

Yoga-Role in Complex Lifestyle Diseases



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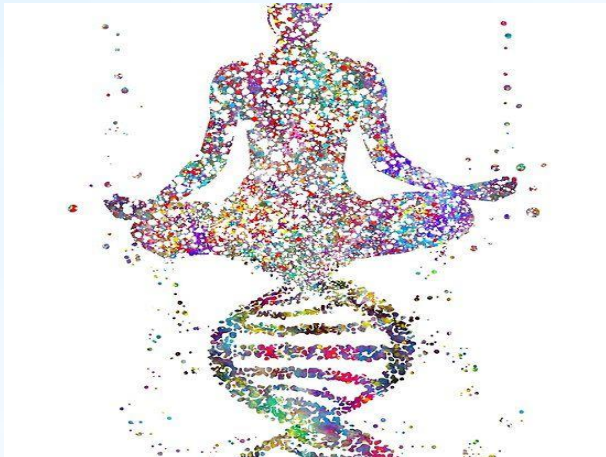
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Overview

- **Complex Diseases- Impact of modern Lifestyle**
- **Our health** dependant on our choices- Impact Epigenome
- **Lifestyle, habits, thoughts, diet-** Directly programs our genes in a semipermanent way-transgenerational
- **Epigenetics-** Genetics of free will- Health/Disease



- **Complex Diseases-**Common underlying mechanism
- **Yoga-** The Polypill-targets each underlying mechanism
- Yoga –positive impact on epigenome
- Yoga Role in health promotion, disease prevention, management, rehabilitative potential

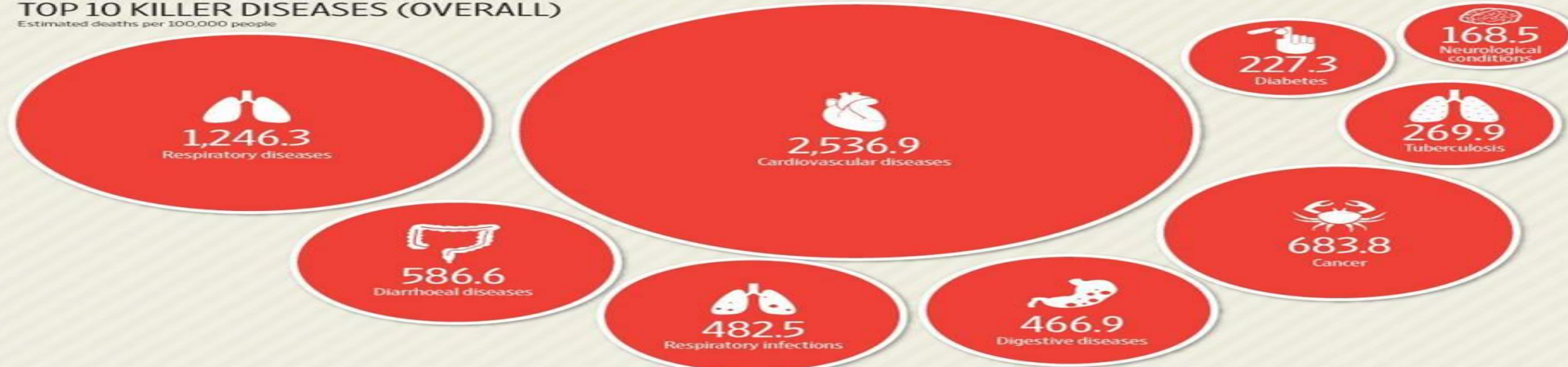
WHAT'S KILLING INDIANS

Heart diseases are the leading cause of death in India, as it is the case in most other countries. But unlike the rest of the world, respiratory diseases are the second biggest killer in the country, which is home to some of the most polluted cities in the world, according to recent reports. The health and family welfare ministry has projected that India will have more than 60 million people with coronary heart diseases by 2015, and 40 million people suffering from diabetes. Meanwhile, a recent report revealed that India has emerged as the world's largest consumer of antibiotics. The use of antibiotics in India grew 62% between 2000 and 2010. Mint reviews the top 10 killer diseases in India, and the drugs most consumed by Indians.

Data compiled by Nikita Mehta/Mint

TOP 10 KILLER DISEASES (OVERALL)

Estimated deaths per 100,000 people



TOP SELLING DRUGS IN INDIA

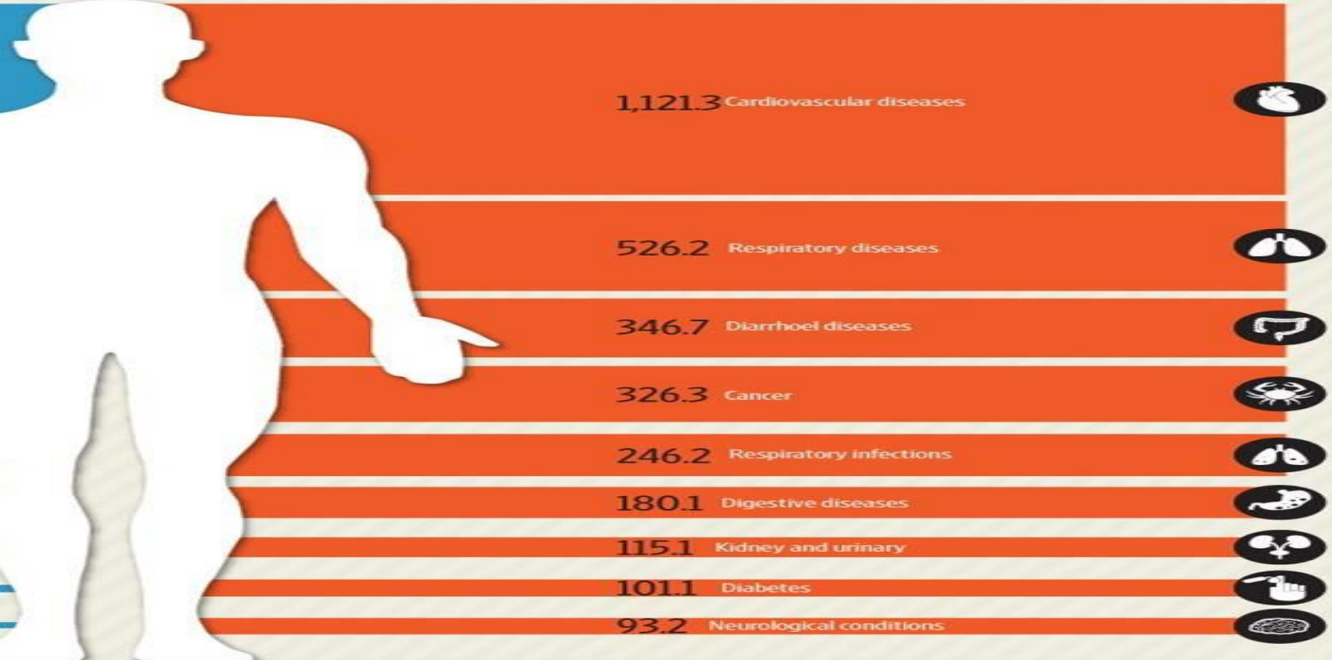
- Augmentin**
Bacterial infections
- Corex**
Cough
- Phensedyl Cough**
Cough
- Voveran**
Inflammatory disorders
- Human Mixtard 30/70**
Insulin
- Monocef**
Typhoid
- Liv-52**
Ayurvedic liver supplement
- Betadine**
Antiseptic
- Dexorange**
Vitamin deficiency

TOP 10 KILLER DISEASES (MEN)

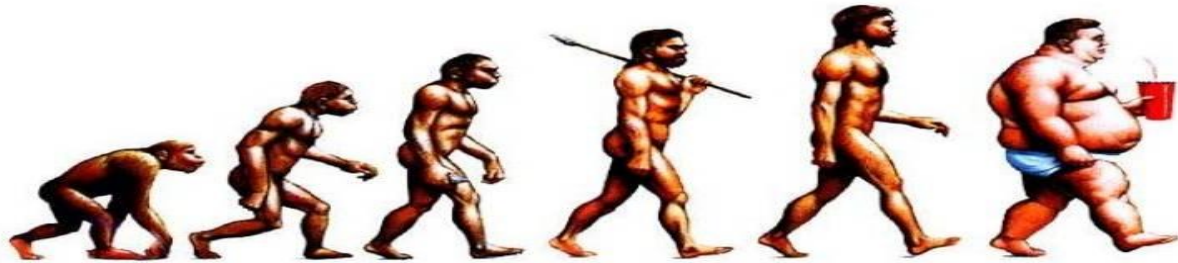
Estimated deaths per 100,000 people



TOP 10 KILLER DISEASES (WOMEN)



Complex lifestyle Diseases – Shared mechanisms



Diabetes, BP & cancer cases rising rapidly

3.5Cr Screened At NCD Clinics In '17 & 6.5Cr In '18

Sushmi.Dey@timesgroup.com

New Delhi: India is witnessing accelerated rise in the prevalence of chronic non-communicable diseases (NCDs) like hypertension, diabetes and cancer. Out of 6.51 crore people diagnosed at state-run NCD clinics during 2018, over 40 lakh were detected with hypertension, more than 31 lakh with diabetes, whereas

Life expectancy rises to 68.7 years

Life expectancy in India has increased from 49.7 years in 1970-75 to 68.7 years in 2012-16, as per the National Health Profile, 2019. For the same period, the life expectancy for females is 70.2 years and 67.4 years for males. For comparison, in last year's survey, the life expectancy had increased from 49.7 years in 1970-75 to 68.3 years in 2011-15. For the same period, the life expectancy for females is 70 years and 66.9 years for males. So there has been an

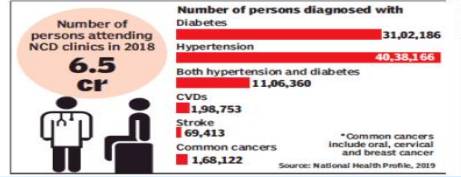
Pneumonia is top killer infection

Acute respiratory infections, often triggered by pollution, poor hygiene and bacterial infections, is the top communicable disease in India in 2018 with pneumonia being the biggest killer infection, according to the NHR 2019. The NHR 2019 recorded 41,996,260 cases and 3.74 deaths from acute respiratory infections across India in 2018. In 2017, acute respiratory infections

1 allopathic govt doc for 11k people

There is only one allopathic government doctor for every 10,926 people in India against the WHO's recommended doctor-population ratio of 1:1,000, stated a government report. Compiled by the Central Bureau of Health Intelligence (CBHI), the National Health Profile, 2019, stated that the number of registered allopathic doctors possessing recognised medical qualifications (under the MCI Act) and registered with state

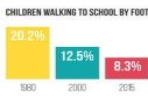
GROWING CONCERN



JUNK FOOD & OBESITY INFOGRAPHIC

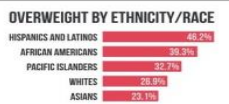


360 000 AMERICANS DIE EACH YEAR FROM DISEASES DIRECTLY RELATED TO OBESITY AND AN UNHEALTHY LIFESTYLE



ONLY 19% OF PEOPLE GET THE NECESSARY MINIMUM PHYSICAL ACTIVITY

80% PEOPLE EAT JUNK FOOD ON A DAILY BASIS



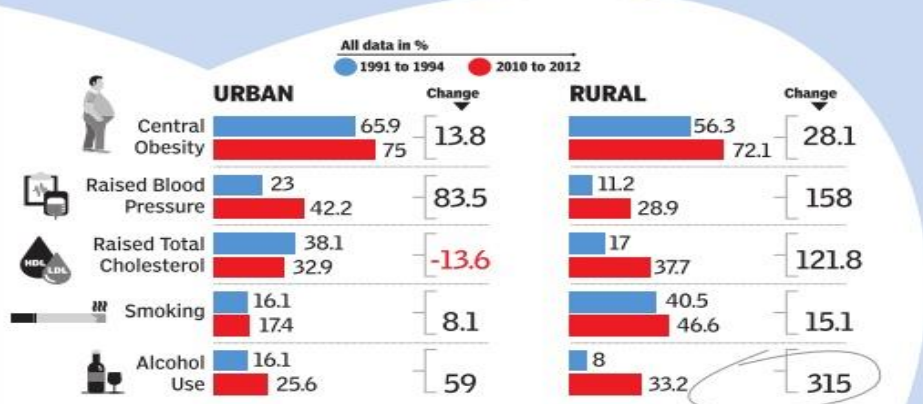
EVERY 5TH CHILD IN THE WORLD IS OVERWEIGHT OR OBESE

dineout
GIRF
GREAT INDIAN RESTAURANT FESTIVAL
FLAT 50% OFF
AT 6000+ RESTAURANTS

EAT MORE. SAVE MORE. #MONTHOFMORE
BOOK NOW ON dineout

MORE OBESE, HIGHER BLOOD PRESSURE, MANY MORE SMOKERS...

...how incidents of heart disease grew in Delhi



Central obesity is... Waist-to-hip ratio > 0.90 for men and > 0.85 for women
High Blood Pressure ≥ 140/90 mm/hg
High Cholesterol ≥ 200 mg/dl
Smoking Use of any smoked tobacco product in past 6 months
Alcohol use Use of any alcohol product in last 12 months

Urban | It included households in New Delhi area and Chandni Chowk among others
Rural | Ballabhgarh block of Faridabad, Haryana

CARDIOVASCULAR DISEASES
CVD are a group of disorders of the heart or blood vessels, and include mainly hypertensive heart disease, ischaemic heart disease, rheumatic heart disease and cerebrovascular disease or strokes

POSSIBLE REASONS
Rapid urbanisation, rural to urban migration, changes in the diet and lifestyle

PREVALENCE IN INDIA
One in every four deaths in India is attributable to CVD. As per Global Burden of Disease study, it causes 272 deaths per 100,000 population in the country against a global average of 235 per 100,000 people

1991 to 1994
Sample size | 3048 (Urban) and 2,487 (Rural)

2010 to 2012
Sample size | 2052 (Urban) and 1917 (Rural)

Age group | 35 to 64 years
Source: Global Heart

White meat or red, both equally bad for you

New Study Contradicts Earlier Wisdom That Eating Poultry Helps In Cutting Cholesterol



MEATY AFFAIR: White meat has an identical effect on cholesterol levels

Washington: A recent study debunked all previous theories that red meat is the only food which has a great impact on cholesterol. The researchers found out that even white meat has an identical effect on cholesterol levels in the body.

The study was published in American Journal of Clinical Nutrition. According to the researchers from the University of California, the study breaks the prolonged mentality of people that eating white meat will be less harmful to the heart as compared to red meat. Though there may be other effects of eating red meat which can trigger cardiovascular diseases.

Several non-meat protein products such as vegetables, dairy and legumes, including beans, are the ones which show the best cholesterol benefit.

It is known that saturated fats which are obtained from animal sources like butter, beef fat, poultry skin increases the concentration of Low density lipoproteins (LDL) in blood or "bad" cholesterol which is usually a waxy substance that can block up your arteries. This could result in a cardiac arrest or a heart attack.

For the test, over 100 healthy men and women of the age bracket 21 and 65 were asked to either consume food with high saturated fat, provided primarily butter and full-fat foods, or low saturated fat groups.

All the participants cycled through three test diets: red meat diet, white meat diet and then a no meat diet. Each diet lasted for about four weeks and was later halted by a "washout period" where the participants were asked to eat their usual food. The main source of red meat blood by the researchers was beef, while chicken served as the main white meat protein. Blood samples of all the participants were collected before and after the start of each diet test.

The results revealed that plant proteins had a healthier impact on blood cholesterol. Participants who consumed a diet rich in saturated fats had higher total LDL cholesterol than those who consumed a diet low in saturated fats.

The study also divulged the size of cholesterol particles where small particles contribute more to artery hardening risk than the large ones.

Two in every 10 schoolchildren suffer from hypertension: Survey

TNN | Jan 13, 2019, 12.56 AM IST

New wave of young diabetics

'Mature' disease now hitting 12-year-olds

By Daily Express Medical Editor

WA CHILDREN as young as 12 are being diagnosed with type 2 diabetes, putting them at risk of kidney, eye and heart problems in their 20s.

Diabetes Australia says the disease is now being diagnosed in children as young as 12, and is being hit by half the rate of those aged 10 and under.

WA state education Sandy Harkin said the big worry was that people were ignoring the signs, which included being thirsty, peeing a lot, losing weight, feeling tired, blurry vision, and slow-healing sores.

Schools Australia says obesity is the leading cause of type 2 diabetes in children.

There has been an alarming rise in the number of children with diabetes across the Asia Pacific region. This could double the rate of heart disease and other complications among young people.

Dr. Harkin said the new wave of type 2 diabetes could be partly caused by children eating more fast food, watching television, playing computer games and not being active.

Some studies also suggest that the 2 diabetes among children is linked to a family history of the disease, according to Diabetes Australia.

CHILDREN AND DIABETES

Diabetes is a chronic condition that causes high blood sugar levels. It is caused by the pancreas not producing enough insulin or the cells in the body not responding to the insulin.

There are two main types of diabetes: type 1 diabetes, which develops when the body cannot produce any insulin, and type 2 diabetes, which develops when the body cannot use the insulin it produces effectively.

Diabetes is a leading cause of blindness, kidney failure, heart disease, and nerve damage. It is also a major cause of premature death.

Children with diabetes need to take care of themselves every day. This includes eating a healthy diet, exercising regularly, and taking medication if necessary.

It is important for children with diabetes to have regular check-ups with their doctor to monitor their blood sugar levels and to manage any complications.

How to tell if your child has hypertension

Percentage	Condition	Blood pressure range
90th percentile	Prehypertension	100/60 to 130/90 mmHg
95th to 99th percentile	Primary or essential hypertension	140/90 to 180/90 mmHg
Above the 99th percentile	Secondary hypertension	160/100 mmHg and above

Parents to know: Hypertension is associated with left ventricular hypertrophy (LVH) and increased arterial wall thickness. Lower socioeconomic status and lower educational attainment are also associated with hypertension. Primary or essential hypertension occurs in its own without an identifiable cause. The risk factors for developing it include being overweight or obese, having a family history of high blood pressure and type 2 diabetes, consuming too much salt, smoking or leading a sedentary life. Secondary hypertension could be due to chronic kidney disease, physical kidney disease, sleep apnea, or a narrowing of the artery. Adverse diabetes, hypertension occurs in a few disorders, among others: "It can affect the brain, eyes, heart and kidneys, leading to their malfunction."

In the long run, hypertension can damage internal organs. It can affect the brain, eyes, heart and kidneys, leading to their malfunction.

1,800 students aged 7-10 in corp schools 'addicted'

Screening On Under HC Order; Lack Of Counsellors A Problem

How social media is encouraging kids to eat junk

Children Likely To Consume More Unhealthy Food If Promoted By Online Stars

The children were then offered a variety of healthy and unhealthy snacks including french fries, pizza, chicken nuggets and jelly sweets.

Interestingly, the results showed that children who had seen the unhealthy images consumed an average of 448 calories, while the others ate just 367 — a difference of 81 calories.

Anna Coates, the lead researcher on the study, added, "We know that if you show children a traditional drink advert, then their preference for that drink rises. We wanted to test their reactions to this new type of celebrity social media star."

At such, they are now calling for more protection for children, particularly on social media where it can be difficult to distinguish between advert and genuine content.

Dr. Coates said the study showed that children who had seen the unhealthy images consumed an average of 448 calories, while the others ate just 367 — a difference of 81 calories.

The study also found that children who had seen the unhealthy images were more likely to consume junk food in the future.

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Drinking juice may not be a great idea

Children who drink fruit juice with breakfast are more likely to become overweight or obese, new research suggests.

Juices, which were once considered a healthy option, have increasingly come under fire for their sugar content. Now, scientists are advising parents to not assume that all juices are healthy and instead replace them with a piece of fruit for their children's breakfast.

The findings, published in the journal *Frontiers in Nutrition*, are based on a survey of 45,000 children aged 7 to 10. The study found that children who drank fruit juice with breakfast were 56% more likely to be overweight, while those who drank water saw their obesity risk fall by 40%.

Peer pressure is difficult to handle so we asked a psychologist for expert advice on how to deal with it

Trying to fit in doesn't have to mean doing things you don't want to. Here are some tips on how to overcome peer pressure

By junior reporter Angel Lau | October 30, 2018

American Institute for Cancer Research

THE FACTS ABOUT Red Meat and Processed Meat and Your Cancer Risk

There is strong evidence that eating too much red meat—and even small amounts of processed meat—can lead to colorectal cancer. The more you eat, the greater the risk.

The term "red meat" refers to meat from mammals, including beef, veal, pork, lamb, mutton and goat.

The term "processed meat" refers to meat that has been processed through salting, curing, fermentation, smoking or other processes to enhance flavor or improve preservation. Processed meat includes:

- bacon
- salami
- pepperoni
- corned beef
- sausage
- deli/luncheon meats
- ham
- hot dogs
- pastrami
- chorizo

STROKES CAN HAPPEN AT ANY AGE

Perinatal stroke: Last few weeks of pregnancy to 1 week after birth. Childhood stroke: 1 month after 1st year.

RISK FACTORS

PERINATAL STROKE

- Maternal high blood pressure
- Diabetes in the mother
- Placental abruption
- Stroke in the mother

CHILDHOOD STROKE

- Heart disease
- Stroke in the mother
- Stroke in the child
- Stroke in the family

FAST

TIME IS BRAIN AT ANY AGE

NEUROLOGICAL

- Stroke and cerebral palsy
- Stroke and epilepsy
- Stroke and autism
- Stroke and ADHD

DON'T DELAY!

Prevent diagnosis and treatment of stroke in children is as critical as it is in adults.

Continued on page 28

HEALTH TIP: The high content of iron in processed meats contributes to increased homocysteine in the blood.

Hypertension on the rise among teens

Doctors say even temper tantrums, poor diet and a general listlessness could be red flags

How to tell if your child has hypertension

Parents to know: Hypertension is associated with left ventricular hypertrophy (LVH) and increased arterial wall thickness. Lower socioeconomic status and lower educational attainment are also associated with hypertension. Primary or essential hypertension occurs in its own without an identifiable cause. The risk factors for developing it include being overweight or obese, having a family history of high blood pressure and type 2 diabetes, consuming too much salt, smoking or leading a sedentary life. Secondary hypertension could be due to chronic kidney disease, physical kidney disease, sleep apnea, or a narrowing of the artery. Adverse diabetes, hypertension occurs in a few disorders, among others: "It can affect the brain, eyes, heart and kidneys, leading to their malfunction."



Choco bars, sugary cereals 'linked to cancer'

10% Increase In Consumption Of Ultra-Processed Foods Hikes Risk By 12%, Says Study

Ultra-processed foods, such as sugary cereals and chocolate bars, are linked to a 12% increase in cancer risk, according to a new study.

The study, published in the journal *Frontiers in Nutrition*, found that children who consumed more ultra-processed foods had a 12% higher risk of cancer.

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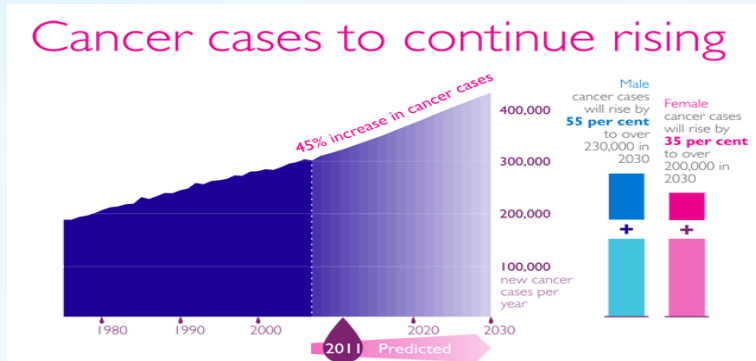
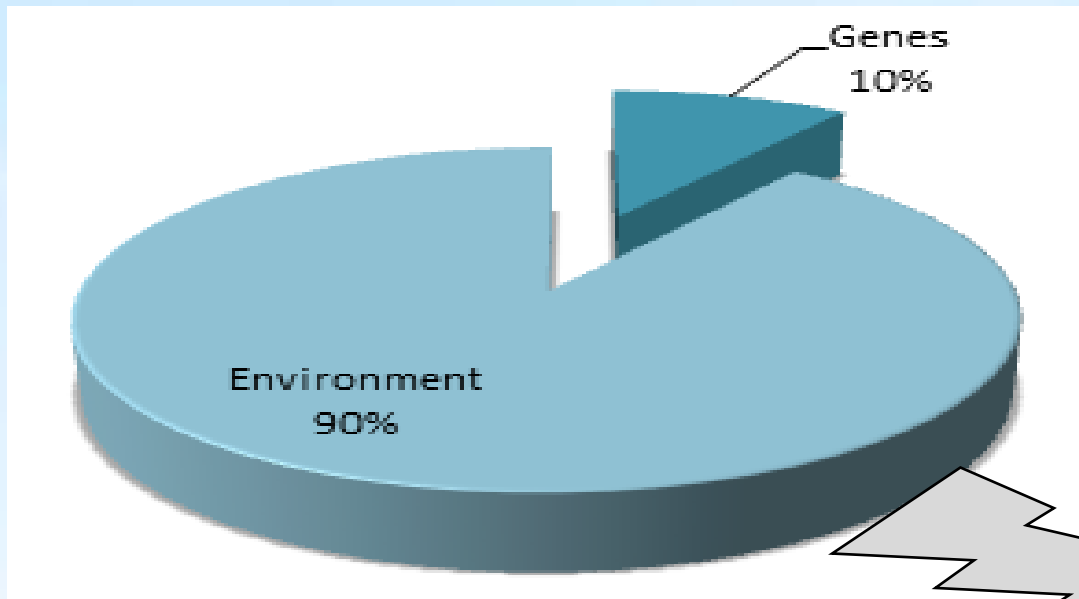
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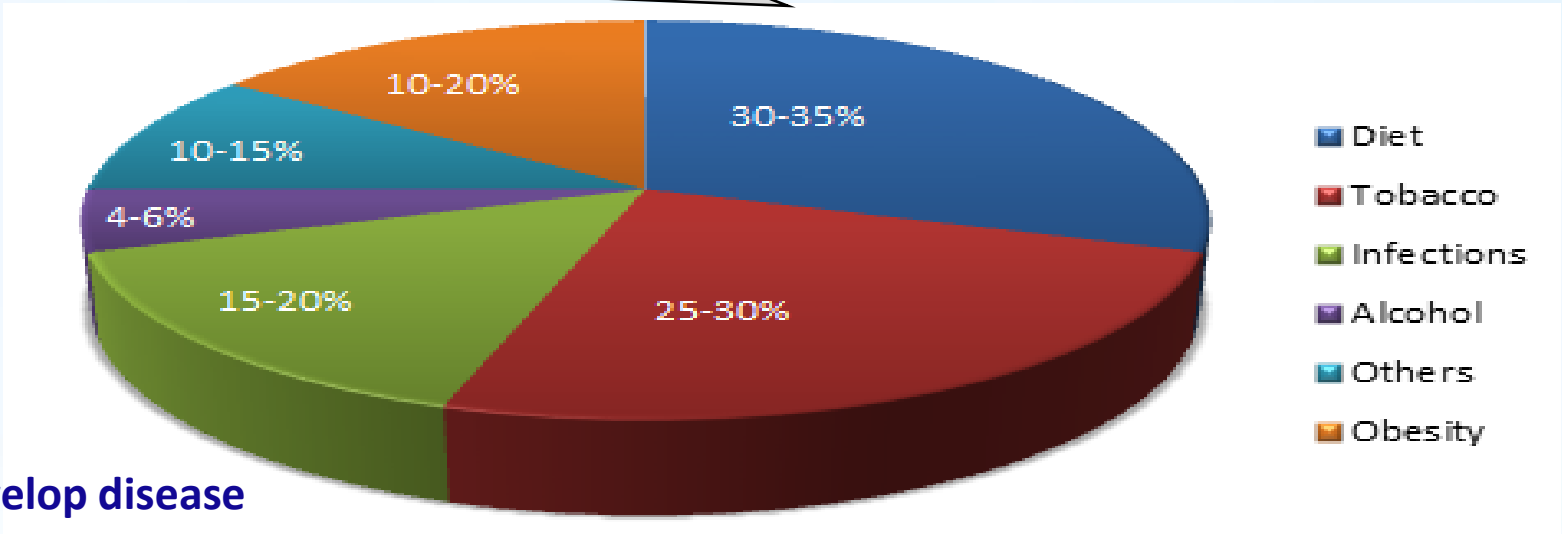
MEALS THAT ARE READY TO EAT AMONG THOSE FLAGGED

- Frozen ready-to-eat meals
- Chicken nuggets
- Fast-food burgers
- More processed meats
- Sugary drinks
- Instant noodle & soup
- Instant ramen
- Sweet or salty packaged snacks
- Chocolate bars & sweets

CANCER- COMPLEX LIFESTYLE DISEASE



2-3% mutations-penetrant
Others increase risk/susceptibility to develop disease



COMPLEX LIFESTYLE DISEASES- SHARED UNDERLYING MECHANISM

Health spending pushed 55m into poverty in a year: Study

'38 Million Made Poor Just By Having To Buy Medicines'

Rema.Nagarajan
@timesgroup.com

About 55 million Indians were pushed into poverty in a single year because of having to fund their own healthcare and 38 million of them fell below the poverty line due to spending on medicines alone, a study by three experts from the Public Health Foundation of India has estimated. The study, published in the British Medical Journal, reveals that non-communicable diseases like cancer, heart diseases and diabetes account for the largest chunk of spending by households on health.

The study concluded that among non-communicable diseases, cancer had the highest probability of resulting in "catastrophic expenditure" for a household. Health expenditure is considered to be catastrophic if it constitutes 10% or more of overall consumption expenditure of a household. In the case of road traffic and non-road traffic injuries, it was found that catastrophic expenditure was higher among the poorest, with average stay in hospital beyond seven days.

Data from nationwide consumer expenditure surveys

Despite govts launching several health insurance schemes, a majority of the population continued to incur significant expenditure on medicines as hospitalisation-based treatment constitutes only 1/3rd of India's morbidity burden, the study said



spanning two decades from 1993-94 up to 2011-12 and the 'Social Consumption: Health' survey done by the National Sample Survey Organisation in 2014 were analysed by the study authors including health economists Sakthivel Selvaraj and Habib Hasan Farooqui.

While the study looks at data up to 2011-12, it refers to measures taken by the government since then to reduce the expenditure burden on medicines and healthcare on households. It noted that though the

Drug Price Control Order 2013 brought all essential drugs in the National List of Essential Medicines under price control, these constituted just 20% of the retail pharmacy market and that the sales volume of many of the drugs brought under price control has fallen.

Despite governments launching several health insurance schemes, a majority of the population continued to incur significant expenditure on medicines as hospitalisation-based treatment, which is what

most insurance schemes cover, constitutes only one third of India's morbidity burden, noted the study. It added that frequency of hospitalisation was smaller than outpatient visits in general, especially for NCDs, which are chronic in nature requiring multiple consultations and long-term or life-long medication and support.

With shrinking availability of free drugs in the government health system for outpatients and a sharper decline in their availability for inpatients, there was little incentive for patients to seek public healthcare, noted the study, adding that medicine-related expenditure for households remained high as most patients sought outpatient care in the more expensive private sector.

As for the government's promise to provide cheap medicines through Jan Aushadhi stores, though the target of opening over 3,000 stores has been met, they have been plagued with frequent stock-outs and quality issues. Most Jan Aushadhi stores have barely 100-150 formulations instead of the promised 600-plus medicines and their numbers are too small compared to the 5.5 lakh plus pharmacies in India.

The Pharmaceutical industry does **not** create cures,



they create CUSTOMERS.

HEALTH CARE REFORM

Healthy Living Is the Best Revenge

Findings From the European Prospective Investigation Into Cancer and Nutrition–Potsdam Study

Earl S. Ford, MD, MPH; Manuela M. Bergmann, PhD; Janine Kröger; Anja Schienkiewitz, PhD, MPH; Cornelia Weikert, MD, MPH; Heiner Boeing, PhD, MSPH

Background: Our objective was to describe the reduction in relative risk of developing major chronic diseases such as cardiovascular disease, diabetes, and cancer associated with 4 healthy lifestyle factors among German adults.

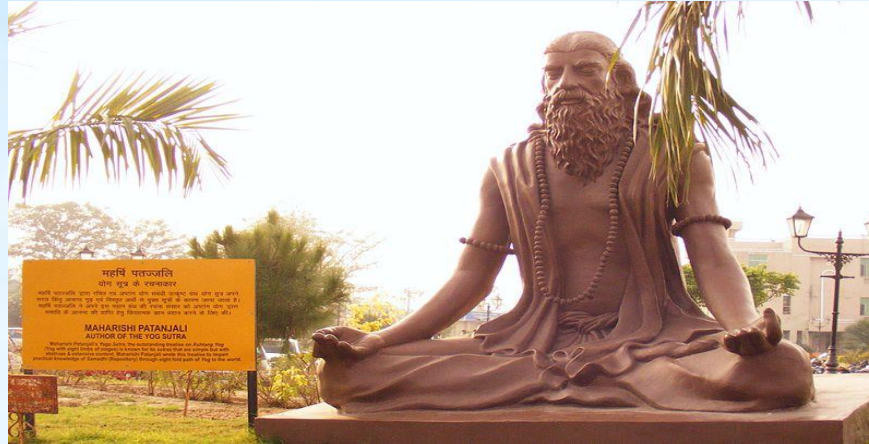
Methods: We used data from 23 153 German participants aged 35 to 65 years from the European Prospective Investigation Into Cancer and Nutrition–Potsdam study. End points included confirmed incident type 2 diabetes mellitus, myocardial infarction, stroke, and cancer. The 4 factors were never smoking, having a body mass index lower than 30 (calculated as weight in kilograms divided by height in meters squared), performing 3.5 h/wk or more of physical activity, and adhering to healthy dietary principles (high intake of fruits, vegetables, and whole-grain bread and low meat consumption). The 4 factors (healthy, 1 point; unhealthy, 0 points) were summed to form an index that ranged from 0 to 4.

Results: During a mean follow-up of 7.8 years, 2006 participants developed new-onset diabetes (3.7%), myocardial infarction (0.9%), stroke (0.8%), or cancer (3.8%). Fewer than 4% of participants had zero healthy factors, most had 1 to 3 healthy factors, and approximately 9% had 4 factors. After adjusting for age, sex, educational status, and occupational status, the hazard ratio for developing a chronic disease decreased progressively as the number of healthy factors increased. Participants with all 4 factors at baseline had a 78% (95% confidence interval [CI], 72% to 83%) lower risk of developing a chronic disease (diabetes, 93% [95% CI, 88% to 95%]; myocardial infarction, 81% [95% CI, 47% to 93%]; stroke, 50% [95% CI, -18% to 79%]; and cancer, 36% [95% CI, 5% to 57%]) than participants without a healthy factor.

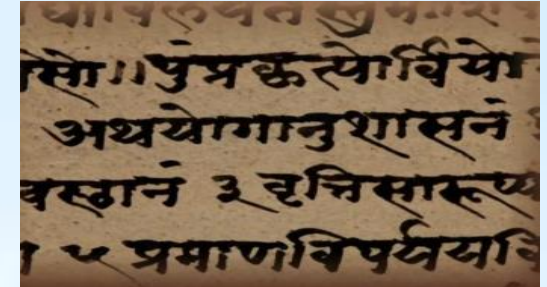
Conclusion: Adhering to 4 simple healthy lifestyle factors can have a strong impact on the prevention of chronic diseases.

Arch Intern Med. 2009;169(15):1355-1362

YOGA



Maharishi Patanjali (184-148 BC)



Yoga -the union-Jivatma to Parmatma, mind, body and soul, individual consciousness to universal consciousness, Dvait to Advait

Ancient Science-15000 yrs Adiyogi-7 Rishis

Maharishi Patanjali 5000yrs ago compiled-- Yog sutras

Health – complete physical, mental, emotional & social,
Increases Mind body awareness, deeper transcendental states to
understand the meaning and purpose of life.

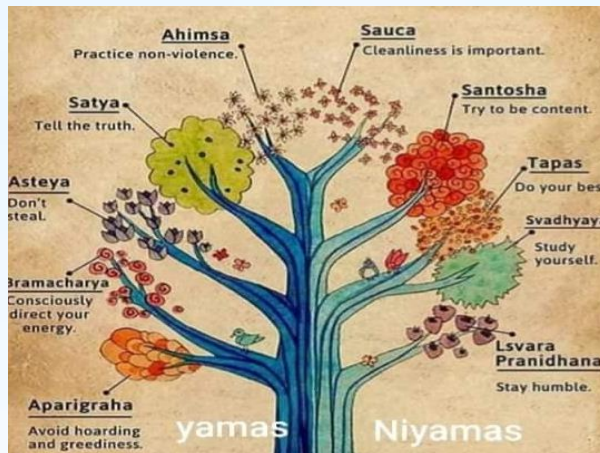
Promotes health, wellness, prevents disease, management ,
rehabilitative potential

Yoga

Yoga is a set of practices aimed at balancing physical, mental and emotional wellbeing by employing postures (asanas) combined with breathing techniques (pranayama) and mindfulness (meditation).

Meditation

A state of being attentive to the present moment (heightened awareness) in a non-judgmental way with awareness of breathing; physiological state of reduced metabolic activity (365)



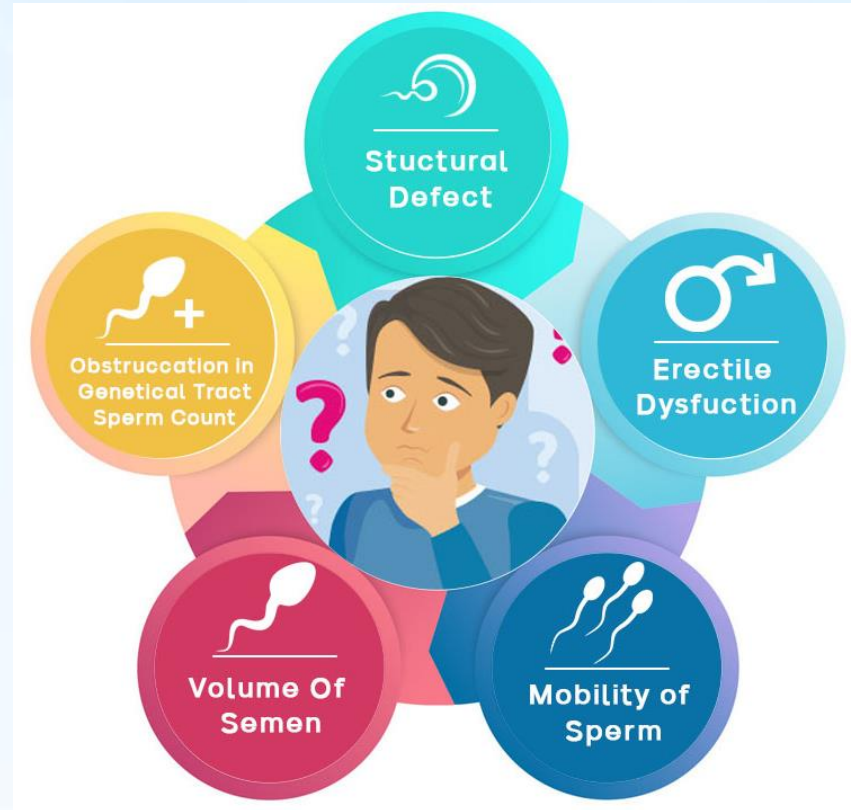
Hatha Yoga-Physical benefits
Raj Yoga- Mental equanimity
Kriya Yoga- Gita Upanishads-Spiritual upliftment
Bhakti Yoga-Devotion
Karma Yoga- Selfless service
Jnana Yoga-Knowledge-Adi Shankracharya

Yoga- Voluntary control over involuntary functions



Mind and Body are same connected through Prana- in gross form the breath. If you can control the breath you can control both mind and body

Unexplained male factor Infertility

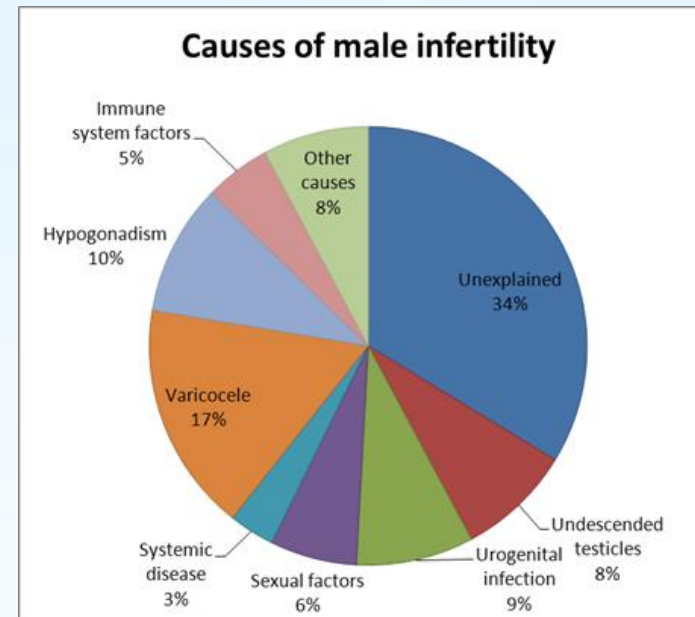


Unexplained male factor infertility

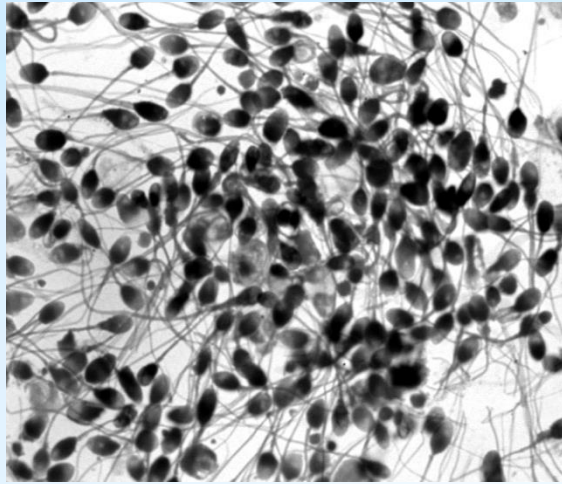


Is the inability to conceive after one year of regular unprotected intercourse-
Complex, common lifestyle disease

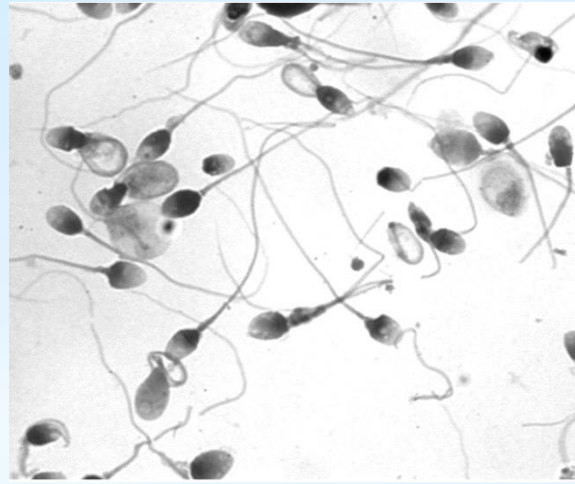
- 15-20% couples attempting pregnancy
- 60-80 million couples worldwide
- India 2.5%; 12-20 million couples
- **Male Factor – 50% cases**
- Decline in male reproductive health
- **Testicular Dysgenesis Syndrome**



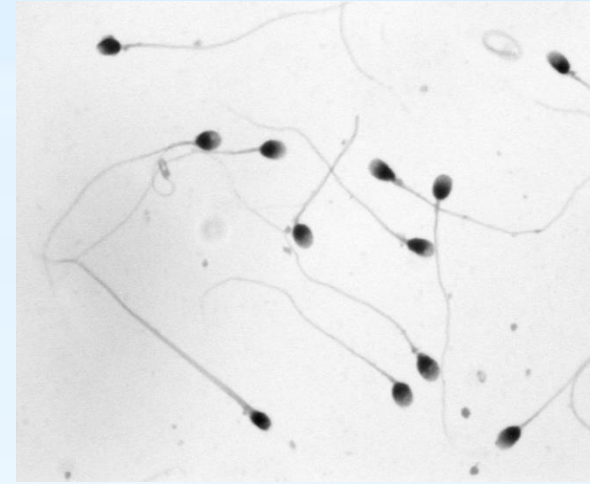
Semen analysis



Normospermia



Oligoastheno-teratozoospermia
(OAT)

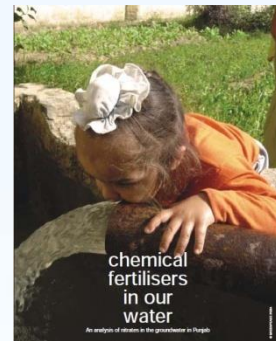


Oligozoospermia

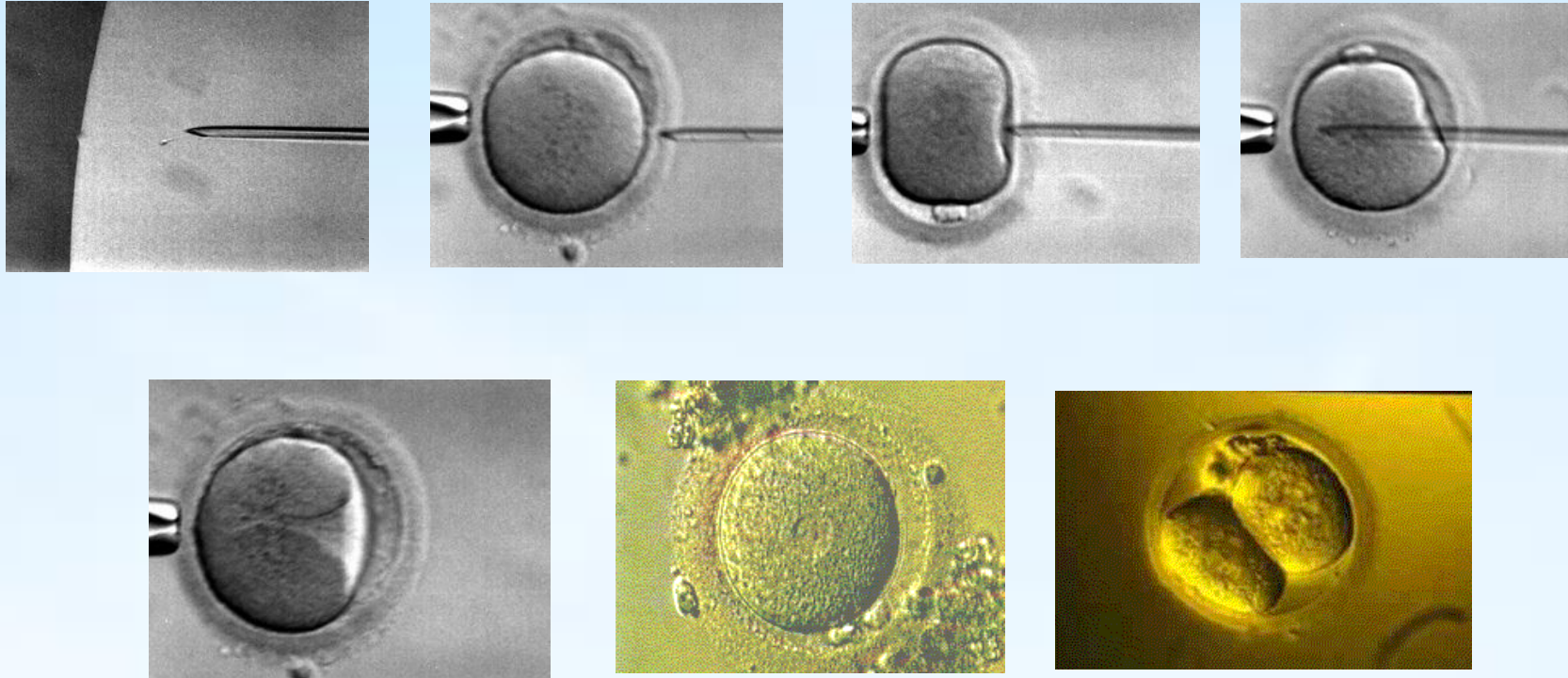
Azoospermia-NOA- Klinefelter Syndrome 47,XXY

Oligozoospermia- Structural Chromosomal abnormalities

Normozoospermia-unexplained infertility-normal parameters as per WHO guidelines



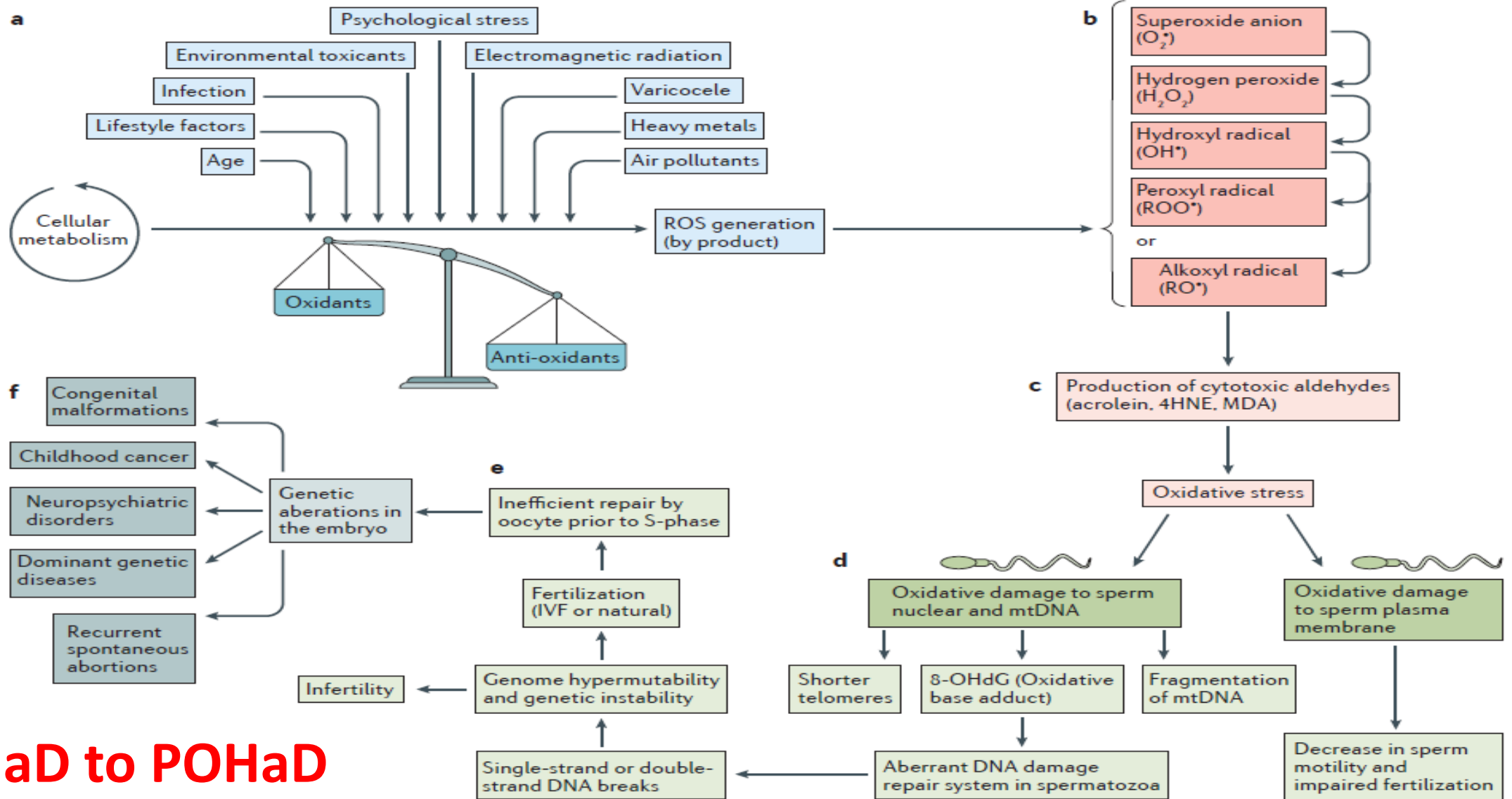
ART- ICSI



- **Male Infertility-** single major reason for couples to have IVF
- Largest single defined cause of human infertility
- One in 15 men are sub or infertile.
- **Sperm DNA damage is the single largest cause of defective sperm function.**
- Phenotype of an individual depends not only on genotype but also on epigenotype.
- Epigenetic states established early in life- Very sensitive to environmental influences.

Oxidative stress and male infertility

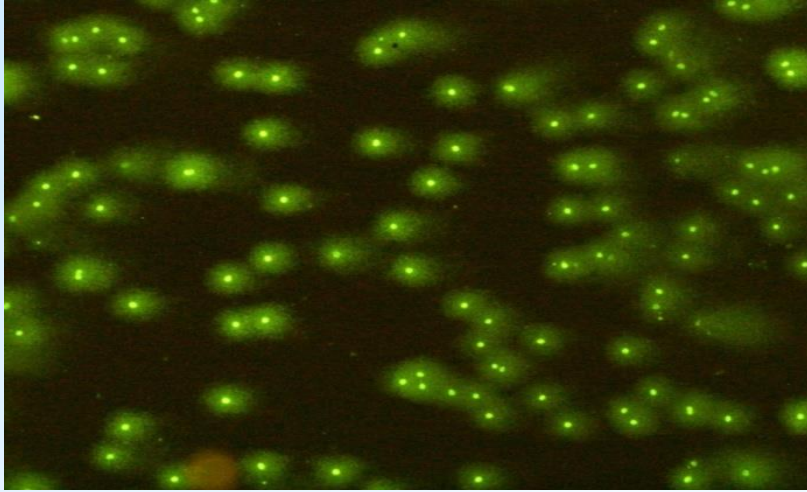
Shilpa Bisht, Muneeb Faiq, Madhuri Tolahunase and Rima Dada



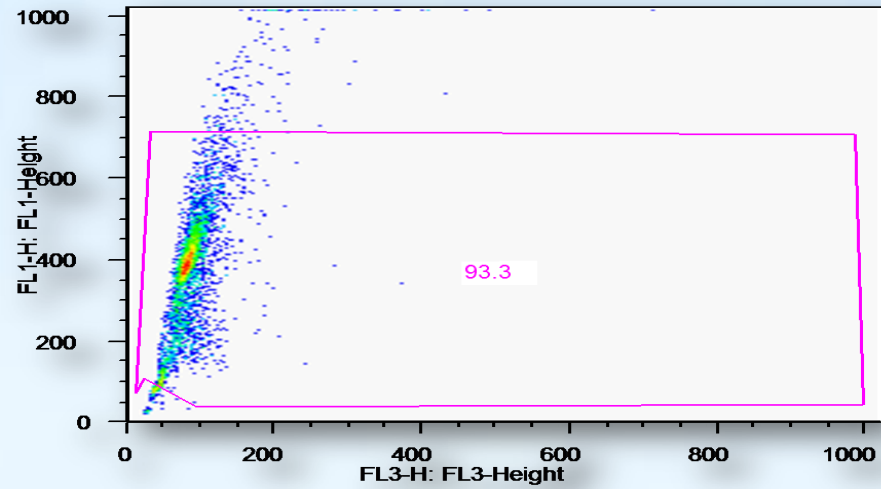
DOHaD to POHaD

Sperm DNA Damage-Comet Assay & SCSA

CONTROLS

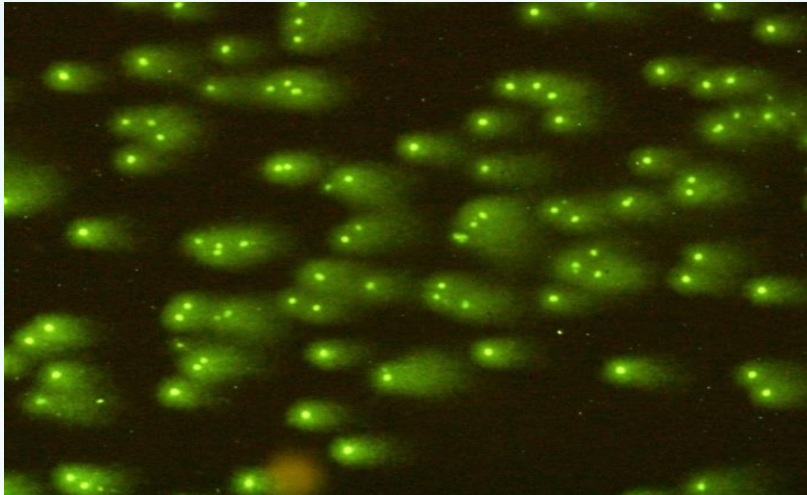


DFI= 9

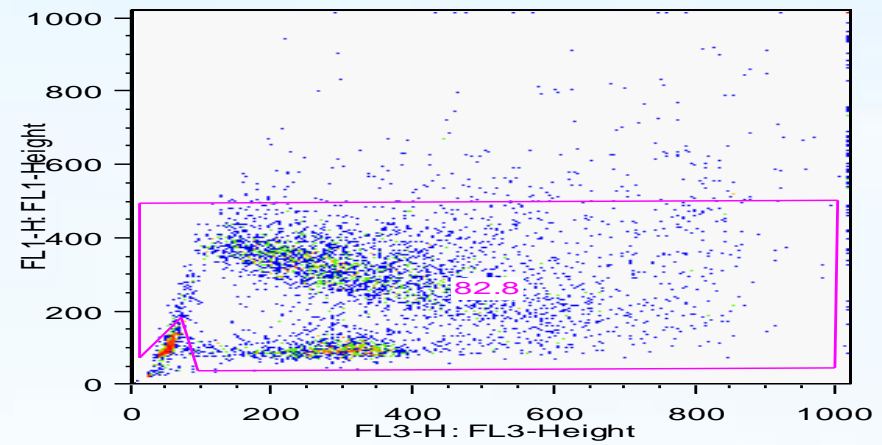


%DFI-8-21

INFERTILE CASES



DFI= 39



8-HYDROXY-2'-DEOXYGUANOSINE (8OHdG)

8-Hydroxy-2'-Deoxyguanosine in Sperm DNA and Increased Risk of Nonfamilial Sporadic Heritable Retinoblastoma in the Child

Shilpa Bisht¹ Bhavna Chawla² Rima Dada¹

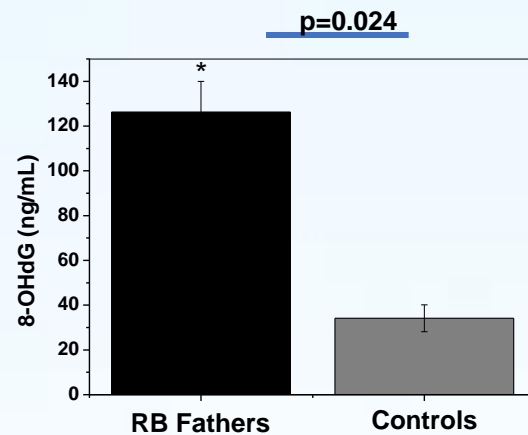
¹ Laboratory for Molecular Reproduction and Genetics, Department of Anatomy, All India Institute of Medical Sciences, New Delhi, India

² Ocular Oncology Service, Dr Rajendra Prasad Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, New Delhi, India

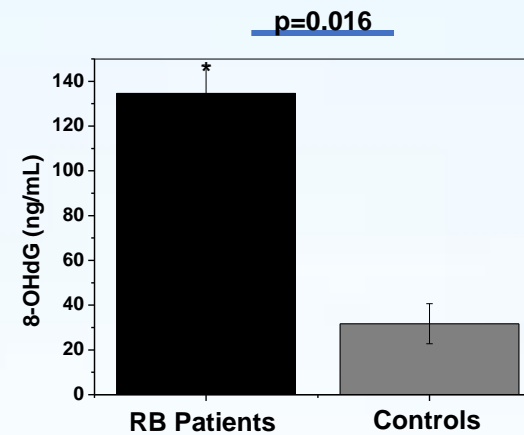
Address for correspondence Rima Dada, MD, PhD, Laboratory for Molecular Reproduction and Genetics, Department of Anatomy, All India Institute of Medical Sciences, Ansari Nagar, New Delhi 110029, India (e-mail: rima_dada@rediffmail.com).

J Pediatr Genet

de novo germline mutations and epimutations



RB fathers vs. controls



RB patients vs. controls

post-zygotic mutations

Paternal Factor in Non familial Childhood Cancer

- Total no. of cases- 95
- Mean ROS :- 32.8 RLU/Sec/Million of sperm
- Mean DFI :- 27.64%

Retinoblatoma n-75

- Mean ROS - 63.48 RLU/Sec/Million of sperm
- Mean DFI - 33.2 %

Leukemia n-20

- Mean ROS - 26.69 RLU/Sec/Million of sperm
- Mean DFI - 23.7%

Normal ROS Levels < 25RLU/sec/million sperm

Normal DFI range 8-21%

Parents both cytogenetically normal

No somatic mutation in Rb gene in parents



Oxidative DNA Damage-8OHdG



8- OHdG level in different life style parameter groups (A-Non-Smokers, B- Smokers, C- Not Exposed (Pesticides), D- Exposed (Pesticides), E- Non- Alcoholic, F- Alcoholic, G- Non-Smokers + Not Exposed (Pesticides) + Non- Alcoholic and H- Smokers + Exposed (Pesticides) + Alcoholic; * $P < 0.05$, ** $P < 0.01$, *** $P < 0.001$)



DOI:<http://dx.doi.org/10.7314/APJCP.2015.16.16.6967>
Tobacco Use Increases Oxidative DNA Damage in Sperm - Possible Etiology of Childhood Cancer

RESEARCH ARTICLE

Tobacco Use Increases Oxidative DNA Damage in Sperm - Possible Etiology of Childhood Cancer

Shiv Basant Kumar¹, Bhavna Chawla², Shilpa Bisht¹, Raj Kumar Yadav³, Rima Dada^{1*}

> *Ophthalmic Genet.* 2022 Aug 5;1-18. doi: 10.1080/13816810.2022.2106497. Online ahead of print.

Identification of novel genes by targeted exome sequencing in Retinoblastoma

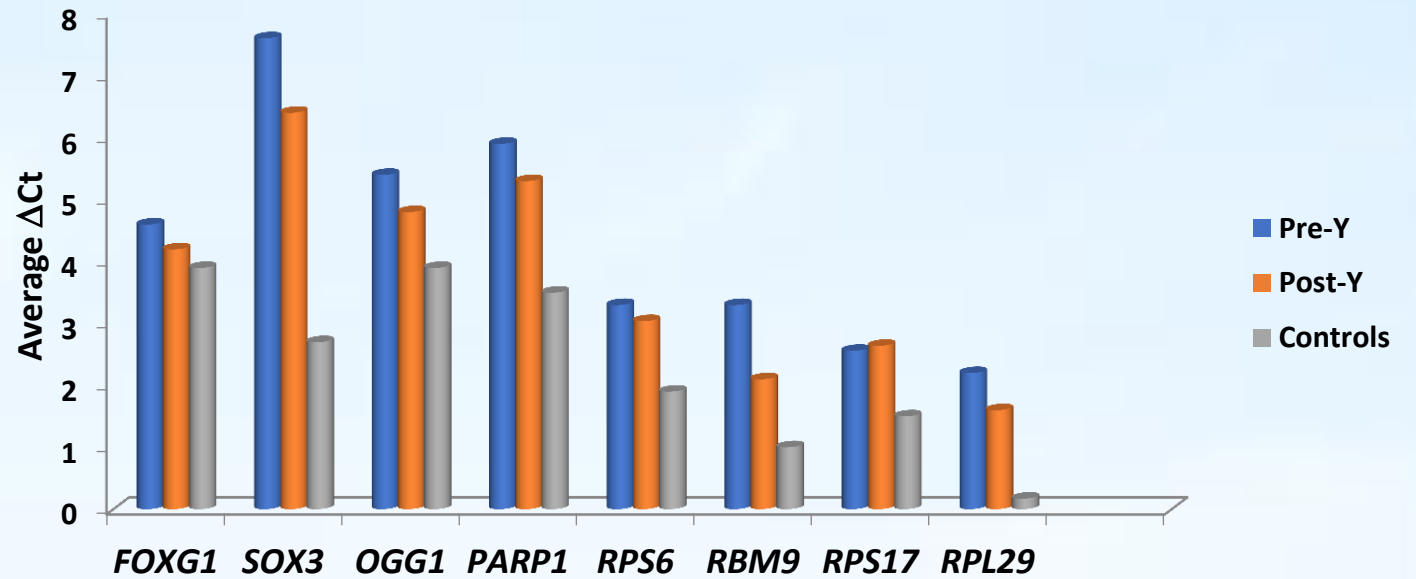
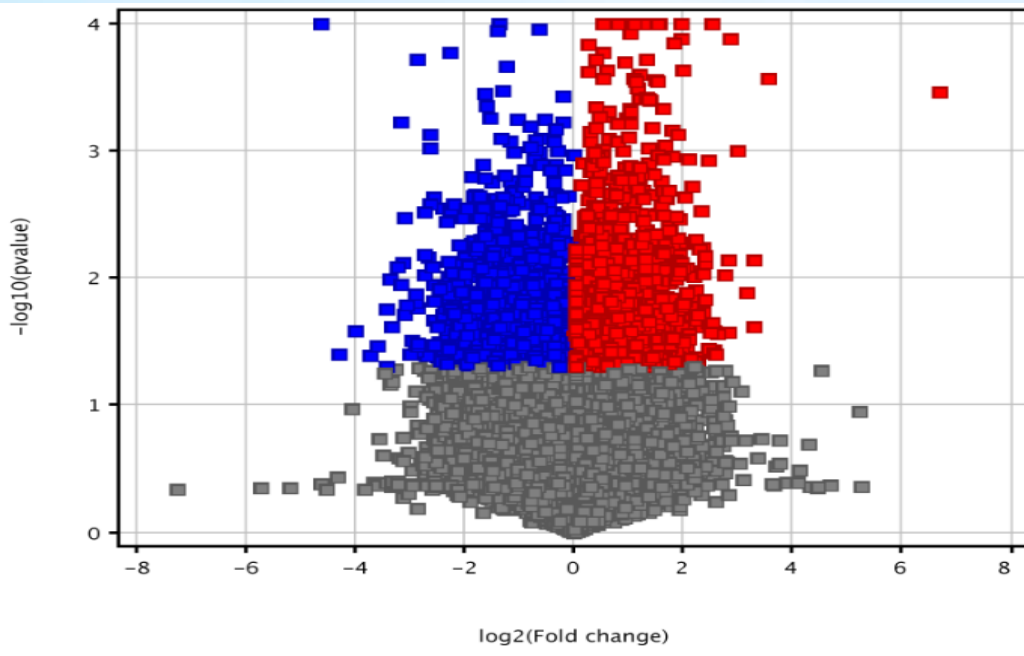
Shilpa Bisht¹, Bhavna Chawla², Amit Kumar³, Viswanathan Vijayan⁴, Manoj Kumar¹, Pradeep Sharma⁴, Rima Dada¹

Affiliations + expand

PMID: 35930312 DOI: 10.1080/13816810.2022.2106497

Increased Sperm Oxidative DNA Damage- *de-novo* germ line, somatic mutations and aberrant methylation in offspring

MICROARRAY GENE PROFILE & Real Time PCR Sperm Transcripts : PRE AND POST YOGA



Total altered genes: 511
252 Up regulated
259 Down regulated

Herbo-mineral supplementation in men with idiopathic oligoasthenoteratospermia : A double blind randomized placebo-controlled trial

Rajeev Kumar, Vaibhav Saxena, Monis Bilal Shamsi,¹ S. Venkatesh,¹ and Rima Dada¹

Department of Urology, All India Institute of Medical Sciences, New Delhi, India

¹Department of Anatomy, All India Institute of Medical Sciences, New Delhi, India

For correspondence: Dr. Rajeev Kumar, All India Institute of Medical Sciences, New Delhi 110029, India. E-mail: rajeev02@gmail.com

Parameter (mean ± SD)	Group A (Drug)			Group B (Placebo)		
	Baseline ^a	3 months	P value	Baseline ^b	3 months	P value
Standard semen analysis						
Sperm concentration (million/ml)	32.6 ± 26.9	30.9 ± 25.6	0.31	31.9 ± 32.0	21.2 ± 16.8	0.15
Total sperm motility (%)	23.2 ± 17.3	33.4 ± 23.2	0.008**	27.9 ± 20.1	34.1 ± 21.1	0.07
Active sperm motility (a+b %)	15.7 ± 12.6	→ 22.6 ± 18.0	0.02**	18.4 ± 12.8	21.0 ± 14.7	0.20
Normal morphology (%)	34.1 ± 10.7	33.0 ± 14.3	0.80	34.3 ± 5.2	33.8 ± 16.0	0.85
TAC (mM)	4.8 ± 2.7	4.5 ± 3.5	0.20	3.9 ± 2.3	4.5 ± 3.5	0.35
DFI (%)	40.8 ± 9.9	→ 41.7 ± 9.0	0.98	39.9 ± 10.8	41.8 ± 9.5	0.22
ROS (RLU/min per 20 × 10 ⁶ sperms)	3410841 ± 312456	3539733 ± 253432	0.66	2293950 ± 491657	2157751 ± 381605	0.52

**Significant improvement; ^{a,b} Baseline semen parameters between the two groups were not statistically different

Seminal parameters in drug and placebo group before and after 3 months of treatment

Antioxidant supplementation (Adyzoa)

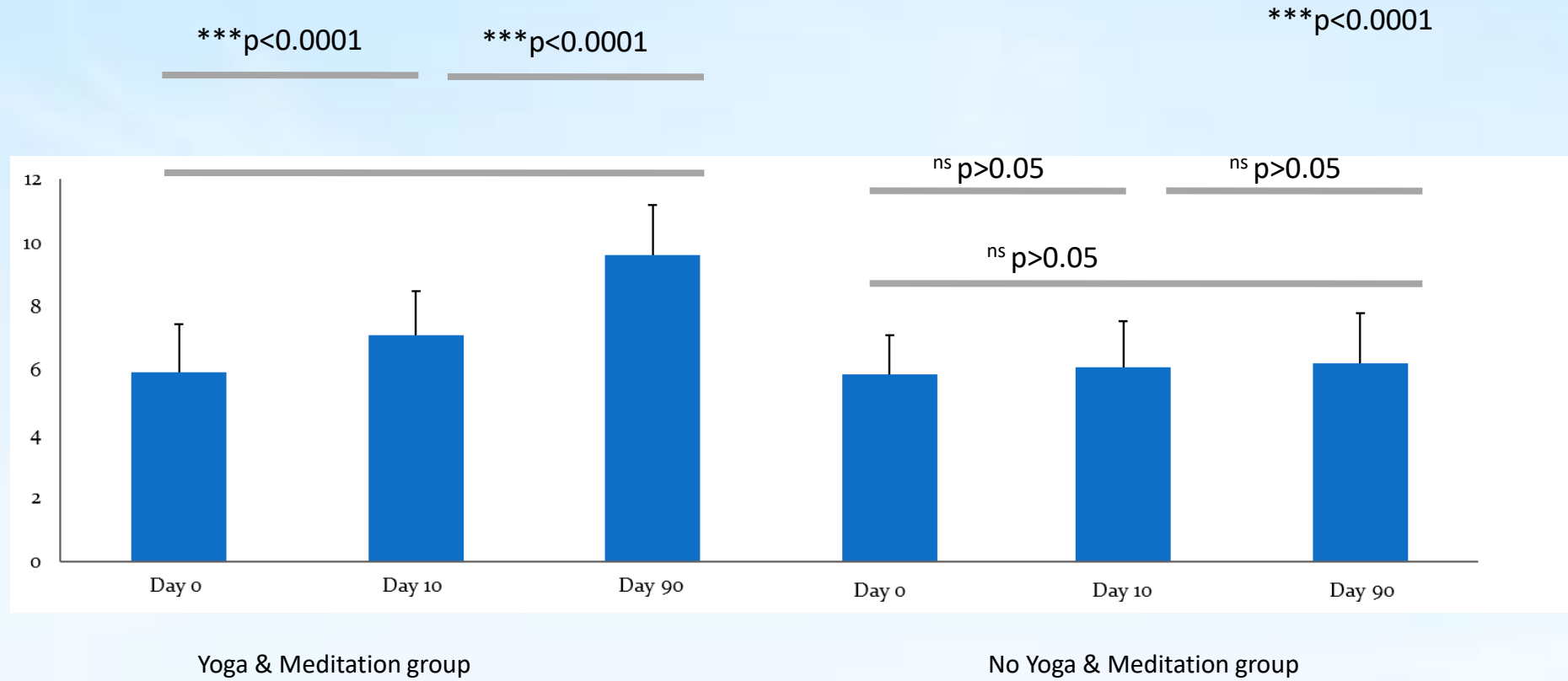
No improvement in DFI, TAC, carry home live birth rate



Impact of Yoga Sperm Genome and Epigenome

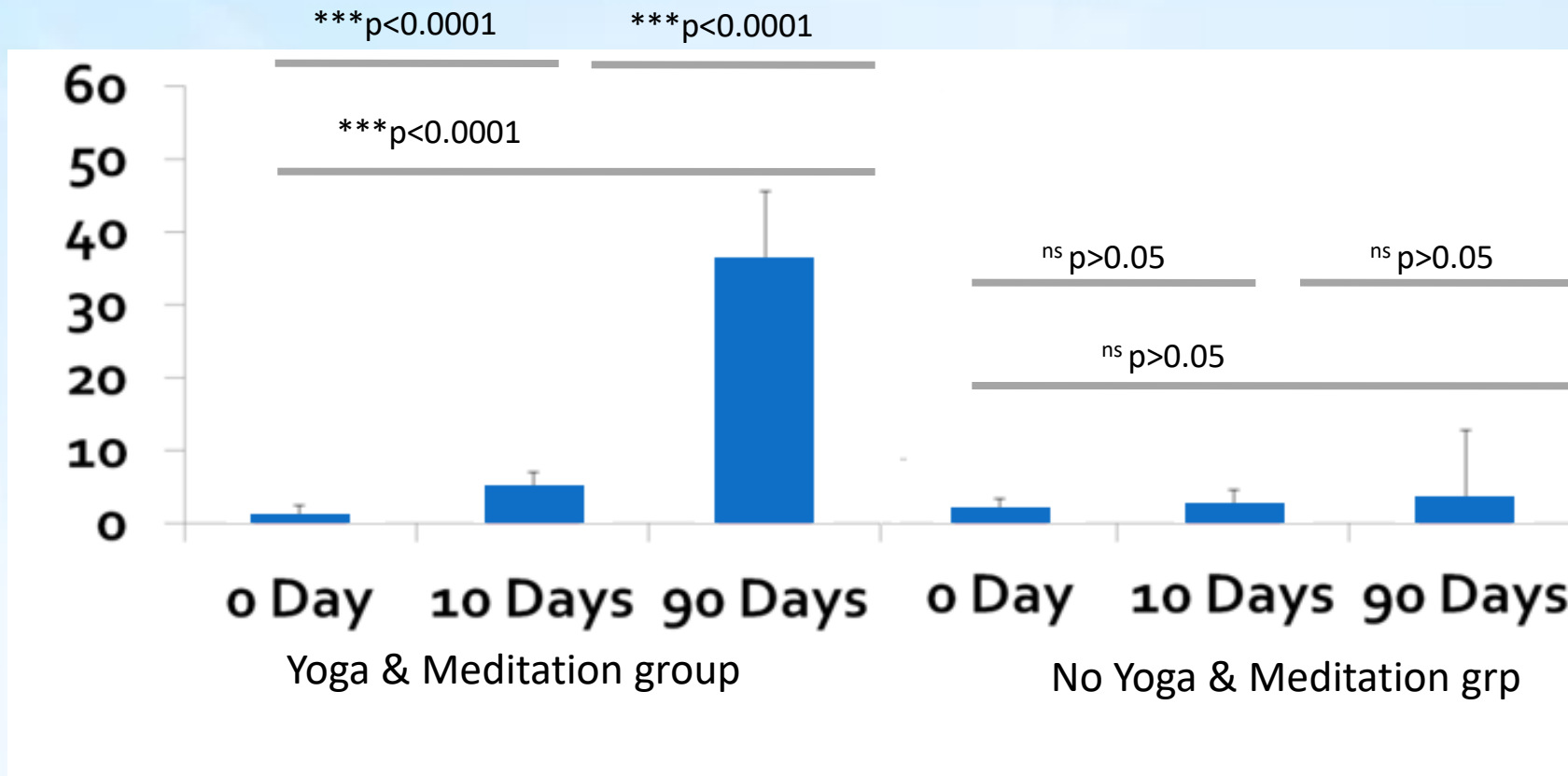


Effect of YBLI on TAC Levels (mM)



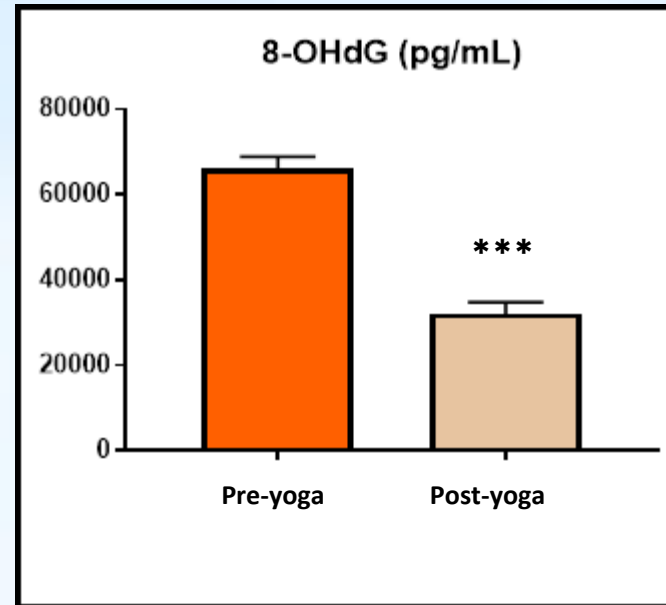
	Day 0 Mean ± SD (mM)	Day 90 Mean ± SD (mM)	P Value
Yoga Intervention Group	5.88 ± 2.62	9.6 ± 2.6	<0.001
No Intervention Group	6.08 ± 3.66	6.41 ± 1.56	>0.05
P Value	>0.05	<0.001	

Effect of YBLI on Telomerase Activity(IU/Cell)



	Day 0 Mean ± SEM (IU/Cell)	Day 90 Mean ± SEM (IU/Cell)	P Value
Yoga Intervention Group	1.38 ± 2.62	39.6 ± 8.6	<0.001
No Intervention Group	2.08 ± 3.66	2.91 ± 11.56	>0.05
P Value	>0.05	<0.001	

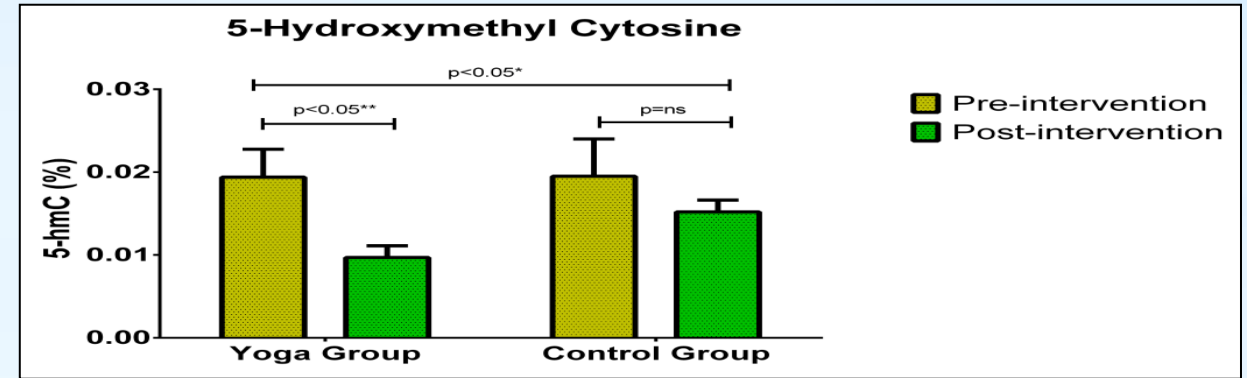
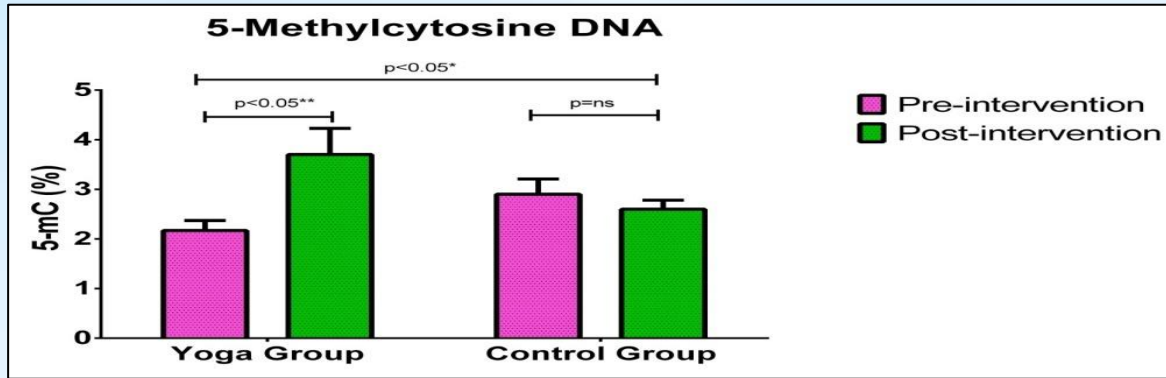
Seminal 8-OHdG levels pre-and-post yoga in the fathers of NFSHRb patients



Variable (Blood)	Cut-off Values	Pre-yoga (n=60)	Post-yoga (n=60)	p-value (≤ 0.05 significant)
8-OHdG (pg/mL)	3321	6791±112	3120±671	0.002***

Changes in Global DNA methylation


DNA-based ELISA



■ Yoga → significant ↑ global 5-mC% & ↓ global 5-hmC%

Oxidative stress –induces- Global hypomethylation; Locus sp. Hypermethylation p53
Genome wide instability and hypermutability

Sperm methylome alterations following yoga-based lifestyle intervention in patients of primary male infertility: A pilot study

Shilpa Bisht¹ | Sofia Banu² | Surabhi Srivastava² | Rashmi U. Pathak² | Rajeev Kumar³ | Rima Dada¹ | Rakesh K. Mishra² 

RRBS RESULTS

Hypomethylated genes	Hypermethylated genes
Bsg: plays an important role in spermatogenesis and embryo implantation.	Sqle: Catalyzes the stereospecific oxidation of squalene to (S)-2,3-epoxysqualene, and is considered to be a rate-limiting enzyme in steroid biosynthesis.
Ncor2: implicated in spermiation, encodes a nuclear receptor for chromatin compaction and transcriptional silencing.	Ywhaz: major regulator of apoptotic pathways critical to cell survival and plays a key role in a number of cancers and neurodegenerative diseases.
Col6a1: plays a role in maintaining the integrity of various tissues, major structural component of microfibrils.	Vcl: (Vinculin) cytoskeletal protein associated with the cytoplasmic face of both cell-cell and cell-extracellular matrix adherens-type junctions.
Cstb: cysteine protease inhibitors, protector against the proteinases leaking from lysosomes.	TXNRD1: mitochondrial TXNRD1 involved in sperm ROS defense.
Terf2: present at telomeres in metaphase of the cell cycle, is a second negative regulator of telomere length and plays a key role in the protective activity of telomeres.	Sin3A: implicated in accumulation of DNA damage and apoptosis in sperm.
Tnk2: involved in a regulatory mechanism that sustains tyrosine phosphorylation signal transduction pathway.	CDK2: serine/threonine protein kinases that participate in cell cycle regulation.
Gamt: a methyltransferase that converts guanidoacetate to creatine, using SAM as the methyl donor.	Sox7: encodes a member of the SOX (SRY-related HMG-box) family of transcription factors involved in the regulation of embryonic development and in the determination of the cell fate.

Sequence reads:	
Total reads in raw data	~40 million
Reads post filtering	~35 million
Coverage	>50X
Mapping with reference genome:	
Total number of uniquely mapped reads	~25 million
Methylation calling:	
Total number of methylated cytosines common across Pre-Yoga and Post-Yoga samples	197,638
Identification of differentially methylated cytosines (DMCs):	
Total number of DMCs identified	442
Hypermethylated DMCs	170
Hypermethylated DMCs annotated to genes	147
Hypomethylated DMCs	272
Hypomethylated DMCs annotated to genes	229

	Pre	Post	Pre	Post	Pre	Post	Pre	Post	Pre	Post
ROS (RLU/sec/10⁶ sperm)	55.0	33.9	48.0	21.4	49.2	19.4	50.2	21.3	47.6	23.5
8-OHdG levels (pg/ml)	627.8	439.1	781.5	735.0	530.9	485.1	586.9	550.0	492.6	365.0
% DFI	40.9	41.0	38.2	32.8	41.3	37.9	41.8	39.8	43.9	41.6

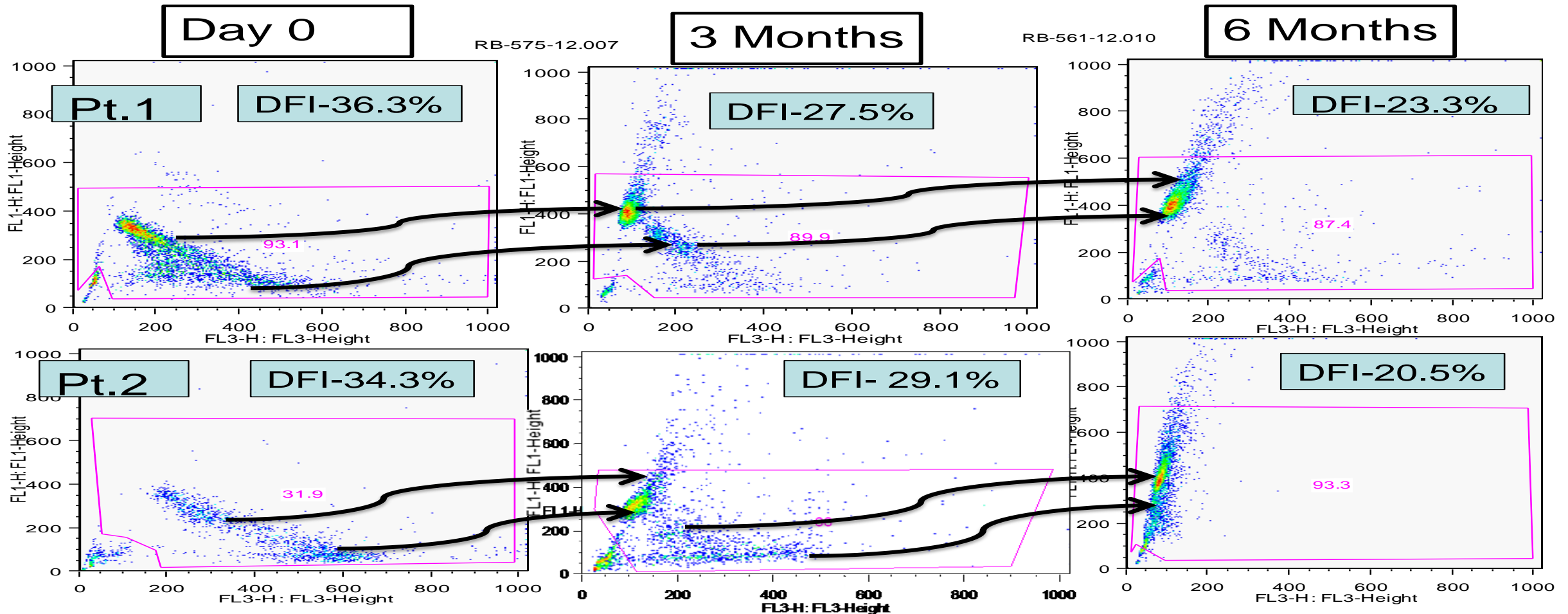
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RESEARCH ARTICLE

Oxidative Stress Induced Damage to Paternal Genome and Impact of Meditation and Yoga - Can it Reduce Incidence of Childhood Cancer?

Rima Dada^{1*}, Shiv Basant Kumar³, Bhavna Chawla², Shilpa Bisht³, Saima Khan³

DFI



IMPACT OF YOGA ON PSYCHOLOGICAL STRESS, QOL AND SYSTEMIC BIOMARKERS OF NEUROPLASTICITY IN THE PARENTS OF RB PATIENTS

- Parents of RB patients (N=86; 46 males and 40 females; age= 31.38±7.3 years) were enrolled in a 12-weeks of Yoga followed by pre-and-post assessment of:
 - The impact of Yoga on psychological stress using Beck depression inventory-II (BDI-II) Scale and assessment of QOL using World Health Organization QOL (WHOQOL-BREF).
 - Levels of systemic biomarkers of neuroplasticity such as BDNF, DHEAS, sirtuin1, cortisol and IL-6.

ANNALS
RES ARTICLE

66

Impact of yoga based lifestyle intervention on psychological stress and quality of life in the parents of children with retinoblastoma

Shilpa Bisht^a, Bhavna Chawla^b, Madhuri Tolahunase^a, Richa Mishra^a, Rima Dada^{*a}

^aLaboratory for Molecular Reproduction and Genetics, Department of Anatomy, All India Institute of Medical Sciences, Ansari Nagar, New Delhi, India.

^bOcular Oncology Service, Dr. Rajendra Prasad Centre for Ophthalmic Sciences, All India Institute of Medical Sciences, Ansari Nagar, New Delhi, India.

ANNALS OF NEUROSCIENCES VOLUME 26 NUMBER 1 APRIL 2019

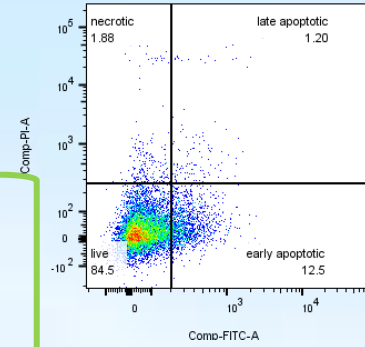
www.annalsofneurosciences.org

To study Impact of Yoga primed serum on cancer cell lines PC-3, LNCap

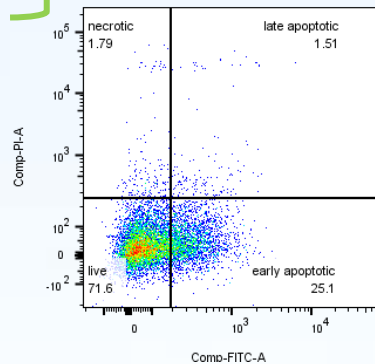
Study design

Pre Yoga

Post Yoga



Blood Serum on cancer cell line

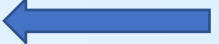


Cell proliferation

MTT assay

Apoptosis rate

Annexin-V



Biomarkers of tumor growth

ELISA- lysate P53, P21, IGF1, IGFBP1

Protein expression level

WB- BCL-2 (Pro), Bax (Pre)

Milliplex Myokine Immuno assay

IL-6, IL-15, Irisin, osteonectin, oncostatin-M



Impact of Yoga- PCOS

PCOS SYMPTOMS

The infographic features a central illustration of a woman with a sad expression. To her left are nine circular icons, each representing a symptom of PCOS. The symptoms are arranged in three rows: Row 1: Hair Loss (scissors and hair), Hirsutism (hair on a face), Pelvic Pain (woman with pain symbol); Row 2: Infertility (testes and uterus), Overweight (scale), Irregular Periods (calendar with irregular dots); Row 3: Fatigue (Zzz), High Testosterone Levels (molecule with OH and an upward arrow), Acne (skin with pimples).

POLYCYSTIC OVARY SYNDROMS (PCOS)



Polycystic Ovarian Syndrome (PCOS)

- ❖ Most common and complex **endocrine and metabolic disorder** worldwide in reproductive-age women.
- ❖ Combination of signs and symptoms of **androgen excess and ovarian dysfunction** (Asunción M *et al.*, 2000).

- ❖ **6-26% of women affected globally** (Karsten *et al.*, 2021).
- ❖ Prevalence - India = 3.7 to 22.5 per cent (Ganie M. *et al.*, 2019).
- ❖ Major cause of anovulatory infertility up to 20% of infertile couples (J. Laven., 2019).
- ❖ 75% to 85% of PCOS women have irregular menstruation (Azziz R *et al.*, 2009).
- ❖ Hyperandrogenism -80 to 85%; Insulin Resistance -70-95%; Anxiety-Depression-15 to 25%
- ❖ Increased risk of T2D, CAD, CVD, HT, NAFLD, Alzheimers disease, Ovarian & endometrial cancer
- ❖ Complex, multifactorial lifestyle disorder-systemic defect rather than reproductive dysfunction alone, strong psychosomatic component- Need to manage by Mind body integrated approach-Yoga.

Rationale: Extra-ovarian factors in PCOS pathogenesis

 Frontiers in Immunology

TYPE Review
PUBLISHED 05 May 2023
DOI 10.3389/fimmu.2023.1169232

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San Diego Biomedical Research Institute,
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Dysregulation of immune response in PCOS organ system

Jingxuan Wang¹, Tailang Yin^{1*} and Su Liu^{2*}

> DNA Cell Biol. 2020 Aug;39(8):1458-1466. doi: 10.1089/dna.2019.5323. Epub 2020 Jun 8.

Identification of Variants in Mitochondrial D-Loop and OriL Region and Analysis of Mitochondrial DNA Copy Number in Women with Polycystic Ovary Syndrome

Pallavi Shukla¹, Srabani Mukherjee¹, Anushree Patil²

0021-972X/06/\$15.00/0
Printed in U.S.A.

The Journal of Clinical Endocrinology & Metabolism 91(1):336–340
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doi: 10.1210/jc.2005-1696

BRIEF REPORT

Reactive Oxygen Species-Induced Oxidative Stress in the Development of Insulin Resistance and Hyperandrogenism in Polycystic Ovary Syndrome

Frank González, Neal S. Rote, Judi Minium, and John P. Kirwan

 Frontiers in Endocrinology

TYPE Review
PUBLISHED 16 December 2022
DOI 10.3389/fendo.2022.1091147

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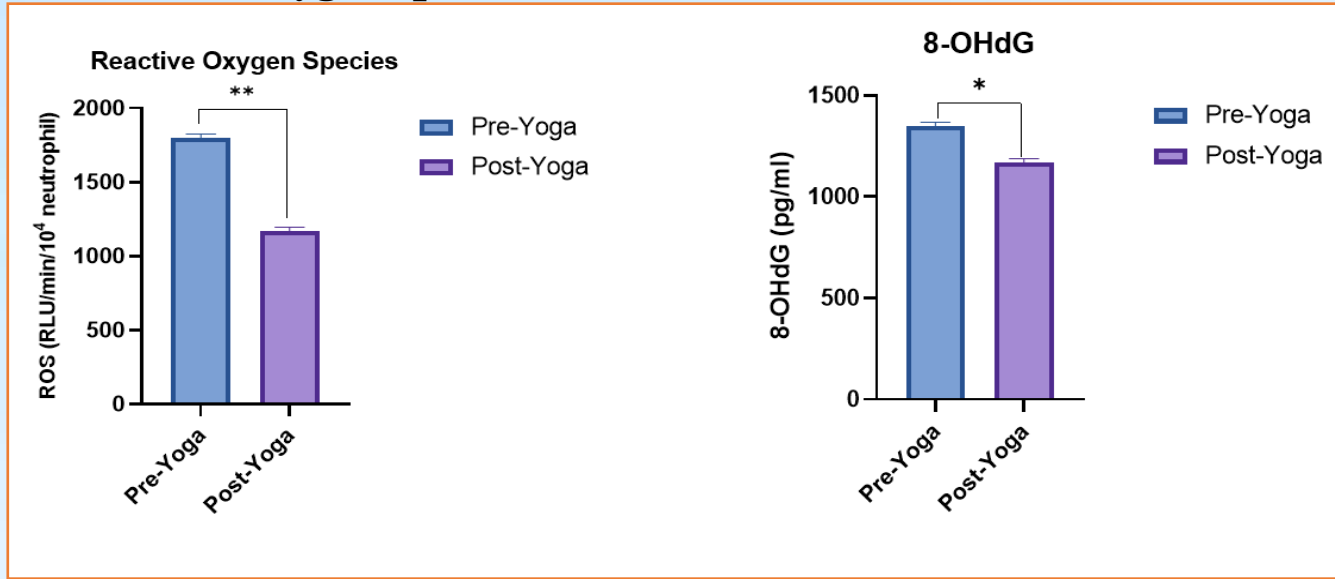
*CORRESPONDENCE
Yue Wu

Insulin resistance, autophagy and apoptosis in patients with polycystic ovary syndrome: Association with PI3K signaling pathway

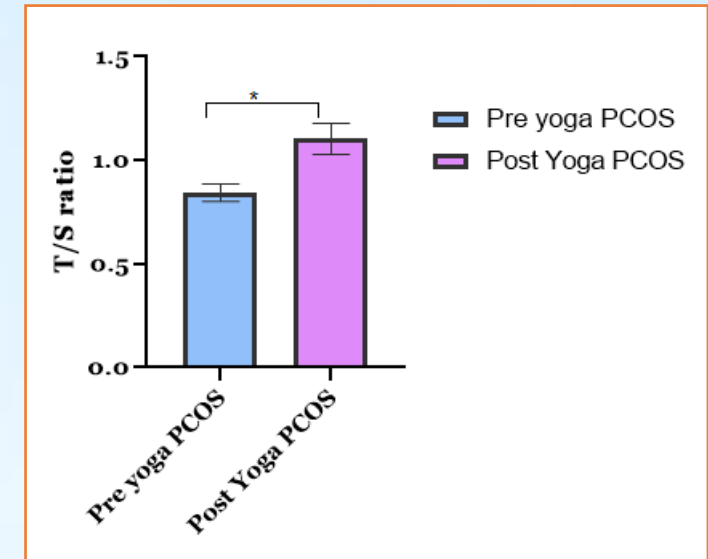
Cheng Tong^{1,2†}, Yue Wu^{1,2†}, Lingling Zhang¹ and Ying Yu^{1,2*}

Impact of Yoga -PCOS

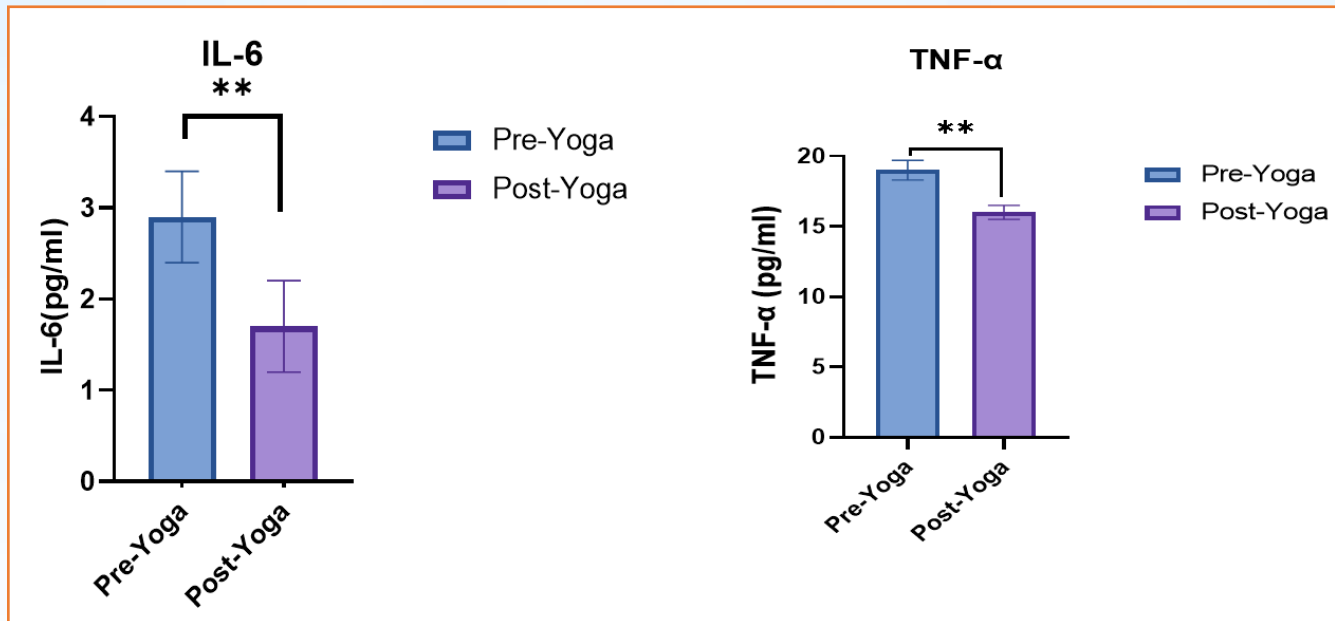
Reactive oxygen species (ROS) and Oxidative stress (OS)



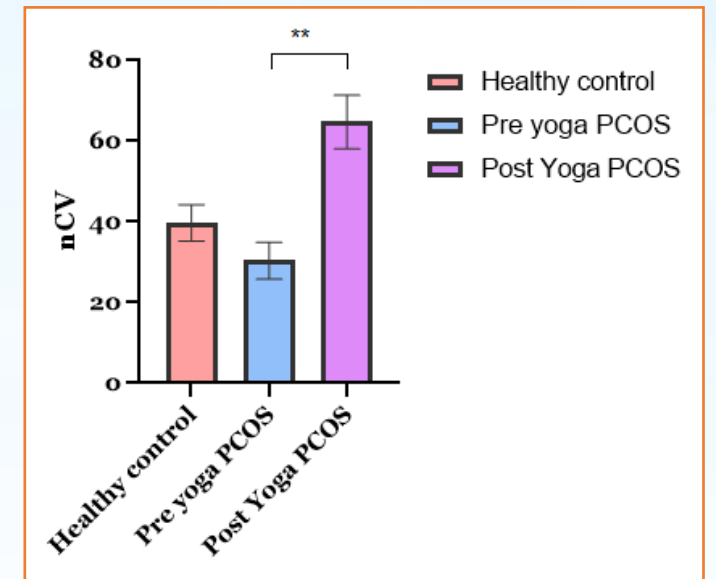
Telomere length



Inflammatory markers

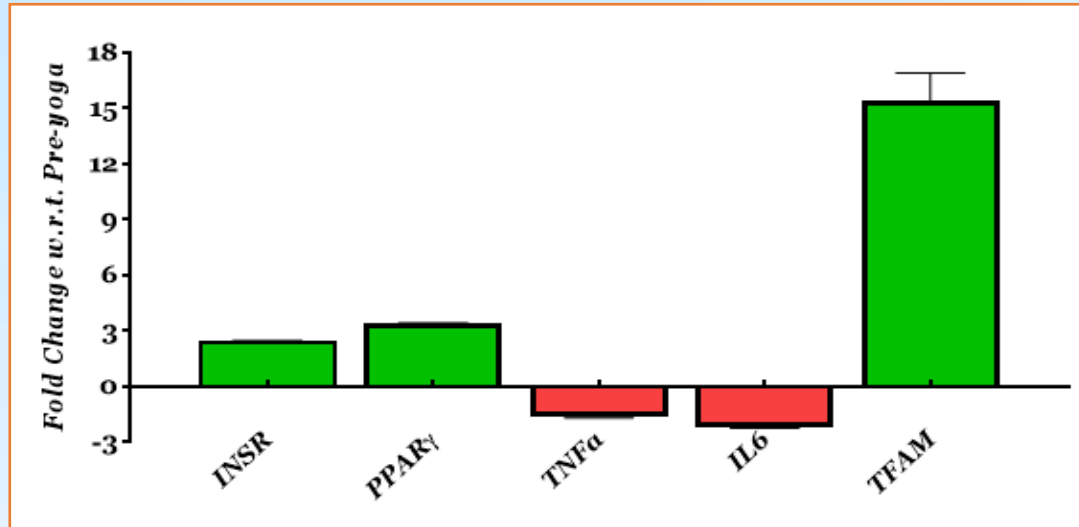


Mitochondrial copy number

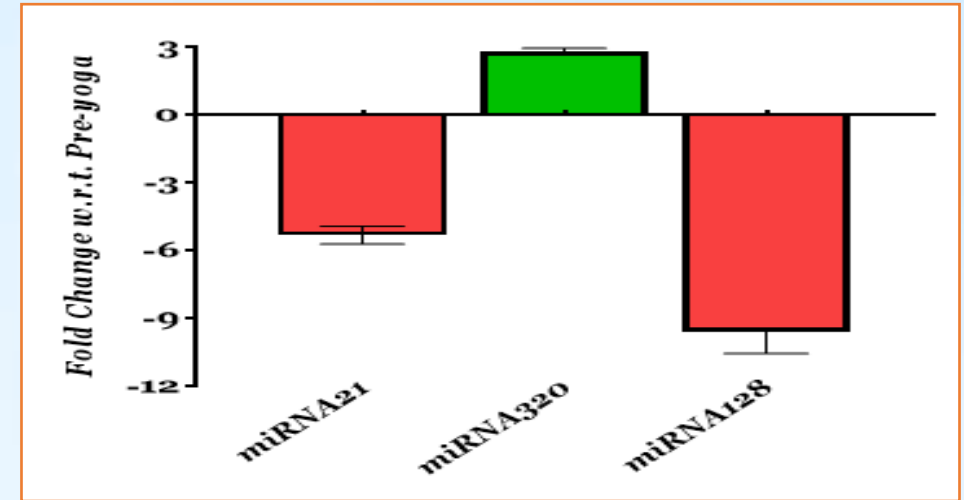


Impact of Yoga -PCOS

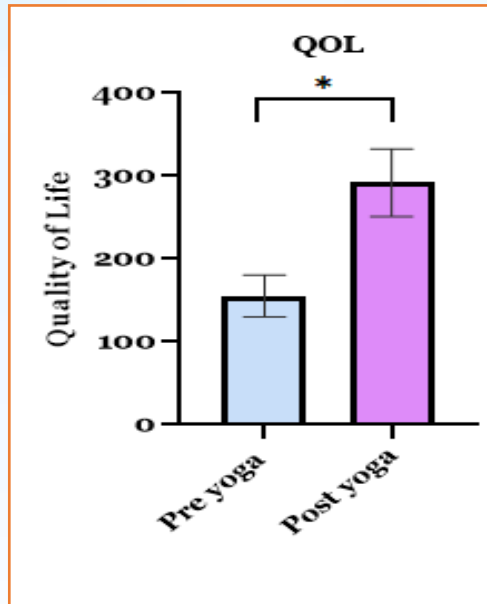
Transcript expression level



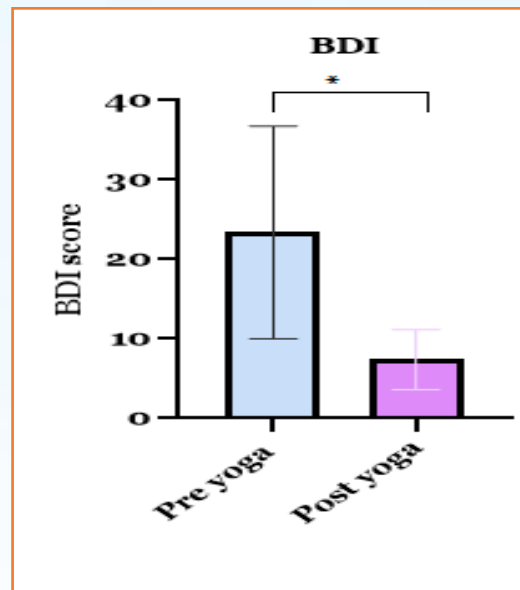
miRNA expression level



Quality of Life



Back depression inventory



- ✓ Significant improvement after yoga intervention
- ✓ Pilot study data suggest that yoga intervention can be explored to address the underlying molecular mechanism at genetic and epigenetic level and evaluate their impact on the modulation of disease progression in PCOS.

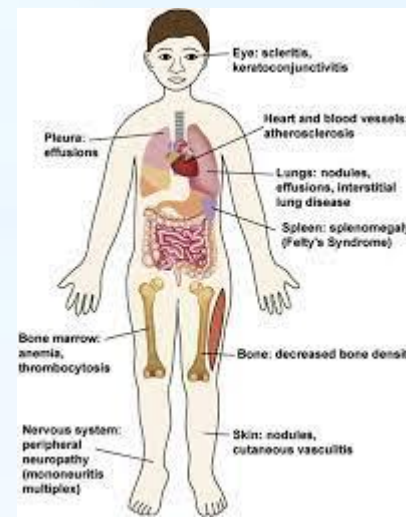
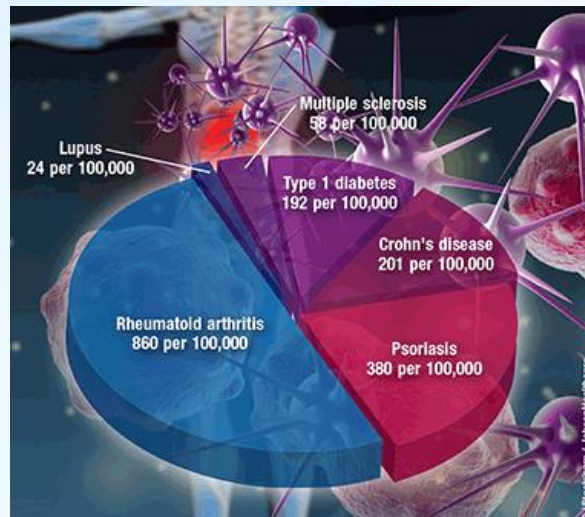


Impact of Yoga on Autoimmune Diseases

Rheumatoid Arthritis



Rheumatoid Arthritis



Treatment takes 6 to 12 weeks to show decline in severity of symptoms
DMARD- numerous side-effects, relapses, poor compliance
Yoga- Re-establishes immunological tolerance & molecular remission

Format: Abstract

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Restor Neurol Neurosci. 2019;37(1):41-59. doi: 10.3233/RNN-180875.

Impact of yoga based mind-body intervention on systemic inflammatory markers and co-morbid depression in active Rheumatoid arthritis patients: A randomized controlled trial.

Gautam S¹, Tolahunase M¹, Kumar U², Dada R¹.

Author information

- 1 Department of Anatomy, Laboratory for Molecular Reproduction and Genetics, All India Institute of Medical Sciences (AIIMS), New Delhi, India.
- 2 Department of Rheumatology, All India Institute of Medical Sciences (AIIMS), New Delhi, India.

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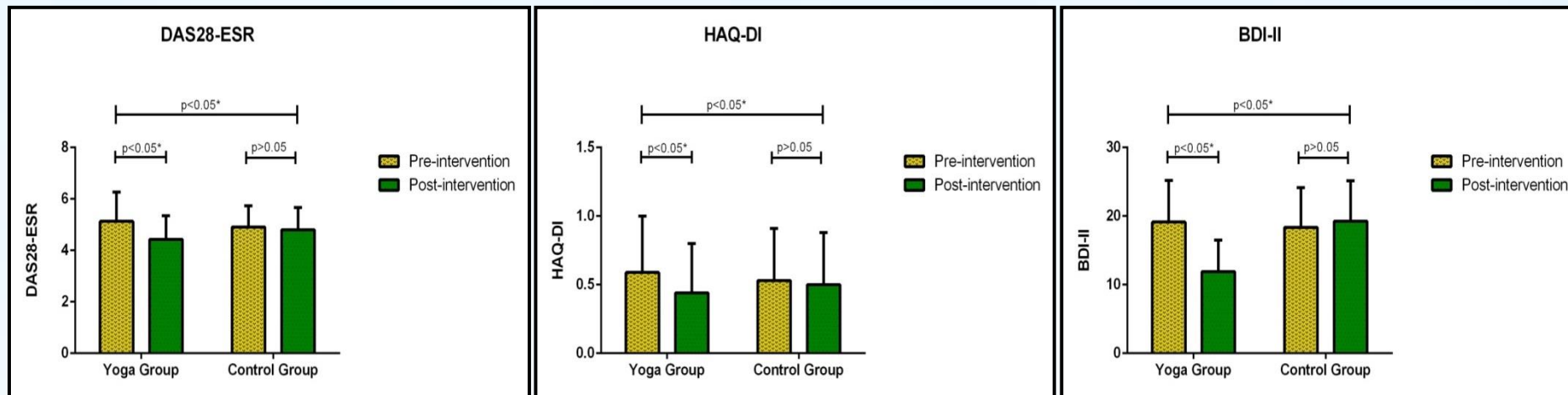


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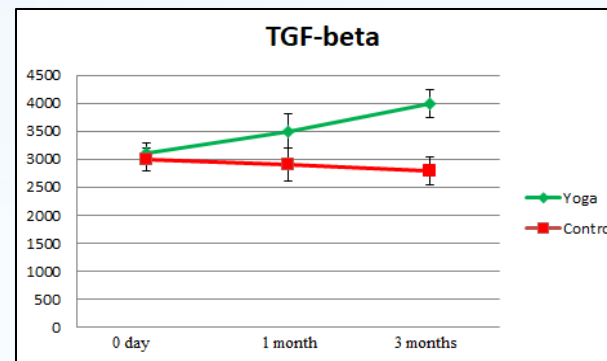
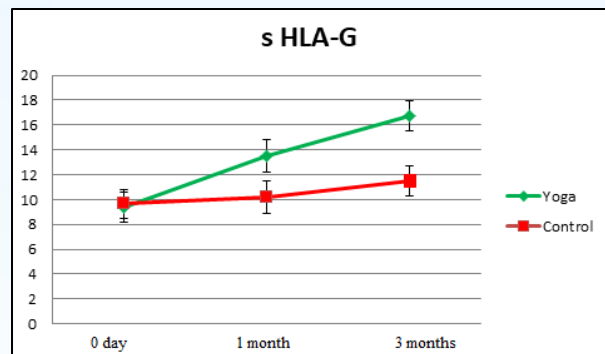
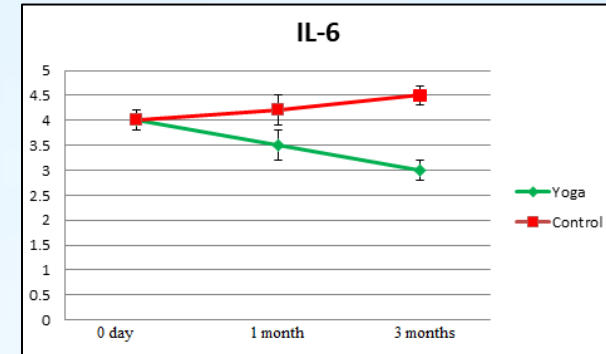
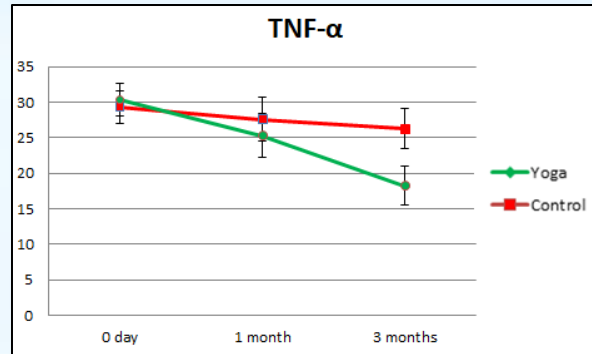
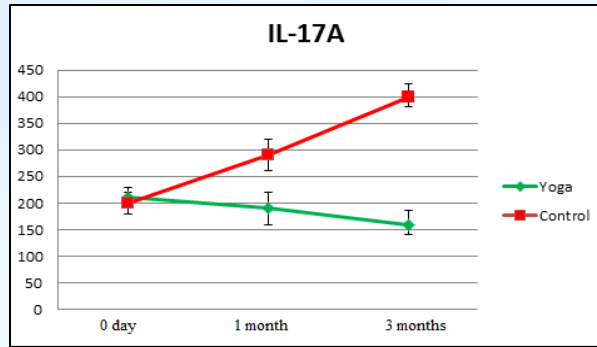


YMLI → significant ↓ in disease severity as ↓ DAS28ESR & ↓ HAQ-DI & ↓ depression severity

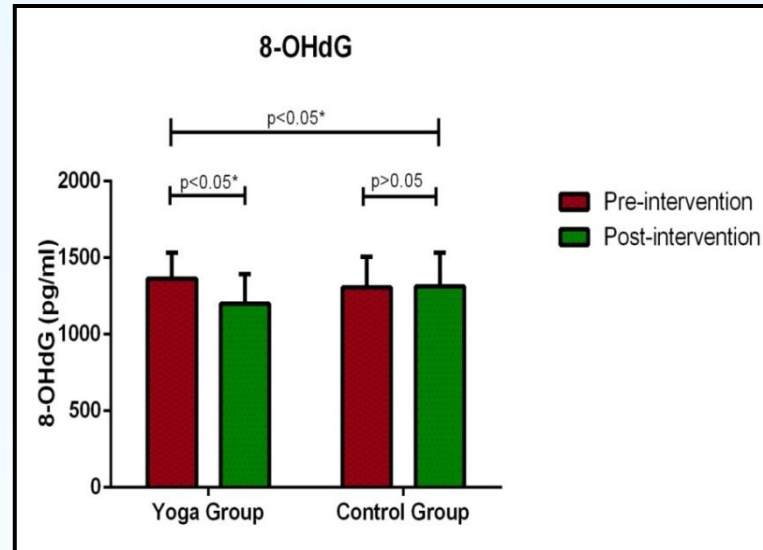
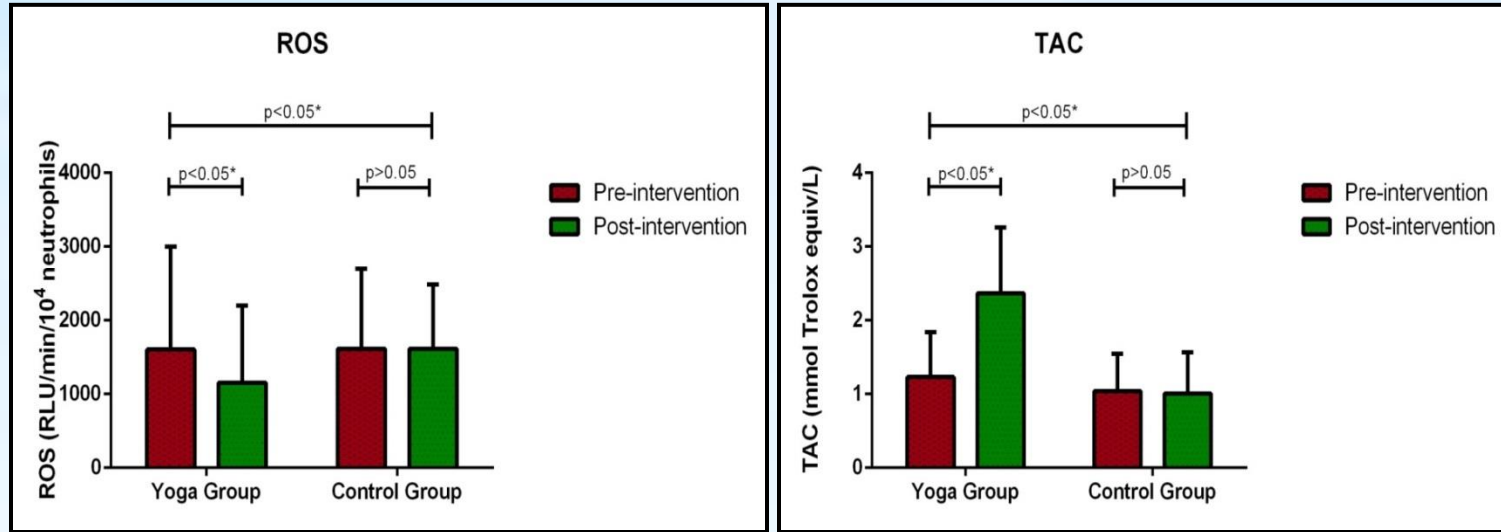
Efficacy of Yoga and Meditation Based Lifestyle Intervention on Inflammatory Markers in Patients with Rheumatoid Arthritis

Authors : Surabhi Gautam, Uma Kumar, Rima Dada

World Academy of Science, Engineering and Technology
International Journal of Medical and Health Sciences
Vol:12, No:5, 2018



Yoga : Markers of Oxidative stress



YBLI → significant ↓
Oxidative stress &
DNA damage

Yoga maintains Th17/Treg cell homeostasis and reduces the rate of T cell aging in rheumatoid arthritis: a randomized controlled trial

Surabhi Gautam^{1,2}, Romsha Kumar³, Uma Kumar⁴, Sanjeev Kumar³, Kalpana Luthra³, Rima Dada⁵

Affiliations + expand

PMID: 37696876 PMCID: PMC10495372 DOI: 10.1038/s41598-023-42231-w

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T cells subset population

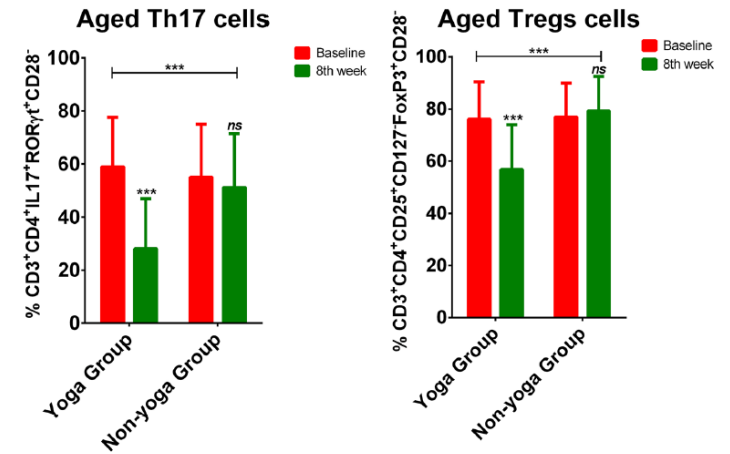
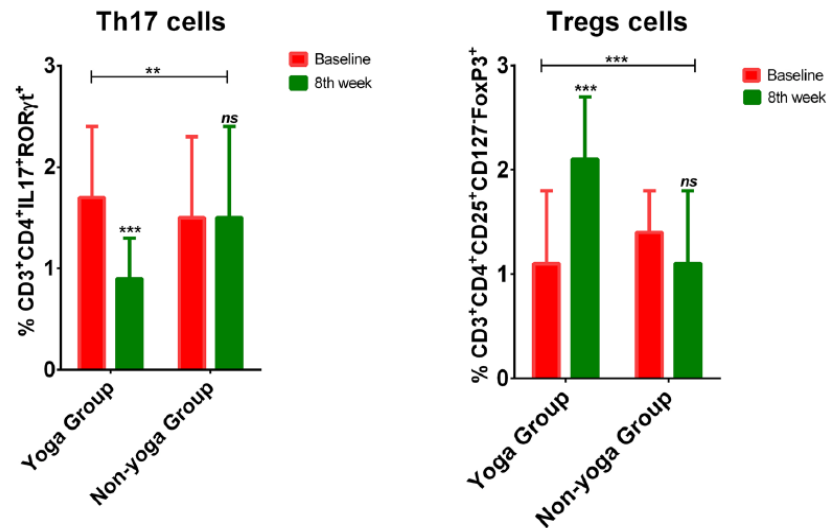


Figure 3. Frequency of Th17, Treg, aged Th17, and aged Treg cells in the yoga group and non-yoga group [p value (ns = p > 0.05; *p < 0.05; **p < 0.01; ***p < 0.001)].

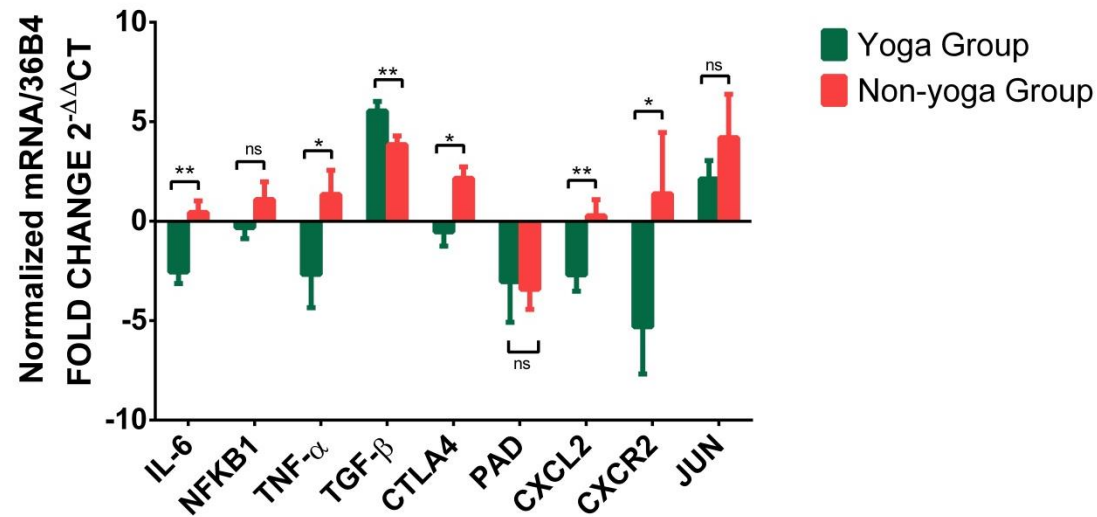
Effect of an 8-Week Yoga-Based Lifestyle Intervention on Psycho-Neuro-Immune Axis, Disease Activity, and Perceived Quality of Life in Rheumatoid Arthritis Patients: A Randomized Controlled Trial

Surabhi Gautam¹, Manoj Kumar¹, Uma Kumar², Rima Dada¹

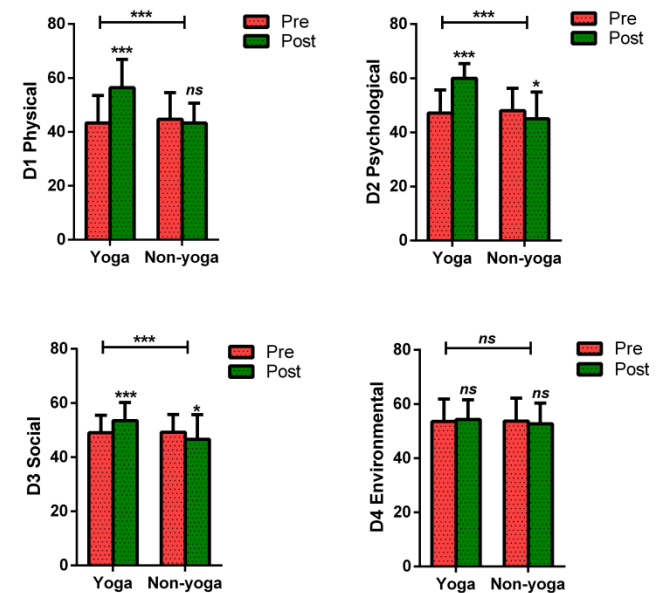
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PMID: 32982898 PMCID: PMC7492675 DOI: 10.3389/fpsyg.2020.02259

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WHOQOL-BREF Score



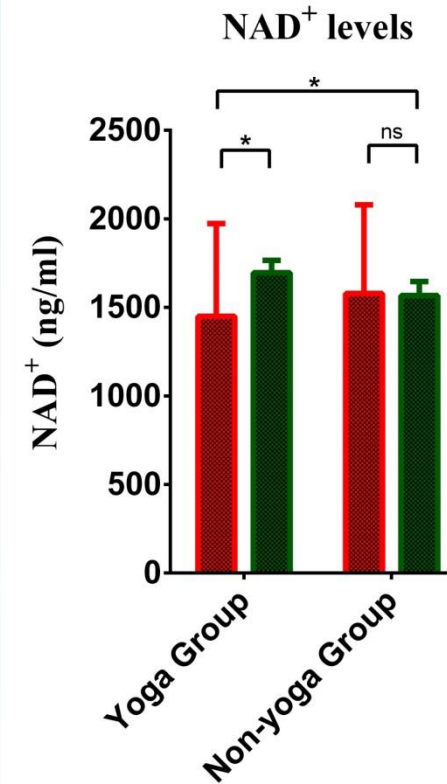
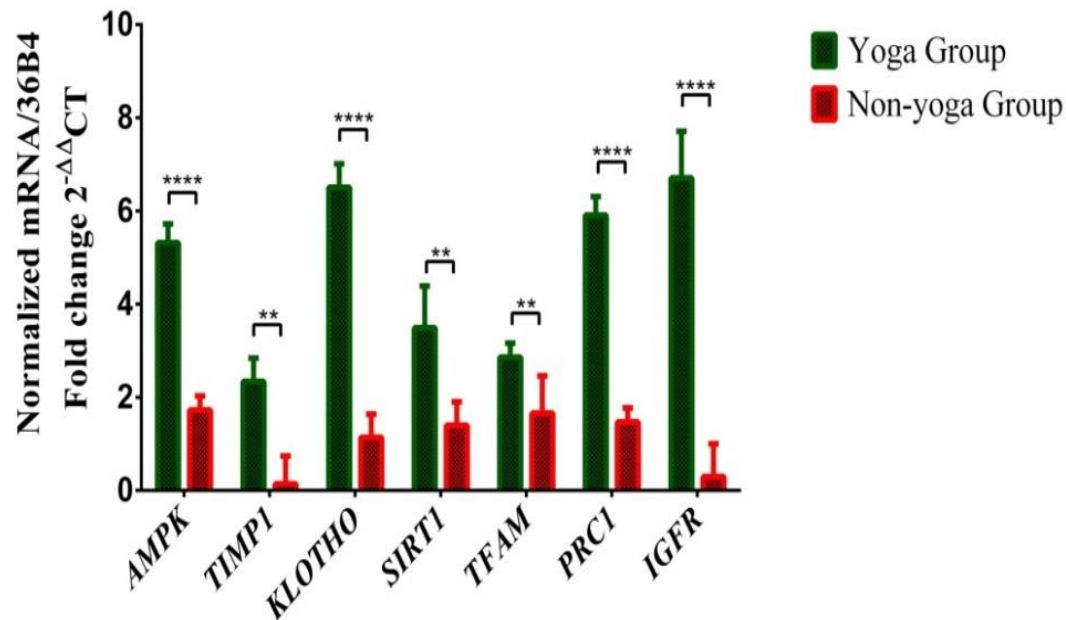
Yoga improves mitochondrial health and reduces severity of autoimmune inflammatory arthritis: A randomized controlled trial

Surabhi Gautam¹, Uma Kumar², Manoj Kumar¹, Deeksha Rana¹, Rima Dada³

Affiliations + expand

PMID: 33741520 DOI: 10.1016/j.mito.2021.03.004

Change in expression levels of selected genes at 8 weeks timepoint



p-value (ns = p > 0.05; *p 0.05; **p 0.01; ***p 0.001 ****; p 0.0001).

Yoga—Impact on Mitochondrial Health: Clinical Consequences

Annals of Neurosciences
1-3

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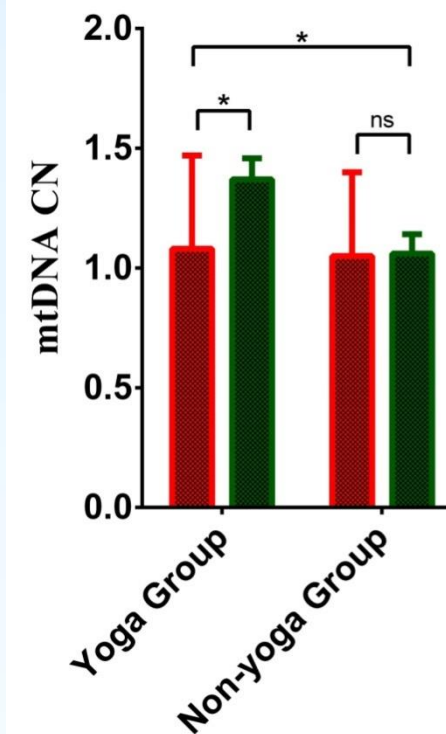
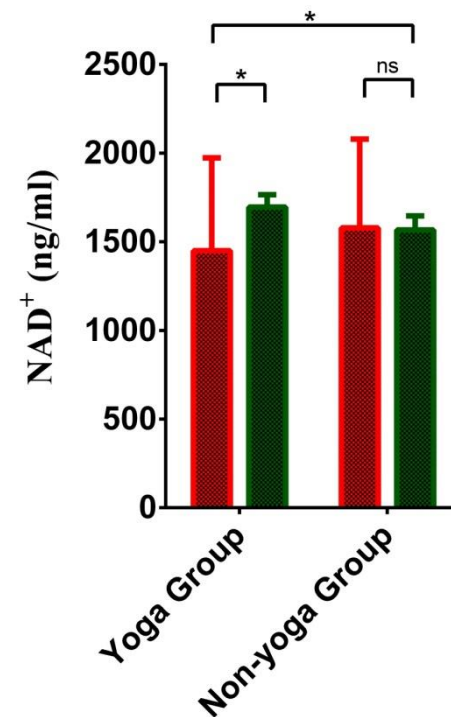
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DOI: 10.1177/09727531211009431

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Surabhi Gautam,¹ Rohit Saxena,² Tanuj Dada² and Rima Dada¹



■ Pre-intervention
■ Post-intervention

Clinical Implications

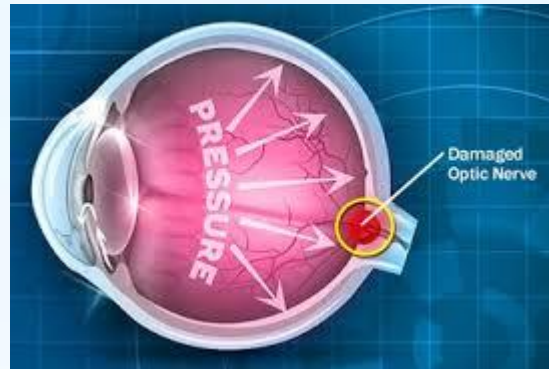
- Mitochondrial Diseases
LHON
- Tissues with high energy demand
Brain, liver, heart
- Aging

p-value (ns = p > 0.05; *p 0.05; **p 0.01; ***p 0.001 ****; p 0.0001).

Mitochondrial biogenesis markers



Impact of Yoga on Glaucoma



Effect of Mindfulness Meditation on Intraocular Pressure and Trabecular Meshwork Gene Expression: A Randomized Controlled Trial



TANUJ DADA, NITHYA BHAI, NEHA MIDHA, JYOTI SHAKRAWAL, MANOJ KUMAR, PRIYANKA CHAURASIA, SHIKHA GUPTA, DEWANG ANGMO, RAJKUMAR YADAV, RIMA DADA, AND RAMANJIT SIHOTA



J Glaucoma. 2018 Sep 25. doi: 10.1097/IJG.0000000000001088. [Epub ahead of print]

Mindfulness Meditation Reduces Intraocular Pressure, Lowers Stress Biomarkers and Modulates Gene Expression in Glaucoma: A Randomized Controlled Trial.

Dada T¹, Mittal D¹, Mohanty K^{1,2}, Faiq MA^{1,2,3,4}, Bhat MA⁵, Yadav RK⁶, Sihota R¹, Sidhu T¹, Velpandian T⁷, Kalaivani M⁸, Pandey RM⁸, Gao Y⁹, Sabel BA⁹, Dada R².

⊕ Author information

POAG Patients



RGC Apoptosis

- Increased IOP
- Ischaemia Hypoxia
- Glutamate excitotoxicity
- Oxidative Stress(ROS)
- Decrease in neurotrophins(BDNF)
- Inflammation of Glial cells(TNF)
- Nitric Oxide-cGMP dysfunction

Increased expression of antiinflammatory genes, genes involved in neuroprotection, & maintenance of TM structure and wound healing ,antioxidant genes

Decreased expression of inflammatory genes, apoptotic genes, genes involved in neurodegeneration and IOP elevation

Reduced Cerebral Blood Flow in the Visual Cortex and Its Correlation With Glaucomatous Structural Damage to the Retina in Patients With Mild to Moderate Primary Open-angle Glaucoma

Qian Wang, MD, Weiwei Chen, PhD,† Xiaoxia Qu, PhD,*
Huaizhou Wang, MD,† Ying Wang, MD,* Xun Zhang, MD,† Ting Li MD*
Ningli Wang, MD, PhD,† and Junfang Xian, MD, PhD* (J Glaucoma 2018;27:816–822)*

Meditation enhances brain oxygenation, upregulates BDNF and improves quality of life in patients with primary open angle glaucoma: A randomized controlled trial

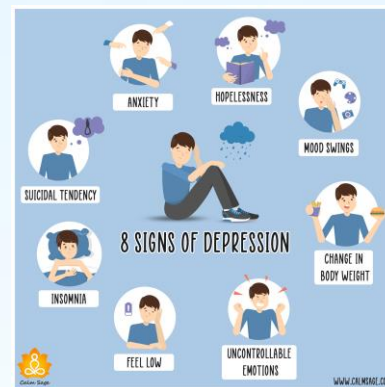
Meghal Gagrani^a, Muneeb A. Faiq^a, Talvir Sidhu^a, Rima Dada^b, Raj K. Yadav^c, Ramanjit Sihota^a, Kanwal P. Kochhar^d, Rohit Verma^e and Tanuj Dada^{a,*}

Restor Neurol Neurosci. 2018;36(6):741-753..

Significant increase in oxygenated Hb in prefrontal cortex after 6 weeks



Impact of Yoga on Depression



The burden of neurological disorders across the states of India: the Global Burden of Disease Study 1990–2019

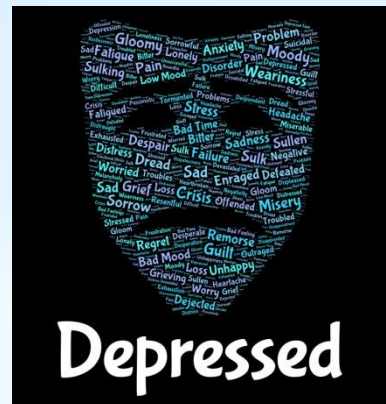
India State Level Disease Burden Initiative Neurological Disorders Collaborators*
 www.thelancet.com/lancetgh. Published online July 14, 2021 [https://doi.org/10.1016/S2214-109X\(21\)00164-9](https://doi.org/10.1016/S2214-109X(21)00164-9)

Summary
Background A systematic understanding of the burden of neurological disorders at the situational level is not readily available for India. We present a comprehensive analysis of the disease burden and trends of neurological disorders at the state level in India.

Methods Using all accessible data from multiple sources, we estimated the prevalence or incidence and disability-adjusted life-years (DALYs) for neurological disorders from 1990 to 2019 for all states of India as part of the Global Burden of Diseases, Injuries, and Risk Factors Study 2019. We assessed the contribution of each neurological disorder to deaths and DALYs in India in 2019, their trends in prevalence or incidence and DALY rates over time, and heterogeneity between the states of India. We also assessed the Pearson correlation coefficient between Socio-demographic index (SDI) of the states and the prevalence or incidence and DALY rates of each neurological disorder. Additionally, we estimated the contribution of known risk factors to DALYs from neurological disorders. We calculated 95% uncertainty intervals (UIs) for the mean estimates.

Findings The contribution of non-communicable neurological disorders to total DALYs in India doubled from 4.0% (95% UI 3.2–5.0) in 1990 to 8.2% (6.6–10.2) in 2019, and the contribution of injury-related neurological disorders increased from 0.2% (0.2–0.3) to 0.6% (0.5–0.7). Conversely, the contribution of communicable neurological disorders decreased from 4.1% (3.5–4.8) to 1.1% (0.9–1.5) during the same period. In 2019, the largest contributors to the total neurological disorder DALYs in India were stroke (37.9% [29.9–46.1]), headache disorders (17.5% [13.6–22.5]), epilepsy (11.3% [9.0–14.3]), cerebral palsy (5.7% [4.2–7.7]), and encephalitis (5.3% [3.7–8.0]). The crude DALY rate of several neurological disorders had considerable heterogeneity between the states in 2019, with the highest variation for tetanus (93.2 times), meningitis (8.3 times), and stroke (5.5 times). SDI of the states had a moderate significant negative correlation with communicable neurological disorder DALY rate and a moderate significant positive correlation with injury-related neurological disorder DALY rate in 2019. For most of the non-communicable neurological disorders, there was an increase in prevalence or incidence from 1990 to 2019. Substantial decreases were evident in the incidence and DALY rates of communicable neurological disorders during the same period. Migraine and multiple sclerosis were more prevalent among females than males and traumatic brain injuries were more common among males than females in 2019. Communicable diseases contributed to the majority of total neurological disorder DALYs in children younger than 5 years, and non-communicable neurological disorders were the highest contributors in all other age groups. In 2019, the leading risk factors contributing to DALYs due to non-communicable neurological disorders in India included high systolic blood pressure, air pollution, dietary risks, high fasting plasma glucose, and high body-mass index. For communicable disorders, the identified risk factors with modest contributions to DALYs were low birthweight and short gestation and air pollution.

Interpretation The increasing contribution of non-communicable and injury-related neurological disorders to the overall disease burden in India, and the substantial state-level variation in the burden of many neurological disorders highlight the need for state-specific health system responses to address the gaps in neurology services related to awareness, early identification, treatment, and rehabilitation.



MENTAL HEALTH MATTER

75,000 | Students killed themselves in India between 2007 and 2016

52% | Rise in student suicides from 2017 (6,248) to 2016 (9,474)*

Based on reply to the Lok Sabha by minister H G Ahir on January 2, 2018

Reasons for rising depression, anxiety among students

- Zero communication with parents
- Overdependence on gadgets
- Mollycoddling of children
- Instant sense of gratification

Problem solving taught

56 million | People with depressive disorders in India in 2015, as per a WHO 2017 study

450 million | People across the globe suffering from mental or neurological disorders in 2015

1 person out of 4 in the world is affected by mental or neurological disorders at some point in their lives

1 person out of 2 in India suffers from depression, says National Mental Health Survey of India 2016

Mental Healthcare Bill 2017 ensures that every person has access to mental health services

Times of India
10th October 2019

THE HEAVY PRICE OF SCREEN ADDICTION

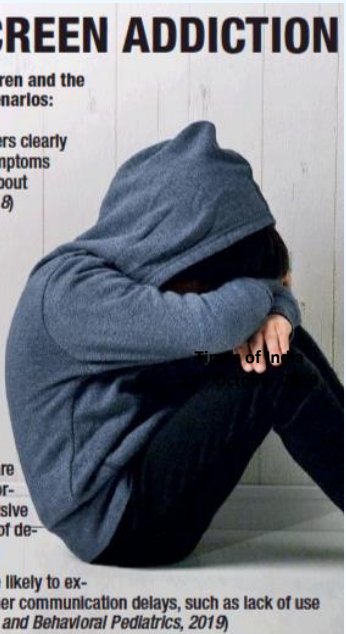
Numerous studies have been done in the recent past on children and the time they spend on screens. Most of them present dismal scenarios:

DEPRESSION, SUICIDAL IDEATION: Researchers clearly link children's screen activities with higher levels of depressive symptoms or suicide-related outcomes, including suicidal ideation (thinking about suicide) and attempts. (*Clinical Psychological Science, January 2018*)

DIABETES, EMOTIONAL INSTABILITY: It has been revealed that children who spend over three hours daily on screens are less lean and more likely to develop Type 2 diabetes. (*Archives of Disease in Childhood, July 2017*). Also, researchers state that more hours of screen time is associated with lower psychological well-being among children aged two to 17, with high users showing less curiosity, self-control, and emotional stability (*Preventative Medicine Reports, 2018*).

INATTENTION, POOR DECISIONS: Compared with pre-schoolers with less than 30 minutes per day of screen time, those who watch more than 2 hours each day are 5.9 times more likely to report clinically significant inattention problems and are at 7.7-fold higher risk for meeting attention deficit hyperactivity disorder (ADHD) criteria. (*Plos One, April 2019*). Another paper links impulsive behaviour and tendency to make poor decisions among kids to use of devices with screens for more than two hours a day. (*Pediatrics, 2019*)

SPEECH DELAY: Toddlers who use mobiles daily are more likely to experience speech delays, i.e., late to begin talking. Prevalence of other communication delays, such as lack of eye contact and eye gaze, also reported. (*Journal of Developmental and Behavioral Pediatrics, 2019*)



Access to mental healthcare is tough for 50% of people: Study

'Patients Are Increasingly Seeking Consultations Online'

Sushmi.Dey@timesgroup.com

CAUSE FOR CONCERN

13.7% Prevalence of mental illness in India as per National Mental Health Survey (2016)

28% of global suicides occur in India

Access to mental healthcare

- 49% had a mental health facility within 20km radius
- 26% reported no mental health facility within 50km radius
- 59% reported lack of any de-addiction service in their area



Awareness about mental health

- 57% not aware of any person with mental illness
- 28% did not consider suicide to be associated with mental illness

Insurance for mental healthcare

- 80% had no health insurance or thought mental health treatment was not covered

treatment of mental illness. "Availability of facilities has been an issue, and an overwhelming 87% individuals favoured use of technology to try to bridge this divide by using mobile phones, apps and tele-medicine," says Srishti Jaju of CIMBS.

Web platforms claim patients are increasingly seeking online consultation for mental illness. For instance, Practo's Online Consult has registered an 88% growth in psychiatric queries since last year.

Besides, cost of treatment appeared to be a significant deterrent in accessing care as 80% of the patients have no health insurance or thought mental health treatment was not covered. Only 8% were aware that health insurance covered such a disorder. The study also showed that 28% did not consider suicide to be associated with mental illness and therefore did not seek intervention.

psychiatrist & director of World Federation of Mental Health (WFMH). The study, conducted by Cosmos Institute of Mental Health and Behavioural Sciences (CIMBS) and WFMH, covered 10,233 individuals in urban and rural areas across 175 districts of UP, Punjab, Haryana, Himachal, Delhi, Uttarakhand and J&K. According to the National Mental Health Survey (2016), lifetime prevalence of mental illness in India is estimated at 13.7% with over 150 million patients in need of active intervention. The study also points at the lack of private sector participation in creating facilities for

Original Research Article

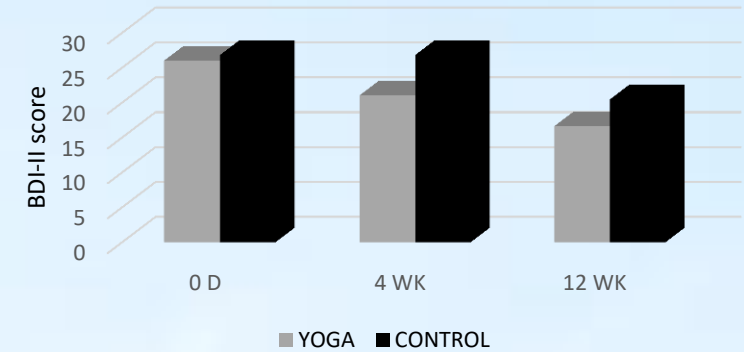
Yoga- and meditation-based lifestyle intervention increases neuroplasticity and reduces severity of major depressive disorder: A randomized controlled trial

Madhuri R. Tolahunase^a, Rajesh Sagar^b, Muneeb Faiq^a and Rima Dada^{a,*}

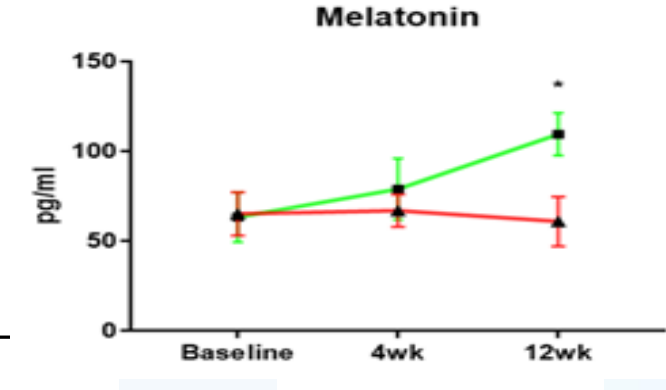
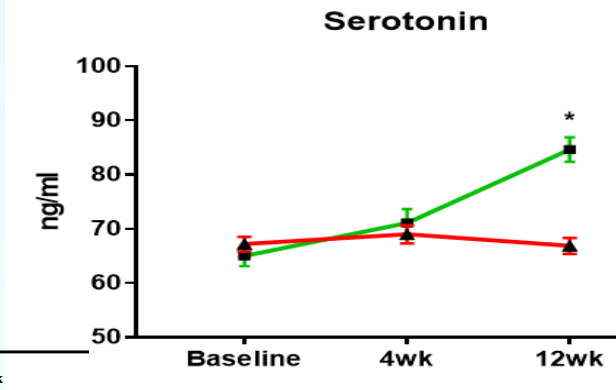
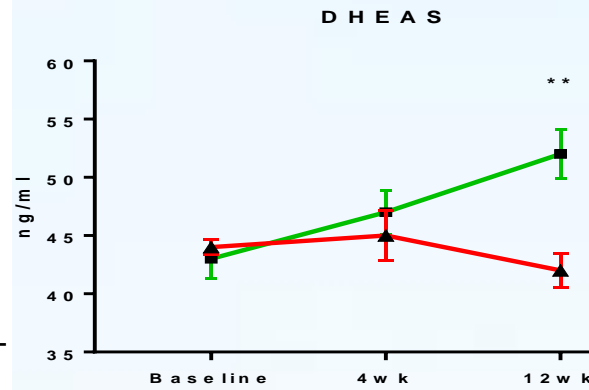
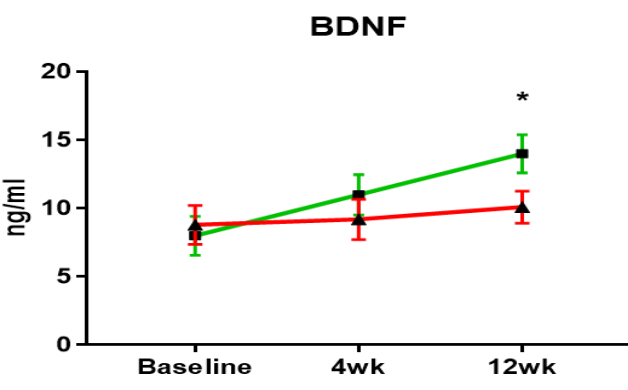
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Depression severity

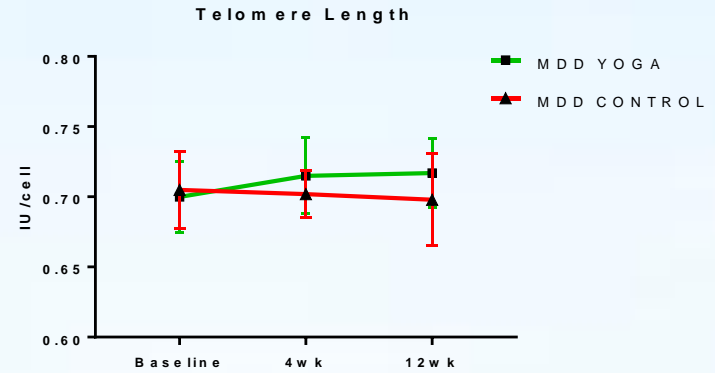
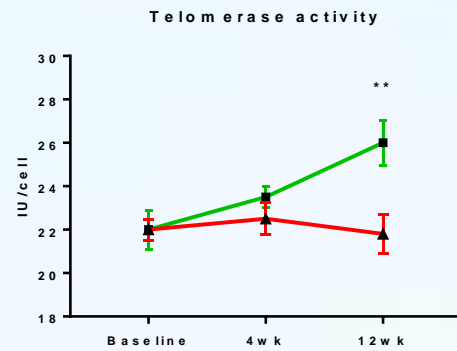
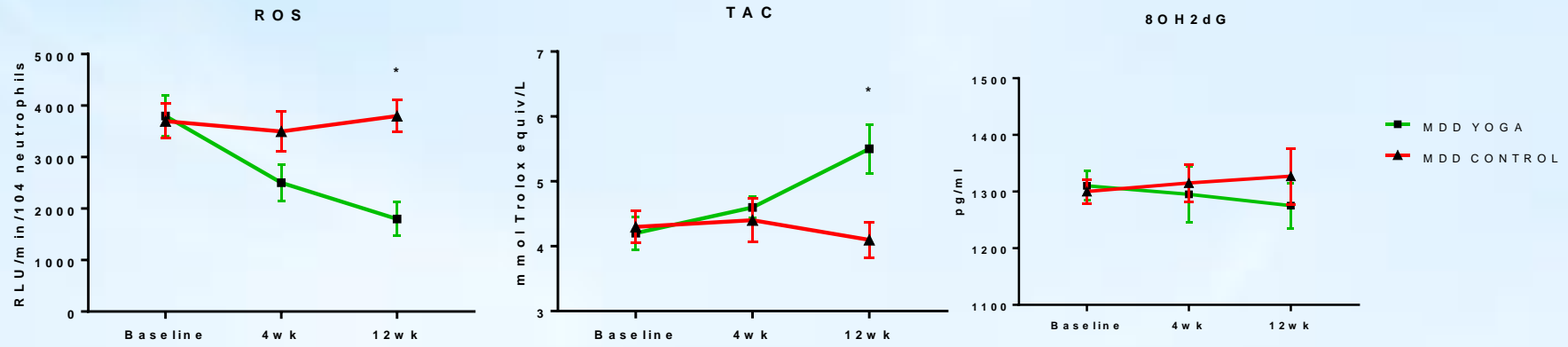


Raw Scores	Depression Severity
0-13	Indicates minimal depression
14-19	Indicates mild depression
20-28	Indicates moderate depression
29-63	Indicates severe depression



■ MDD YOGA
▲ MDD CONTROL

Yoga-Depression



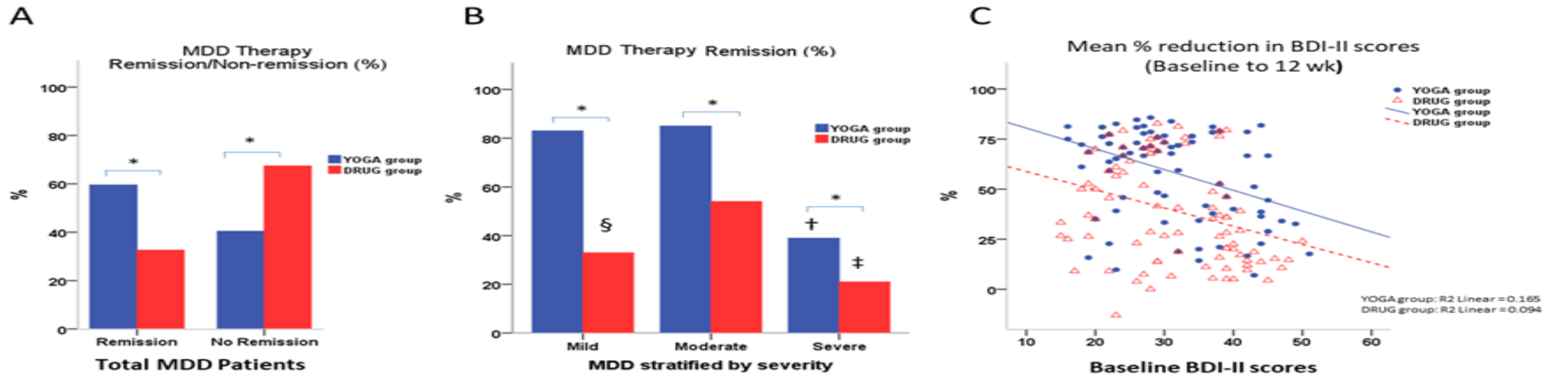


Indian J Psychiatry. 2018 Oct-Dec; 60(4): 410–426.
doi: [10.4103/psychiatry.IndianJPsychiatry_398_17](https://doi.org/10.4103/psychiatry.IndianJPsychiatry_398_17)

PMCID: [PMC6278208](https://pubmed.ncbi.nlm.nih.gov/PMC6278208/)
PMID: [30581206](https://pubmed.ncbi.nlm.nih.gov/30581206/)

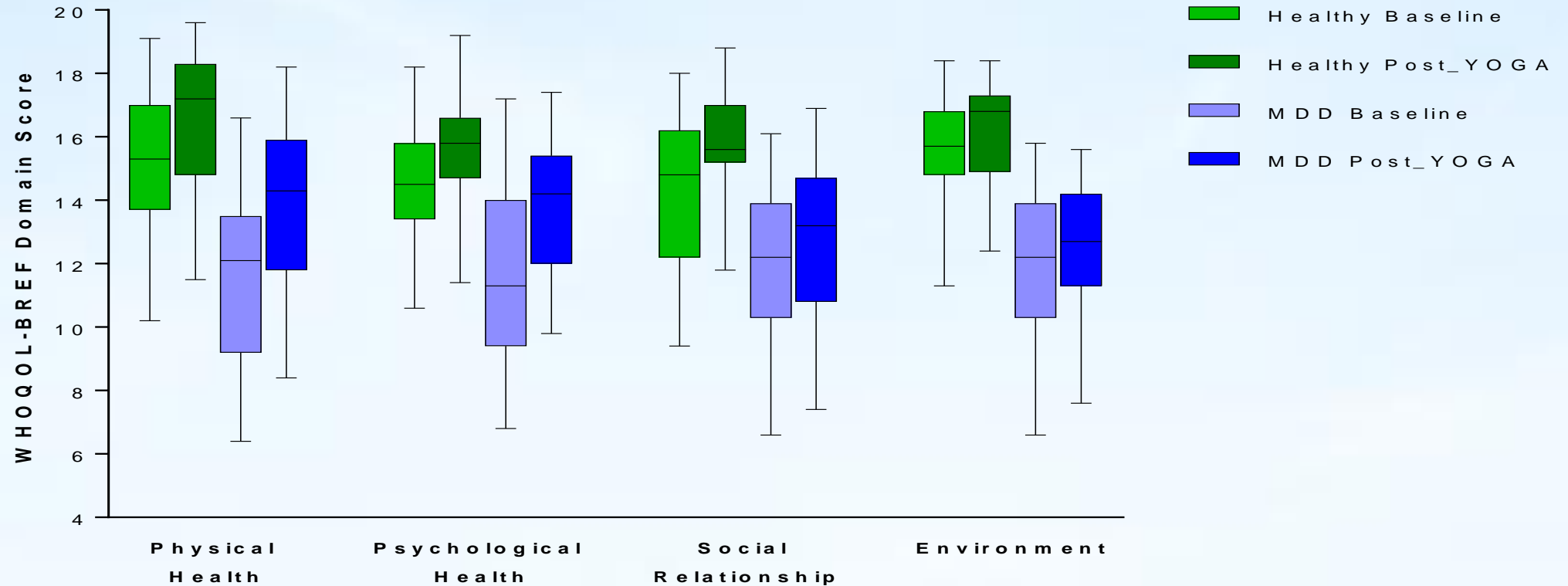
5-HTTLPR and *MTHFR* 677C>T polymorphisms and response to yoga-based lifestyle intervention in major depressive disorder: A randomized active-controlled trial

Madhuri R. Tolahunase, Rajesh Sagar,¹ and Rima Dada



The rates for remission -59% YOGA group and 33% DRUG group

QOL -Healthy and Infertile Patients before and after YOGA



Yoga- ART OF LIVING

Modulates -THE INTERNAL PHARMACY



Yoga-Tremendous transformative power-dynamic changes in gene expression

**Epigenome influences our health- We too can influence our epigenome-by our choices
What will your choice be?**



Thankyou