

YOGA AND HYPERTENSION

Yogacharya

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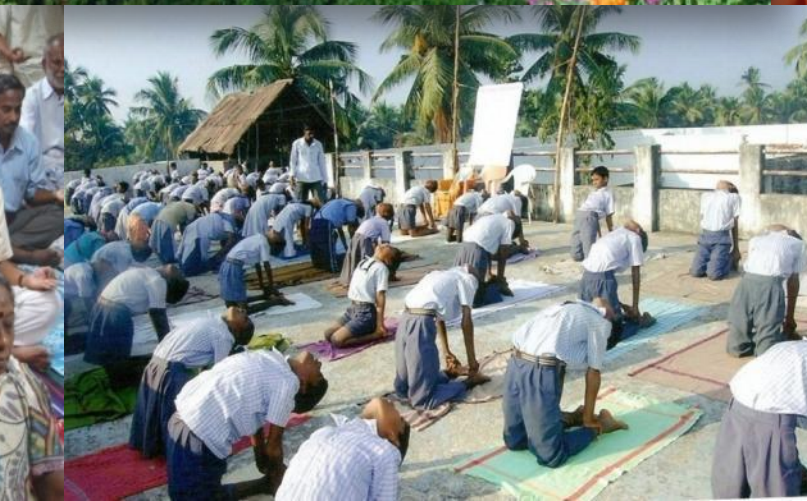
**Program Coordinator- Advanced Centre for Yoga
Education, Therapy and Research (ACYTER), JIPMER,
Puducherry-6**

யோக சிகிச்சை கல்வி மற்றும் ஆராய்ச்சிக்கான முதுநிலை மையம்
योग चिकित्सा शिक्षा एवं अनुसंधान उन्नत केन्द्र

ADVANCED CENTRE FOR YOGA THERAPY EDUCATION AND RESEARCH (ACYTER)

(A collaborative venture between JIPMER and MDNIY, New Delhi)





YOGA

- Spiritual art and science of psychosomatic, spiritual integration
- Promotes positive health
 - *Yogic lifestyle and techniques like asana, pranayama, shatkriya, mudra, relaxation, meditation etc*
- Improved psycho-neuro-immune function
- Yogic lifestyle (*yama-niyama*) is preventive
- Improved sense of well being and QOL
- Positive attitude towards suffering -*Bhavana*

ADVANTAGES OF LIFESTYLE MODIFICATIONS

- **Natural, effective and safe**
- **Complementary to “modern” medicine**
- **Cost effective**

Should be the basis of our public health policy and clinical approach- yet,

Are our doctors trained in it?

ADVANTAGES OF YOGA

- **Wholistic:** Body, mind, soul
- Preventive, promotive, curative
- Science, philosophy, art
- Desirable +ve “side benefits”
- Simultaneous improvement in health and control of other diseases
- Relief from **stress** - the main cause of *Adhija Vyadhi* (psychosomatic disorders)
- Yoga enables us to attain and maintain a dynamic *Sukha Sthanam* - a dynamic sense of physical, mental and spiritual well being.

- Yoga helps cultivation of **positive health** through three integral steps:
 1. Cultivation of **correct psychological attitudes**,
 2. **Reconditioning of neuro-muscular and neuro-glandular system** – in fact, the whole body – enabling it to withstand stress and strain better,
 3. Laying great emphasis on **appropriate diet** conducive to such a peak state of health, and **encouraging natural processes of elimination** through various processes of *mala shuddhi*.

Components of a healthy Yogic lifestyle :

- **ACHAR** – healthy physical activities and exercise
- **VICHAR** – right thoughts and right attitude
- **AHAR** – healthy, nourishing diet
- **VIHAR** – proper recreational activities

PATHOPHYSIOLOGY OF HYPERTENSION

- Cardiac output and peripheral resistance are the two determinants of arterial pressure.
- Cardiac output is determined by stroke volume and heart rate. Stroke volume is related to myocardial contractility and size of vascular compartment.
- Peripheral resistance is determined by functional and anatomic changes in small arteries and arterioles.

1. Genetics

- Almost 10 genes have been identified to cause Mendelian forms of high and low blood pressure
These mutations affect blood pressure by altering renal salt handling
- **Yoga may modify gene expression by changing internal and external environment through diet, attitudinal changes etc.**
- **Relaxation response though meditation changes gene expression (Benson)**

2. Autonomic Nervous System

- Increased sympathetic activity in HT involves peripheral and central alterations in baro & chemoreflex pathways.
- Those with family history of HT manifest augmented vasoconstrictor and sympathetic responses to lab stressors (CPT).
- **Yoga balances the autonomic nervous system with decrease in sympathetic over activity.**
- **Head below heart postures may modulate resetting of baroreflex mechanism while Pranayama may modulate chemoreflex mechanisms.**
- **Shavasana modifies cold-pressor test (JIPMER).**

3. Renin- Angiotensin- Aldosterone

- Recent studies claim that obesity is a risk factor for HT because of activation of renin- angiotensin - aldosterone system in adipose tissue, and also link the renin- angiotensin system with insulin resistance.
- **Yoga helps normalize body weight and improves insulin sensitivity.**
- **Autonomic balance produced by Yoga can also help as it has been found that ablation of the sympathetic nerves to renal arteries reduces BP.**

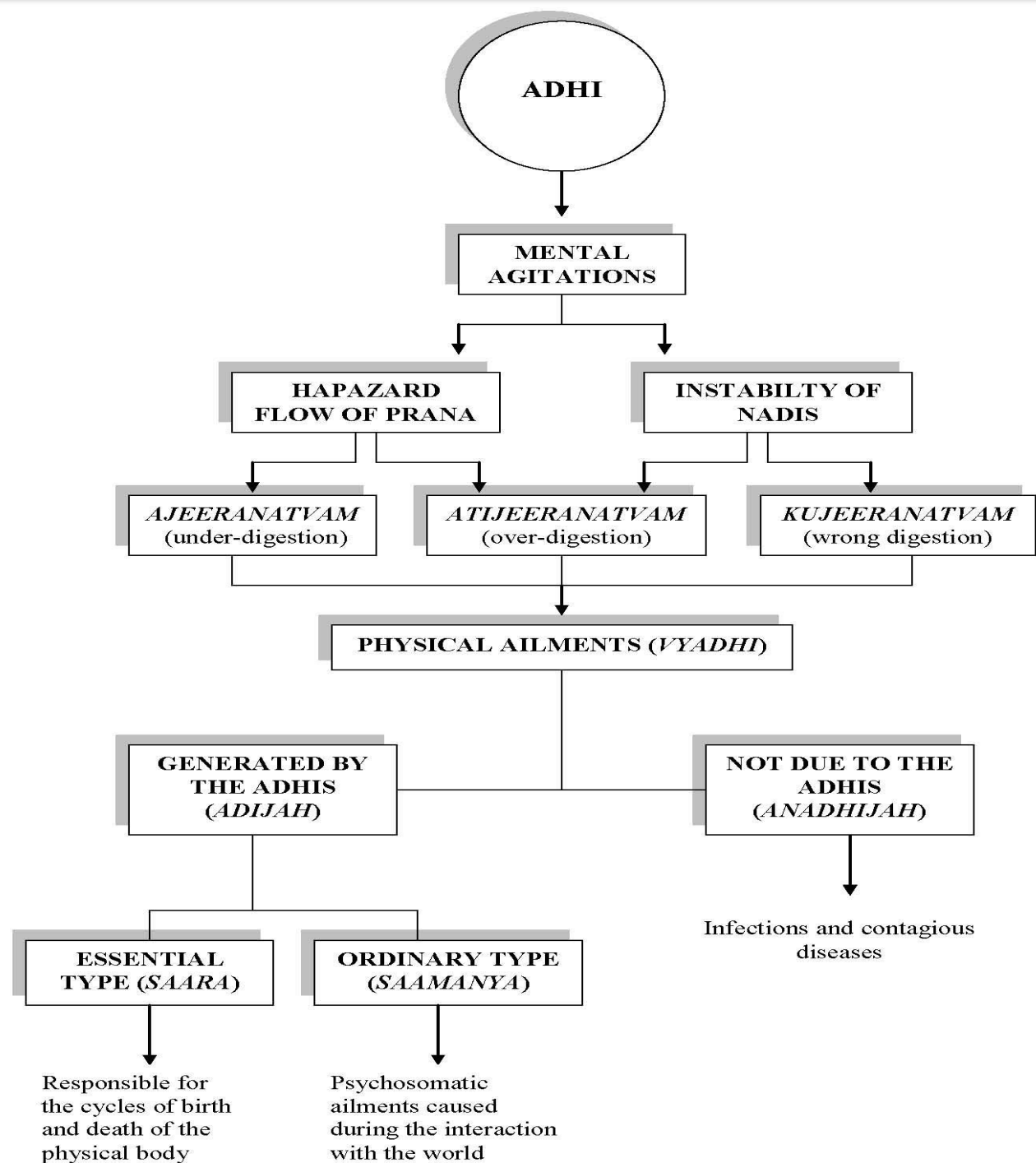
4. Endothelial dysfunction

- Oxidant stress alters many functions of the endothelium, including modulation of vasomotor tone.
- **Research has shown the anti-stress and anti-oxidant potential of Yoga.**
- **Vasomotor tone may be modulated by the changes in autonomic balance too.**
- **Decreases in LDL and VLDL coupled with increases in HDL are found to occur after Yoga.**

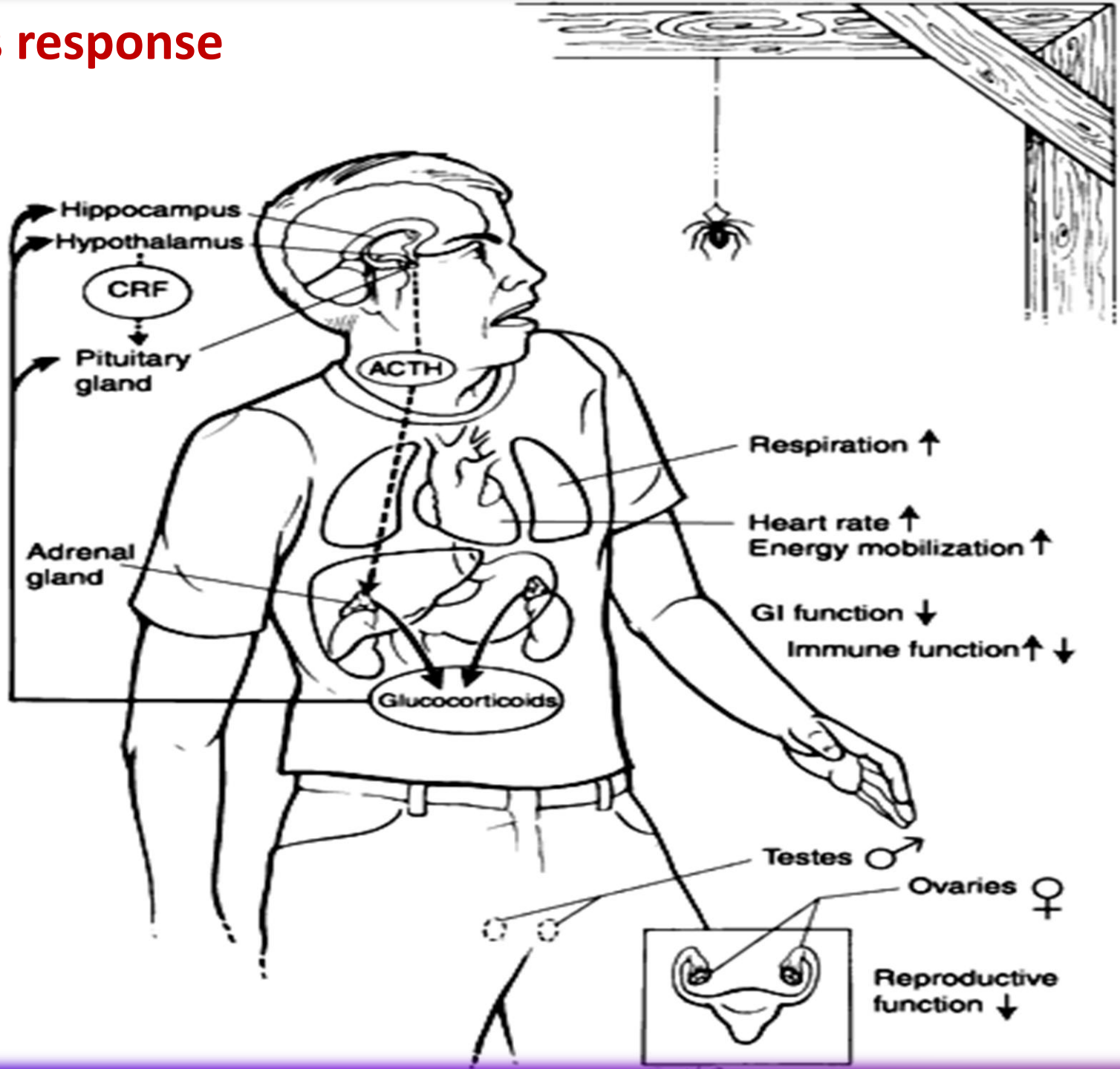
THE YOGIC CONCEPT OF ORIGIN OF DISEASE

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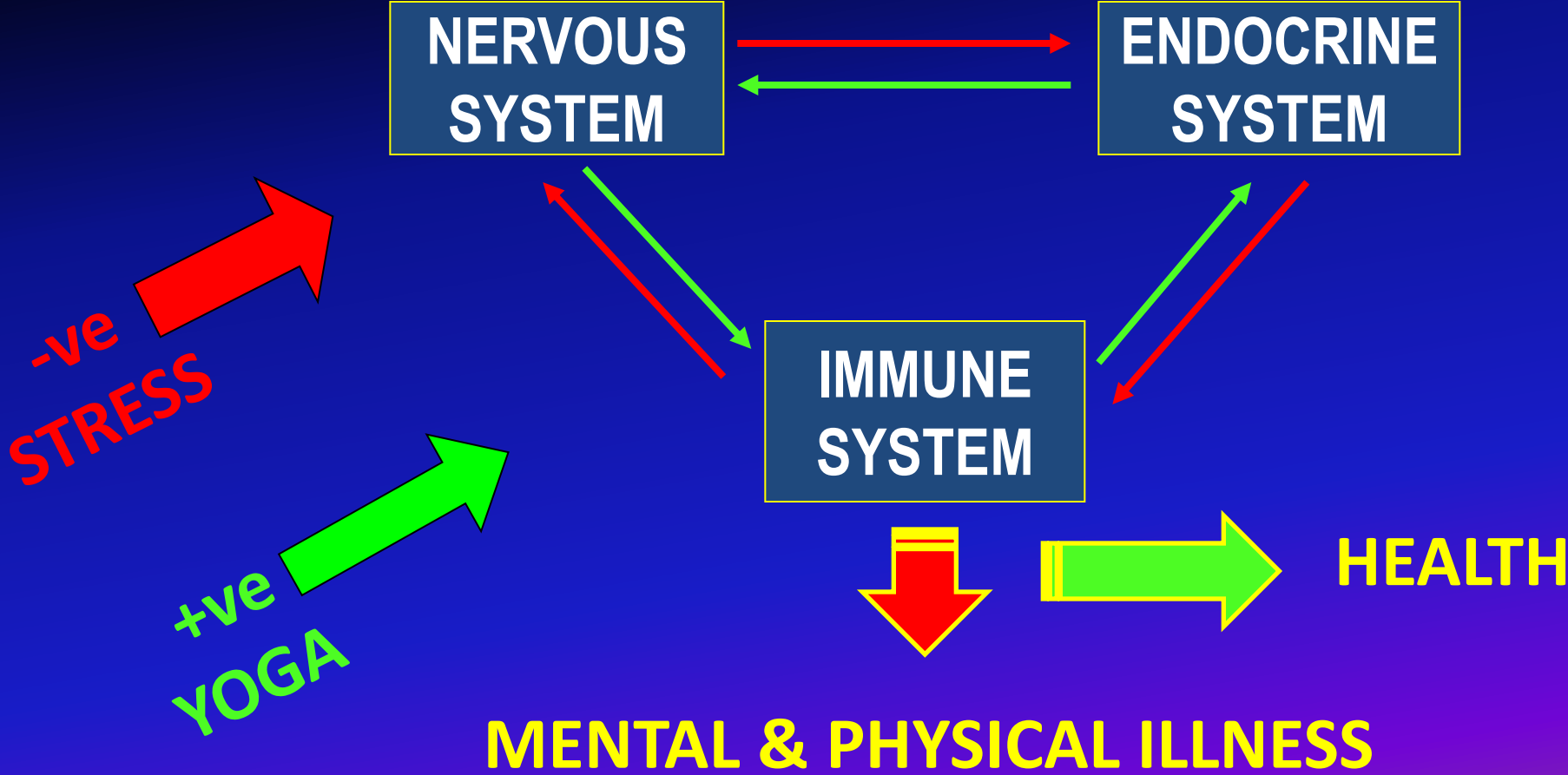
Yoga
Vashishta
(> 5000 yrs ago)



Stress response

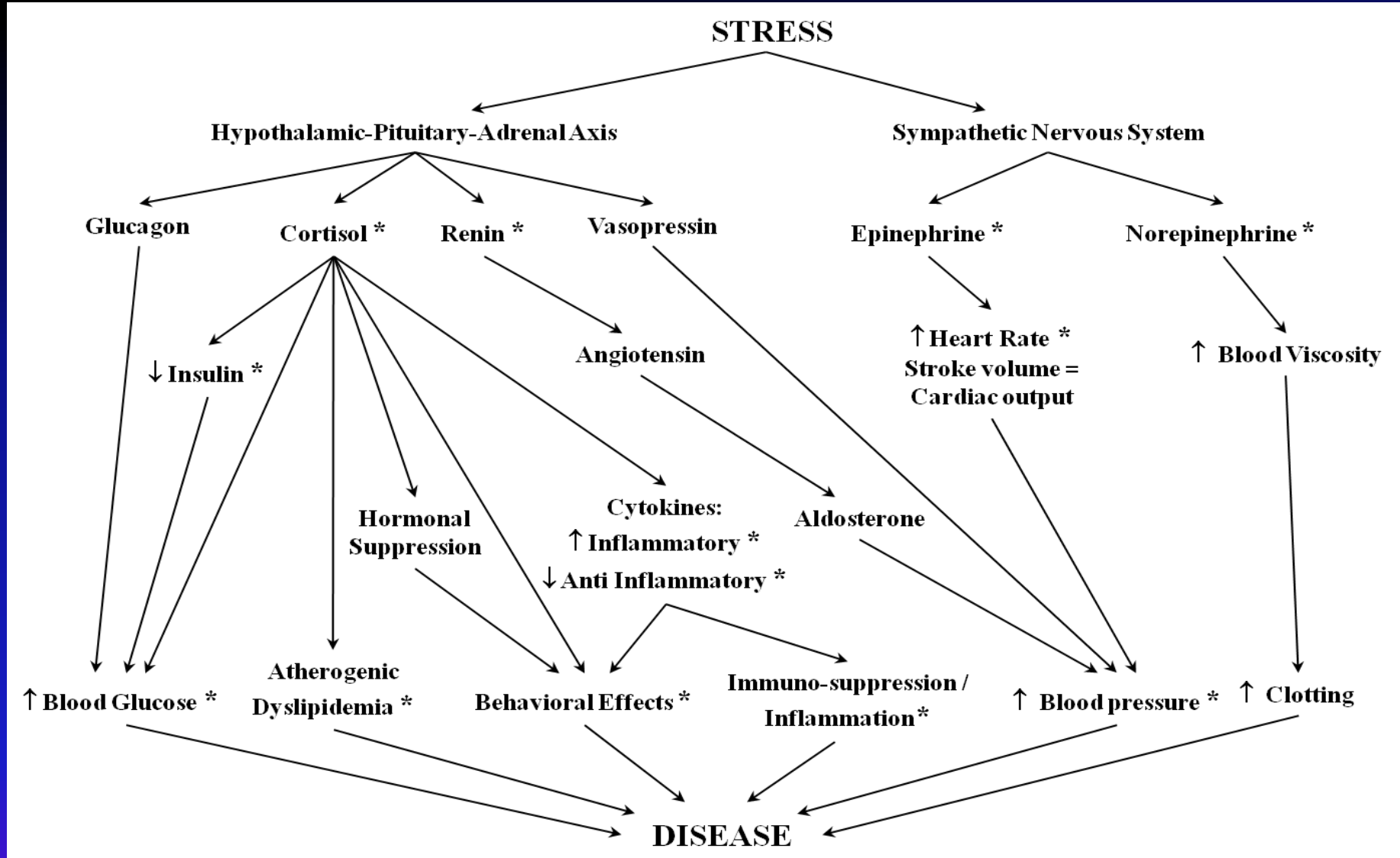


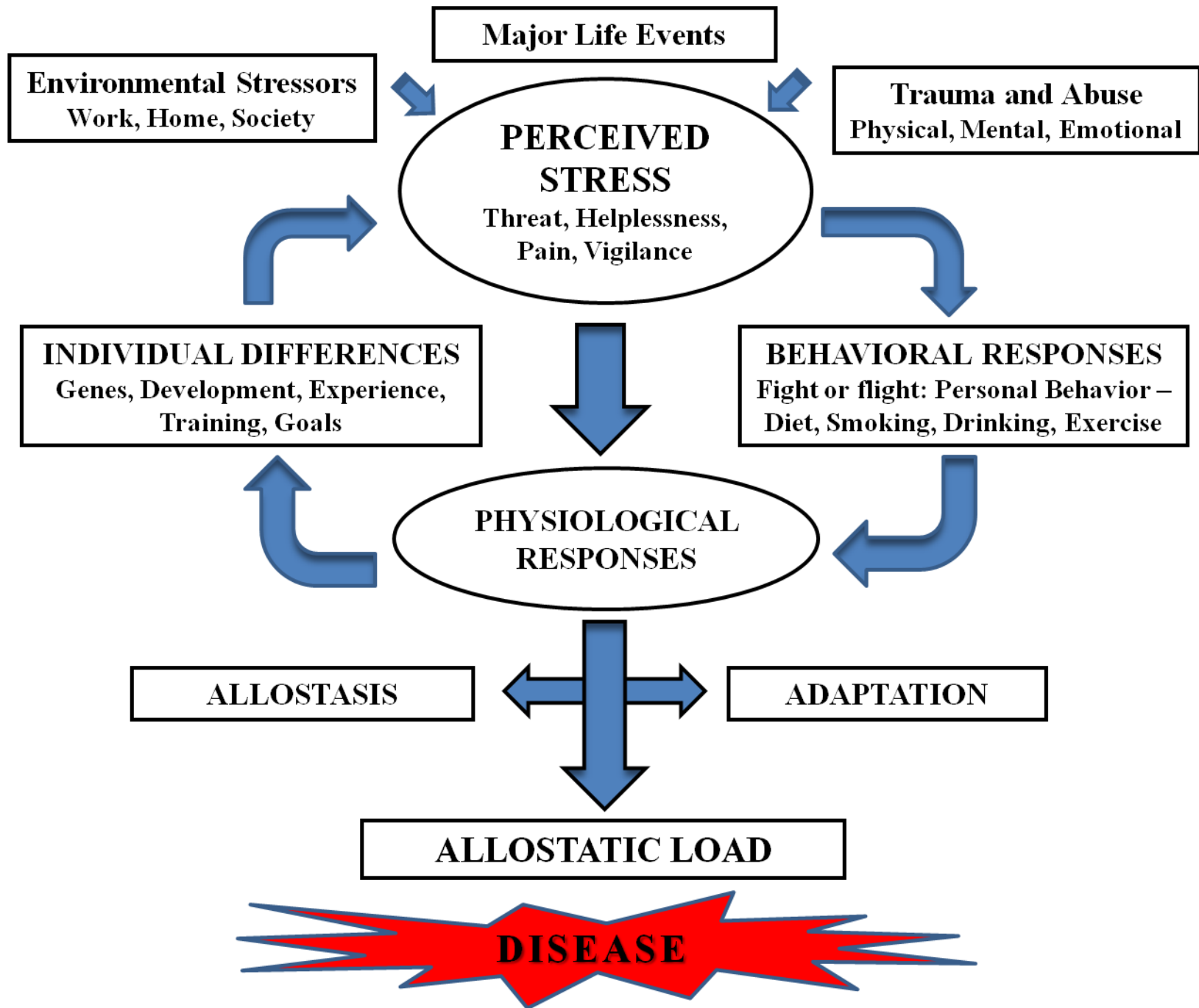
PSYCHO-NEURO-IMMUNO-ENDOCRINOLOGICAL CORRELATES OF STRESS



Impact of stress on hypothalamic–pituitary–adrenal (HPA) axis and sympathetic NS.

* Yoga has been shown to have significant beneficial effects in these



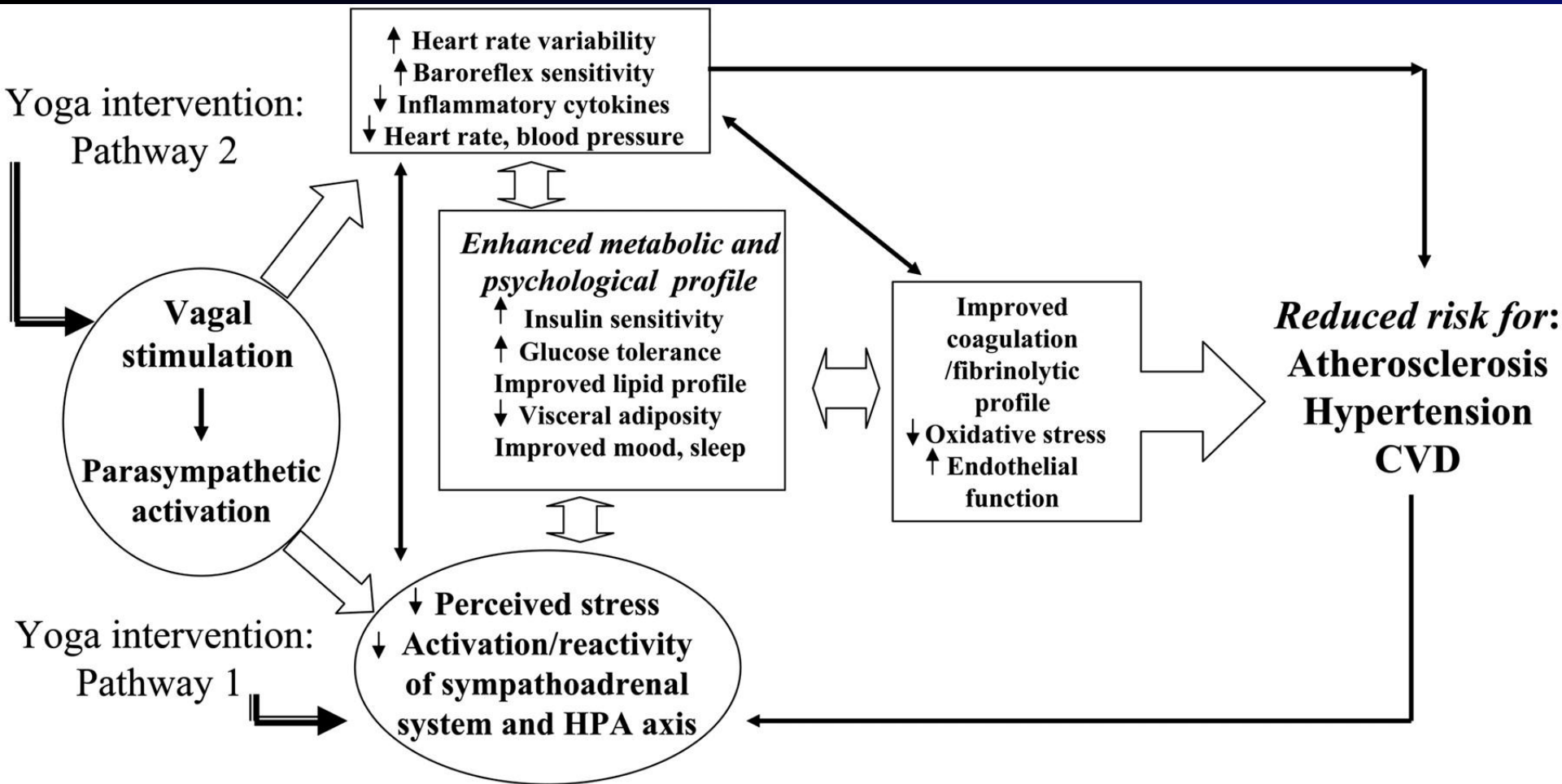


**Nothing
can stress you,
unless
you allow it to do so!**

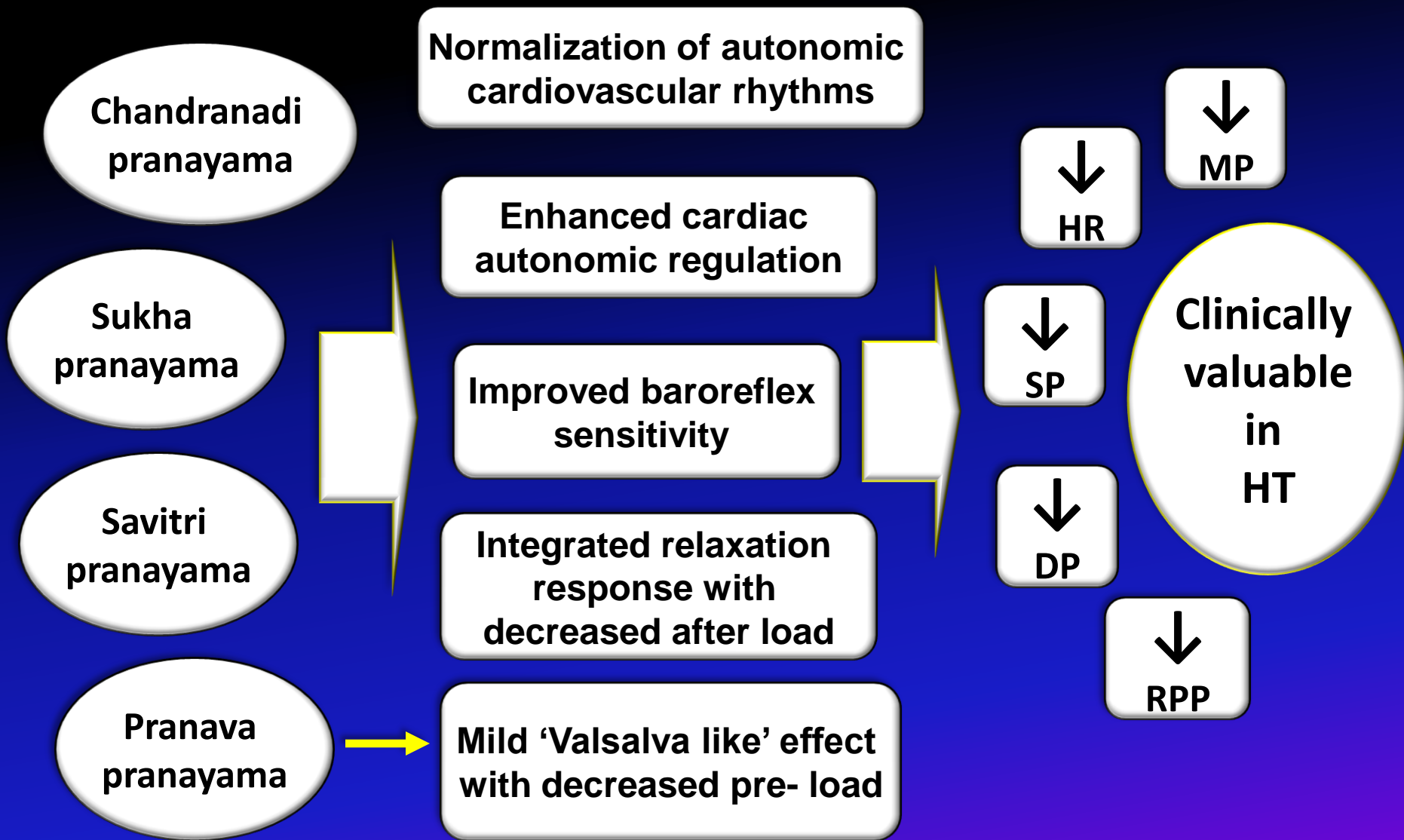
Streeter CC et al. Med Hypotheses 2012; 78: 571-9

- Stress induces autonomic imbalance.
- Decreased para-sympathetic & increased sympathetic activity, under activity of GABA system, the primary inhibitory neurotransmitter, and increased allostatic load.
- *Yoga helps correct the underactivity of para-sympathetic nervous system and GABA systems in part through stimulation of vagus nerves with reduction in the allostatic load.*

Postulated mechanisms by which Yoga reduces cardiovascular risk

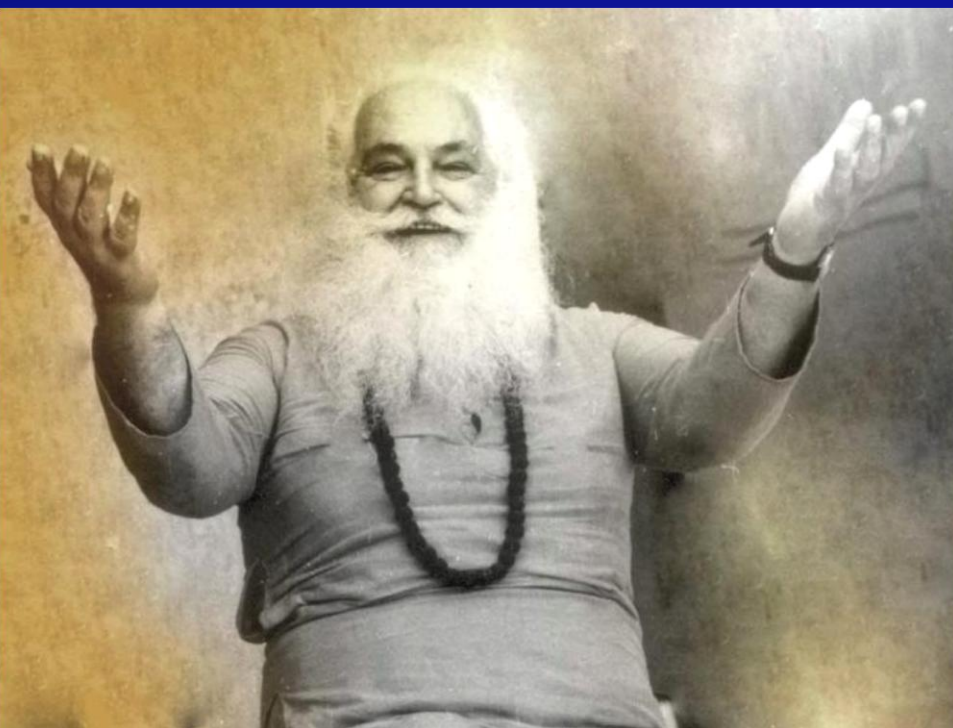


Innes KE, Bourguignon C, Taylor AG. Risk indices associated with the insulin resistance syndrome, cardiovascular disease, and possible protection with yoga: a systematic review. *J Am Board Fam Pract* 2005;18:491-519.



- Psychosomatic and stress related disorders
 - DM, hypertension, bronchial asthma, IBS, epilepsy, back pain and functional disorders
- Reduce / eliminate drug dosage / dependence in
 - DM, hypertension, epilepsy, anxiety, bronchial asthma, constipation, dyspepsia, insomnia, arthritis, sinusitis and dermatological disorders
- Yoga therapists must work in tandem with medical doctors when treating patients on allopathic treatment
- *“The treatment of the part shouldn’t be attempted without a treatment of the entirety” - the treatment of the body without treating the mind and soul is a useless waste of time” - Plato*

***“Health and happiness are your birthright.
Do not forsake your golden culture for the
plastic playthings of the modern world.
Learn and live Yoga for then you will know
true health and happiness”***



**Yogamaharishi
Dr Swami Gitananda Giri
Guru Maharaj**

**Founder: ICYER at Ananda
Ashram, Pondicherry
(1907-1993)**



EFFECTS OF A COMPREHENSIVE EIGHT WEEK YOGA THERAPY PROGRAMME ON CARDIOVASCULAR HEALTH IN PATIENTS OF ESSENTIAL HYPERTENSION

**Dr Madanmohan, Dr Ananda Balayogi Bhavanani, Dr Zeena Sanjay
 Selvi L Vithyalakshmi and Sri G Dayanidhy**
 ACYTER, JIPMER, Puducherry

INTRODUCTION

- Yogic practices may aid in the prevention and management of Hypertension (HT) and reduce cardiovascular complications in the population.
- Hypertension (HT) is one of the most common health disorders prevalent worldwide and is a major risk factor for stroke, coronary artery disease and organ failure. Increased sympathetic activity, enhanced cardiovascular reactivity and reduced parasympathetic tone have been strongly implicated in the pathogenesis of atherosclerosis and cardiovascular disease.
- The present study was undertaken to evaluate the effects of a comprehensive eight week yoga therapy programme on anthropometric, cardiovascular and biochemical parameters in patients of essential HT.



Effect of 8 weeks yoga therapy on total cholesterol (TC), triglycerides (TG), low density lipoprotein (LDL), very low density lipoprotein (VLDL) & high density lipoprotein (HDL), weight, BMI in patients of hypertensive patients before (B) & after (A) study period.

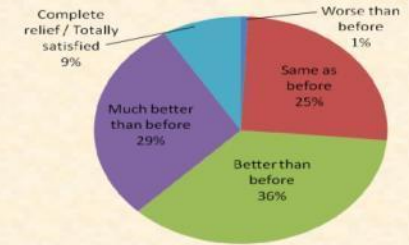
	B	A	% Change	p Value
TC (mg/dl)	173±10.23	161.07±9.11	-7.26	0.0288
TG (mg/dl)	142.33±15.57	125.00±13.19	-12.18	0.0226
LDL (mg/dl)	108.87±8.75	101.73±8.35	-6.56	0.0459
VLDL (mg/dl)	30.80±3.08	26.80±2.62	-12.99	0.0381
HDL (mg/dl)	39.00±2.24	41.87±2.06	+7.36	0.0008
TC / HDL	4.67±0.39	3.95±0.25	-15.50	0.0218
LDL / HDL	2.97±0.35	2.50±0.22	-15.88	0.0355
HDL / LDL	0.40±0.046	0.45±0.048	+13.75	0.0055
WEIGHT(m)	66.60±1.98	65.60±1.92	-1.50	0.0009
BMI (kg/m ²)	25.54±1.02	25.16±1.00	-1.49	0.0009

METHODOLOGY

- 15 (9 male, 6 female) patients aged 25 – 65years receiving medical treatment at JIPMER were recruited for this study by accidental sampling method and informed consent obtained from them
- BMI, Blood pressure, lipid profile including total cholesterol (TC), triglyceride (TG), high density lipoprotein (HDL), low density lipoprotein (LDL) and very low density lipoprotein (VLDL) were evaluated before and after a comprehensive yoga therapy program comprising thrice weekly sessions for eight weeks.
- A post-intervention, retrospective wellness questionnaire compiled by ACYTER was used to evaluate their comparative feelings after the therapy program.

RESULTS

- There was a significant ($P<0.001$) decrease in SP, DP, MP, RPP & DoP where as HR & PP shown a significant ($P<0.01$) reduction.
- There was a significant ($P<0.01$) decrease in fasting and postprandial blood glucose levels as well as LDL.
- The decrease in TC, TG, LDL and VLDL was significant ($P<0.05$) and increase in HDL was also statistically significant ($P<0.005$)
- All the lipid ratios showed desirable improvement with a decrease ($P<0.05$) of TC/HDL and LDL/HDL ratios and increase ($P<0.005$) in the HDL/LDL ratio.
- There was a significant ($P<0.001$) decrease in weight & BMI.



Post-intervention overall % responses of the participants to the wellness questionnaire

INTERVENTION

- Initial consultation session at ACYTER yoga OPD with yogic counseling and lifestyle modification advice.
- A comprehensive yoga therapy program imparted for 60 min / thrice a week for eight weeks with regular home practice.

Talasan	Bhujangasan
Ardha kati chakrasan	Chandranadi pranayam
Ushtrasan	Vibhag pranayam
Balasan	Pranav pranayam
Sashasan	Nadi shuddhi
Matsyasana	Vyagrah pranayam
Pashchimottanasan	Bhramari pranayam
Pavanamuktasan	Savitri pranayam
Dhwipada uttanasan	Kayakriya
Shavasana	

Effect of 8 weeks yoga therapy programme on heart rate (HR), systolic pressure (SP), diastolic pressure (DP), pulse pressure (PP), mean pressure (MP), rate-pressure product (RPP) and double product (DoP) in patients of essential hypertension before (B) and after (A) the study period.

	B	A	% Change	p Value
HR (bts/mt)	84.13±2.79	80.53±2.89	-4.28	0.0089
SP (mm Hg)	149.60±3.13	132.60±2.51	-11.36	0.0000
DP (mm Hg)	95.60±3.10	86.27±1.78	-9.76	0.0008
PP (mm Hg)	54.00±3.75	46.33±2.89	-14.20	0.0174
MP (mm Hg)	113.60±2.56	101.71±1.53	-10.47	0.0000
RPP (units)	125.95±5.04	106.79±4.34	-15.21	0.0000
DoP (units)	95.90±4.40	82.07±3.47	-14.42	0.0000

CONCLUSION

- The RPP provides a simple measure of overall HRV in hypertensive patients and is a surrogate marker in situations where HRV analysis is not available. Hence the significant post training decrease in HR and RPP in our study indicates healthier autonomic regulation of the heart with decreased oxygen consumption and load.
- A comprehensive 8-week yoga therapy programme produces significant improvement in anthropometric and cardiovascular parameters and lipid profile in patients of essential HT.
- It is concluded that a comprehensive yoga therapy programme has potential to enhance the beneficial effects of standard medical management of essential HT and can be used in an effective complementary or integrative therapy programme.

Yogic Intervention

- Initial consultation session at ACYTER Yoga OPD with yogic counseling and lifestyle modification advice.
- A comprehensive yoga therapy program imparted for 60 min / thrice a week for 8 weeks with home practice.

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Ardha kati chakrasan

Ushtrasan

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Chandranadi pranayam

Vibhag pranayam

Pranav pranayam

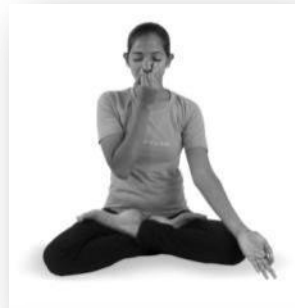
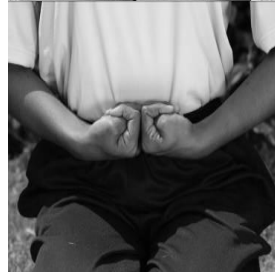
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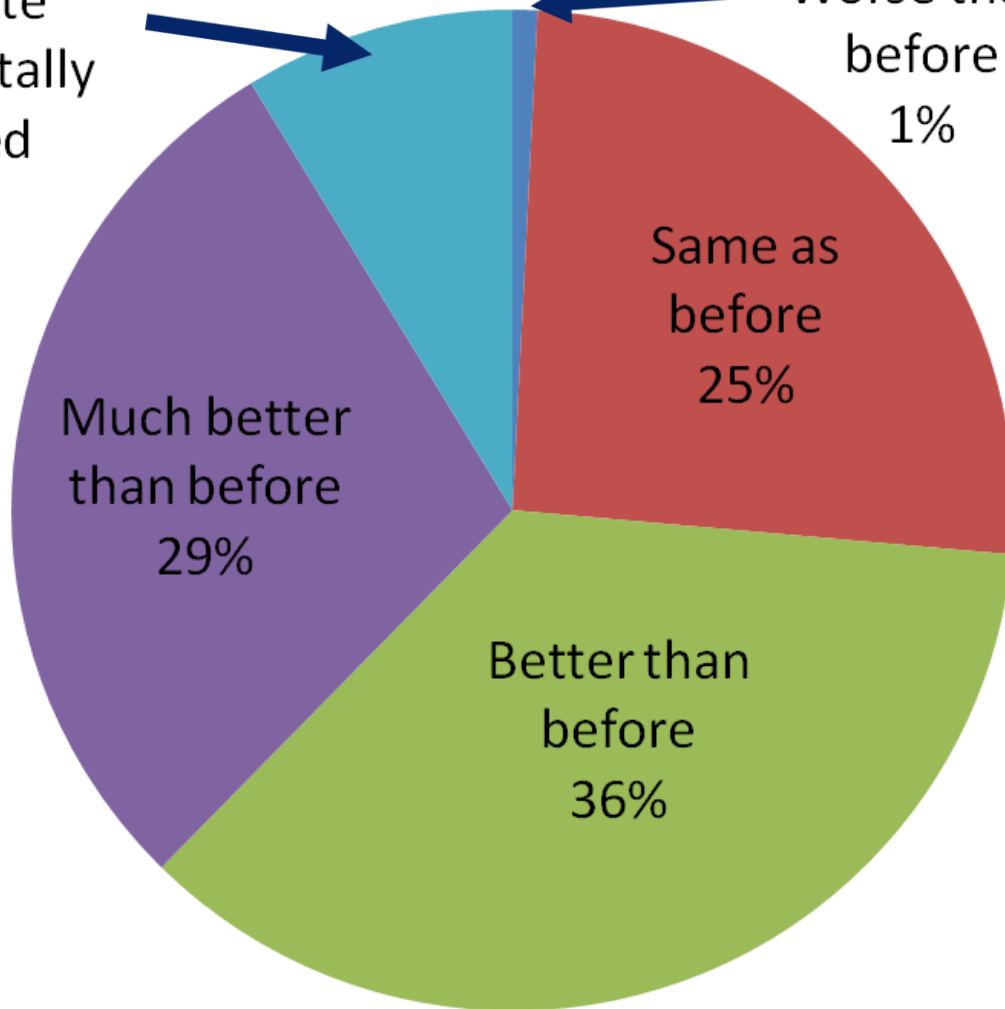
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Complete relief / Totally satisfied
9%



Worse than before
1%

Much better than before
29%

Same as before
25%

Better than before
36%

Post-intervention overall % responses of the participants to the ACYTER wellness questionnaire

**No need for anti-hypertensives
in patients of mild HT with no
pre-existing CV disease and in
frail older adults!**

- Dr KK Aggarwal

**(Eminent cardiologist, Padmashree and
Dr. BC Roy National Awardee)**

- No convincing data to show benefit from antihypertensive therapy in patients with mild hypertension and no pre-existing CV disease.
- A recent meta-analysis combined 4 placebo-controlled trials (8912 patients). During 4 to 5 years follow-up, antihypertensive therapy resulted in lower rates of mortality and stroke but higher rates of myocardial infarction.
- Low-risk patients with mild HT and no pre-existing CV disease not reducing BP with lifestyle modification should receive anti-hypertensive therapy.

Diao D, Wright JM, Cundiff DK, Gueyffier F. Pharmacotherapy for mild hypertension. Cochrane Database Syst Rev 2012; 8: CD006742.

- Older adults who are frail may not benefit from antihypertensive therapy.
- An observational study (2340 adults > 65 yrs) examined association between BP and mortality according to whether or not individuals were frail (inability to walk 6 meters in less than 8 sec).
- Among frail adults, there was no association between BP and mortality.
- Higher BP was associated with a lower risk of death among the most frail.

Odden MC, Peralta CA, Haan MN, Covinsky KE. Rethinking the association of high blood pressure with mortality in elderly adults: the impact of frailty. Arch Intern Med 2012; 172:1162.

Limitations of Yoga Therapy

- Not a miracle cure for all problems
- Use discernment (*Viveka*)
- Not for emergencies
- Consult a doctor where in doubt
- Each patient is different
- Different approaches of different traditions
- Don't be a quack !

An Integrated Approach

- The need of the modern age is to have an integrated approach towards therapy and to utilize Yoga therapy with coordination and collaboration with other systems of medicine such as Allopathy, Ayurveda, Siddha and Naturopathy
- Physiotherapy, osteopathy and chiropractic practices may be used with the Yoga if needed
- Advise on diet and life style is very important
- Adoption of right attitudes through Yogic counselling

In Conclusion

- The ancient art and science of Yoga has infinite possibilities of solutions for the health related issues faced by modern humankind.
- We however want it to be a miracle pill, that we take only once - immediate solution to all problems!
- Yoga is a wholistic science and must be learnt and practiced with a holistic view.
- The dedicated practice of Yoga as a **way of life** is no doubt a panacea for psychosomatic, stress related disorders helping us to regain our birthright of natural health and universal happiness.
- The integration of Yoga and modern medicine can help create a healthier and happier world.

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