Medical science

and

medical pseudoscience:

The road from foolish beliefs to fraud
Traditional medicine: civilization, cultural heritage, source of information

WHO
2000: over the world 70-80 % of basic medical service is still provided by traditional healers, 20 000 different “medical preparations”

WHO:
Traditional Medicine Program (ethnomedicine, medical anthropology, ethnobotanics, ethnopharmacology etc.)
(http://www.who.int/mediacentre/factsheets/fs134/en)

1974: Popular Medicine section of the Hungarian Society for Medical History
Database of the Ethnographic Research Group of the Hungarian Academy of Sciences (Archives of Folk-medicines)
Classical civilizations developed medical theories: Egyptian-mesopotamian, Indian, Chinese, Japanese, Tibetan, Persian-greek-roman-arabic-muslim, Aztec, Maya, etc.

Traditional or folk-medicine: people in traditional communities lived in close contact with nature, their medicine is based on observations, beliefs and rituals.

Diseases are caused and healed by demons, spirits, gods: mixture of religion and science.

Shamans, witch doctors, fetish men, medicine man, they used many plants, preparations of animal- and mineral origin.

Traditional medicine: civilization, cultural heritage, source of information.
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civilization, cultural heritage, source of information

Typical features (and mistakes) of traditional medicine:
  no (scarce) written sources,
  even the literature is:
    a mixture of facts and beliefs (no control expts)
    sloppy description of symptoms
    different diseases with the same names (pox, black death, etc.)
    diseases with different names
    minimal knowledge on the function of organs
    no quality control, sense of dosage
Lacking basic knowledge on pathogens and infection, biochemistry and physiology

Results:
  very high children mortality
  low life expectancy
  devastating epidemics and pandemics
  - the size of population was constant or declining for hundreds of years
Ancient medicine

The earliest known surgery in Egypt was performed around 2750 BC

Hesy-Ra “Chief of Dentists and Physicians” for King Djoser in the 27th BC

earliest known woman physician, Peseshet, „Lady Overseer of the Lady Physicians”

1600 BC: an ancient textbook on surgery almost completely devoid of magical thinking

Babylonian Diagnostic Handbook by Esagil-kin-apli (1069-1046 BC)
introduced etiology, empiricism, logic and rationality in diagnosis, prognosis and therapy.

Huangdi neijing, or Yellow Emperor's Inner Canon (5th? or 27th? BC)
medical "silk manuscripts" dating from around 200 BC
Muhammad ibn Zakariya al-Razi: *Large Comprehensive measles and smallpox*

Ibn Sina (Avicenna): *The Canon of Medicine*, considered to be the most famous book in the history of medicine

Torah, i.e. the Five Books of Moses, contain various health related laws and rituals, such as isolating infected people

Hippocrates (460 BC – 370 BC), "father of modern medicine" developed a medicinal system where treatment sought to restore the balance of humors within the body

Galen: *eye and brain surgery*, - anatomical beliefs not challenged for centuries

The Romans invented numerous *surgical instruments*, forceps, cautery, scalpels, cross-bladed scissors, the surgical needle and speculas.
Development of modern medicine

Galen (130-200 BC), good description of blood vessels, - did not recognized circulation

Ibn al Nafis (1210-1288) first description of heart septum, discovery of pulmonary circulation

Miguel Servetus (1511-1553), discovery of pulmonary loop

1616: William Harvey (1578-1657) theory of circulation
   „Better to be wrong with Galen, than be right with Harvey,“

1661: Marcello Malphigi (1628-1694) capillaries

1664: Robert Hooke - microscope

1684: Antonie van Leeuwenhoek - microorganisms
Development of modern medicine

1798: Edward Jenner - smallpox vaccination
1847: Ignaz Semmelweis - sepsis
1864: Louis Pasteur – germ theory of disease (not spontaneous generation)
1865: Joseph Lister - antiseptic methods
1884: Robert Koch - Koch’s postulates
1880-1941: vitamins
1910: Paul Ehrlich – Salvarsan
1921: Banting and Best – insulin
1920-35: Alexander Fleming - antibiotics
1935: Gerhard Domagk: sulfonamides
1986: recombinant insulin
2000: human genome, monoclonal therapy
A modern orvostudomány kialakulása

Galenus (i. sz. 130-200), azt hitte a májról, hogy a vénarendszer központja, a szív elválasztó falát véráteresztő anyagként képzelte el. A vérút irányát, az ereket meglehetősen pontosságúan írta le, de az önmagába visszatérő keringésre nem jött rá.

Ibn al Nafisz (1210-1288) elsőként írta le a szív elválasztó septumának átjárhatatlanságát, és utalt a kisvérkörre.

Miguel Servetus (1511-1553), a kisvérkör felfedezője

William Harvey (1578-1657) 1616-ban tartott adásaiban ismertette a vérkeringés felfedezését: "Inkább tévedni Galenusszával, mint elismerni Harvey igazságát."

Marcello Malphigi (1628-1694) 1661-ben: a hajszálerek felfedezése

1664: Robert Hooke - microscope

1684: Antonie van Leeuwenhoek - microorganisms

1798: Edward Jenner - smallpox vaccination

1864: Louis Pasteur - spontaneous generation

1884: Robert Koch - Koch's postulates

Semmelweis Ignác (1847) szepszis és Joseph Lister (1965) antiszeptikus módszerek

Emil Kraepelin (1856-1926) introduced new medical categories of mental illness
The effect of modern medicine on world health

![Graph showing changes in leading causes of death from 1900 to 2000](image)
Drug development

- a particular **biological target** thought to be important in disease
- New Molecular Entities (NMEs)
- safety, toxicity, pharmacokinetics and metabolism
  - in vitro, ex vivo studies, (HTS)
  - acute toxicity, carcinogenic effect, in vivo stability, transporters
  - animal experiments (tox: rat, dog, teratogenic effect: rabbit)
  - metabolism, long term toxicity, formulation
- human clinical trial -"first-in-man" (FIM) or First Human Dose (FHD)
  - effect on healthy subjects
  - effect on patients (selected groups, all patients)
  - double-blind studies
  - long term studies
- marketing approval (FDA or equivalent national authorities)

Cost: 500-1000 million USD/new drug
Only 3 out of 10 new medicines pay for the development costs!
Modern (Western) non-conventional medicine

- unproven, unorthodox, alternative, unconventional, complementary, innovative, integrative therapies
- therapeutic practices that lack biomedical explanations
- which has not been shown consistently to be effective
- therapeutic practices which are not currently considered an integral part of conventional medical practice.
- Therapies are termed as Complementary when used in addition to conventional treatments and as Alternative when used instead of conventional treatment.
- Alternative therapies include, but are not limited to the following disciplines:
  - folk medicine, herbal medicine, diet fads, homeopathy, faith healing, new age healing, chiropractic, acupuncture, naturopathy, yoga, biofeedback, massage, hypnosis, meditation, traditional Chinese medicine, Ayurveda, Unani, diet-based therapies and music therapy.
Why complementary/alternative medicine?

• Unrealistic expectations toward evidence-based therapies
• Increasing medical / pharmaceutical expenses
• Health care administration, „authority” of doctors alienate patients
• The patient avoids surgery and drugs and gets treated by a non-invasive magical device/cocktail. (Of course, if these approaches worked, scientific medicine would be the first to use them.)

• Science is getting more and more complicated, difficult to understand
• Ineffective education of natural sciences in schools
• It is not a shame to be silly and under-educated

• Increasing affinity and demand for supernatural, esoteric and paranormal
• Increasing influence of churches and religious organizations,
• Nice to believe in miracles!
Traditional Asian (Chinese, Japanese, Thai, etc.) medicine

Traditional Chinese (Asian) medicine is an ancient, holistic system, based on harmony and balance, and employing the ideas of moderation and prevention.

The philosophical concept: the human body is a small universe with a set of sophisticated interconnected systems those systems usually work in balance to maintain health.

Chinese physician is more of an advisor than an authority every patient should be treated differently, one does not treat the disease or condition, but rather the individual patient methods are mostly natural and noninvasive "curing the root" of a disease and not merely in treating its symptoms

Infectious diseases and pathogens are not appreciated No awareness of malignant diseases

Western physicians might employ surgery and chemotherapy or radiation for a cancer patient, a TCM physician might use acupuncture and dietary changes
folk medicine is characterized by a reliance on narrative patterns and folk statistics ("counting the hits and ignoring the failures") rather than rigorous empiricism.
Traditional drugstore
Ayurveda (~300 BC) and Indian medicine

Ayurveda is connected to Hindu religion.

The most authentic compilation of teachings and work of the surgeon Sushruta (1st millennium BC) in *Sushruta Samhita*. 184 chapters and description of 1,120 illnesses, 700 medicinal plants, 64 preparations from mineral sources and 57 preparations based on animal sources.

The Atharvaveda, a sacred text of Hinduism (10th to 12th BC) was the first Indic text dealing with medicine.

Indian medicine, the medical works of both Sushruta and Charaka were translated into the Arabic language during the Abbasid Caliphate (750 AD) and influenced Muslim (and Christian) surgery.

In India, over 100 colleges offer degrees in traditional Ayurvedic medicine.

Many clinics in urban and rural areas are run by professionals who qualify from these institutes.

The Indian government supports research and teaching in Ayurveda.
Ayurvedic (Indian traditional) medicine

Ayurveda is a metaphysics-based medical science (science of life).
The Universe (also the human body) is composed by Five great Elements: earth, water, air, fire and ether.
Chyle, blood, flesh, fat, bone, marrow, and Shukra dhatu (germinal tissues/organs) form the body.
Ayurveda stresses a balance of three Humors or Energies: wind/air, bile and phlegm.
when they are imbalanced, the body has diseases.

Surgery and surgical instruments are employed. It is believed that attaining good digestion, and proper excretion leads to vitality.
Ayurveda also focuses on exercise, yoga, meditation, and massage.

Thus, body, mind, and spirit/consciousness are addressed both individually and in unison for health.
Ayurvedic (Indian traditional) medicine

The practice of *Panchakarma* eliminates toxic elements from the body.

There are eight disciplines of Ayurveda treatment:

Internal medicine (*Kaaya-chikitsa*)
Paediatrics (*Kaumarabhrtyam*)
Surgery (*Shalya-chikitsa*)
Treatment of diseases above the clavicle (*Salakyam*)
Demonic possession (*Bhuta vidya*) ~ psychiatry.
Toxicology (*Agadatantram*)
Prevention diseases and rejuvenation (*rasayana*)
Aphrodisiacs and improving health of progeny (*Vajikaranam*)

Danvantari (अष्टांग), god of medicine
Islamic medicine

First **drugstores** in Baghdad (754)
Ammar ibn Ali al-Mawsili (9th AD) **injection syringe**

Muslim physicians contributed significantly to the field of **anatomy**, **ophthalmology**, **pharmaceutical sciences**, **physiology** and **surgery**.

The Arabs further developed Greek and Roman medical practices. Muslim physicians set up some of the earliest **dedicated hospitals**

Muhammad al-Razi was also the first who challenged and disproved the **theory of humorism** using an experimental method

Abu al-Qasim (Abulcasis, 1000 AD), the father of modern surgery wrote the **Kitab al-Tasfif**, a 30-volume medical encyclopedia

Ibn Sina (Avicenna, 1020): discovered the **contagious nature of infectious diseases**, introduced the **quarantine**, established **systematic experimentation and clinical trials**, **quantification in physiology**,
Medieval Europe (Dark age)

- Snakes from horse hairs in stagnant water
- Mice from grain and cheese wrapped in a sweater
- Maggots from rotting meat
- Fleas from hair
- Flies from fresh and rotting fruit
- Mosquitoes from stagnant pondwater
- Eels from slimy mud at the bottom of the ocean
- Locusts from green leaves
- Raccoons from hollow tree trunks
- Termites are generated from rotting wood
  - Leeches, ointments, herbal and gem therapy, blood letting
  - Prayers, miraculous healing
Alternative medical preparations

Traditional medicine is characterized by a reliance on beliefs and folk statistics ("counting only the hits and ignoring the failures").

Some of the preparation (containing alkaloids, heavy metals or poisons) cause toxication, others might cause serious infections by different pathogenic agents.

Chemical composition of the constituents is different from batch to batch (according to place, soil, climate, etc.).

Cleanliness of the sources can not be guaranteed.

If diagnosis is scientifically incorrect, how can one expect proper treatment?

Traditional medicine has a place to complement modern medicine (especially in psychotic and psychosomatic conditions) but its use as alternative medicine is clearly disadvantageous.
From foolish beliefs to fraud

Homeopathy: Samuel Hahnemann, 1796 (did not know about molecules)

Homeopathic remedies are prepared by serial dilution with forceful shaking „potentization” (this suppose to increases the effect of the treatment). Dilution continues until none of the original substance remains.

Modern homeopaths have proposed that water has a memory that allows homeopathic preparations to work (the popular homeopathic flu-remedy Oscillococcinum is diluted $10^{400}$-fold!) Oceans: $10^{24}$ g

Homeopathy's efficacy beyond the placebo effect are unsupported by the collective weight of scientific and clinical evidence

Use of remedies lacking active ingredients have caused homeopathy to be described as pseudoscience, quackery and a "cruel deception."

Homeopathic remedies are not tested the same rigorous way as medicines made by the pharmaceutical industry,

they are frequently more expensive than effective drugs
The preparation is derived from duck liver. The final product contains not even one molecule of the original liver. Homeopaths claim that the molecules leave an "imprint" in the dilution that causes a healing effect on the body.

In 1925 Joseph Roy was a French military surgeon. On examining the blood of flu victims, he had observed an oscillating bacterium which he named Oscillococcus. Roy claimed he had detected it in the blood of patients that had several viral diseases like herpes, chicken pox and shingles. He believed that this bacterium was the causative agent of diseases like eczema, rheumatism, tuberculosis, measles, and cancer.

In 2000 Oscillococcinum was one of the top ten selling drugs in France, in 2008 it sells 15 million USD per year in the U.S., and it also sells widely in Europe.
Phytotherapy

• A number of herbs are likely to cause adverse effects. Furthermore, adulteration, inappropriate formulation, or lack of understanding of plant and drug interactions have led to adverse reactions that are sometimes life threatening or lethal.

• Inaccurate spelling of herb names is not uncommon in medical literature (Eleutherococcus senticosus is frequently identified as "ginseng" in the US, although it is not part of the Panax genus and has significantly different medicinal characteristics).

• Plant typically synthesize a large number of chemically related drugs – that might have very different biological effects. The quantity and ratio of these compounds is always changing in the plants: side effects are guaranteed!

• The phama industry is desperately searching for new drugs. Really effective plants are the best source of these. Pharmaceutical preparation contain only isolated, active ingredients, in defined quantity.
Immune System Supplements

**Beta Carotene (Dry Natural), 25,000 IU, 100% Natural Dunaliella Salina, Nature's Way - 100 Capsules**
Beta Carotene from Nature's Way is a potent and popular antioxidant found in plants and vegetables. Antioxidants help combat free radicals and molecules which damage cells and DNA.
Retail: $15.99
Our Low price: $9.25

**Ester C with Bioflavonoids, Nature's Way 500 mg - 180 Tablets**
Nature's Way Ester-C with bioflavonoids is 100% natural calcium ascorbate with biologically active metabolites. These metabolites enhance cellular uptake and retention of Vitamin C.
Retail: $23.99
Our Low price: $12.95

**Cruciferous Vegetable Blend (Protectamins), Nature's Way - 60 Capsules**
Detoxify your body naturally with Nature's Way Cruciferous Vegetable Blend.
Retail: $12.99
Our Low price: $7.99

**CoQ10, All Natural, Hypoallergenic, Nature's Way 60mg - 60 Softgels**
CoQ10 is vital for cellular energy production and is a powerful antioxidant and free radical scavenger.
Retail: $37.99
Our Low price: $18.99
Radiesthesia

- **Radiesthesia** is a practice diagnosing disease and selecting a suitable treatment.
- „We all know that **everything is created of energy and energy is vibration**. If so, then everything has its own frequency, wavelength and is measurable and detectable.”
- „Every object in the world has a characteristic "aura", or electromagnetic field that can cause a sensitive person to be able to perform dowsing.”
- „One method is using a pendulum. The technique **does not require the actual presence of the patient**, since it can be applied to a ‘witness’, such as a sample of hair, nail clippings, blood, or saliva. Diagnosis is made by comparing the response of the pendulum to that observed with reference samples taken in various disease states.”
- „When you ask a question an electrical impulse is being sent to your brain. In response, compatible wavelength is created and another electrical impulse is sent back. That kind of impulses create a micro-constriction of muscles, which pushes energy down along your arm and underarm finally reaching the string of your pendulum.”
Using diet, radiesthesia, traditional healing methods and a spring in Western Hungary (St. Jaques spring) he can cure all kind of diseases. Gall stones, tumors, viral warts, mental problems, etc.

Your bed supposed to be on a place free from radiation and influence of water.

No meat, pork, milk, sugar, flour, margarine, eggs, cheese, sweets and soya are allowed. The cure is complemented with massage and meditation.

Slovakian television already made a one hour report with him. „...almost all of them became healthy very soon.” „...of these almost sixty patients more than twenty have no symptoms by now.” „one of the children had no seizures since the … treatment”
Energy healing, faith healing

- There are many theories being offered, the most common ones these days being couched in terms of chi or prana, meridians, auras, and chakras. Is there any evidence that there is a metaphysical life force (call it “energy” or “chi” or whatever you want) that determines health depending on whether it is blocked or flowing?
- Aura healers and chakra healers have been practicing their craft under different names for centuries. In Japan the practice of energy healing is known as reiki.
- Dolores Krieger, one of the creators of Therapeutic Touch, has been offered a million $ by James Randi to demonstrate that she, or anyone else for that matter, can detect the human energy field.
- Placebo effect is opioid in nature: we can be conditioned to release such chemical substances as endorphins, catecholamines, cortisol and adrenaline. One reason, therefore, that people report relief from energy medicine may be that they experienced stimulation of the opioid system, the body's natural pharmacy.
Fat burning

• „In addition to regular exercise, you'll also want to add some fat burning foods to your diet to help trim your waistline.

  Foods that are high in protein and fiber are the best kinds of food to eat if you want to burn fat. Get rid of 2 pounds of fat a day!

  Did you know that it takes more energy to digest protein than it does to digest fat? So the more protein you eat, the more calories your body burns.”

• Facts:
  • 450 g fat 4-5000 kcal (1 kcal: 1 l water, 1 C temp. increase)
  • Burning one pound of fat in a day would increase the temperature of a 100 kg man to boiling temperature
  • (1 h exhausting exercise costs 500 kcal – appr. 50 g fat)

• In Hungary you can also buy (very expensive) sticky strips, that induce fat burning without any exercise. Just apply on your body part, where you want to remove fat!
Acidification

„Blood pH is 7.35, which means alkaline. Alkaline: healthy, acidic: disease”

The symptoms of excess internal acidity include:
- Fatigue/low energy
- Unexplained aches and pains
- Overweight conditions
- Low resistance to illness
- Allergies
- Unbalanced blood sugar
- Headaches
- Irritability/mood swings
- Indigestion
- Colitis/ulcers
- Diarrhea/constipation
- Urinary tract infections
- Rectal itch/vaginal itch

„The body produces fat in order to bind acids and thus protect organs from damage.”

„...the unfriendly bacteria and fungi that populate our intestinal tracts thrive in an acidic environment and are responsible for secreting mycotoxins, which are the root cause of many debilitating human conditions”

„increased acid level extracts calcium, magnesium, and zinc from the blood vessels, these have to be replaced by other connective materials such as cholesterol and fat.”
Acidification

How to Restore Alkalinity:

Avoid foods that are yeast-and-fungus producing foods: meats, sugars, dairy products, mushrooms, and pickled and malted products—these foods create acidity

Avoid antibiotics—they kill off the good bacteria causing the growth of the bad

Increase friendly flora (bacteria) in the intestine with a probiotic supplement, ideally, \textit{lactobacillus acidophilus} and \textit{bifidus} cultures

\textbf{Dr. Robert O. Young}, microbiologist, nutritionist, author of several outstanding books, e.g. ‘The pH Miracle’ or ‘The pH Miracle for Diabetes’.

• Pubmed: Your search for \textit{young, robert o} retrieved no results.
"Miracle Cold Buster"

- Concocted by second-grade teacher Victoria Knight McDowell and her screenwriter husband Thomas, *Airborne* promised to “boost your immune system to help your body combat germs” and instructed users to “take it at the first sign of a cold symptom or before entering crowded, potentially germ-infested environments.”
- *Airborne’s* basic formula contains Vitamins A, C, and E, amino acids glutamine and lysine, and an “herbal extract proprietary blend”.
- “There’s no credible evidence that *Airborne* can prevent colds or protect you from a germy environment,” said CSPI senior nutritionist David Schardt.
- The makers of Airborne, — whose labels and ads falsely claimed that the product cures and prevents colds — will refund money to consumers who bought the product, as part of a $23.3 million class action settlement agreement.

- *Center for Science in the Public Interest* won the lawsuit against the McDowells, one of the biggest supplement frauds in the country.