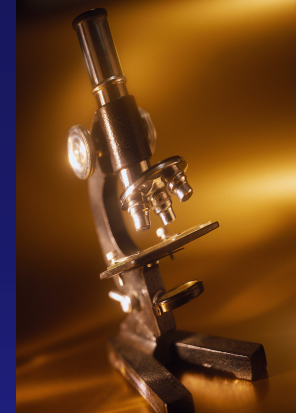
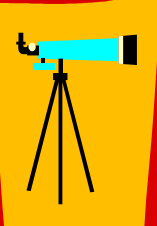
HFB believes that nothing short of a separate Ayurvedic regulatory body with adequate representatives and practitioners from the Hindu faith, should regulate membership, curriculum and training to ensure the safe practise of Ayurveda in Britain. Most Indian practitioners of Ayurveda and Ayurvedic associations accept this view.

- **Position in Europe:**

Human Medicines (Pharmaceuticals) Directive – extremely broad definition of medicinal product – existing and proposed legislation will consider Ayurvedic products as medicinal products. Fast track allowed if it can be shown that 30 yrs safe use and 15 in the EU!!

- **Science can try 'to see the world in a grain of sand', in the stars and galaxies, in the energy hidden within the atom, or in the growth and development of the human brain. But it does not really matter where science starts, because eventually it will lead to the same place - the mystery of Life, the Universe and everything in it.**

# SCIENCE AND HINDUS



- From the very beginning, Science and Religion were the two methods employed by mankind to try to understand the world.
- Now, more than ever before, these two completely distinct branches of wisdom are coming together.
- Science is embracing multi and inter-disciplinary approaches to reach the ultimate truth. And, in its embracing of diversity, it is espousing religion, mythology and philosophy to reach THE TRUTH.
- Paradoxically, it is only through diversity that the spirituality of unity can be reached.
- Science describes spirituality, but spirituality also describes science. It is only through the communion of their differences that each one may be understood and experienced.



## Asking Forgiveness



Having taught me, my Guru bade me teach,  
“Teach”, he said, “but do not preach”,  
If perchance, I offend thee with my speech,  
“Forgive me, forgive me”, I do beseech.

Thank You

**Professor Raman Gokal**

