Ayurveda
The Science for next generations

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Four dimensions of ‘Ayu’ (life):

- Life with social well being or the life which is socially & environmentally useful and responsible (Hitayu).
- Life without social well being or socially and environmentally irresponsible life (Ahitayu).
- Life with pleasure or healthy & happy life (Sukhayu).
- Life without pleasure or with sufferings (Dukhayu).
What can we infer?

Lifetime Risk of Developing or Dying From Cancer

• The lifetime risk of developing or dying from cancer refers to the chance a person has, over the course of his or her lifetime (from birth to death), of being diagnosed with or dying from cancer. These risk estimates, like annual incidence and mortality data, provide another measure of how widespread cancer is in the United States.

• The information is taken in next slides from the US National Cancer Institute’s Surveillance Epidemiology and End Results (SEER) Database, and is based on incidence and mortality data for the United States from 2008 through 2010, the most current years for which data are available. (http://cancer.org)
# Lifetime Risk of Developing or Dying From Cancer - Men

<table>
<thead>
<tr>
<th>Males – all sites</th>
<th>Risk of developing</th>
<th>% 1 in 2</th>
<th>Risk of dying from</th>
<th>% 1 in 4</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>43.92%</td>
<td></td>
<td>22.94%</td>
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- Lifetime risk of developing cancer: 43.92% or 1 in 2
- Lifetime risk of dying from cancer: 22.94% or 1 in 4
# Lifetime Risk of Developing or Dying From Cancer - Women

<table>
<thead>
<tr>
<th>Females – all sites</th>
<th>Risk of developing</th>
<th>% 1 in 3</th>
<th>Risk of dying from</th>
<th>% 1 in 5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>38%</td>
<td></td>
<td>19.34%</td>
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In UK, the data of 2008 – 2010 shows that life time risk of developing cancer in males is 46.32% (almost 1 in 2) and in females is 41.18% (around 1 in 3).

Source: cancerresearchuk.org
India - The current probability of developing cancer of all sites from 35-64 years is 4.67% in males and 6.55% in females while life time risk was found to be 9.05% and 10.2% respectively.

Risk of cancer development in India. Murthy NS1, Rajaram D, Gautham MS, Shivaraj NS, Nandakumar BS, Pruthvish S.
The United States, with less than 5 % of the global population, uses about a quarter of the world’s fossil fuel resources—burning up nearly 25 % of the coal, 26 % of the oil, and 27 % of the world’s natural gas.

Source: The State of Consumption Today
http://www.worldwatch.org/node/810
Social Impacts of Consumption in the U.S.

An estimated 65 % of U.S. adults are overweight or obese, leading to an annual loss of 300,000 lives and at least $117 billion in health care costs in 1999.

In 2012, 61 % of U.S. credit card users carried a monthly balance, averaging $12,000 at 16 % interest. This amounts to about $1,900 a year in finance charges—more than the average per capita income in at least 35 countries (in purchasing power parity).
The 12 percent of the world’s population that lives in North America and Western Europe accounts for 60 percent of private consumption spending, while the one-third living in South Asia and sub-Saharan Africa accounts for only 5.2 percent.

Source: The State of Consumption Today
http://www.worldwatch.org/node/810
One can directly correlate high incidence of cancer in developed countries and high rate of consumption of natural resources among population of developed countries (socially and environmentally irresponsible life – Ahitayu and Dukhayu)

With

Ayurveda principle of health which advocates socially and environmentally responsible life style that has direct link with optimal health of an individual.
Kindly consider very low incidence of malignancy in developing countries where low consumption of resources of mother nature and tradition of strong family bonds exists (socially and environmentally responsible life – Sukhayu and Hitayu)
Ayurveda presents a total Life Science and visualizes the total health to the total human being in a holistic way.
Holistic is defined as pertaining to all aspects of human nature - physical, mental, emotional, and spiritual.

The underlying foundation and pre-requisite for true healing is compassion for the patient, and consideration of all aspects of the patient's nature, including the family, culture and community.
Ayurveda is holistic

- Ayurveda is a complete way of life.

- As a holistic health system comprising diet, yoga, detoxification, herbal remedies, meditation, Jyotish, Vaastu and daily lifestyle; Ayurveda improves not only a person's health, but also their well being, behavior and state of mind.
Non-communicable diseases are now the most common cause of death world wide.
Raising incidences with unusual manifestations

In August, 2013, a 5-year-old Indigenous girl accompanied her mother to a diabetes outreach appointment in a remote community in Australia. Towards the end of her consultation, the mother mentioned concerns about new-onset seizures on her daughter’s thighs. Noting the child’s obesity, two random blood glucose level tests were done, showing concentrations of 19.2 mmol/L and 18.7 mmol/L. A urine dipstick test was negative for ketones. The girl’s mother reported that the sores had been present for roughly 5 weeks, and bedwetting for the last 12 months. There was no history of diarrhoea or vomiting. The child was born macrosomic (4.5 kg) at 38 weeks by caesarean section after a pregnancy complicated by poorly controlled gestational diabetes. Her diet was high in large portions of refined carbohydrates and simple sugars. There was a strong family history of type 2 diabetes.

The patient was above the 95th centile for weight (36 kg), body-mass index (24.5 kg/m²) and height (123 cm). Crusted sores on both upper thighs and right axilla were consistent with impetigo. The rest of the examination was unremarkable except for acanthosis nigricans in the axillae and around the neck (figure). The patient had high concentrations of HbA1c (11.9%, normal range 4.3–6.0; or 077 mmol/mol, 23–42), plasma glucose (19.5 mmol/L, 3.0–7.8), C-peptide (1.6 mmol/L, 0.3–1.6), and insulin (201 pmol/L, 14–160). Urine albumin:creatinine ratio was normal (0.3 g/mol creatinine, normal <1.0). Tests for type 1 diabetes autoantibodies and genetic tests for MODY1 (HNF4A) and MODY3 (HNF6A) were negative. The patient was transferred to a tertiary centre and given intravenous antibiotics for infection, and metformin and insulin for type 2 diabetes. When seen for follow-up in November, 2013, she was no longer taking metformin because of intolerance, but remained on insulin. Blood glucose concentrations remained above target levels at 10–13 mmol/L.

Driven by increased urbanisation, high calorie diets, and increasingly sedentary lifestyles, the worldwide rise in the incidence of type 2 diabetes has predominantly occurred in adults. However, children are also being affected. The continued burden of infectious diseases (eg, respiratory and diarrhoeal illnesses) coupled with an increasing prevalence of chronic diseases (particularly cardiovascular disease and type 2 diabetes) has resulted in Indigenous Australians having an additional 70% disease burden compared with the general Australian population. Remote Indigenous communities are generally socioeconomically poor yet pay high prices for fresh food because of transport costs and limited competition. In addition to adverse socioeconomic determinants, genetic factors and in utero exposure to hyperglycaemia likely contributed to this child’s risk of developing type 2 diabetes. The US SEARCH study provides epidemiological data about the incidence of diabetes in young people. In our experience with this population, compliance and good diabetic control is often difficult to achieve and sustain—the TODAY trial showed that even under trial conditions 52% of children on metformin alone, and 39% of children on combination oral treatment lost glycaemic control (HbA1c >8% for 6 months or required insulin), over an average follow-up period of 3–5 years. Further long-term outcome studies are needed to determine the most efficacious combinations of interventions for type 2 diabetes in children who have extra decades to accrue disabling complications.

Contributors
DK wrote the report and initially managed the patient. DW and AS helped review the report and assisted with references, and have provided ongoing care to the patient. Written consent to publish was obtained.

Declaration of interests
AS has been on advisory boards for Sanofi-Aventis and AstraZeneca-BMS; been on speakers bureaux for Eli Lilly, AstraZeneca-BMS, Novo Nordisk, Sanofi-Aventis, Merck Sharp & Dohme, and Novartis; and received research grants from Novo Nordisk and Merck. DK and DW declare that they have no competing interests.

References
DALYs, by broad cause group 1990 - 2020 in Developing Countries (baseline scenario)

DALY = Disability Adjusted Life Years

Communicable diseases, maternal and perinatal conditions and nutritional deficiencies
Injuries
Noncommunicable conditions

Source: WHO, Evidence, Information and Policy, 2000
Diabesity, relatively a new term refer to the growing epidemic of Obesity, Diabetes, and Associated complications.

The problem of Diabesity is getting significant attention now-a-days.
In addition, New Complex Syndromes like **DIABESITY** are at rise.
Life style disorders do have big spectrum of ailments.

As an Indian population, we are at the edge of a big epidemic of life style disorders.

Indians have highest incidence of DM, CAD, HTN as compared to rest of the World.
POSSIBLE THEORIES FOR SUCH MANIFESTATIONS

❖ Theory 1 : GENES
Genetic adaptation in populations in a changing environment

❖ Theory 2 : DIET

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EAT FOOD

NOT TOO MUCH

MOSTLY PLANTS
POSSIBLE THEORIES ..................

Theory 3

SITTING and
NOT SLEEPING

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1. Chronic short sleep has consequences for health
2. Night Shifts are against the nature. They act as inflammatory markers
3. 43% increased risk of diabetic incidents for every quartile of Obstructive Sleep Apnea severity
Theory 4: The GUT BIO-MICROME

What is GUT BIO-MICROME

**Microbe:** tiny living organism, such as bacterium, fungus, protozoan, or virus

**Microbiome:** collectively all the microbes in the human body; a community of microbes

**Biofilm:** a community of microbes that live together on a surface

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Many microorganisms in our bodies are critical for our lives. Promote an internal environment that enables helpful bacteria to thrive and outcompete unhelpful bacteria.
From the moments after our birth, throughout our lives, humans serve as reservoirs for extremely complex and dynamic micro-organisms that have co-evolved over millions of years with the healthy human host to provide a range of beneficial, and often essential services.
Humans are super-organisms whose metabolism represents an amalgamation of microbial and human attributes.
Theory 4: The GUT BIO-MICROME

- Our gut hosts billions of microorganisms
- The micro-biome performs digestive and metabolic functions, and “evolves” over our life course
- The micro-biome **TALKS** to the liver, the brain, organs controlling metabolism, inflammation and the immune system
- The micro-biome is affected by **WHAT WE PUT INTO OUR MOUTHS**
Intestinal System is now being considered as Second Brain.
Disruptions to the Gut Microbiome

Absence of beneficial microbes is a risk factor for infectious diseases..

Modern lifestyle advances may be depleting specific microbes that enhance immunity against pathogens..
Major Causes for Disruptions to the Gut Microbiome

- **Diet:** High salt, saturated fats and fast food diet is associated with reduced microbiome diversity

- **Antibiotics:** Effects are immediate and potentially long lasting, especially important for children

- **Disease state:**
On 10\textsuperscript{th} August 2013:

- Multi Drug Resistant Oral Fungal infection in a tracheostomied old male of 59 years, recovering from cardiac arrest and renal failure.

Courtesy: Dr. Geethakrishnan, MEDANTA, India
Response......

What we did?

- Triphala choornam – dense water extract-
- +1/4th honey:
- To paste form
- Painted 6th hourly on the entire oral cavity and nasopharyngeal region.

After 7 days of painting

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Courtesy: Dr. Geethakrishnan, MEDANTA, India
In vitro effect of Triphala and honey as we used it:

Our lab bacteria seemed love it.

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Courtesy: Dr. Geethakrishnan, MEDANTA, India
There was something which controlled the oral thrush

It could be the revitalized microbiome.

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Courtesy: Dr. Geethakrishnan, MEDANTA, India
Background on Microbiome & its correlation with AMA

Courtesy: Dr. Geethakrishnan, MEDANTA, India
There is increasing evidence that the human microbiome plays a major role in health. Microbiome influence everything from our weight to our cancer susceptibility.

The “microbiome” is the “second human genome.”

NEJM, 2013 Year in Perspective

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Courtesy: Dr. Geethakrishnan, MEDANT, India
Obesity

- Gut microbiota collected from obese and lean humans were placed into the guts of average-weight mice.
- Those receiving the microbiota from obese humans became obese mice, and those receiving microbiota from lean humans remained lean.

(*NEJM JW Gen Med* Nov 15, p. 175, and *Science* Sep 6; 341:1079).
Colon Cancer

- The gut bug *Fusobacterium nucleatum* is linked to colorectal cancer (CRC) ([NEJM JW Gen Med Dec 1 2011, p. 184, and Genome Res 2012 Feb; 22:292]).

- When this bacterium was placed in the guts of CRC-susceptible mice, they developed excess numbers of CRCs. ([NEJM JW Gen Med Nov 1, p. 169, and Cell Host Microbe Aug 14; 14:195]).
Type 2 Diabetes

• In 2013, a “microbiome signature” was identified, that does a better job in predicting type 2 diabetes mellitus than any human gene or behavior that has been linked to that disease.


Atherosclerosis

• In animal experiments, probiotic interventions abolished atherogenesis.


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Courtesy: Dr. Geethakrishnan, MEDANTA, India
Background on *Ama*

- Part of most pathologies
- Strong relationship to AGNI / digestive system
- Medical management involves:
  - Fasting / controlled / medicated diet to help correct metabolic defects
  - Drugs to improve metabolism
  - Even external therapies to remove locally accumulated metabolites (? Toxins)
  - Shodhana by Panchakarma Procedures

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Courtesy: Dr. Geethakrishnan, MEDANTA, India
Example: Rheumatoid arthritis (RA)

- Influenced by diet / climate / heredity / stress
- Managed with
  - Diet
  - Drugs
  - External therapies
  - Panchakarma (detoxifying therapies)

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Courtesy: Dr. Geethakrishnan, MEDANTA, India
Example: Pathology of RA

- Active phase of the disease (state of ama) in an RA patient would correspond with change in the microbiome of the GI tract, leading to destabilised chemical (enzymatic / immune) reactions, in-turn leading to release of toxins (chemicals entities?) which triggers the inflammatory changes of the disease.

- Ama of the GI tract and joint inflammation are connected through chains of secondary reactions and metabolites, all triggered by the imbalance of the gut microflora.

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Courtesy: Dr. Geethakrishnan, MEDANTA, India
Example: Management of RA

Medicines / diet / physical therapies / Panchakarma reducing Ama, reestablishes the microbiome of the gut, digest the metabolites / neutralizes the toxins in the GI tract and thereby reduce the triggering factors responsible for inflammation. Medicines and procedures also provide multiple pathways for neutralizing the secondary metabolites causing joint inflammation.

Courtesy: Dr. Geethakrishnan, MEDANTA, India
In this context, it can be hypothecated that:

- The responses of disrupted gut microbiota, leads to:
  - altered chemical environment in the ecosystem of the human body, giving rise to different pathologies, as predisposed by genetic, structural and nutritional health of the related tissue.
  - The altered chemical response mediated by altered microbiota, which triggers most pathological processes, could be correlated to *Ama.*
NEED TO MAINTAIN NORMAL FLORA OF GUT

Can Ayurveda Play a vital role in maintaining Healthy Gut Flora??

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Indigestion is the root cause of a number of diseases.

Individuals are to be wisely select dietary articles and other substances carefully after thorough examination.

This indicates that the GUT is crucial and its physiology is to be protected

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Any impairment of the GI barrier can increase the risk of developing infectious, inflammatory and functional GI diseases, as well as extraintestinal diseases such as immune-mediated and metabolic disorders.

Hence, maintaining normal physiology of KOSHTHA and AGNI are essential in treatment
Theory of Life (Ayu)

SHARIRA
(Physical Body)

ATMA
(Conscious element)

LIFE
(Ayu)

SATTVO
(Psyche)

INDRIYA
(Senses)
BODY

MIND

SOUL

Living individual
There is a sentient end – the Indriyas to the non-sentient Body and a non-sentient end the Manas to the sentient Atma.

Mana is the inter link between the inert body and the sentient soul through the intermediate faculties of which the mind itself is one.
Mana is permanently connected to the Atma

It gets connected to one faculty at a time and the choice of faculty is dictated by the desire of Atma

This ensures clarity of cognition avoiding superimposition and resultant confusion
Persistence of experience creates an impression of simultaneous experience.

In fact Mana is

- Dravya - Substance
- Anu – Minute
- Eka – Single

(Charaka Sharira 1/19; 1/48)
Manas collects information through the external faculties processes them and presents the result to the Atma

It is the Atma which takes decisions

The Decision making capacity of Atma is called Buddhi (Intellect?)

Adhyatma is a Vehicle to reach Atma
According to Ayurveda (As well as Samkhya Darshana):

- Sattva, Rajas and Tamas are Mahagunas- three Universal attributes
- Sattva is Pure while the other two are impure
- Sattva represents Knowledge and happiness
- Rajas Symbolizes Pain, Aversion and action
- Tamas stands for ignorance, inertia and confusion
Mana (mind)

- Mind is physical
- Atindriya – transsensual
- Adhisthayaka – controller of senses
- Anutvam – atomic dimension
- Ekatvam – only one in number
There are five states of mind (chitta)-

1. Ejection - Kshipta
2. Attention - Vikshipta
3. Inertia - Moodha
4. Content – Nirudha (desires)
5. Focus - Ekagrata
Management of Diseases

- Achara Rasayana – codes of good conduct to get more Sattva Guna
- Yukti Vyapashraya (Treatments with medicines and therapies)
- Daivavyapashraya (non medicinal aspects of therapeutic management) &
- Satvavajaya (control of mind from unwholesome objects - psychotherapy?)

http://learnayurveda.com
Principles of treatment (Yukti Vyapashraya) in Ayurveda include:

1. Nidana Parivarjana
2. Samprapti Vighatana
   - Bio-purification by Panchakarma
   - Bio-balancing by
     - Suitable Drugs
     - Compatible Diet
     - Changes in Life style
One who carefully observes the rules regarding diet and behavioral practices
.... consumes healthy and wholesome food
.... carries himself thoughtfully in daily activities
.... does not succumb to passion and greed .......

lead a disease-free, peaceful, healthy and happy life
THANK YOU