

INTEGRATIVE MEDICINE IN THE POST-GENOMIC ERA

The case of homeopathy

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professor of general pathology, university of
Verona, Italy

Seven Figures (Rabindranath Tagore)



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*“Visva-Bharati acknowledges India's
obligation to offer to others the hospitality
of her best culture and India's right to
accept from others their best”*

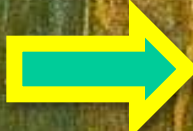
(Rabindranath Tagore)

Seven Figures (Rabindranath Tagore)

INTEGRATIVE MEDICINE IN THE POST-GENOMIC ERA

The case of homeopathy

SUMMARY

- 
1. Integrative medicine: what and why
 2. A new vision of pathology
 3. Integrative therapies and homeopathy

These figures are available in my website:
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Seven Figures (Rabindranath Tagore)

WHAT IS INTEGRATIVE MEDICINE

“Integrated medicine (or integrative medicine as it is referred to in the United States) is practising medicine in a way that selectively incorporates elements of complementary and alternative medicine into comprehensive treatment plans alongside solidly orthodox methods of diagnosis and treatment”

Lesley Rees & Andrew Weil
BMJ 2001;322:119-120



WHY INTEGRATIVE MEDICINE IN THE XXI CENTURY?

*This is because our high-tech western
“official” or “conventional” medicine is
showing its limits in the cure of most modern
diseases.*

We need to go beyond the “GENOMIC ERA”

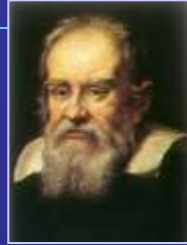
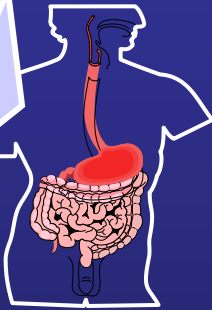
Lesley Rees & Andrew Weil
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THE SCIENTIFIC DEVELOPMENT OF WESTERN MEDICINE



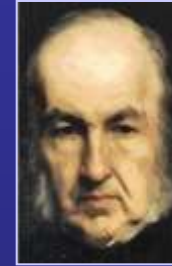
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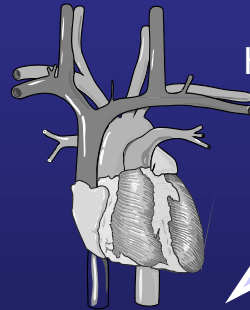
Galileo, Cartesio



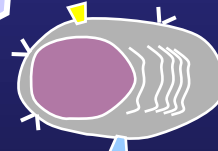
Harvey, Claude Bernard



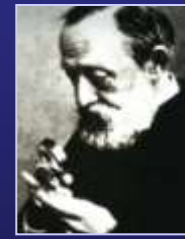
1600-1700



1700-1800



1800-1900



Pasteur, Virchow



1900-2000



Monod, Dulbecco

Reductionism: from macroscopic to microscopic, from complex to simple, from holism to analysis

Mechanicism: the body as a machine made of several parts linked by deterministic laws (metabolic, thermic, hydraulic, informatic)



THE ORIGINS OF MODERN WESTERN MEDICINE



Michiel e Pieter van Miereveld (1567-1641 e 1596-1623)
Lesson of anatomy of dr. van der Meer, 1617
Museum het Prinsedof, Delft

“Scientific” medicine begun in the XVI-XVII centuries with a strict association with mechanistic view of the body and separation of the body from the mind/spirit

The human genome is ten years old: has it been a success?



- In June 2000, the announcement of the first complete sequencing of the human genome was made by two companies, the international, publicly funded Human Genome Project and the private, for-profit US company Celera Genomics, in the presence of the US President Bill Clinton and the UK Prime Minister Tony Blair.
- This event was recalled in a recent issue of *Nature* with several articles from people who were involved in that enterprise.
- The question asked to those people was the following: despite all the intellectual ferment of the past decade, has human health truly benefited from the sequencing of the human genome?
- The startlingly honest response from the leaders of the public and private efforts, Francis Collins and Craig Venter, was 'Not much'.

(Marco Bregni, *Journal of Medicine and the Person* dec 2010)



Francis Collins



THE MYTH OF THE BIOTECH REVOLUTION

Nightingale P, Martin P.

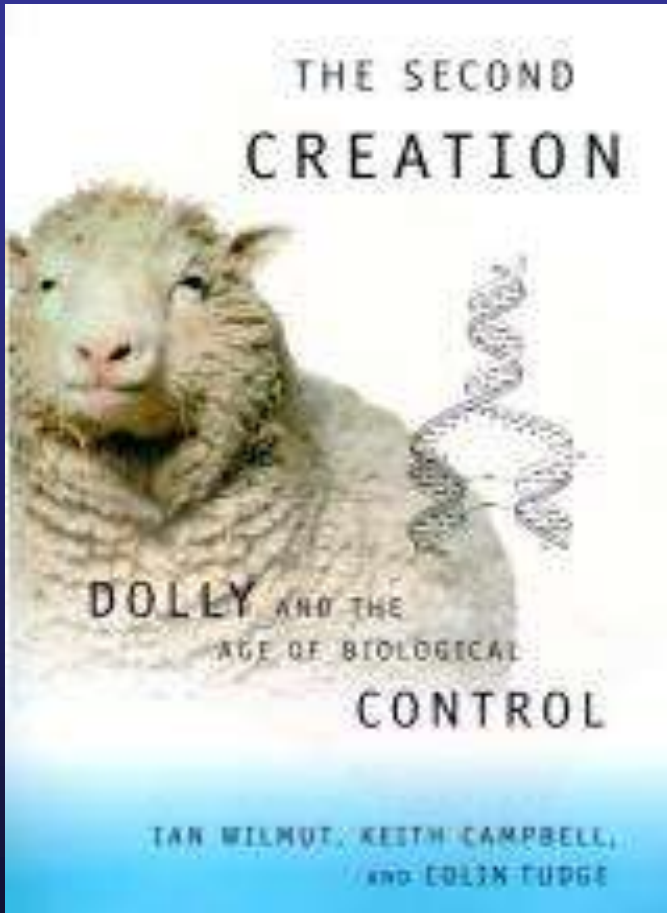
Trends Biotechnol. 2004 Nov;22(11):564-9.

Science Policy Research Unit, Freeman Centre, University of Sussex, Brighton, BN1, UK.

- The medicinal '**biotech revolution**' has been widely promoted by academics, consultants, industry and government.
- **This has generated expectations** about significant improvements in the drug discovery process, healthcare and economic development that influence a considerable amount of policy-making.
- Here we present empirical evidence, from a variety of indicators, that shows that **a range of outputs have failed** to keep pace, with increased research and development **spending**.
- Consequently, **many expectations are wildly optimistic** and over-estimate the speed and extent of the impact of biotechnology.



OBITUARY: DOLLY THE SHEEP (†18 FEBRUARY 2003)



Dolly's comparatively premature death is typical of cloned animals. **From conception onwards, clones suffer a higher mortality rate than non-clones.**

Since Dolly, other mammals - cows, rabbits, mice, cats, goats and pigs - have also been cloned. Studies in mice seem to show that this bad health persists throughout life.

The **process of genetic reprogramming seems too complex to control tightly, and its success rate has not improved much since Dolly's day** - she was the sole surviving adult from 277 attempts.

J. Whitfield - Nature, 20 feb. 2003

THIS APPROACH CAN'T BE THE ONLY "FUTURE" OF MEDICINE!

A PRECURSOR OF INTEGRATED MEDICINE: ALEXIS CARREL



Dr. Alexis Carrel (1873-1944)
Nobel prize for Medicine 1912

“To date we have studied ourselves only in such a way as to procure fragmentary concepts of what we are. Our analysis began right from the outset by severing the continuity of the human being and his cosmic and social environment. Then it separated the soul from the body.

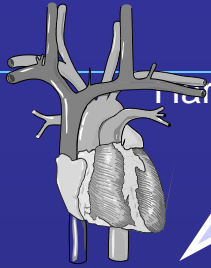
The body was divided into organs, cells, and fluids. And in this process of dissection, the spirit has vanished.

But a human being is much more than the sum of these analytical data. He should thus be considered both in his parts and as a whole, inasmuch as he reacts in the cosmic, economic, and psychological environment as a single entity and not as a multiplicity of entities”

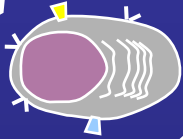
(Carrel, A. Le rôle futur de la médecine. In: *Médecine officielle et médecines hérétiques*. Plon, Paris, 1945)



WHERE TO GO FURTHER?

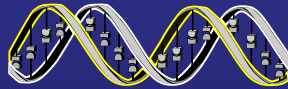


Harvey, Claude Bernard



Pasteur, Virchow

1800-1900



1900-2000



Monod,
Dulbecco

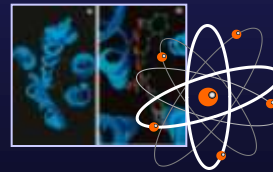


Complexity sciences

- Psicosomatics
- Neuroimmunology
- Bioetics
- Dynamic systems theory
- Complementary medicine

Reductionism Mechanicism

- Pharmacogenomics
- Bio-technology
- Molecular pathology
- “Home-made”-genomics



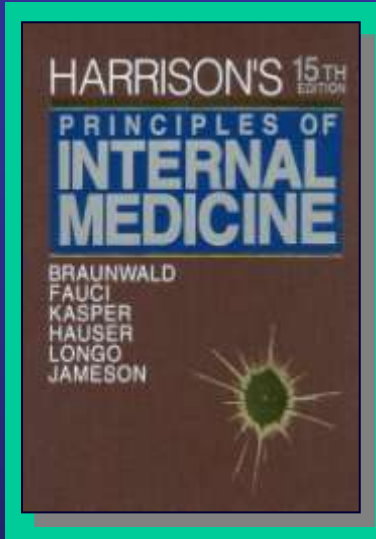
?

Integrative medicine



MEDICINE: SCIENCE AND ART

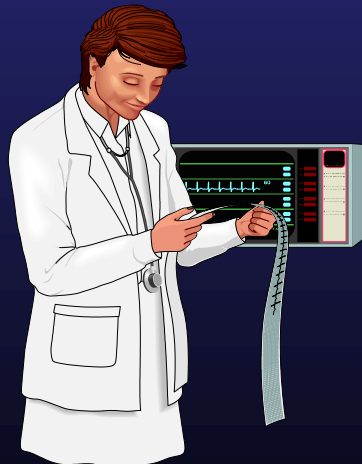
From: *Harrison's Principles of Internal Medicine*, 15th ed. (2001) McGraw-Hill, New York, pp. 1-5.



*“The practice of medicine combines both **science** and **art**.*

The role of science in medicine is clear. Yet skill in the most sophisticated application of laboratory technology and in the use of the latest therapeutic modality alone does not make a good physician.

*One must be able to identify the crucial elements in a **complex history** and physical examination.”*



*“The combination of medical knowledge, intuition, and judgment defines the **art of medicine**, which is as necessary to the practice of medicine as is a sound scientific base”*

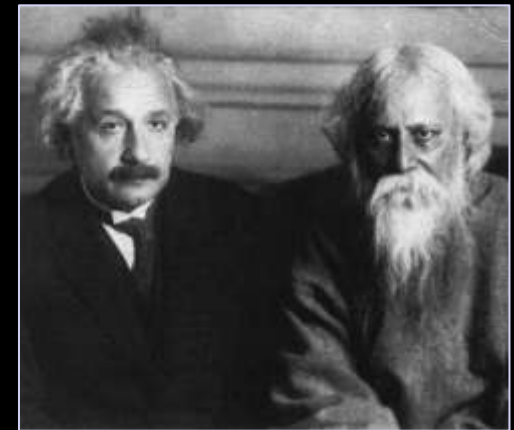


THE WINGS OF INTEGRATIVE MEDICINE

SCIENCE



ART

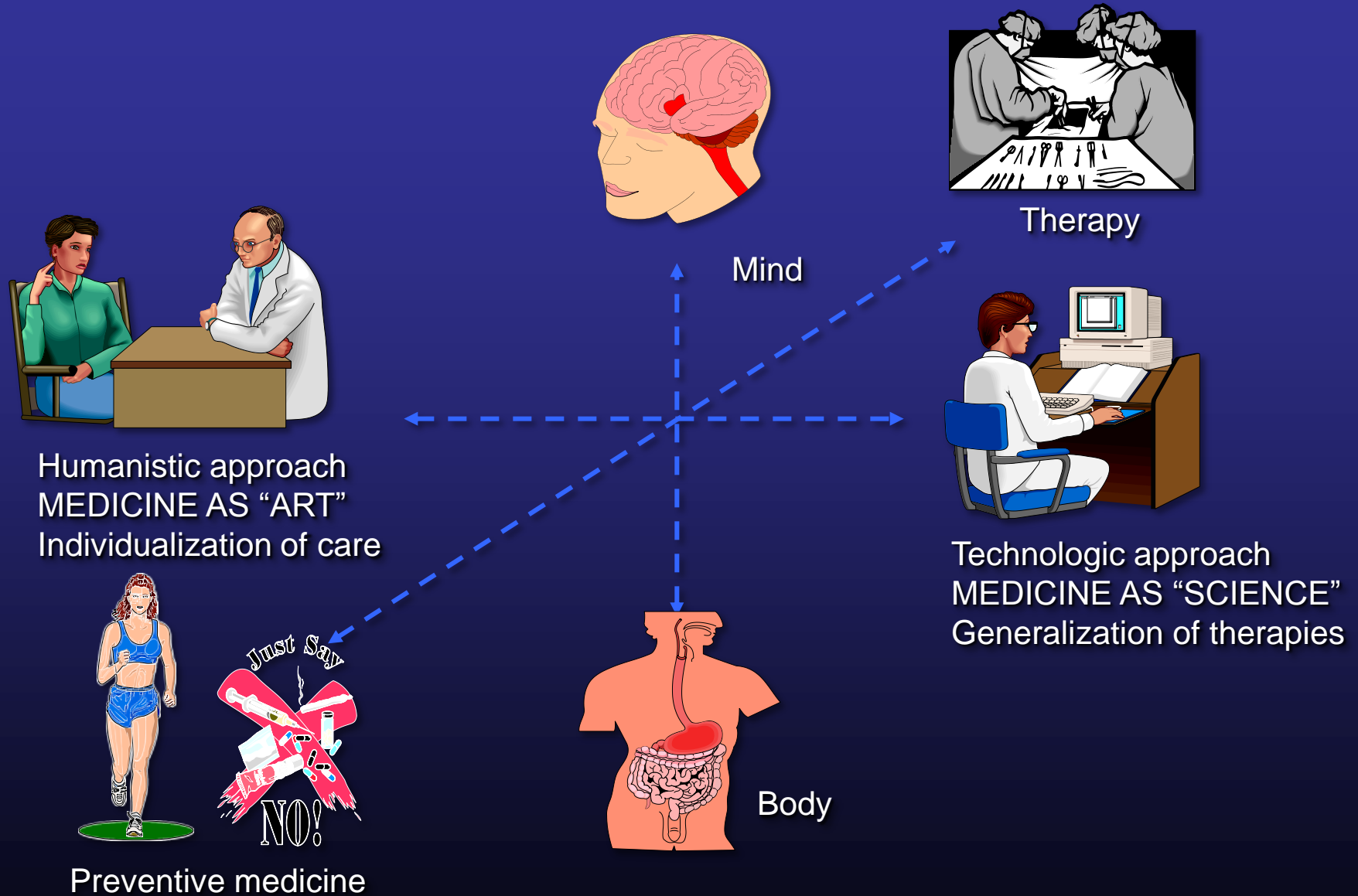


A. Einstein and R. Tagore

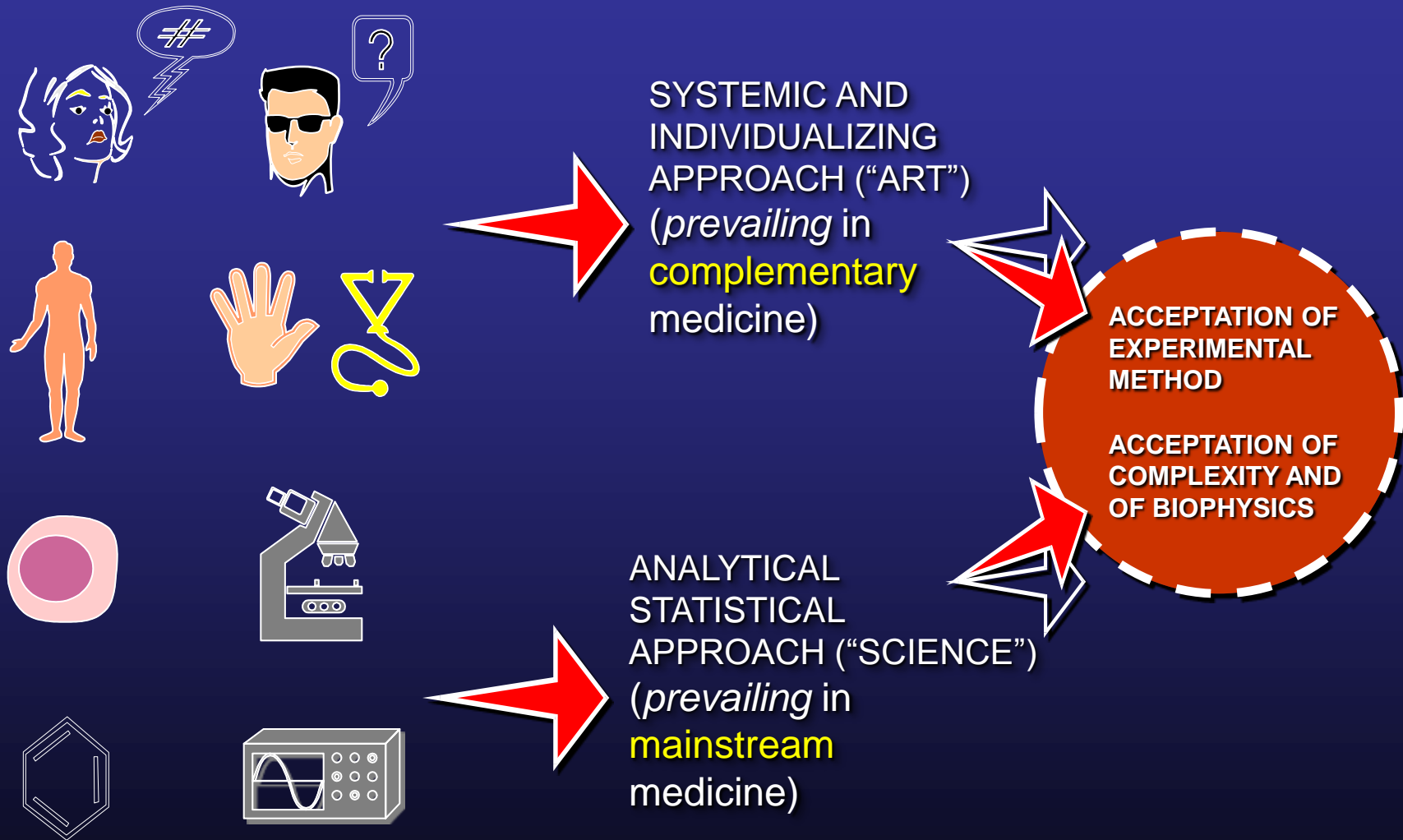
The NIKE of Samotracia (Parigi, Louvre)



THE THREE DIMENSIONS OF INTEGRATIVE MEDICINE



COMPLEMENTARY AND MAINSTREAM MEDICINE. THE INTERFACE

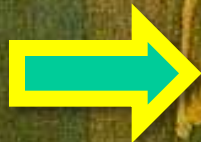


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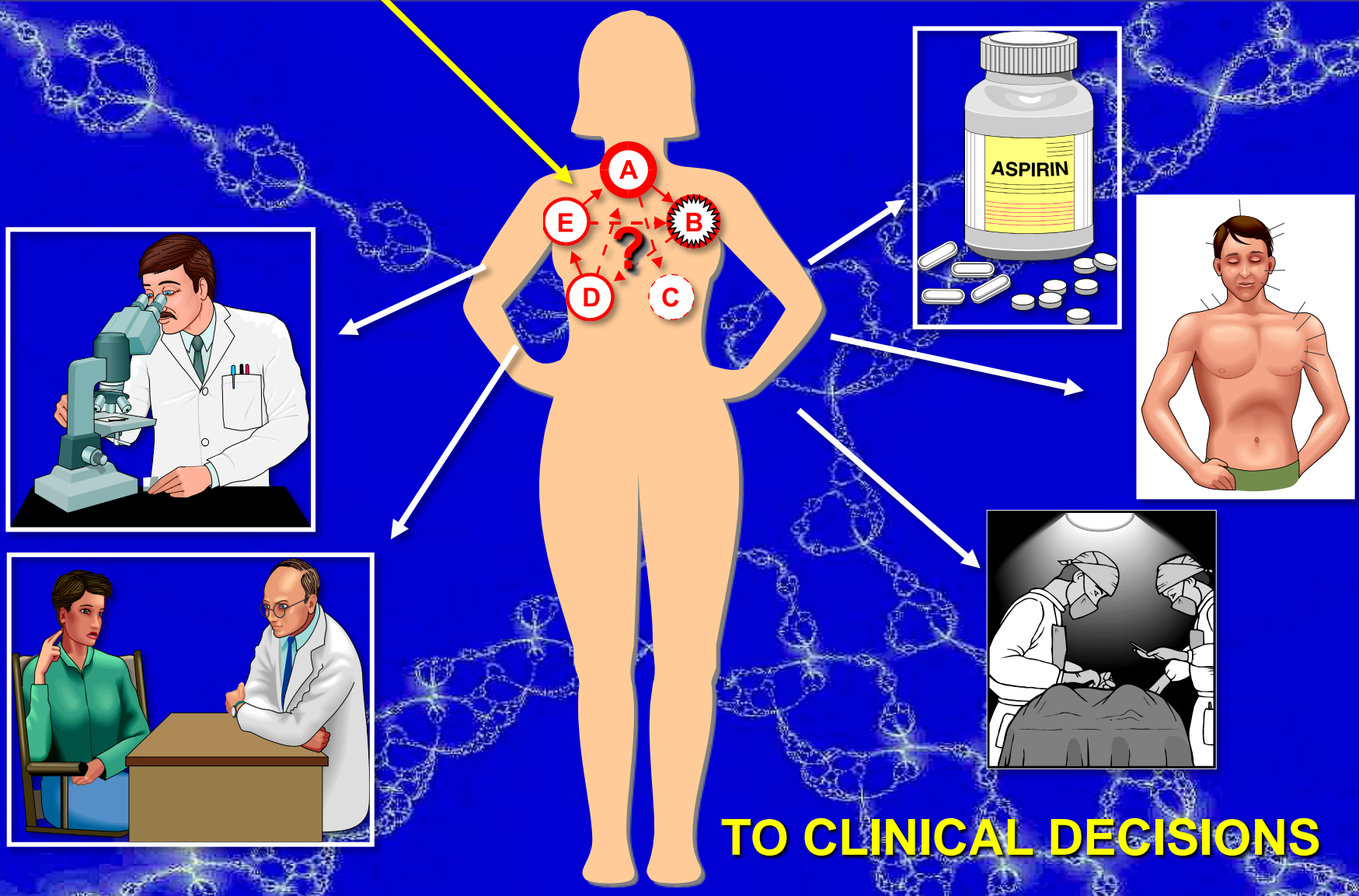


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Seven Figures (Rabindranath Tagore)



FROM THE CONCEPT OF DISEASE



TO CLINICAL DECISIONS

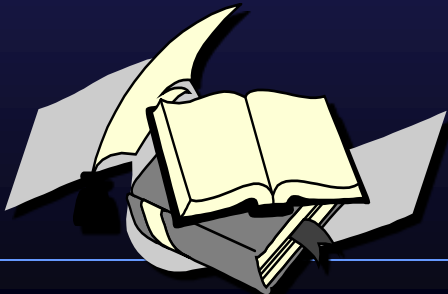


MULTIFACTORIAL DISEASES

“Many of the **common disorders** that constitute a major part of the health care budget in the Western world **are not caused by defects in single genes**”

“The hypothesis has evolved that variations at a **number** of different gene loci causing **subtle** or **minor changes** in the level of gene expression or function, may **predispose** an individual to development of disease”

“These genetic variations may then **interact with environmental factors** to determine an individual’s overall risk of developing disease”



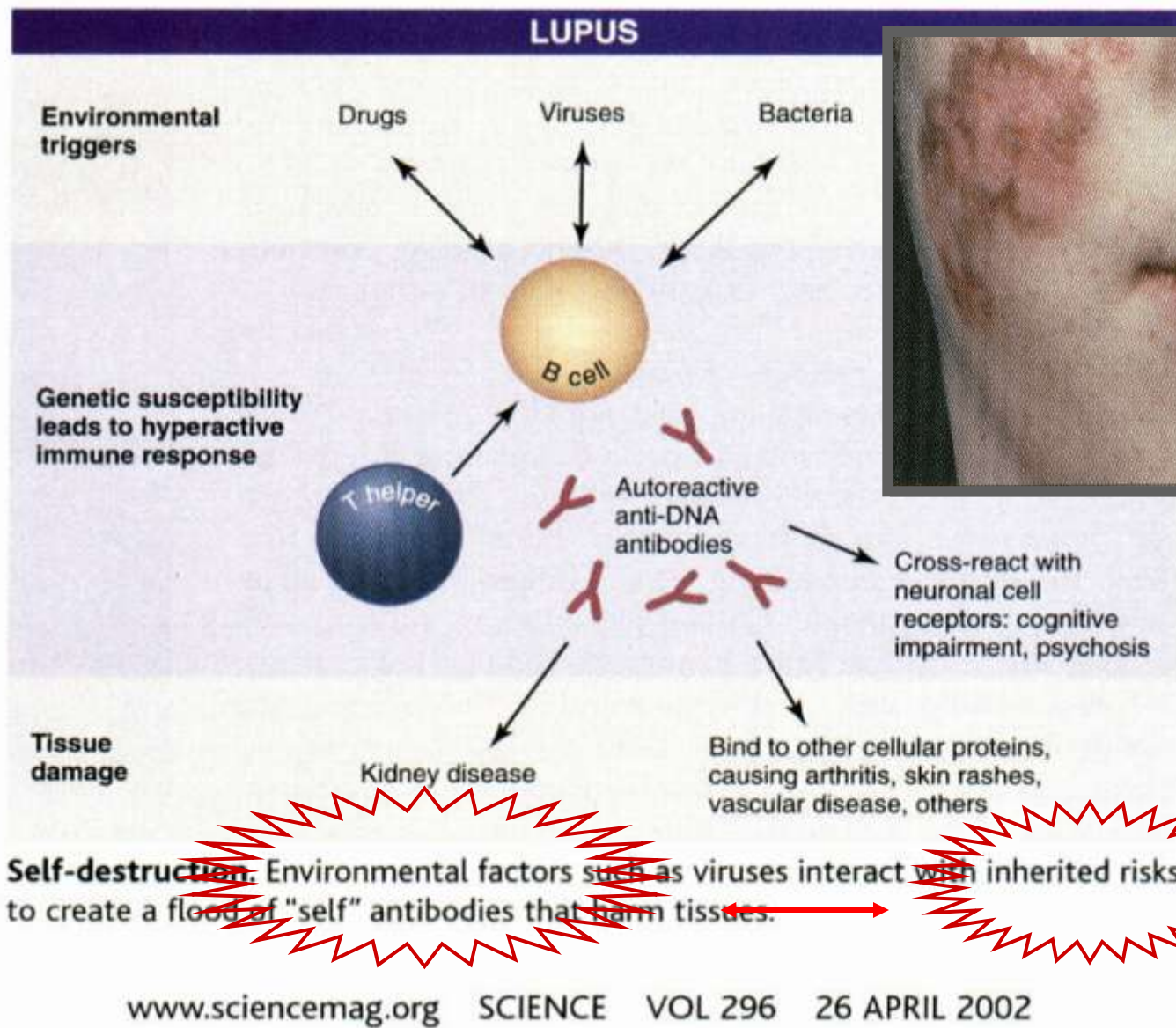
Talmud and Humphries, in **Oxford Textbook of Pathology**, 1992



THE PUZZLE OF COMPLEX DISEASES



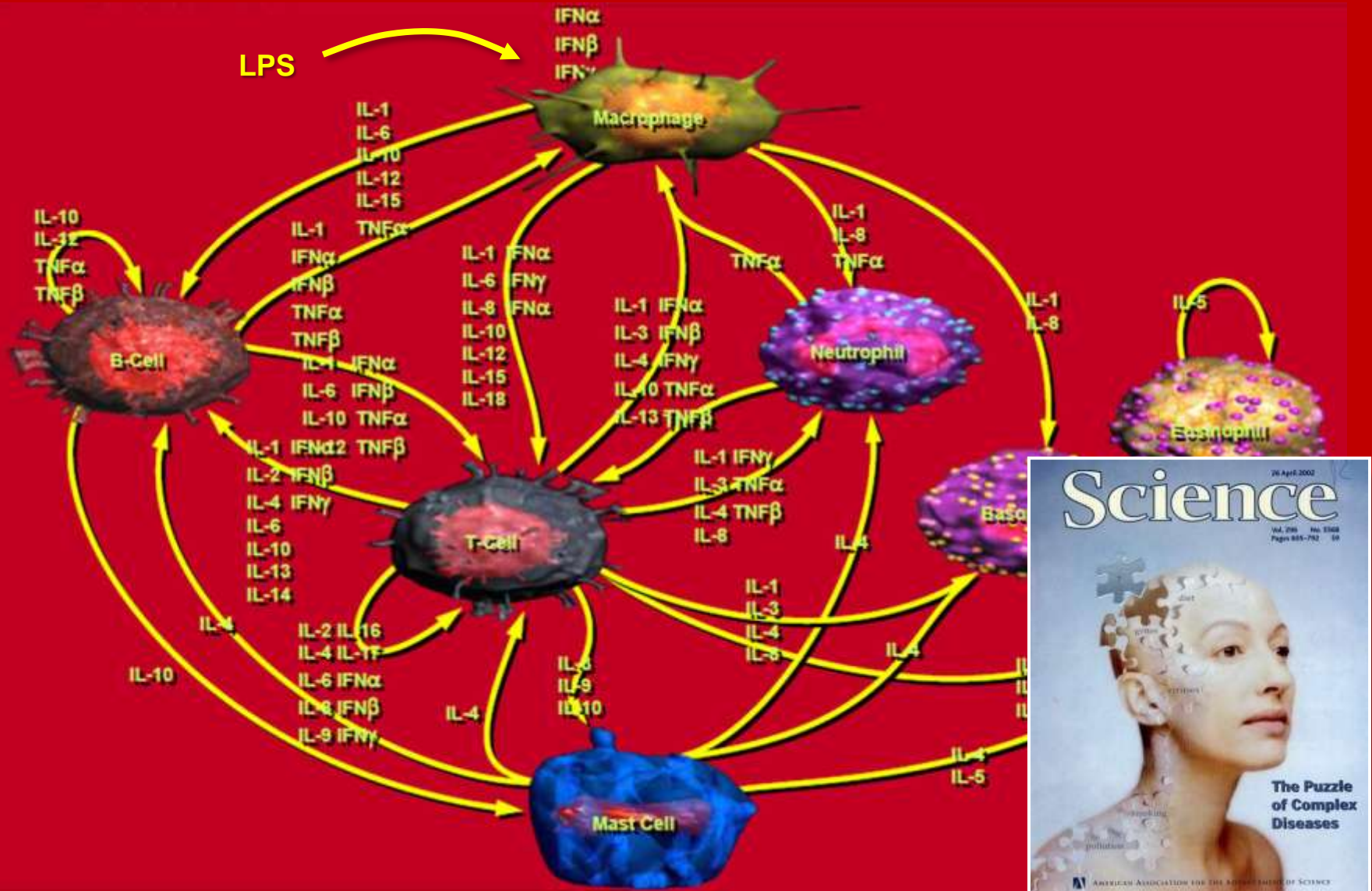
THE PUZZLE OF COMPLEX DISEASES



PATHOLOGY
As disorder of the interaction of the various systems inside the person and with environment



Cytokine & chemokine signaling: a complex network



HAHNEMANN'S COMPLEXITY OF DISEASES



*“Every disease (not entirely surgical) consists only in a **special, morbid, dynamic alteration** of our vital energy” (Organon, par. 29)*

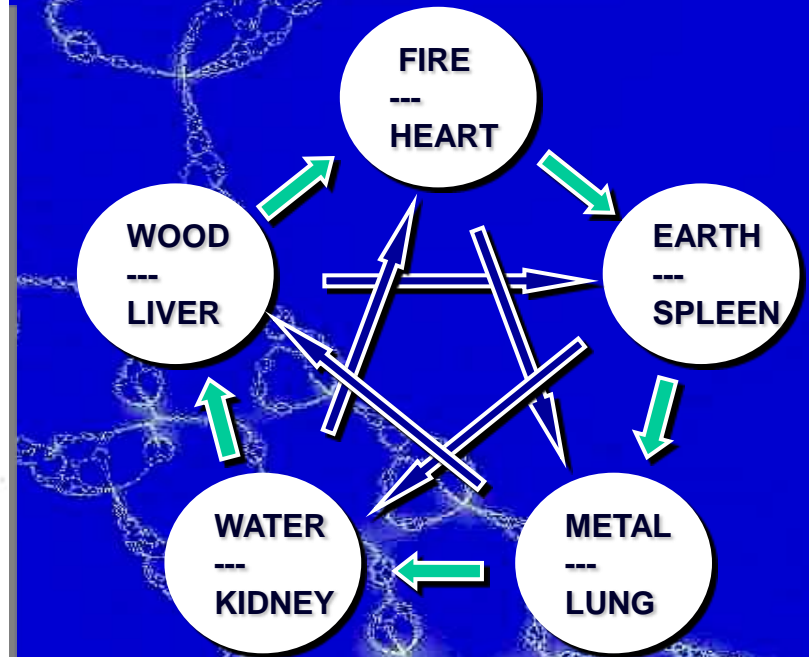
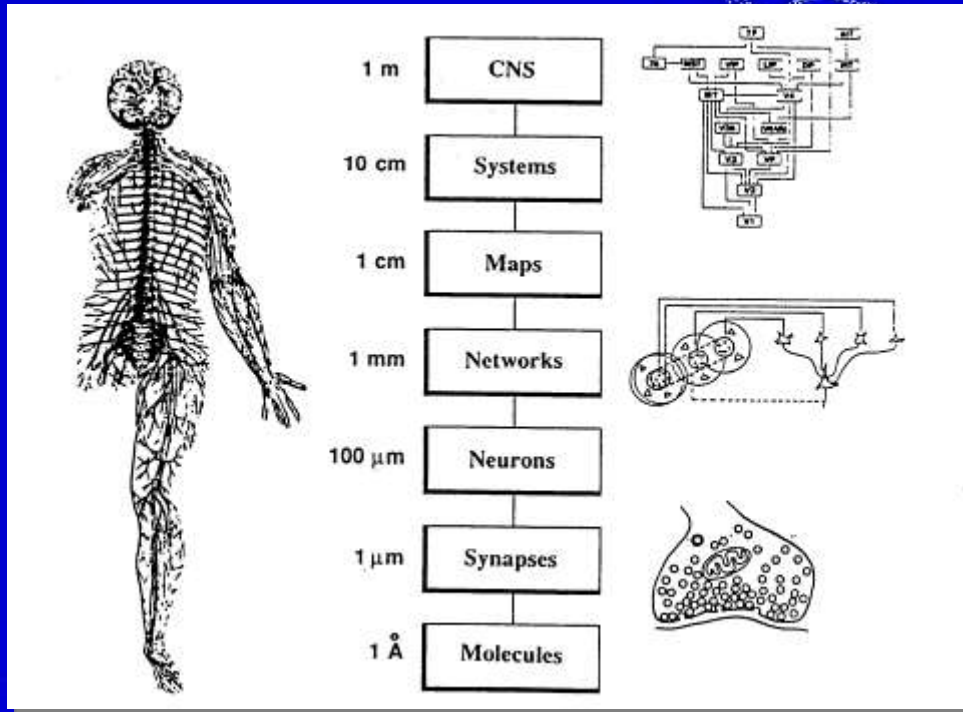
*“Disease and healing develop only through **dynamic influences**” (Organon, par. 86)*



COMPLEXITY OF ADAPTIVE SYSTEMS

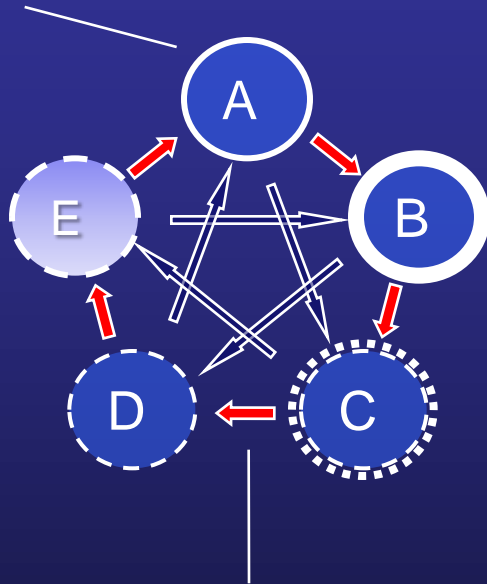
A complex adaptive system is a collection of individual agents with freedom to act in ways that are not always totally predictable, and whose actions are interconnected so that one agent's actions changes the context for other agents

P.E. Plsek and T.Greenhalgh, Complexity science, *BMJ* 323, 625-628, 2001





THE MODEL OF NEURAL NETWORKS






Nodes



Connections (o "synapses"):



 = stimulation
 = inhibition

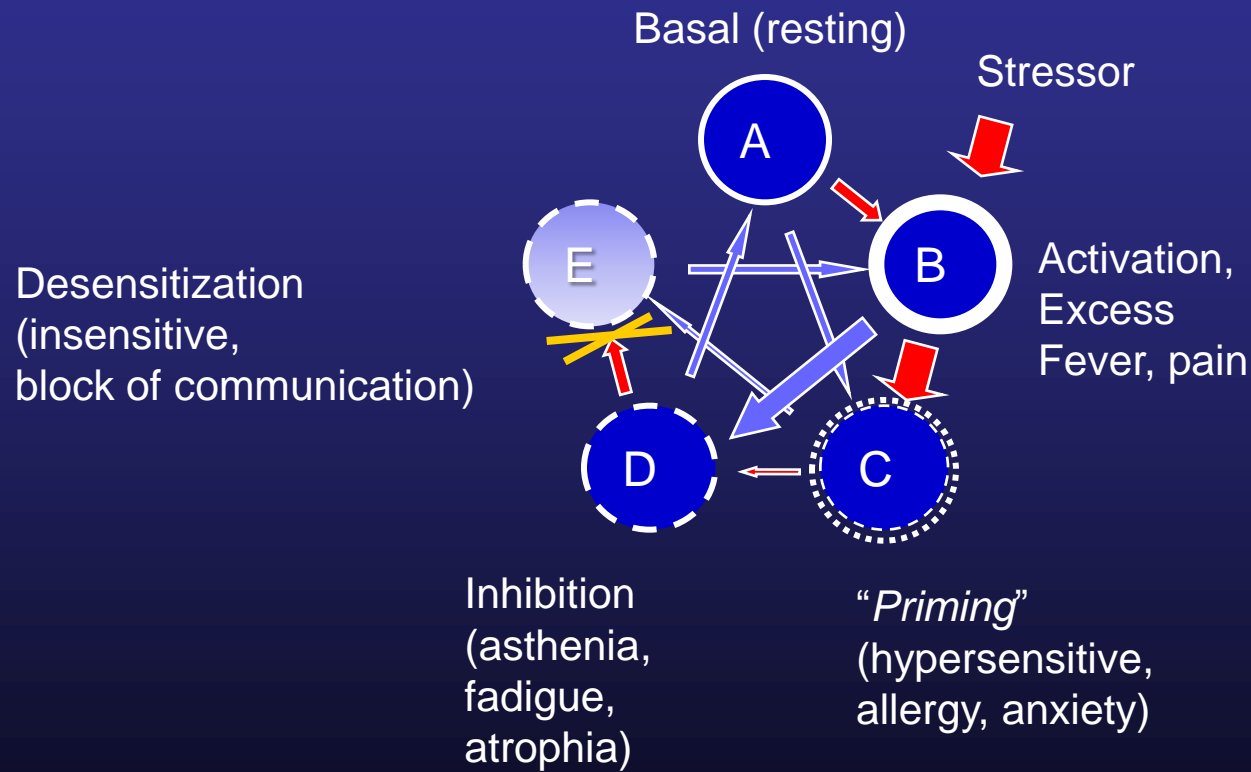
Possible states of nodes (o "neurons"):

-  = normal activity (basal state)
-  = activated
-  = primed[↑]
(normal activity, +hypersensitivity)
-  = inhibited, low activity
-  = desensitized
(not responsive)



POSSIBLE PHYSIOPATHOLOGICAL MEANING OF THE DIFFERENT SYMBOLS OF THE NETWORK MODEL

 = stimulation
 = inhibition



DISEASE DYNAMICS IN STATE-SPACE OF A TYPICAL NETWORK MODEL

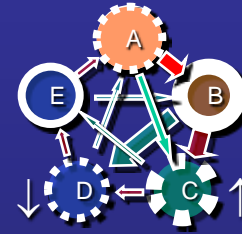
“A special, morbid, dynamic alteration of our vital energy”

Meta-stable
(far-from equilibrium)
states

Inherited
“predisposition”
“susceptibility” +

Environmental
factors

Reactions
(meta-stable
states)



ACUTE DISEASE
=Unsuitable, damaging reaction

Energy expenditure, symptoms

“Bifurcation”
(critical point)

Damage

“Healing”

Examples:

- Abscess
- Thrombosis
- Allergy acute symptoms
- Shock
- Panic attack
- Hischemic tissue injury

Healthy state
(physiological network,
homeodynamics)

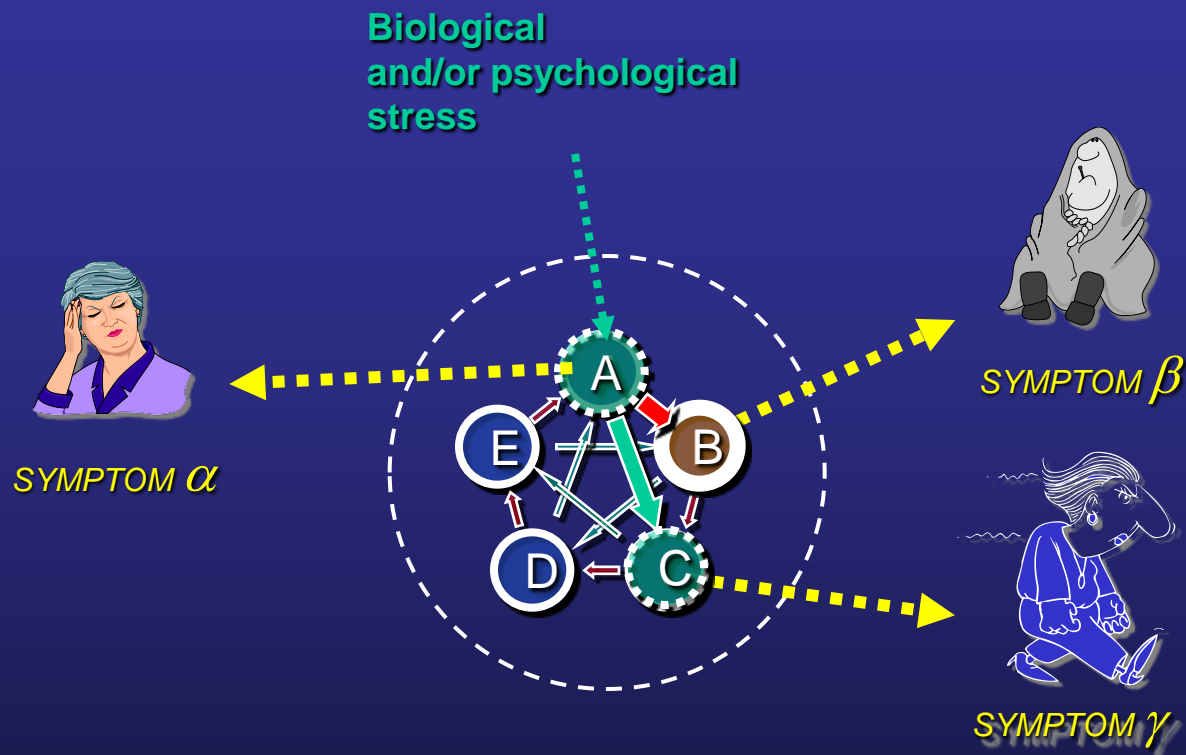
Physiological adaptation
(reinforced network)

Series of states of the system

Stable
states



SYMPTOMS ARE EMERGENT PROPERTIES OF THE GLOBAL, INDIVIDUAL, NETWORK

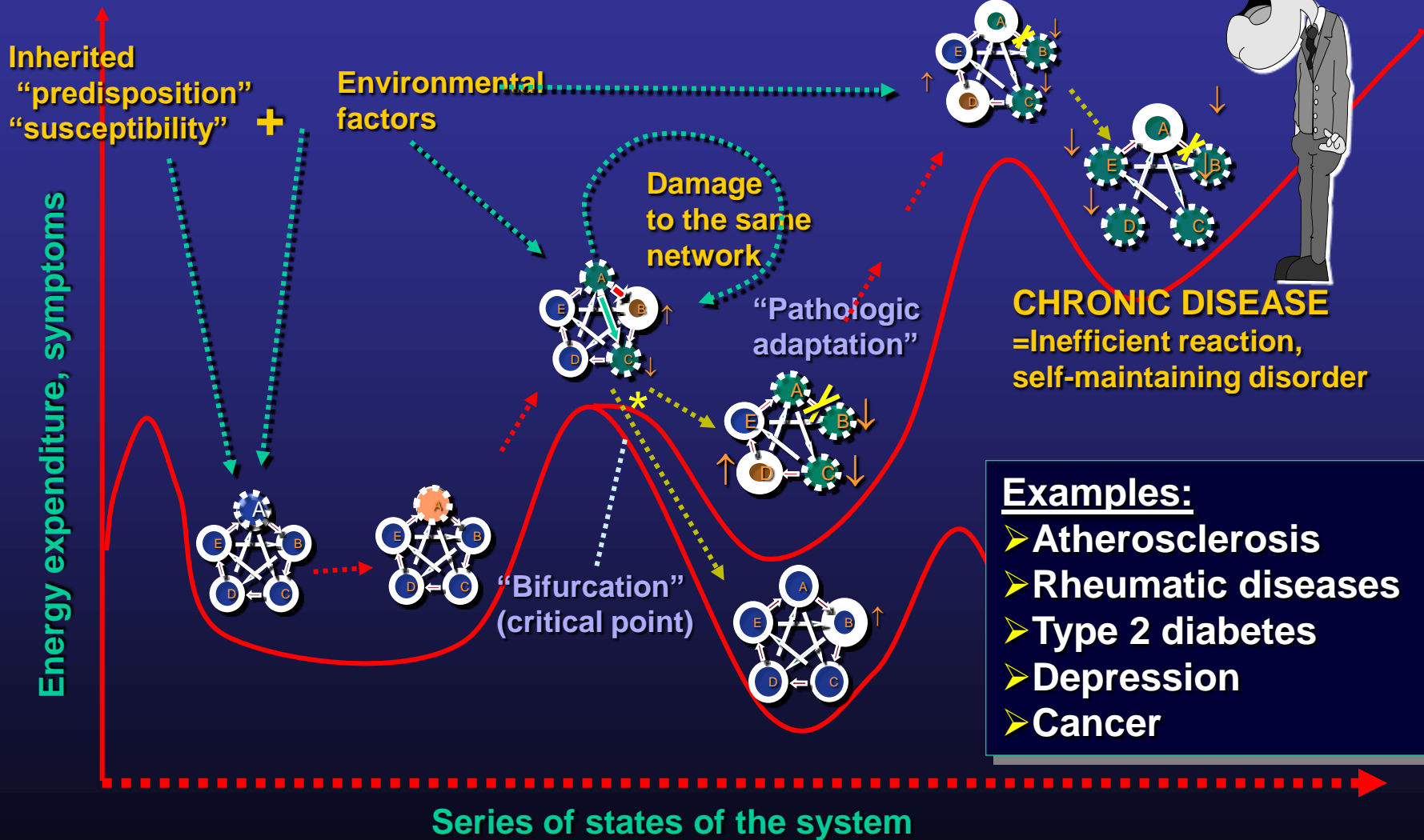


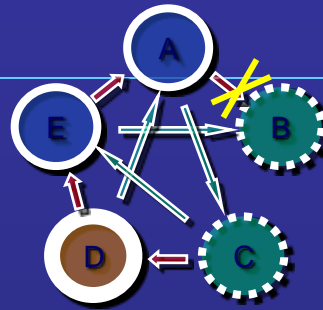
“Concomitant symptoms emerge in unique **patterns** for each **individual** and typically **involve the systemic, organism level of organization** (e.g., fatigue, cognitive problems, headache, palpitations, gastrointestinal distress, and joint pains) more than a single bodily subsystem.”

Iris R. Bell, Carol M. Baldwin and Gary E. R. Schwartz, Sensitization studies in chemically intolerant individuals - Annals of the New York Academy of Sciences 933:38-47 (2001)

DYNAMICS OF CHRONIC DISEASES IN THE SPACE-STATE

“A special, morbid, dynamic alteration of our vital energy”





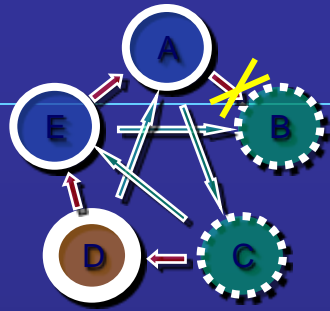
*“A special, morbid, dynamic
alteration of our vital energy”
C.F.S. Hahnemann*

LOSS OF CONNECTIVITY AND OF COMMUNICATION (DIS-INTEGRATION) IN THE COMPLEX NETWORKS

IS DELETERIOUS
(= TRULY PATHOLOGICAL)
BECAUSE

**>> THE HOMEODYNAMIC FUNCTION ITSELF IS DAMAGED
OR EVEN BLOCKED**

>> SPONTANEOUS RECOVERY IS HINDERED



BIOLOGICAL MECHANISMS

OF THE **LOSS OF CONNECTIVITY** IN THE HOMEODYNAMIC SYSTEMS

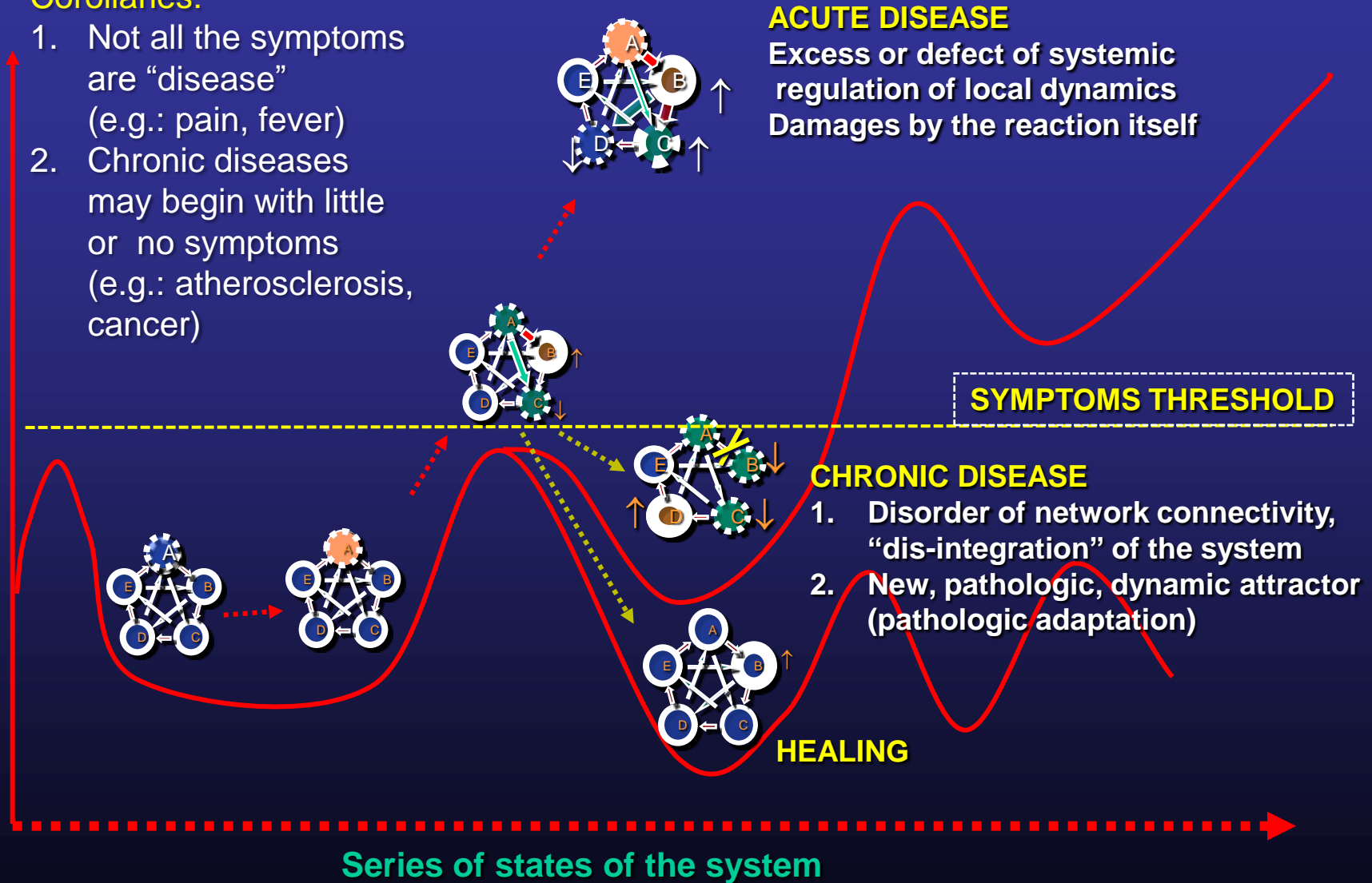
- Homologous desensitization due to signal overflow: receptor down regulation, inactivation, shedding
- Heterologous desensitization (cross-desensitization) (e.g.: chemokine/opioid peptides in inflammation)
- Inhibitory effects of bacterial/chemical toxins (including drugs)
- Block of signal molecules and/or of membrane receptors by endogenous toxins (e.g.: free radicals) or auto-antibodies
- Cell and tissue aging, sclerosis, amyloidosis, etc.

SUMMARY AND IMPORTANT COROLLARIES OF THE NEW VISION OF PATHOLOGY

Corollaries:

1. Not all the symptoms are “disease” (e.g.: pain, fever)
2. Chronic diseases may begin with little or no symptoms (e.g.: atherosclerosis, cancer)

Energy expenditure, symptoms



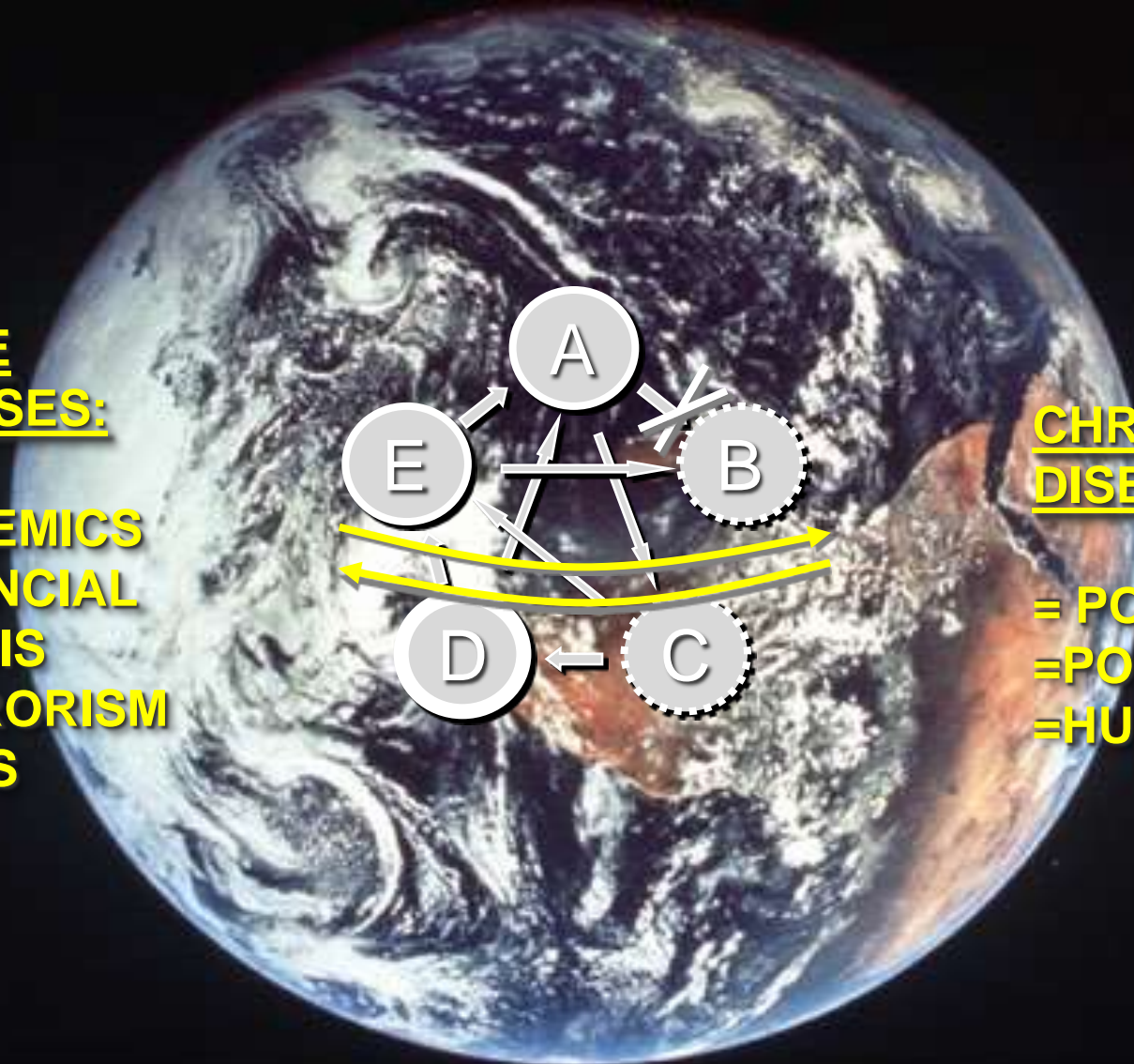
THE WORLD AS A COMPLEX (AND OFTEN SICK) ORGANISM

ACUTE DISEASES:

= EPIDEMICS
= FINANCIAL CRISIS
= TERRORISM
= WARS

CHRONIC DISEASES:

= POLLUTION
= POVERTY
= HUNGER



THE NEW VISION OF UNIVERSE AND NATURE

“Our physical universe is no longer symbolized by the regular, periodic motion of the planets which underlies classical mechanics.



Ilya Prigogine
Nobel prize-winner
In Chemistry, 1997

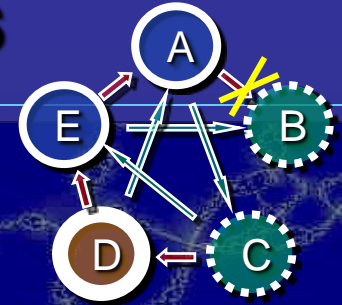
It is rather a universe of instability and fluctuations, which underlie the incredible wealth of forms and structures we see in the world around us.

We therefore need new concepts and new instruments to describe a nature in which evolution and pluralism have become the basic watchwords”

NGC1232 galaxy



THE (TRUE) COMPLEXITY OF DISEASES



1. Most diseases have multifactorial **causes**
2. All diseases affect life **energy** and **information**
3. Disease is a **dynamic** disorder (it changes in time)
4. Disease is a **systemic** process, involving the whole person and his/her interaction with environment
5. Not all the **symptoms** are true “disease”, often they represent normal **reactions** to the pathogenic factors

These complex features claim for a new attitude of medicine, both in “diagnostics” and in “therapeutics”



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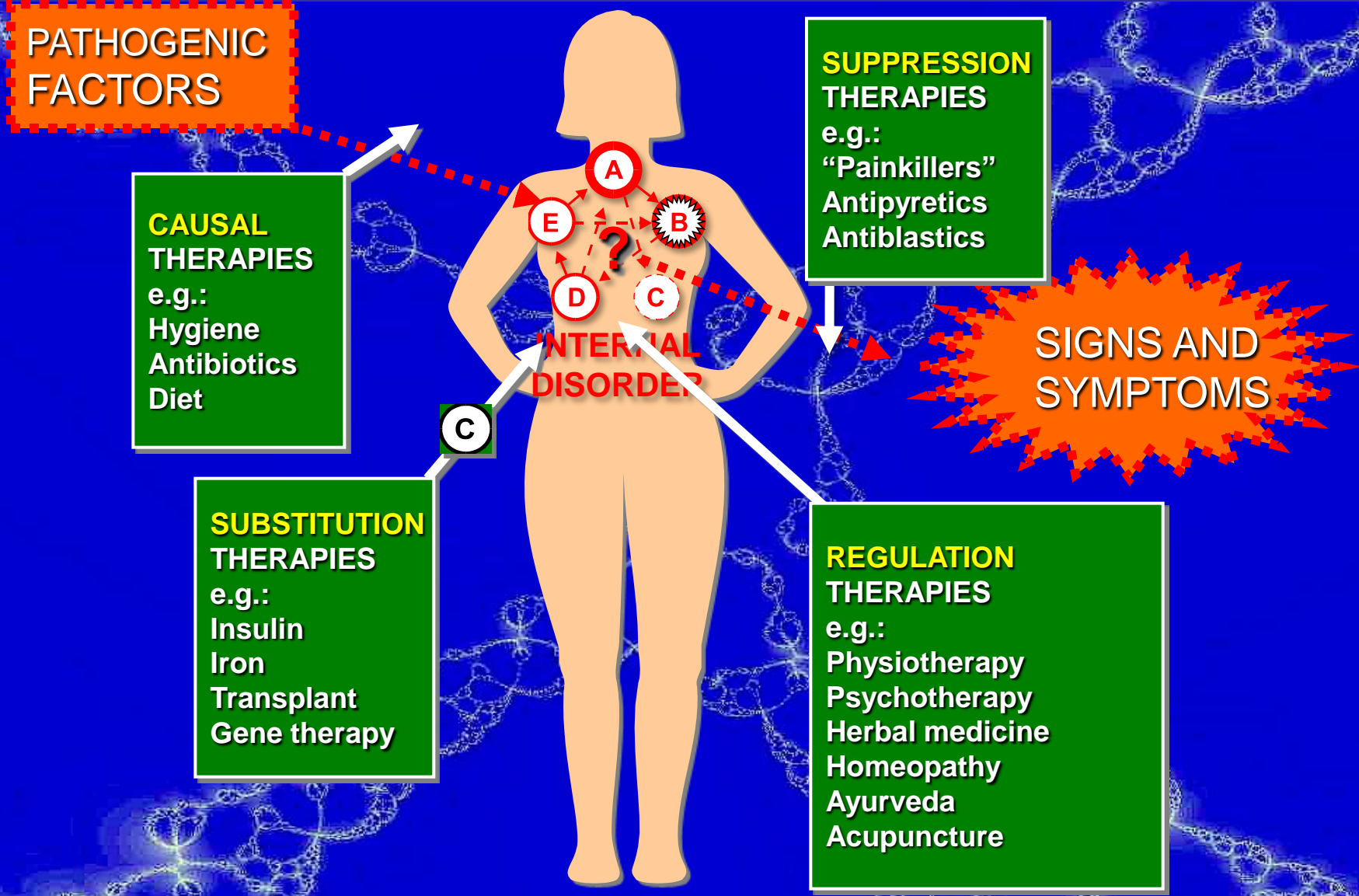
2. A new vision of pathology

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THE RATIONALE OF DIFFERENT THERAPEUTIC APPROACHES



PATHOGENIC FACTORS

CAUSAL THERAPIES
e.g.:
Hygiene
Antibiotics
Diet

SUBSTITUTION THERAPIES
e.g.:
Insulin
Iron
Transplant
Gene therapy

SUPPRESSION THERAPIES
e.g.:
“Painkillers”
Antipyretics
Antiblastics

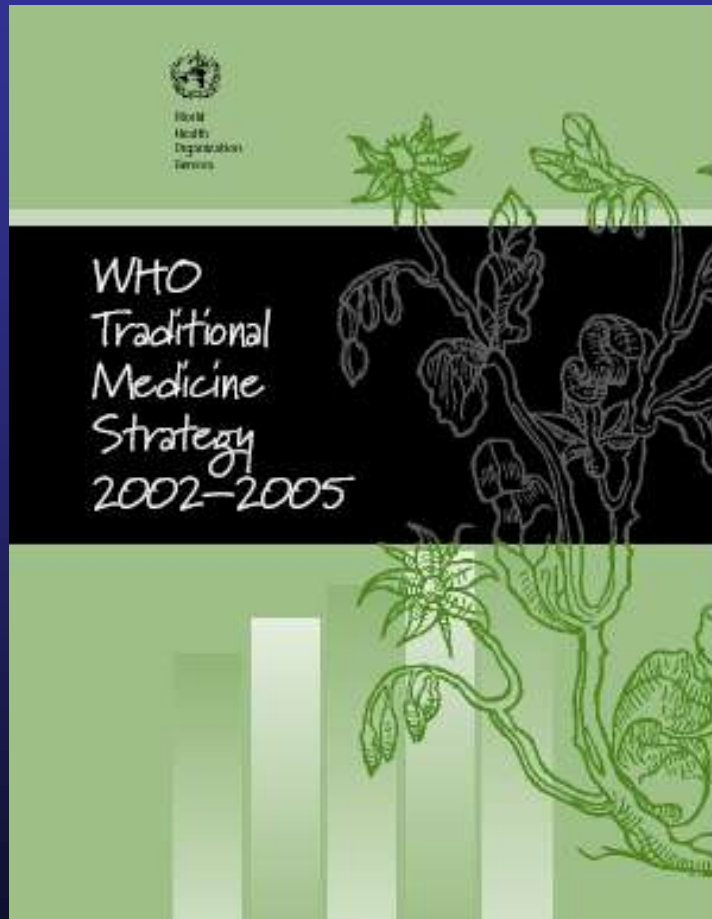
SIGNS AND SYMPTOMS

REGULATION THERAPIES
e.g.:
Physiotherapy
Psychotherapy
Herbal medicine
Homeopathy
Ayurveda
Acupuncture

INTERNAL DISORDER

The use of traditional and complementary/alternative medicine

LEGAL STATUS OF TRADITIONAL MEDICINE AND COMPLEMENTARY/ALTERNATIVE MEDICINE: A WORLDWIDE REVIEW



The World Health Organization encourages and supports Member States to integrate traditional and complementary/alternative medicine into national health care systems and to ensure their rational use.

DEFINITIONS

- **"Complementary medicine"** refers to use of CAM **together with** conventional medicine, such as using acupuncture in addition to usual care to help lessen pain.
- Most use of CAM by Americans is complementary.
- **"Alternative medicine"** refers to use of CAM **in place of** conventional medicine.
- **"Integrative medicine"** (also called integrated medicine) refers to a practice that combines both conventional and CAM treatments for which there is evidence of safety and effectiveness.

(<http://nccam.nih.gov/health/whatiscam/>)

U.S. DEPARTMENT OF HEALTH
AND HUMAN SERVICES

National Institutes of Health

National Center for Complementary
and Alternative Medicine



NCCAM





- The majority of cancer patients (63 percent) enrolled in clinical trials at the National Institutes of Health used at least one CAM therapy.
- This same study found that the most frequently utilized therapies were spiritual approaches, relaxation, imagery, exercise, lifestyle, diet (e.g., macrobiotic, vegetarian), and nutritional supplementation therapies.
- Patients unanimously believed that these CAM treatments helped to improve their quality of life by helping them cope more effectively with stress, decreasing their discomforts related to treatment and the illness itself, and giving them a better sense of control.





Review

Open Access

The use of complementary and alternative medicine by cancer patients

Mariama Adams* and Andrew Paul Jewell

Abstract

The use of Complementary and Alternative Medicine (CAM) among cancer patients is widespread and appears to be increasing. However, it is not clear whether patients use CAM as an 'alternative' to standard oncology care or as an adjunct to the conventional treatment they receive. This study reviews the role of CAM therapies in the management of cancer, from the view of both patients and health professionals and it highlights issues relating to the efficacy of CAM used by cancer patients. Most patients use CAM to 'complement' the conventional therapies of radiotherapy, chemotherapy, hormone therapy and surgery. Health professionals in general have expressed positive views when CAM is used 'complementarily' and not as an 'Alternative'. Results so far published have shown that CAM can contribute to improving the quality of life of cancer patients and their general well-being.





- Unconventional Complementary medical therapies must be evaluated with the same standards of quality, rigour, and ethics as conventional medical treatments.
- First class scientific research is crucial to helping people — and those who care for them — make the wisest health care decisions.

www.whccamp.hhs.gov





The report notes an emerging dialogue between complementary , alternative medicine and conventional medicine and recommends that efforts should be made to strengthen it.

It calls for integrating proven safe and effective complementary and alternative medicine practices into conventional health care

It recommends:

- Increased *funding* for research
- Creation of a central, *co-ordinating office* to oversee all activities
- *Education* of practitioners
- *Dissemination of information* about on complementary and alternative medicine
- *Reimbursement* for proven treatments
- Information about *adverse events* associated with complementary and alternative therapy products.





CAMDOC ALLIANCE



European Committee for Homeopathy
European Council of Doctors for Plurality in Medicine
International Council of Medical Acupuncture and Related Techniques
International Federation of Anthroposophic Medical Associations



THE REGULATORY STATUS OF COMPLEMENTARY AND ALTERNATIVE MEDICINE FOR MEDICAL DOCTORS IN EUROPE





- Commonly cited examples include naturopathy, chiropractic, herbalism, traditional Chinese medicine, Ayurveda, meditation, yoga, biofeedback, hypnosis, homeopathy, acupuncture, and diet-based therapies, in addition to a range of other practices.
- It is frequently grouped with **complementary medicine**, which generally refers to the same interventions when used in conjunction with mainstream techniques, under the umbrella term **complementary and alternative medicine**, or **CAM**.

CAM Community Policy: Summary



- Our healthcare system should shift its focus from a mainly treatment-oriented framework of public health to a more prevention-centered society in which healthy lifestyles are promoted and sustained.
- Current gaps in healthcare service provision should be addressed through extending the system to include the concept of salutogenesis and the holistic approach of Complementary and Alternative Medicine (CAM), resulting in **integrative** care throughout the system and the inclusion of CAM methods currently mostly only available in private practice.

http://www.camdoc.eu/CAM_for_Europe/Summary.html



PHYTOTHERAPY

- *Phytotherapy, or herbal therapy, is the use of plants or plant extracts for medicinal purposes.*
- *The choices made in phytotherapy are mainly based on empirical knowledge which has never been abandoned over the years on account of its essential practical validity. In recent decades, however, there has been a perceived need to provide well documented evidence, on the basis of scientific criteria, for many of the notions that have come down to us over centuries of history of the practice of medicine.*
- *The PubMed database of the National Library of Medicine currently reviews 8080 papers on phytotherapy and 1490 papers on herbal medicine, while, if one runs a search for the key word “plant extracts”, the number of hits is an extraordinary 41,172. The substantial number of publications having to do with phytotherapy confirms that research is ongoing and ranges from studies on the molecular action mechanisms of components of medicinal plants to randomised clinical trials evaluating the efficacy of complete extracts.*
- *In synthesis, recent years have also witnessed the growth of meta-analyses and of systematic reviews demonstrating the superiority of a number of plants over placebo and their substantial equivalence to the other available therapies in a number of clinical conditions.*



Arnica m.

PHYTOTHERAPY. WELL-DOCUMENTED PROPERTIES OF SOME PLANTS

- *Ginkgo biloba* is safe and capable of improving cognitive performance and social functioning of dementia patients and in patients suffering from cerebral circulatory insufficiency
- An extract of kava (*Piper methysticum*) was found to induce a slight increase in word recognition ability and a greater capacity to differentiate between new and repeated words as compared to control subjects.
- Extracts of the fruits of the saw palmetto (*Serenoa repens*), appreciably reduce the discomfort caused by benign prostatic hypertrophy.
- *Hypericum* or St. John's wort (*Hypericum perforatum*), has recently achieved media notoriety on account of its efficacy as an antidepressant, with better tolerance than conventional drugs.
- Garlic (*Allium sativum*), has serum lipid lowering and antiatherogenic effects, antihypertensive effects, antithrombotic activity.
- *Echinacea* may be helpful in the treatment or prevention of upper respiratory tract infections, but trial data are not fully convincing.
- Ginseng has been used medicinally in the Far East for several millennia and is currently one of the most widely taken herbal products throughout the world. It has been attributed with a plethora of physiological effects that could potentially benefit cognitive performance or mood.
- Extracts and preparations from the tree parasitic plant mistletoe (*Viscum album* L.) have been used in the treatment of cancer for decades. Numerous preclinical and *in vitro* studies have reported immunostimulatory, cytotoxic, and proapoptotic effects.



Serenoa



Hypericum

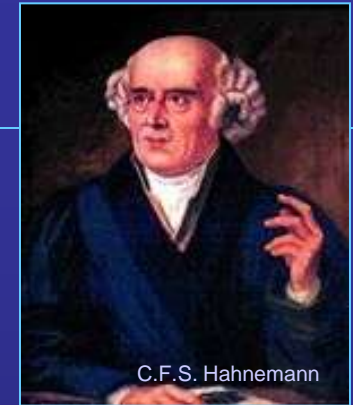


Echinacea



Viscum

HOMEOPATHY



Homeopathy, or Homeotherapeutics, is a unique scientific system of medicine predicated on the Law of Similars, Similia similibus Curentur or "let likes be cured by likes".

(Very low doses of a substance that can induce symptoms of disease in healthy persons can heal a person with similar symptoms)

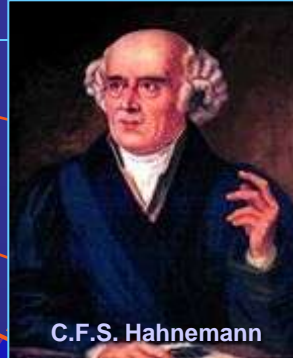
Although this principle was first postulated by Hippocrates, it had its first practical application in 1796 when Samuel Hahnemann established Homeopathy.

AMERICAN INSTITUTE OF HOMEOPATHY: Standards of Homeotherapeutic Practice.

<http://www.healthy.net/associations/pa/aih/standards.htm>



THE MAJOR TENETS OF HOMEOPATHY



SIMILIA PRINCIPLE ("INVERSE EFFECTS")

- Systemic biology
- Dynamic pathology
- Individual therapy

MICRODOSE ("NANOPHARMACOLOGY")

- Water/solvent physics
- Bioelectromagnetics
- Chaos theory

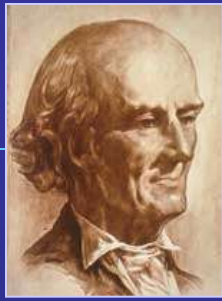


Homeopathy



- Although our conventional medical paradigm assumes that larger and larger doses of pharmacological agents will create increasingly significant biochemical reactions, such reactions do not necessarily lead to better or improved health. In fact, increasing doses of most drugs generally lead to increased side effects.
- Homeopathic medicine presents a significantly different pharmacological approach to treating sick people. Instead of using strong and powerful doses of medicinal agents that have a broad-spectrum effect on a wide variety of people with a similar disease, homeopaths use extremely small doses of medicinal substances that are highly individualized to a person's physical and psychological syndrome of disease, not simply an assumed localized pathology.

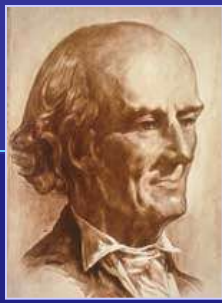




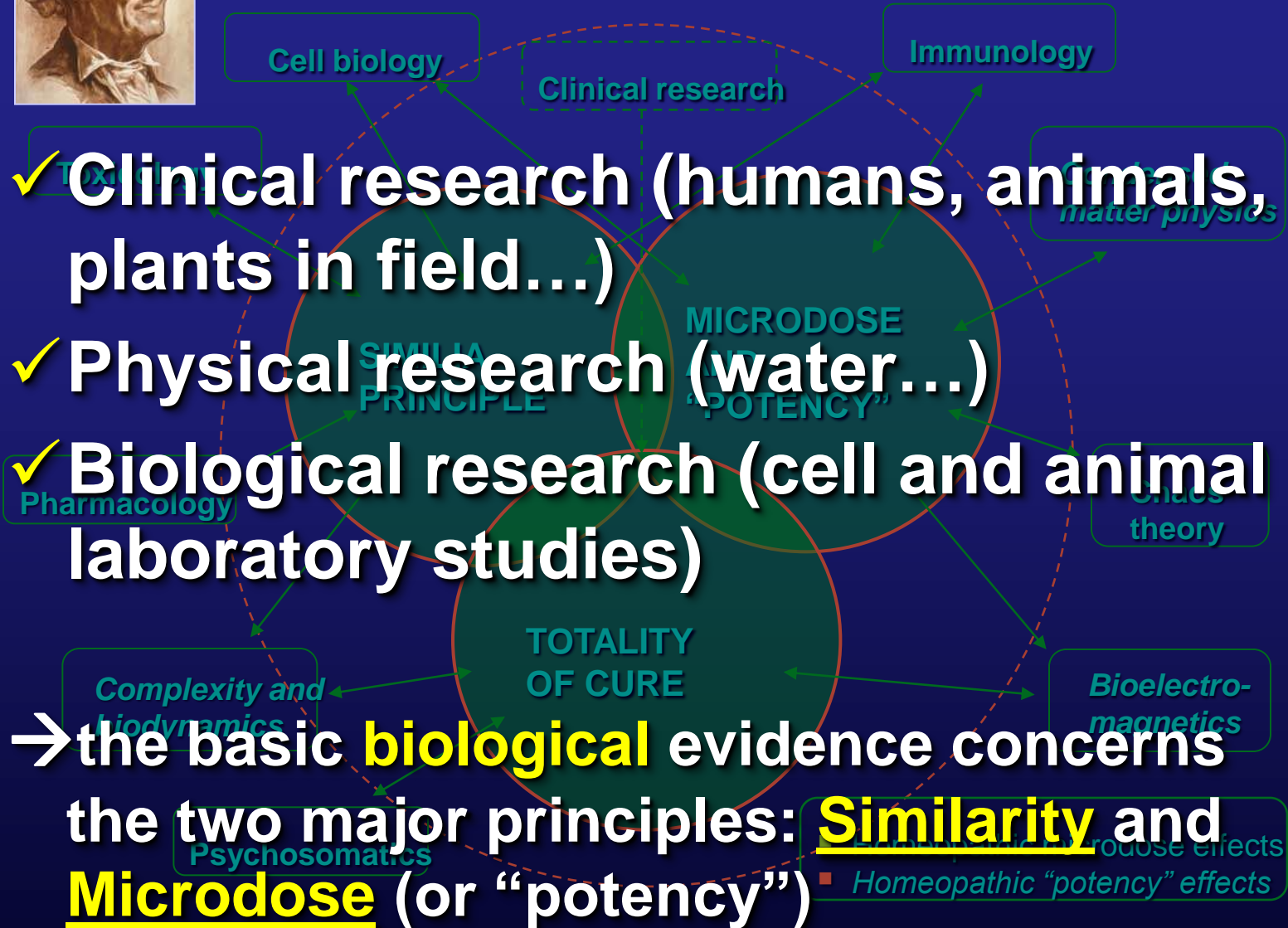
PROBLEMS OF UNDERSTANDING AND ACCEPTING HOMEOPATHY

1. The structure of **contemporary scientific thought** inherited from positivism (everything is material, and each object can be reduced to its component parts).
 2. The **scarcity of demonstrations** of clinical efficacy based on methods shared by official medicine, which is due partly to intrinsic difficulties and partly to the fact that homeopathy has long been banned from academic institutions
 3. The **scarcity of explanations** that are plausible and understandable in terms of current pharmacological theories based on the molecular paradigm.
- Points 2 and 3 can be scientifically investigated





SCIENCE FIELDS INVOLVED IN THE INVESTIGATION OF HOMEOPATHIC PHENOMENA

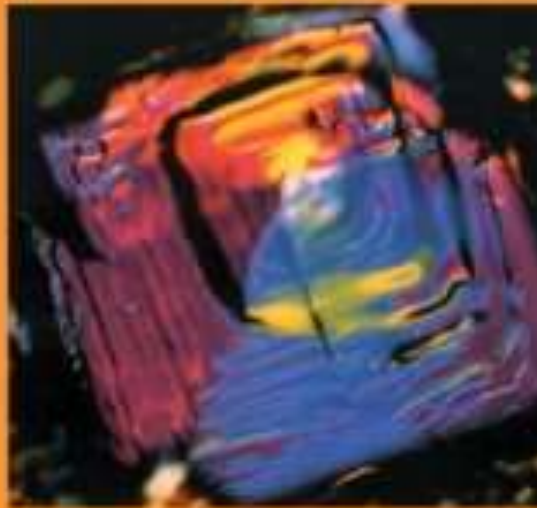


Nanopharmacology

THE EMERGING SCIENCE OF **HOMEOPATHY**

COMPLEXITY, BIODYNAMICS,
and NANOPHARMACOLOGY

Revised and Expanded Edition



PAOLO BELLAVITE, M.D.
ANDREA SIGNORINI, M.D.

Paolo Bellavite & Andrea Signorini
North Atlantic Books, 2002

- Homeopathic medicines are so small in dose that it is appropriate to refer to them as a part of a newly defined field of *nanopharmacology* (the prefix “nano” derives from Latin and means dwarf; today, the prefix is used to refer to technologies or substances that are extremely small, at least one-billionth of a unit, designated as 10^{-9}).



LABORATORY EVIDENCES OF NANOPHARMACOLOGY



System	Agent	Dilution	Effect	Ref.
Human basophils	Histamine	10^{-24}	Inhibition	Belon 1999-2008- (and others including Chirumbolo et al.)
Chicken embryo	Bursin	15 CH 10^{-27} g	Immunomodulatory and endocrine activity	Youbicier-Simo 1993-97
Rat Hypothalamus	Sodium chloride	10^{-60}	Reduces firing rate in rats under high-salt diet	Sukul 1991-98
Mice nervous system	Nux vomica	30 CH	Reduction of alcohol-induced sleep time	Sukul 1999
Mouse blood	Acetylsalicylic acid	10^{-30}	Pro-thrombotic	Doutremepuich 1998
Mouse ears	Silica	10^{-60}	Speeds up wound healing	Oberbaum 1998
Wheat germination	Arsenic Silver nitrate	10^{-45} 26 D	Protect from toxicity Enhances growth	Betti 1997/2001 Pongratz 1998
Neurons	Cycloheximide	10^{-27}	Increases viability	Marotta 2002
Lymphocytes	Cadmium	15CH-20CH	Protects from cadmium toxicity	Wachli 2006
Mouse behaviour	Gelsemium	9CH-30CH	Anxiolytic-like effect	Bellavite 2009-10



Nanopharmacology



- To understand the nature and the degree of homeopathy's nanopharmacology, it is important to know the following characteristics of how homeopathic medicines are made:
- Most homeopathic medicines are made by diluting a medicinal substance in a double-distilled water. It should be noted that physicists who study the properties of water commonly acknowledge that water has many mysterious and amazing properties. Because homeopaths use a double-distilled water, it is highly purified, enabling the medicinal substance to solely infiltrate the water.
- Each substance is diluted, most commonly, 1 part of the original medicinal agent to 9 or 99 parts double-distilled water. The mixture is then vigorously stirred or shaken. The solution is then diluted again 1:9 or 1:99 and vigorously stirred. This process of diluting and stirring is repeated 3, 6, 12, 30, 200, 1,000, or even 1,000,000 times.
- It is inaccurate to say that homeopathic medicines are extremely diluted; they are extremely "potentized." Potentization refers to the specific process of sequential dilution with vigorous stirring. Each consecutive dilution infiltrates the new double-distilled water and imprints upon it the fractal form of the original substance used (fractal refers to the specific consecutively smaller pattern or form within a larger pattern).



ULTRA-LOW DOSES AND HIGH DILUTIONS: KEY-POINTS



- HOMEOPATHIC DRUGS DILUTED/DYNAMIZED UNTIL **10-12CH (centesimal dilutions)** ARE IN THE RANGE OF “ULTRA-LOW DOSES” (until 10^{-20} to 10^{-24} mol/liter) of active principles
- Biological activity of these ULTRA-LOW DOSES on specific cellular and subcellular systems can be retrieved from scientific literature independently of studies on homeopathic drugs.
- In this range of dilutions, explanations can be found inside the molecular paradigm and extremely high power of signal amplifications of biological systems.



A. Avogadro
(1776 – 1856)

-
- HOMEOPATHIC DRUGS DILUTED/DYNAMIZED BEYOND or **10-12CH** ARE IN THE RANGE OF “HIGH-DILUTIONS” (No molecules besides solvent, according to the Avogadro’s law)
 - Here a **SOLID EVIDENCE** and a **NEW THEORY** are needed:
 - For condensed matter physics (water)
 - For the action in the body (human, animal and plant studies)



THERMOLUMINESCENT GLOW OF ULTRA-HIGH DILUTIONS: CLAIM THAT WATER HAS MEMORY



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Physica A 323 (2003) 67–74

PHYSICA A

www.elsevier.com/locate/physa

Thermoluminescence of ultra-high dilutions of lithium chloride and sodium chloride

Louis Rey*

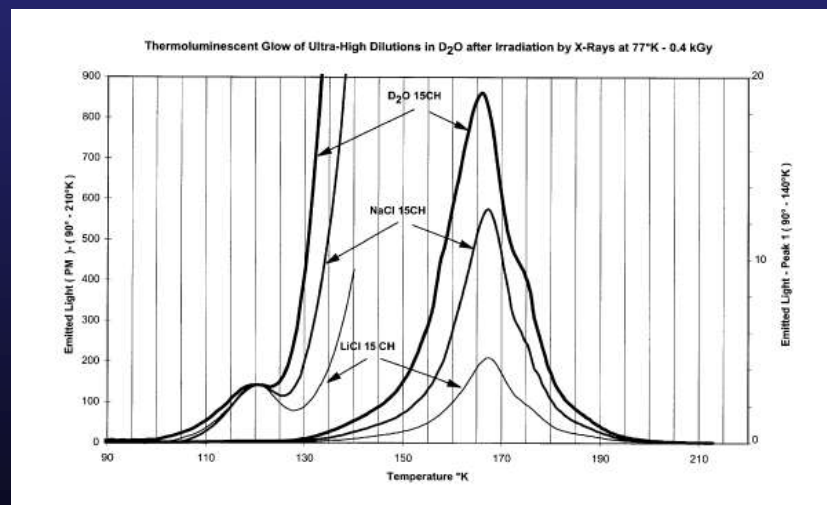
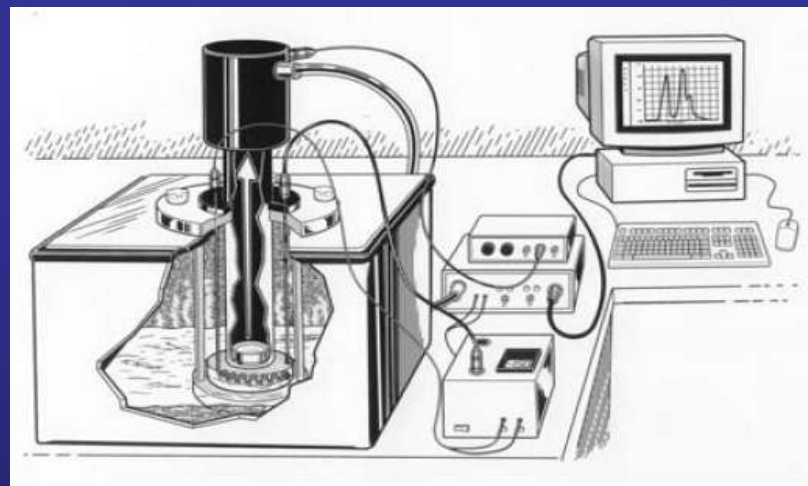
Chemin de Verdonnet 2, 1010 Lausanne, Switzerland

Received 10 December 2002

Abstract

Ultra-high dilutions of lithium chloride and sodium chloride ($10^{-30} \text{ g cm}^{-3}$) have been irradiated by X- and γ -rays at 77 K, then progressively rewarmed to room temperature. During that phase, their thermoluminescence has been studied and it was found that, despite their dilution beyond the Avogadro number, the emitted light was specific of the original salts dissolved initially.

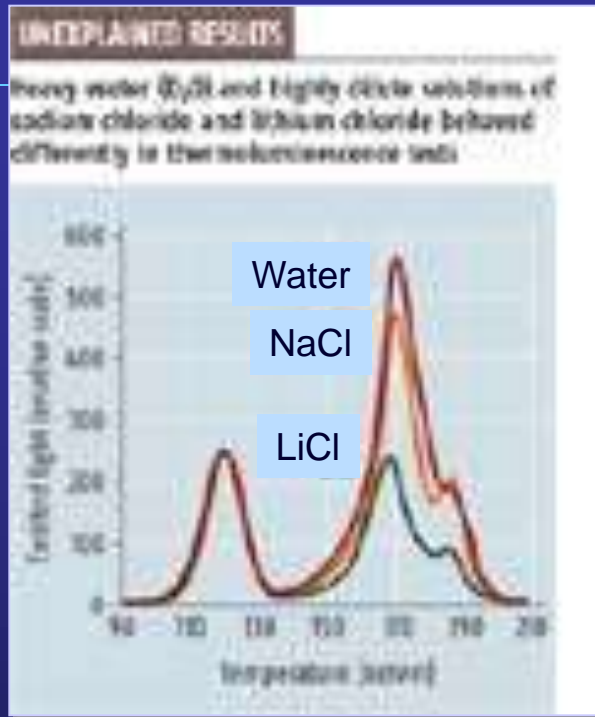
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CLAIM THAT WATER HAS MEMORY

L. Milgrom

New Scientist June, 11, 2003



The thermoluminescence study of ice it reports suggests **the structure of hydrogen bonding in homeopathic dilutions of salt solutions is different to that of pure water**, despite neither containing any salt.

Could it be time to take the memory of water seriously?

- The technique involves bathing a chilled sample with radiation. **When the sample is warmed up, the stored energy is released as light in a pattern** that reflects the atomic structure of the sample.
- When Rey compared the ultra-dilute lithium and sodium chloride solutions (diluted down to a notional 10^{-30} grams per cubic centimetre) with pure water that had been through the same process, the **difference in their thermoluminescence peaks compared with pure water** was still there.
- He believes the result **proves that the networks of hydrogen bonds in the samples were different.**



EVIDENCES AND PLAUSIBILITY OF BIOLOGICAL HIGH-DILUTION EFFECTS

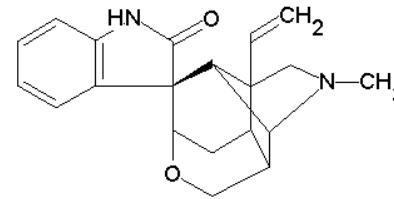
- Many experiments on biological systems have shown consistent effects of homeopathic dilutions far beyond the Avogadro number, i.e. in virtual absence of molecules
- Liquid water is organized in H-bonded dynamic structures (*clusters* and *chains*) .
- NMR , Thermodynamic, Spectrometric , Thermoluminescence measurements have provided provisional experimental evidence of “anomalous states of water” in diluted and succussed solutions
- Water treated with *electromagnetic fields* acquires and maintains the capacity to modify the function of membrane channels and leukocytes .
- Homeopathic medicines are inactivated by (strong) VHF and MW fields
- Cells, enzymes, receptors and whole body exhibit high sensitivity to regulation by long-range *electromagnetic interactions*



Gelsemium sempervirens

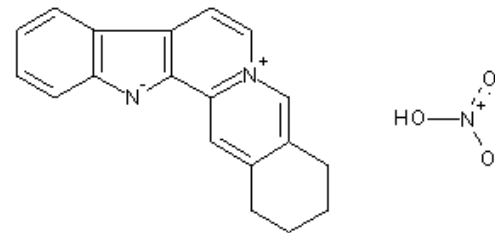


CAROLINA-JESSAMINE
Gelsemium sempervirens (L.) Ait. f.
LOGANIA FAMILY



Gelsemine

Molecular Weight: 322,41)



Sempervirine

Molecular Weight: 335,36)



Light-Dark ethological test

(anxiety-like response due to conflict between tendency to exploration and aversion to light and to be alone in open space)



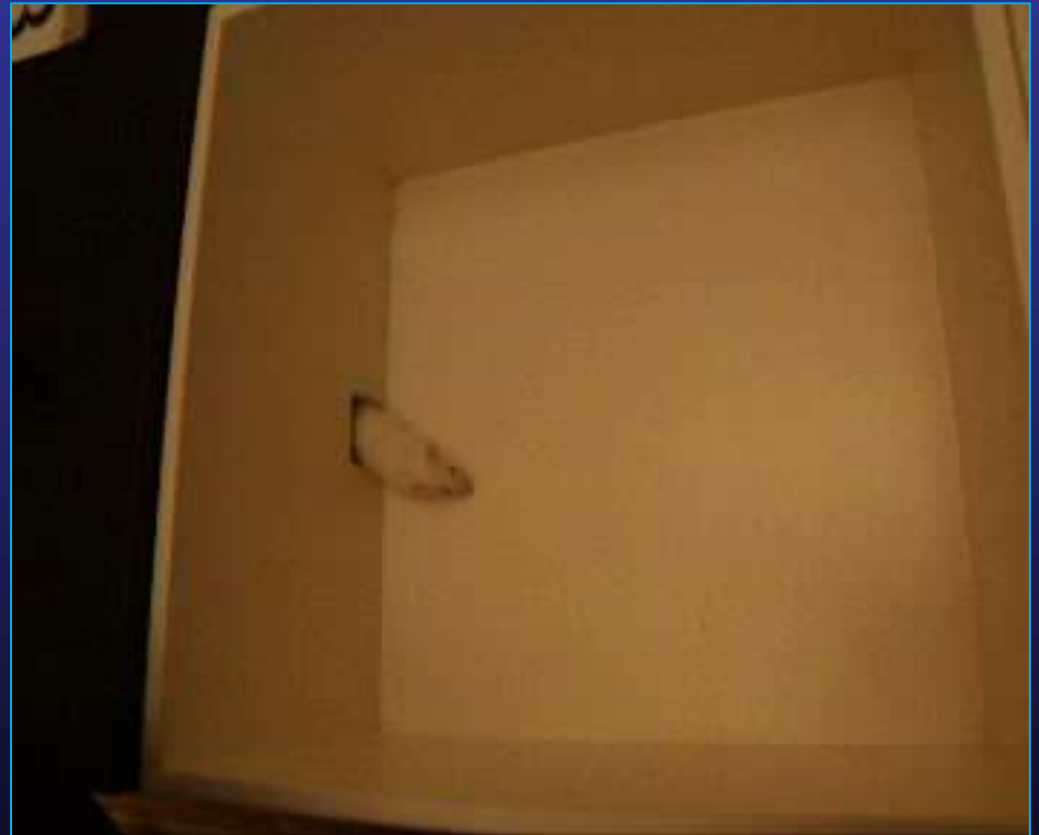
Main parameters:

→ % Time in Light area

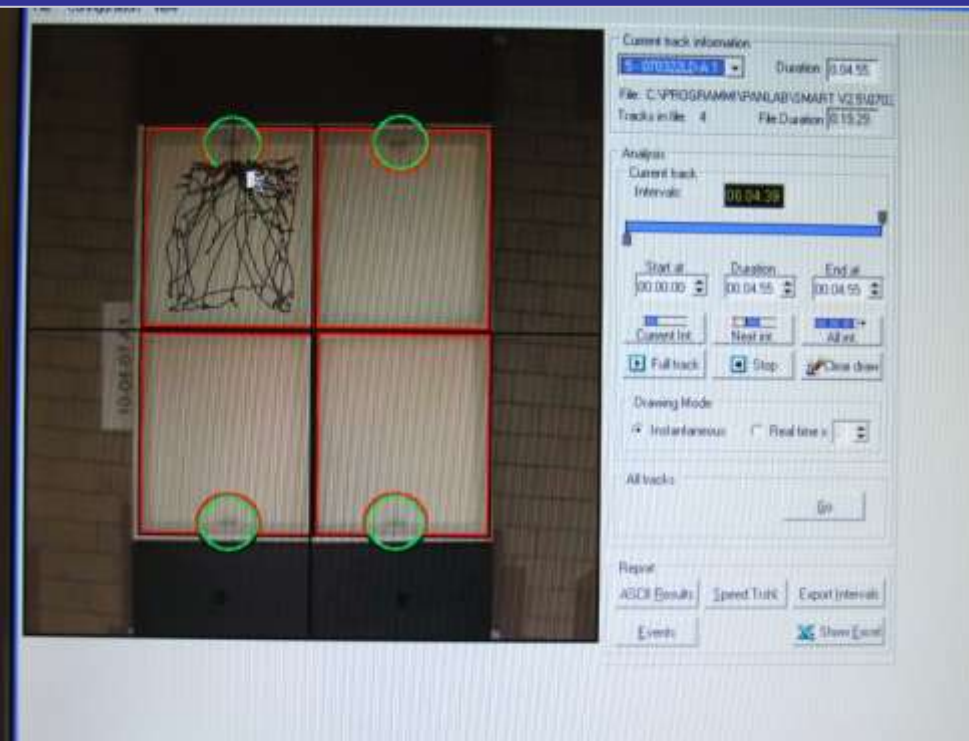
→ N. of transitions



*Experiments approved
by ethical committee
No pain, no artificial stress*



VIDEO-TRACKING AND AUTOMATIC CALCULATION OF BEHAVIOURAL SCORES



Tracking and Analysis with Smart software (Panlab Instruments)



Gelsemium showed anxiolytic-like properties in Light-dark test



Light-Dark Mean effect \pm SEM of 6 experiments total 48 mice/group

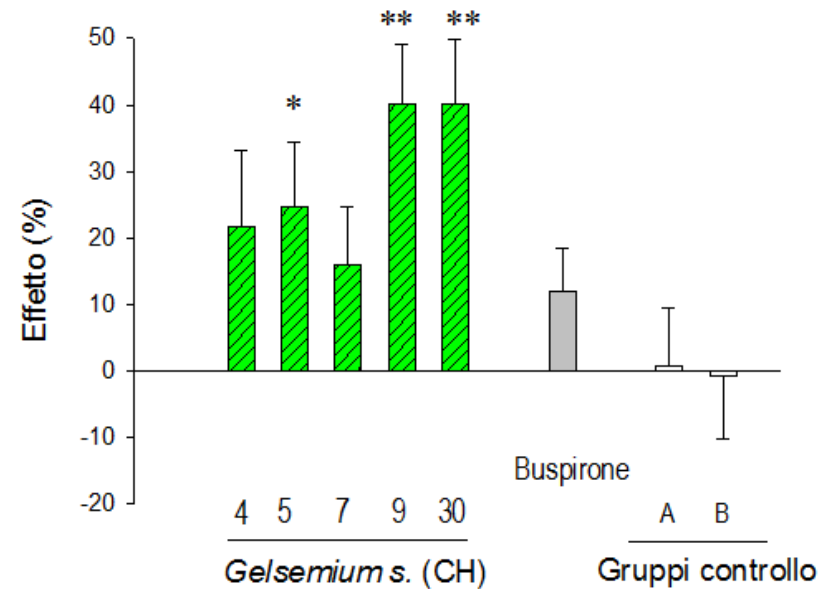
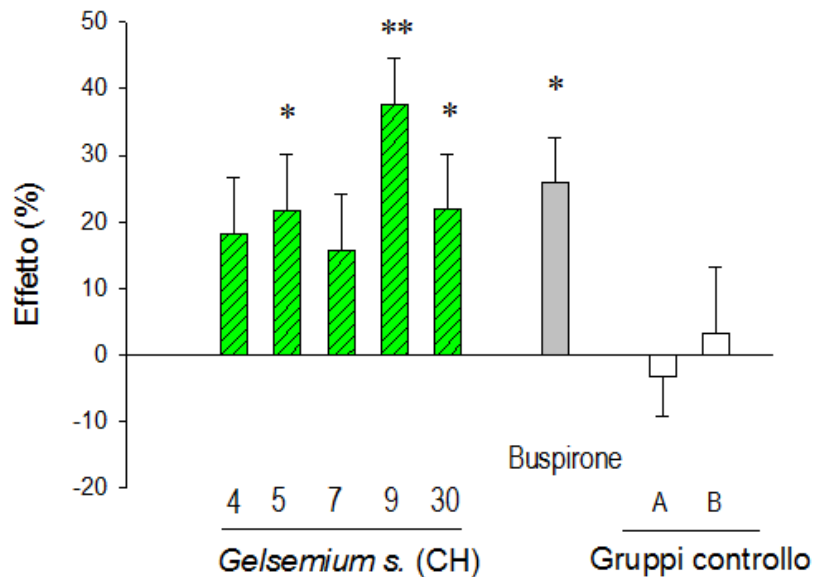
D: Global ANOVA for groups
P=0.0004

E: Global ANOVA for groups
P=0.0002

P* <0,05
P** <0,001

D: Light-dark: time spent in light (anxiolytic-like effect)

E: Light-dark: number of transitions





The KEY-NOTES

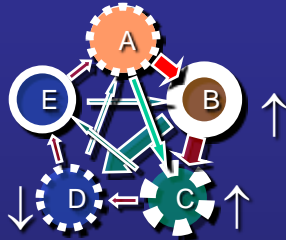


***Gelsemium sempervirens* improves some indexes of anxiety-like behavior significantly more than placebo in a large group of mice in rigorously blind conditions:**

- The *Gelsemium* effects in mice concern a subset of symptoms which have been tested in our models:
 - aversion to open space
 - amelioration with movement
 - feeling in a danger
 - aversion to light
- 9CH and 30CH potencies appear to be more active than 4CH and 5CH
- The anxiolytic-like effects of *Gelsemium* in Open Field are quite different from those of allopathic drugs (buspirone and diazepam)
- Gelsemium* has no adverse effects on locomotion nor causes sedation (an effect shown by buspirone in chronic treatment)



THE STARTING POINT OF A THEORY OF “SIMILE”: DISEASE AS “SYSTEMIC AND DYNAMIC INFORMATION DISORDER”



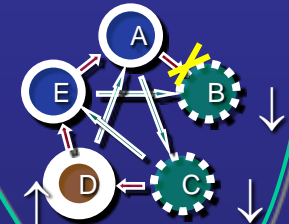
ACUTE DISEASE

Excess or defect of systemic regulation of local dynamics
Damages by the reaction itself



CHRONIC DISEASE

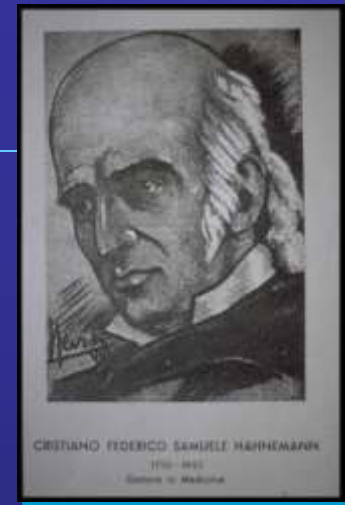
1. Disorder of network connectivity, “dis-integration” of the system
2. New, pathologic, dynamic attractor (pathologic adaptation)



*“A special, morbid, dynamic alteration
of our vital energy”
C.F.S. Hahnemann*

SIMILIA SIMILIBUS

“One imitates nature which at times heals one chronic disease by adding another to it and employs in the disease that drug which is in the position to excite another artificial disease as similar to it as possible and it will be healed: similia similibus”



C.F.S. Hahnemann

Versuch über ein neues Princip zur Auffindung der Heilkräfte der Arzneisubstanzen
Hufeland's Journal 2, 381, 1796.





THE LOGIC OF THE HOMEOPATHIC “SIMILE”

The “therapeutic similarity” in drug action may be fundamentally based on the widespread phenomenon of inversion of biological effects dependent on the following factors:

1. the **dose**, and/or on
2. the **time** of administration, and/or on
3. the **physiological state** of the receiver

A combination of one or more of these factors and the contribution of **complexity science** give rise to an complete theory of the homeopathic “simile” effect

Main references in: Bellavite et al. : ECAM Journal 2007 (available online through PubMed-Medline)



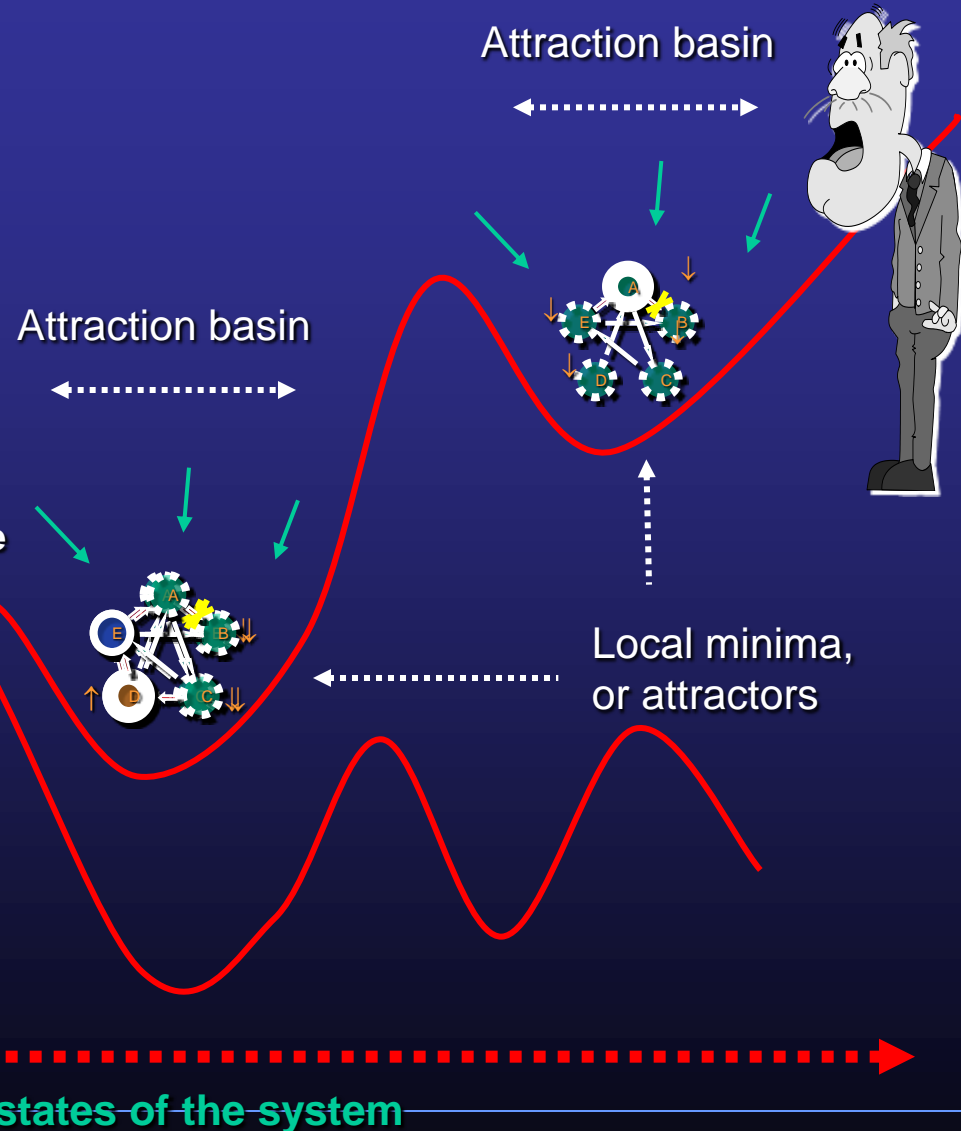
TREATING THE NETWORK IN THE STATE-SPACE

(Hyland and Lewith, Oscillatory effects in a homeopathic clinical trial *Homeopathy* 91: 145-149, 2002):

→ Some networks can become “stuck” in semi-stable states. These semi-stable states can be referred as **local minima**, or as **attractors**.

→ Asthma (and many other chronic diseases) can be treated as “**stuck**” states of a network: the underlying pathology remains because the network is unable, by itself, to achieve the effective regulatory competence.

→ Although the consequences of being “stuck” in a state of dysregulation can be treated (e.g. treating asthmatic with inhaled steroids), the underlying pathology remains and **the disease becomes chronic**, therefore conventional treatment is suppressive rather than curative.

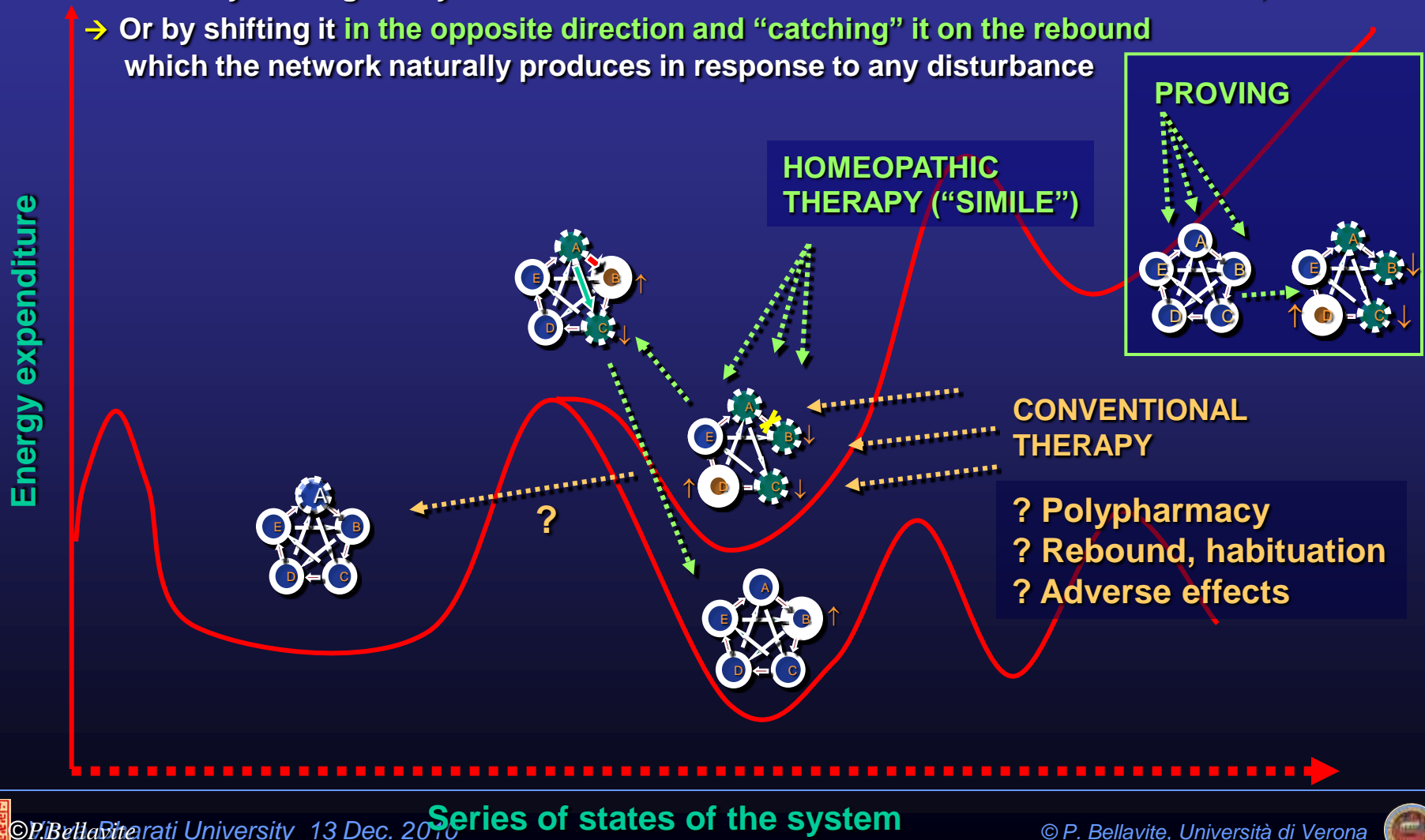


TREATING THE NETWORK (Hyland and Lewith, Homeopathy 91: 145-149, 2002):

To treat the network, it is necessary to find a way of disturbing it in some way that will re-set its “thermostat” and allow it to become “unstuck”.

Theoretically, there are two possible ways of doing this:

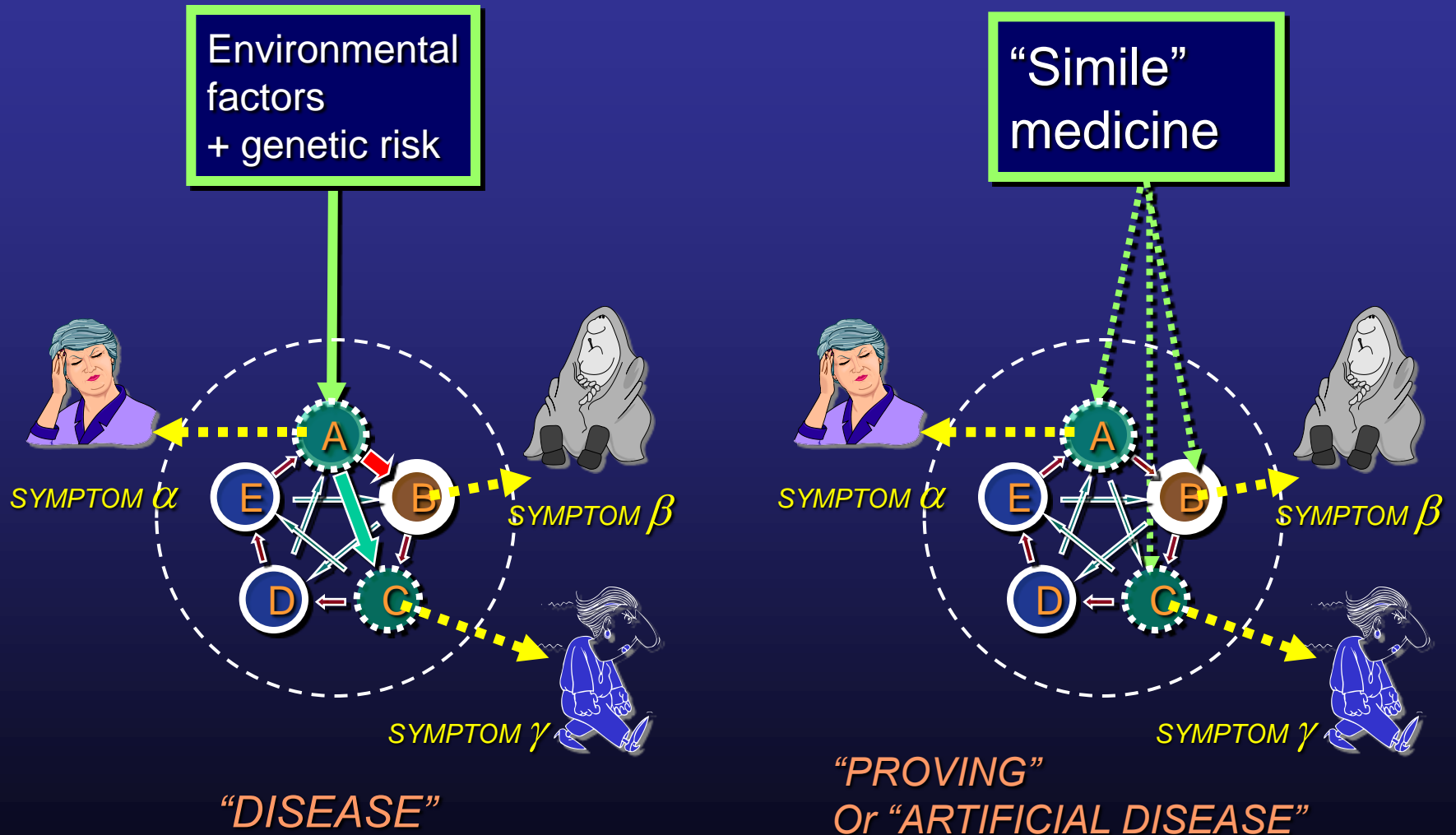
- Either by shifting the dynamics of the network in the direction of the desired state,
- Or by shifting it in the opposite direction and “catching” it on the rebound which the network naturally produces in response to any disturbance



Series of states of the system

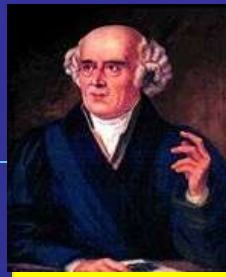


Essential scheme of the Hahnemann's "simile"





SUMMARY OF THE WORKING HYPOTHESIS



1. Conventional therapy is addressed to **environmental** and **genetic** factors but in complex diseases this is not enough. We need a method to identify specific and individual remedies at the level of the **systemic information disorders**.
2. The “simile” medicine may be perceived by specific centers (nodes) of **network** regulatory systems as a complex **information**, regarding the whole disease dynamics.
3. In acute diseases the “simile” may **activate an integrated local feedback** (e.g.: histamine on basophils) but it may also reinforce the connectivity of **local** reactions with **systemic**, teleonomically oriented, reactions.
4. In chronic diseases the “simile” may operate by **“unblocking” the pathological attractor** and orienting the network towards a pattern that is proximal to the healthy homeodynamics.
5. High specificity of remedy actions may be based on the **sensitization (priming)** of the involved network nodes and on the **complexity and coherence** of the remedy actions at various levels.
6. Since **ultra-low doses** of medicines are used, they touch only nodes having enhanced susceptibility. Possibly, **high dilutions/potencies** integrate global dynamics also by electromagnetic (or quantum entangled) regulation.
7. **Symptoms** are external expressions of the pattern of reactions caused by a medicine (in sensitive provers) and by disease (in sick persons): so, the classical “similitude of symptoms” may **bypass the ignorance of molecular mechanisms** in complex diseases.



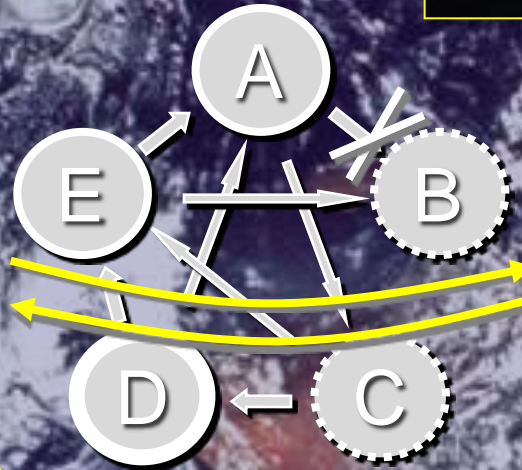
THE WORLD AS A COMPLEX (AND OFTEN SICK) ORGANISM



**CONTRARIA
CONTRARIIS**



**ACUTE
DISEASES**
= EPIDEMICS
= FINANCIAL
CRISIS
= TERRORISM
= WARS



**CHRONIC
DISEASES**
= POLLUTION
= POVERTY
= HUNGER



**SIMILIA
SIMILIBUS**



INTEGRATIVE MEDICINE

“Integrative medicine is good medicine, and its success will be signalled by dropping the adjective.”

The integrative medicine of today should be the medicine of the new millennium.”

(Rees & White, British Medical Journal 2001;322:119-120)

Castelvecchio medioeval bridge (Verona)





INTEGRATIVE MEDICINE AND HOMEOPATHY

C.W.Hufeland

“No homeopathy, but indeed a homeopathic method in rational medicine.

No homeopaths but indeed rather physicians who employ the homeopathic method at the right time and place.

The special and most beautiful task of homoeopathy remains: to find and seek for new specific agents”



Quoted from **C.W.Hufeland**, In: **L.J. Boyd**. *A Study of the Simile in Medicine*, Boericke and Tafel, Philadelphia, 1936. p. 147



Verona “Complementary and Integrative Medicine Research Group”



Salvatore Chirumbolo
Paolo Magnani
Marta Marzotto
Riccardo Ortolani
Paolo Bellavite
Antonio Vella



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