Radiation Hormesis
放射線ホルミシス

MAY 11, 2019

MEDICAL HORMESIS K.K. SEMINAR

株式会社ホルミシスメディカル

西川　浩介

Koosuke Nishikawa

Radiation: “waves or particles propagating through space o through a medium, carrying energy”. “the emission of energy as electromagnetic waves or as moving subatomic particles especially high – energy particles that cause ionization”. “Ionizing radiation, radiation that is of high enough energy to cause atoms to lose or gain electrons, rendering molecules, such as proteins, incapable of functioning”.

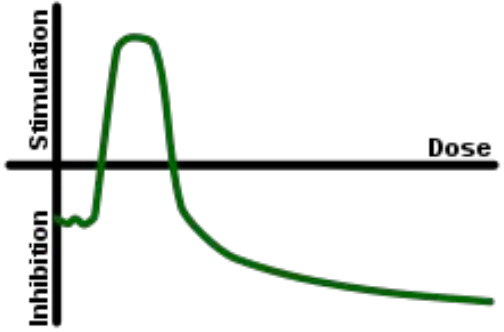
Self presentation

- *Koosuke Nishikawa*
- *From Kakogawa City, Hyogo Prefecture.*
- *Born, Showa 45 nen, (1970) AB type*
- １９ *years old, move to Tokyo*
- ２５ *years old, graduate as judicial scrivener.*
- ４０ *years old: Diagnosed Autonomic Imbalace.*
- ４2 *years old, Aim for true health after overcoming illness.*
- *Actually, 2019, 48 years old in good health, working hard.*

My life changing experience

- *From stress to Autonomic Imbalance*
- *Not improvement at all during hospitalization.*
- *Dramatic recovery after Hormesis treatment*
- *Hormesis saved me from hell*
- *Any disease can be overcome by enhancing our self-healing ability*

Hormesis

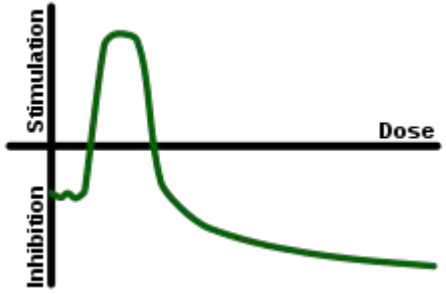


Hormesis is a term used by toxicologists to refer to a biphasic dose response to an environmental agent characterized by a low dose stimulation or beneficial effect and a high dose inhibitory or toxic effect. In the fields of biology and medicine hormesis is defined as an adaptive response of cells and organisms to a moderate (usually intermittent) stress. Examples include ischemic preconditioning, exercise, dietary energy restriction and exposures to low doses of certain phytochemicals. Recent findings have elucidated the cellular signaling pathways and molecular mechanisms that mediate hormetic responses which typically involve enzymes such as kinases and deacetylases, and transcription factors such as Nrf-2 and NF-κB. As a result, cells increase their production of cytoprotective and restorative proteins including growth factors, phase 2 and antioxidant enzymes, and protein chaperones. A better understanding of hormesis mechanisms at the cellular and molecular levels is leading to and to novel approaches for the prevention and treatment of many different diseases

Hormesis Defined
Mark P. Mattson
Ageing Res Rev. Author manuscript; available in PMC 2009 Jan 1.Published in final edited form as: Ageing Res Rev. 2008 Jan; 7(1): 1–7.
Published online 2007 Dec 5. doi: 10.1016/j.arr.2007.08.007
PMCID: PMC2248601

Radiation Hormesis

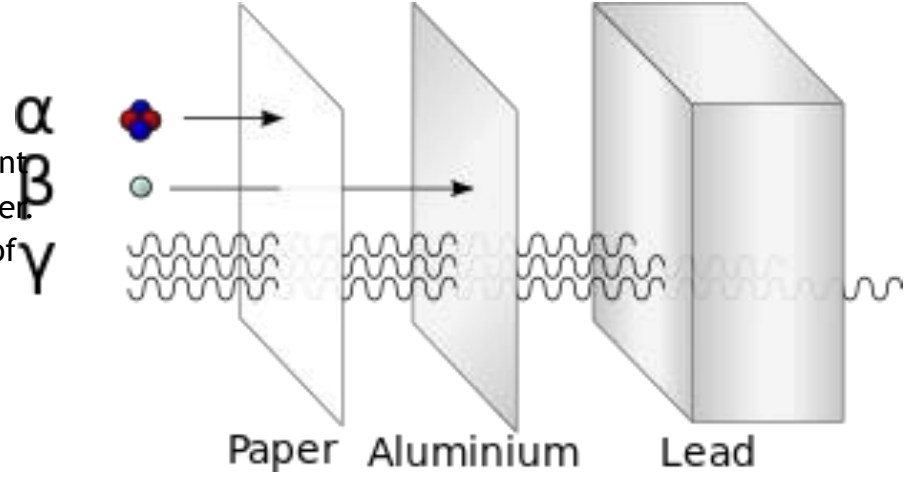
- Harmful procedure when used in high concentration or in a large amount but very useful when used in low concentration or trace amount
- From the greek “hormaein” (ὁρμάω, stimulate)
- Same root of “hormone”.
- It works hormone like.



Radiation Hormesis is the *hyphotesis* that low dosis (1-100 mSv) of *ionizing radiation* (within the region of and just above natural *background levels*) are beneficial, stimulating the activation of *repair mechanism that protect against disease,* that are not activated in absence of ionizing radiation (similar to vaccinations). The reserve repair mechanisms are hypothesized to be sufficiently effective when stimulated as to not only cancel the detrimental effects of ionizing radiation but also inhibit disease not related to radiation exposure.

DEFINITIONS OF RADIATION

- In physics, **radiation** is the emission or transmission of energy in the form of waves or particles through space or through a material medium.[1][2] This includes:
- electromagnetic radiation, such as radio waves, microwaves, infrared, visible light, ultraviolet, x-rays, and gamma radiation (γ)
- particle radiation, such as alpha radiation (α), beta radiation (ß), and neutron radiation (particles of non-zero rest energy)
- acoustic radiation, such as ultrasound, sound, and seismic waves(dependent on a physical transmission medium)
- gravitational radiation, radiation that takes the form of gravitational waves, or ripples in the curvature of spacetime.



- Illustration of the relative abilities of three different
- types of ionizing radiation to penetrate solid matter.
- Typical alpha particles (α) are stopped by a sheet of
- paper, while beta particles (ß) are stopped by an
- aluminum plate. Gamma radiation (γ) is damped
- when it penetrates lead. Note caveats in the text
- about this simplified diagram.

TYPES OF RADIATION

Radiation is often categorized as either ionizing or non-ionizing depending on the energy of the radiated particles. Ionizing radiation carries more than 10 eV, which is enough to ionize atoms and molecules, and break chemical bonds. This is an important distinction due to the large difference in harmfulness to living organisms.

Gamma rays, X-rays and the higher energy range of ultraviolet light constitute the ionizing part of the electromagnetic spectrum. The word "ionize" refers to the breaking of one or more electrons away from an atom, an action that requires the relatively high energies that these electromagnetic waves supply. Further down the spectrum, the non-ionizing lower energies of the lower ultraviolet spectrum cannot ionize atoms, but can disrupt the inter-atomic bonds which form molecules, thereby breaking down molecules rather than atoms; a good example of this is sunburn caused by long-wavelength solar ultraviolet. The waves of longer wavelength than UV in visible light, infrared and microwave frequencies cannot break bonds but can cause vibrations in the bonds which are sensed as heat. Radio wavelengths and below generally are not regarded as harmful to biological systems. These are not sharp delineations of the energies; there is some overlap in the effects of specific frequencies.

The international symbol for types and levels of radiation that are unsafe for unshielded humans. Radiation in general exists throughout nature, such as in light and sound

60 years of service

UN Scientific Committee reports to General Assembly.

- Assesses global levels and effects of ionizing radiation.
- Provides scientific basis for ra

SUSTAINABLE DEVELOPMENT GOALS

THE UN SCIENTIFIC COMMITTEE REPORT ENDORSE THE LNT MODEL: ZERO EXPOSURE

This topic is of heated discussion in dedicated forums to radiological protection. However, and as a precaution, international organizations dedicated to the protection radiological or the promotion of nuclear energy (ICRP, IAEA, NEA, UNSCEAR, etc.) use the Linear Model without Threshold (LNT MODEL) which assumes that the probability of occurrence of damage stochastics (probabilistic as cancer) starts from zero dose and behaves linearly until it reaches the studied data (from epidemiological studies of Hiroshima and Nagasaki among others).

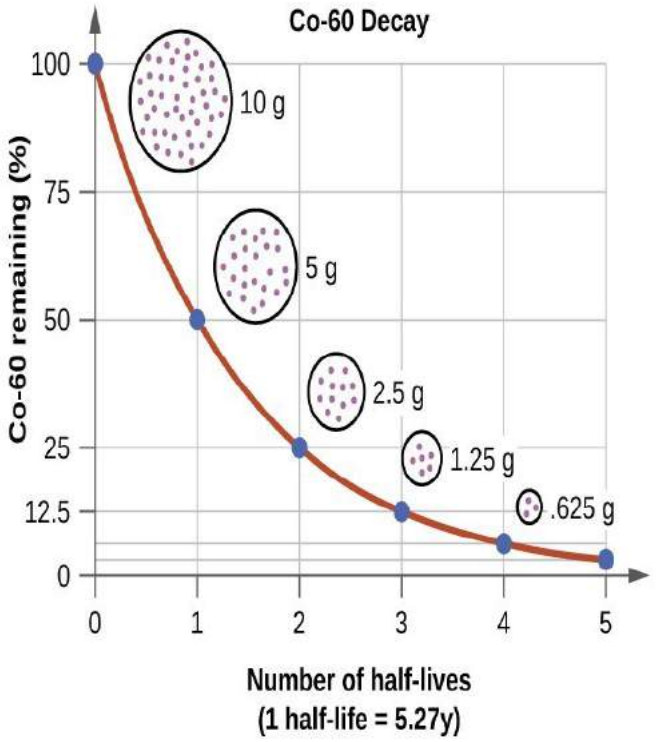
Ionizing radiation

Radiation with sufficiently high energy can ionize atoms; that is to say it can knock electrons off atoms, creating ions. Ionization occurs when an electron is stripped (or "knocked out") from an electron shell of the atom, which leaves the atom with a net positive charge. Because living cells and, more importantly, the DNA in those cells can be damaged by this ionization, exposure to ionizing radiation is considered to increase the risk of cancer. Thus "ionizing radiation" is somewhat artificially separated from particle radiation and electromagnetic radiation, simply due to its great potential for biological damage. While an individual cell is made of trillions of atoms, only a small fraction of those will be ionized at low to moderate radiation powers. The probability of ionizing radiation causing cancer is dependent upon the absorbed dose of the radiation, and is a function of the damaging tendency of the type of radiation (equivalent dose) and the sensitivity of the irradiated organism or tissue (effective dose)

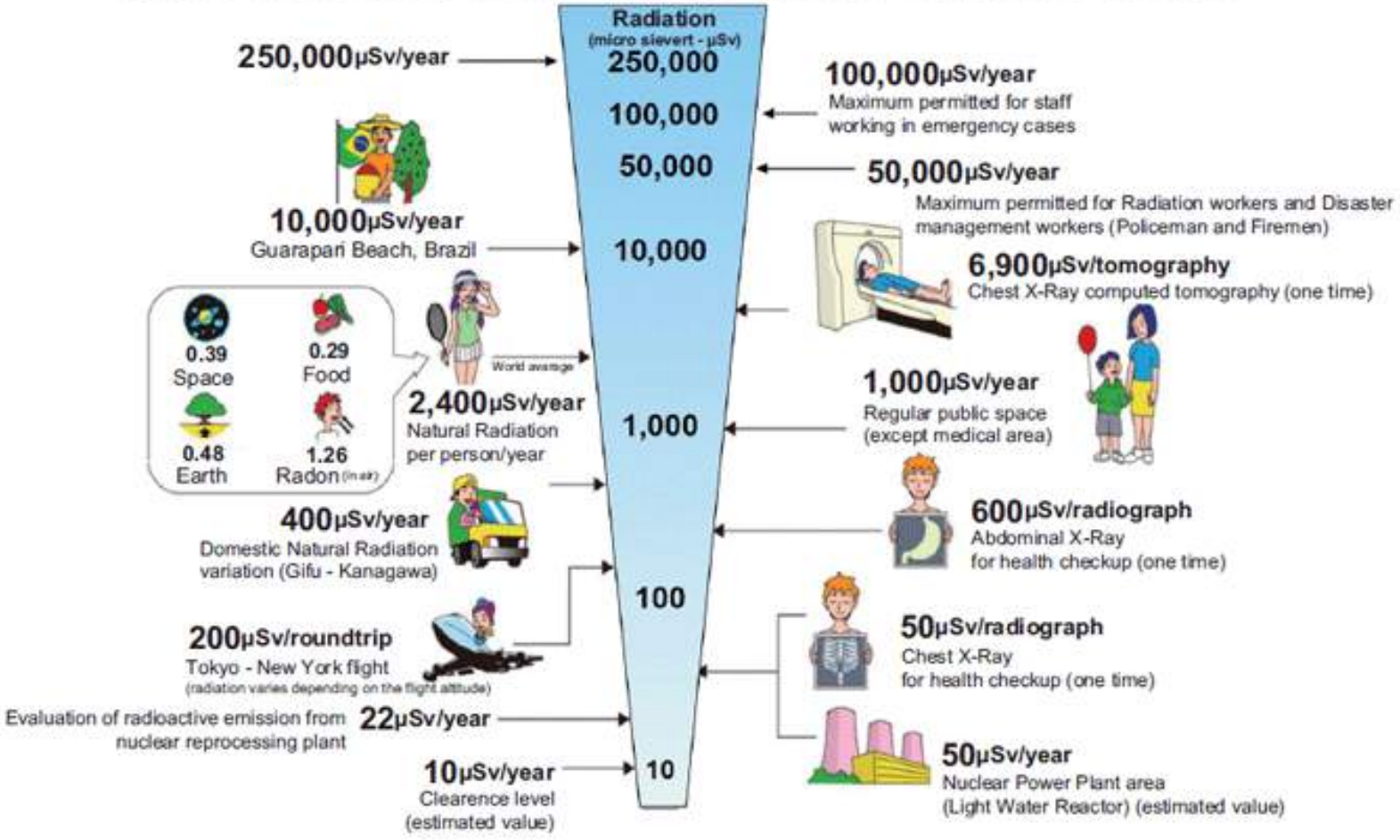
(Wikipedia)

: Half-Lives and Applications of Some Radioactive Isotopes

Radioactive Isotope	Half-Life	Typical Uses
*The m denotes metastable, where an excited state nucleus decays to the ground state of the same isotope.		
hydrogen-3 (tritium)	12.32 yr	biochemical tracer
carbon-11	20.33 min	positron emission tomography (biomedical imaging)
carbon-14	5.70×10^3 yr	dating of artifacts
sodium-24	14.951 h	cardiovascular system tracer
phosphorus-32	14.26 days	biochemical tracer
potassium-40	1.248×10^9 yr	dating of rocks
iron-59	44.495 days	red blood cell lifetime tracer
cobalt-60	5.2712 yr	radiation therapy for cancer
technetium-99*m**	6.006 h	biomedical imaging
iodine-131	8.0207 days	thyroid studies tracer
radium-226	1.600×10^3 yr	radiation therapy for cancer
uranium-238	4.468×10^9 yr	dating of rocks and Earth's crust
americium-241	432.2 yr	smoke detectors



RADIATION EXPOSURE IN DAILY LIFE



Sv (sievert) = *constant of biological effects of radiation** x *Gy (Gray)*

(*) X-Ray, Y-Ray = 1

Source: Ministry of Education, Culture, Sports, Science and Technology of Japan

We bake in radiation every day since the beginning of life

- Hormesis is a fundamental concept in evolutionary theory. From the beginning through the present time, life on earth has existed in harsh environments in which cells are often exposed to free radicals and toxic substances. To avoid extinction organisms have developed complex mechanisms to cope with the environmental hazards.
- Radiation from the earth ground has been released since it was formed, 4.6 billions years ago.
- Radiation has always poured from the sun and the space.
- All living things on earth use the energy of radiation.
- There are have been great missunderstandings especially after 3:11. and the real danger of cancer that exposure to high levels of it entrails.
- Life on earth is not possible without radiation?
- An expert panel convened at the 2006 Ultra-Low-Level Radiation Effects Summit at Carlsbad, New Mexico, proposed the construction of an Ultra-Low-Level Radiation laboratory The expert panel believes that the Ultra-Low-Level Radiation laboratory is the only experiment that can explore with authority and confidence the effects of low-level radiation; that it can confirm or discard the various radiobiological effects proposed at low radiation levels e.g. LNT, threshold and radiation hormesis .[64]*Wikipedia

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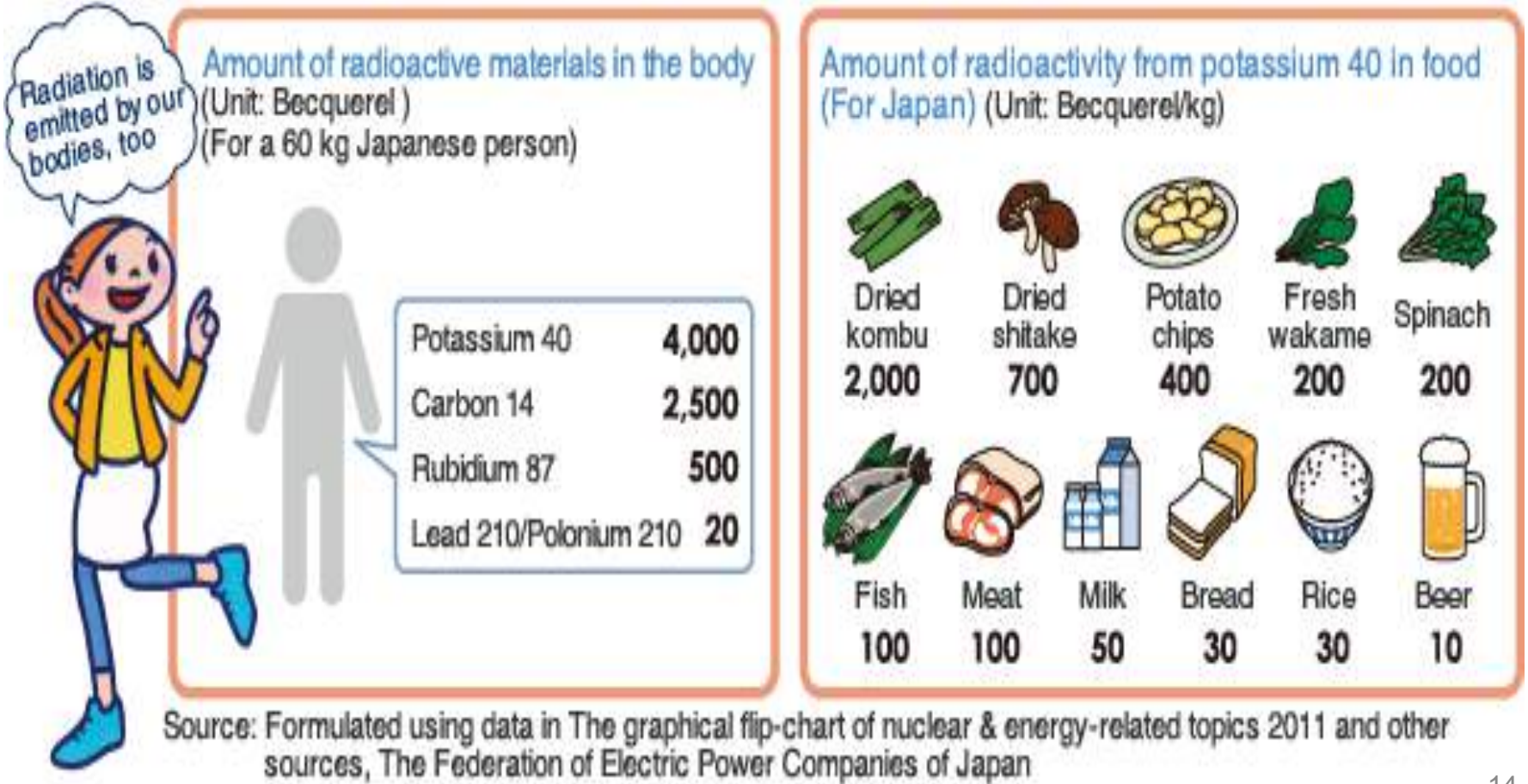
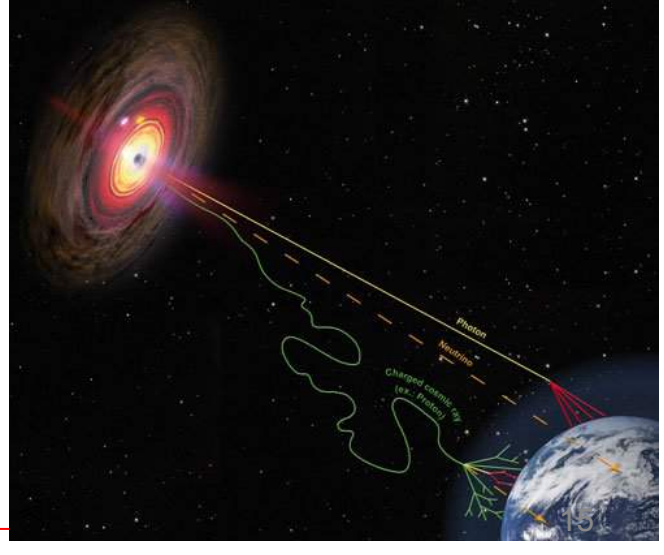


Source: Formulated using data in The graphical flip-chart of nuclear & energy-related topics 2011 and other sources, The Federation of Electric Power Companies of Japan

Radiation is very familiar

- World average 2.4 millisieverts, stone houses, (Japan 1.5 millisievert, wooden house)
- 0.8 mm from outside of the body, at 0 mts. sea level, cosmic rays radiation doubles to 1.6 mm at 1500 mts. high.
- 1.6 mm from the inside of the body Radon in the air, potassium from food 0.01%, from potassium 40
- Tokyo NY round trip 0.2 mm,
- CT examination 6.9 mm.
- Astronaut 1 mm a day, 180 mm half a year.



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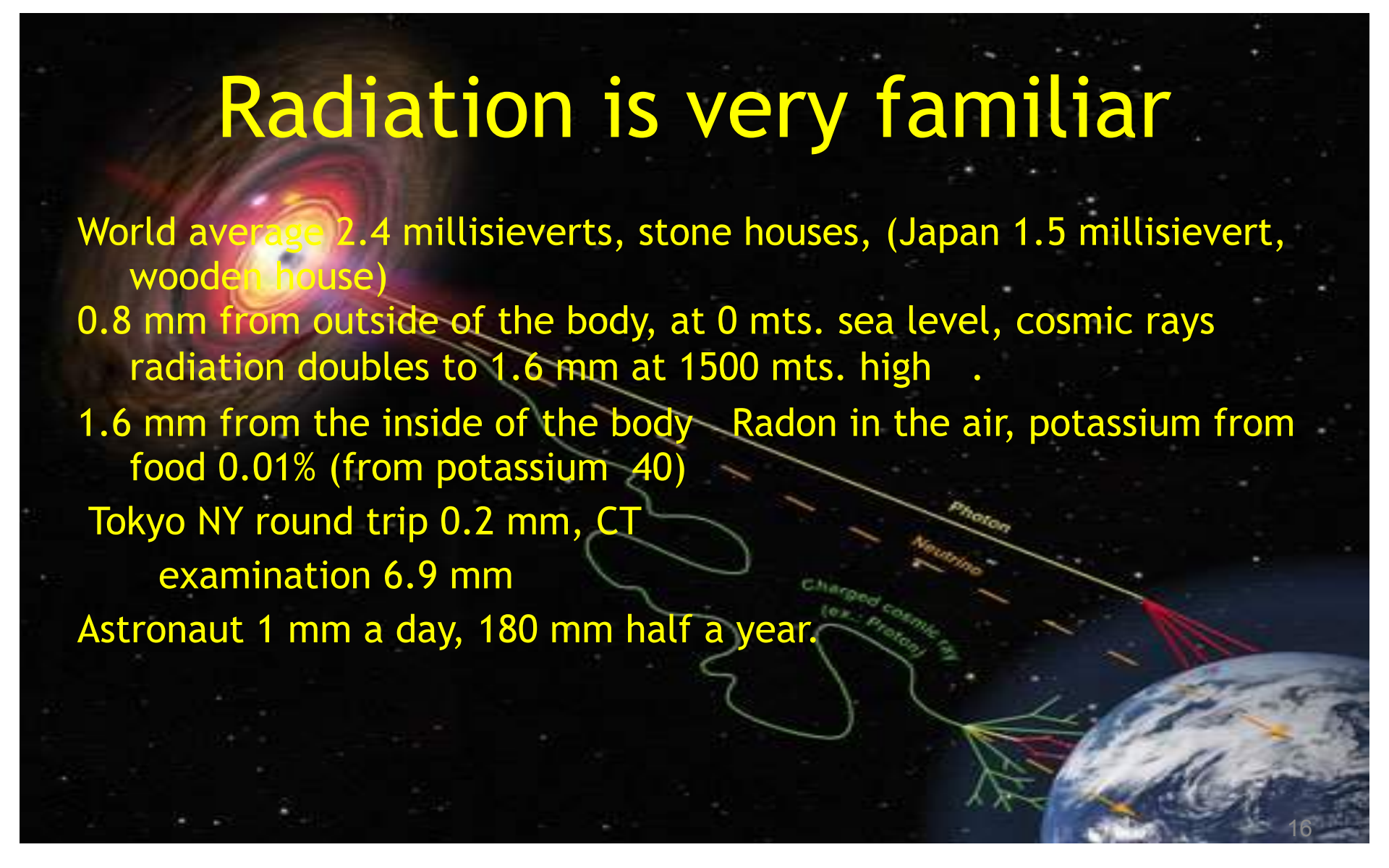
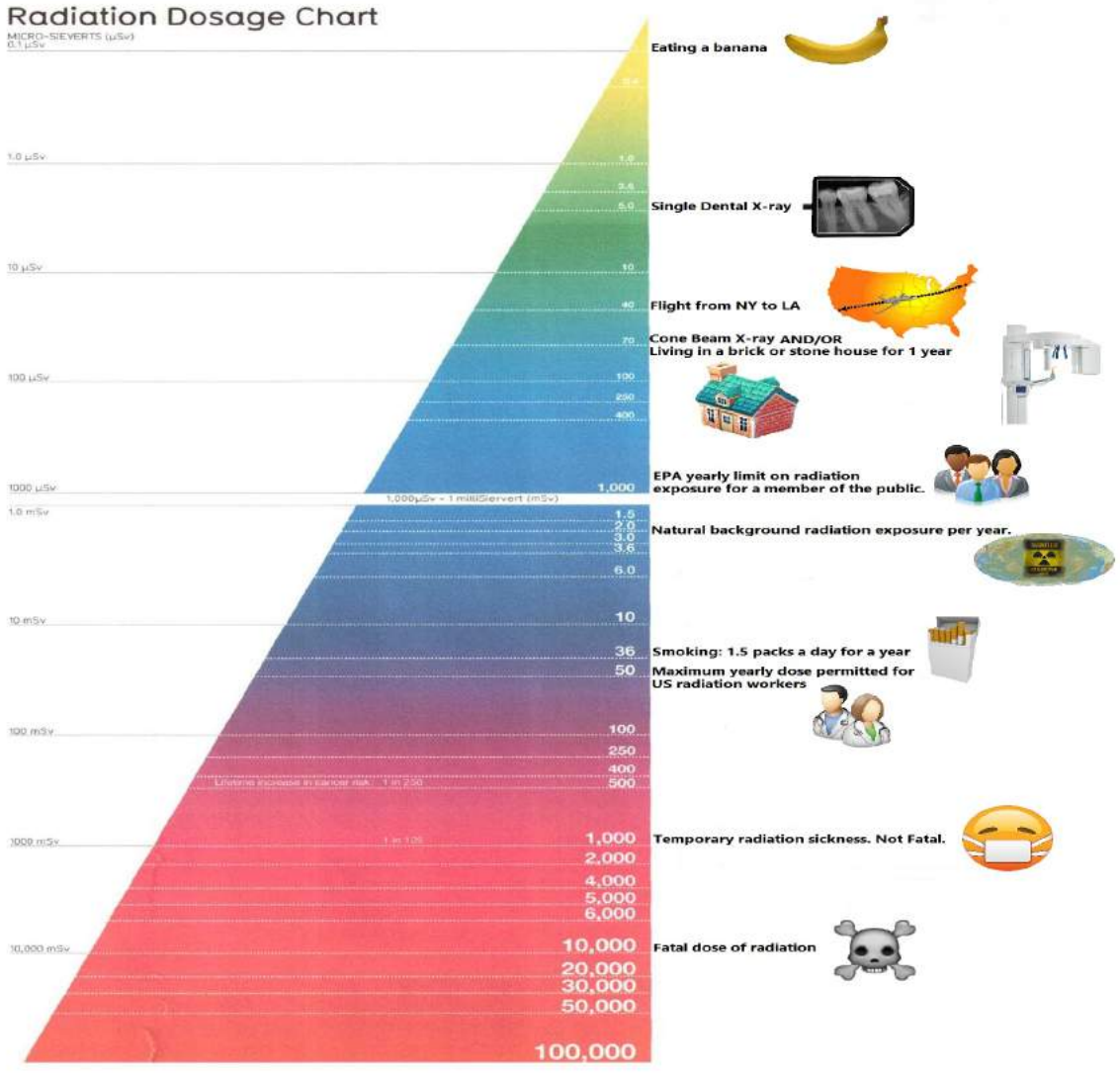



Radiation Dosage Chart
MICRO-SIEVERTS (µSv)
0.1 µSv
1.0 µSv
10 µSv
100 µSv
1000 µSv
1.0 mSv
10 mSv
100 mSv
1000 mSv
10,000 mSv
1,000µSv = 1 milliSievert (mSv)
Lifetime increase in cancer risk: 1 in 250
1 in 100
0.4
1.0
2.4
5.0
10
40
70
100
250
400
1,000
1.5
2.0
3.0
3.6
6.0
10
36
50
100
250
400
500
1,000
2,000
4,000
5,000
6,000
10,000
20,000
30,000
50,000
100,000
Eating a banana
Single Dental X-ray
Flight from NY to LA
Cone Beam X-ray AND/OR
Living in a brick or stone house for 1 year
EPA yearly limit on radiation
exposure for a member of the public.
Natural background radiation exposure per year.
Smoking: 1.5 packs a day for a year
Maximum yearly dose permitted for
US radiation workers
Temporary radiation sickness. Not Fatal.
Fatal dose of radiation
InformationIsBeautiful.net

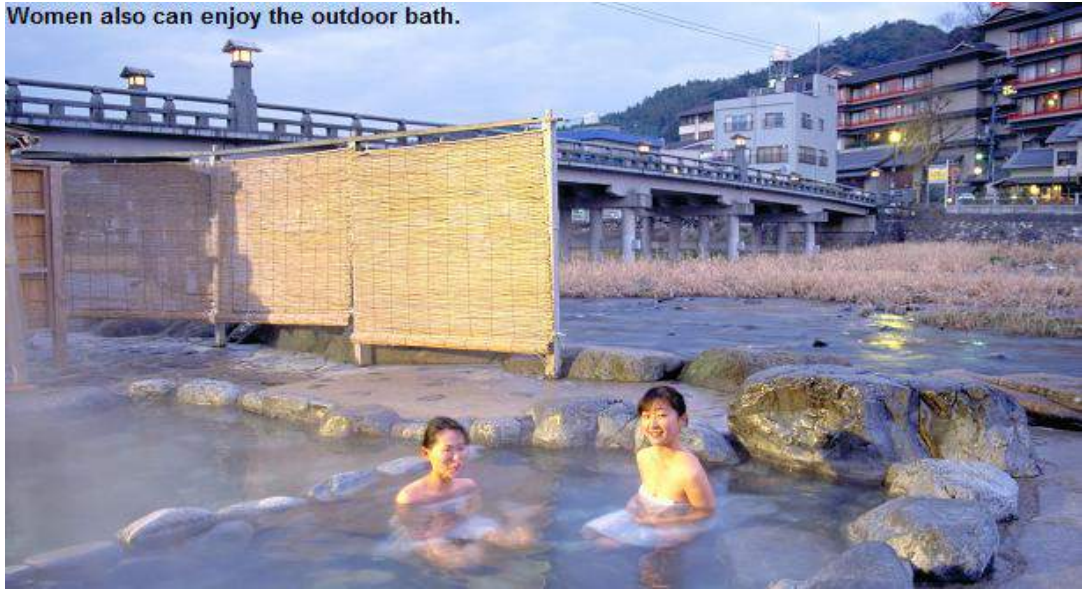
The ongoing debate, the proposition we subscribe to

- The 2005 French Academy of Sciences-National Academy of Medicine's report concerning the effects of low-level radiation rejected LNT as a scientific model of carcinogenic risk at low doses.[14] …They go on to outline a growing body of research that illustrates that the human body is not a passive accumulator of radiation damage but it actively repairs the damage caused via a number of different processes, including:[14][18]
- Mechanisms that mitigate reactive oxygen species generated by ionizing radiation and oxidative stress.
- Apoptosis of radiation damaged cells that may undergo tumorigenesis is initiated at only few mSv.
- Cell death during meiosis of radiation damaged cells that were unsuccessfully repaired.
- The existence of a cellular signaling system that alerts neighboring cells of cellular damage.
- The activation of enzymatic DNA repair mechanisms around 10 mSv.
- Modern DNA microarray studies which show that numerous genes are activated at radiation doses well below the level that mutagenesis is detected.
- Radiation-induced tumorigenesis may have a threshold related to damage density, as revealed by experiments that employ blocking grids to thinly distribute radiation.
- A large increase in tumours in immunosuppressed individuals illustrates that the immune system efficiently destroys aberrant cells and nascent tumors. *Wikipedia

Radium hot spring is also hormesis!

The Epidemiological Survey of Okayama University at **Misasa Onsen**, famous for its Randon Content, Report of its residents:

- High SOD activity enhancing capacity to process reactive oxygen
- High immune functions such as killer T cells



And also the Bedrock bath in Tamagawa Onsen, Akita Prefecture

Taking radiation baths by sleeping on radioactive rocks. Tamagawa onsen.

And Yamanashi Prefecture **Masutomi onsen.** Hot Spring Resort, famous for its high content of radium

World highest natural radiation hot springs

Iran: Ramsar 10.2 mm a year, 260 mm in highest place

China: Guangdong , Yangjiang county 6.4 mm a year

Brazil: Guarapari 5.5 mm per year

India: Kerala, Karunagappally 3.5 mm per year

Radon Therapy in the World

Montana Mines

- In the United States, thousands of people enter the old Radon mines in Montana each year. 。 A half-dozen defunct gold and uranium **mines** south of Helena, Montana, attract ailing tourists, who bask in radioactive **radon** gas and drink radioactive water to improve their **health.**
- Hot springs in Europe have high concentrations of water and atmospheric radon. Get into the natural spa at the direction of your doctor. Around the world, 2 million people receive radon therapy each year in over 500 health resorts. Half are in Russia, and Pyatigorsk Senior Radon Hospital treats 1000 patients per day.

Austria 、 Budgastine, Heilstrasse 、


Kassa
Therapieeinteilung
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WIR ÖFFNEN IHNEN DIE TÜR ...
« NATÜRLICH SCHMERZFREI LEBEN »
GASTEINER
HEILSTOLLEN

Gassteiner Heilstrassen 1

- 1 hour by car from Salzburg 。
- Radon content 170kBq / m3, temperature 37-41.5 ℃, humidity 70-100%.
- Treatment: one hour, every other day, 2-3 weeks, 8 to 10 times in total.
- 10,000 patients a year come from all over Europe.
- 90% of patients report recovery.
- Sustained analgesic effects (9 months) and drug reduction (1 year), have been demonstrated.
- Austria and Germany accept health insurance payments。
- Research for the University of Innsbruck School of Medicine and the University of Salzburg School of Science, the University of Paracelsus School of Medicine.

Gassteiner Heilstrassen **Main indications**

(Deetjen, 2005)

- **Organ motor system**: ankylosing spondylitis, rheumatoid arthritis, arthropathy, psoriatic arthritis, spinal syndrome, fibromyalgia, osteoporosis, neuralgia, peripheral neuropathy, sports injury, sarcoidosis
- **Respiratory system**: chronic bronchitis, bronchial asthma, chronic sinusitis, hay fever.
- **Skin diseases**: psoriasis vulgaris, neurodermatitis, treatment of slow healing injuries, sclerosis
- It is also effective in preventing menopausal disorders and general illnesses and **strengthening the immune system.**

Germany, Bad Kreuznach

- 60 km southwest of Frankfurt
- An ancestor of modern spa therapy, an ancestor of Radon hot springs
- Around the wine producing area
- There is a traditional hot spring accommodation
- Pull up water. with 37,000 Becquerel radon, from 500 meters underground.

Bad Kreuznach, Germany

Czech Republic, Yahimov

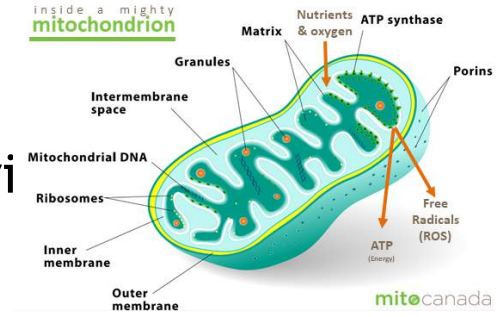
- About 3 hours by bus from Prague
- Radium Palace Hotel Medical Facility and Accommodation
- Concert hall
- 100 years of history
- Hot water of 20,000 becquerel spring out from underground to bathtubs, sanitation, nurses
- 20 minutes bathing, 20 minutes in bed
- Frequented by rich Arabs due to its quality and privacy .

Czech Republic, Yahimov Radium Palace

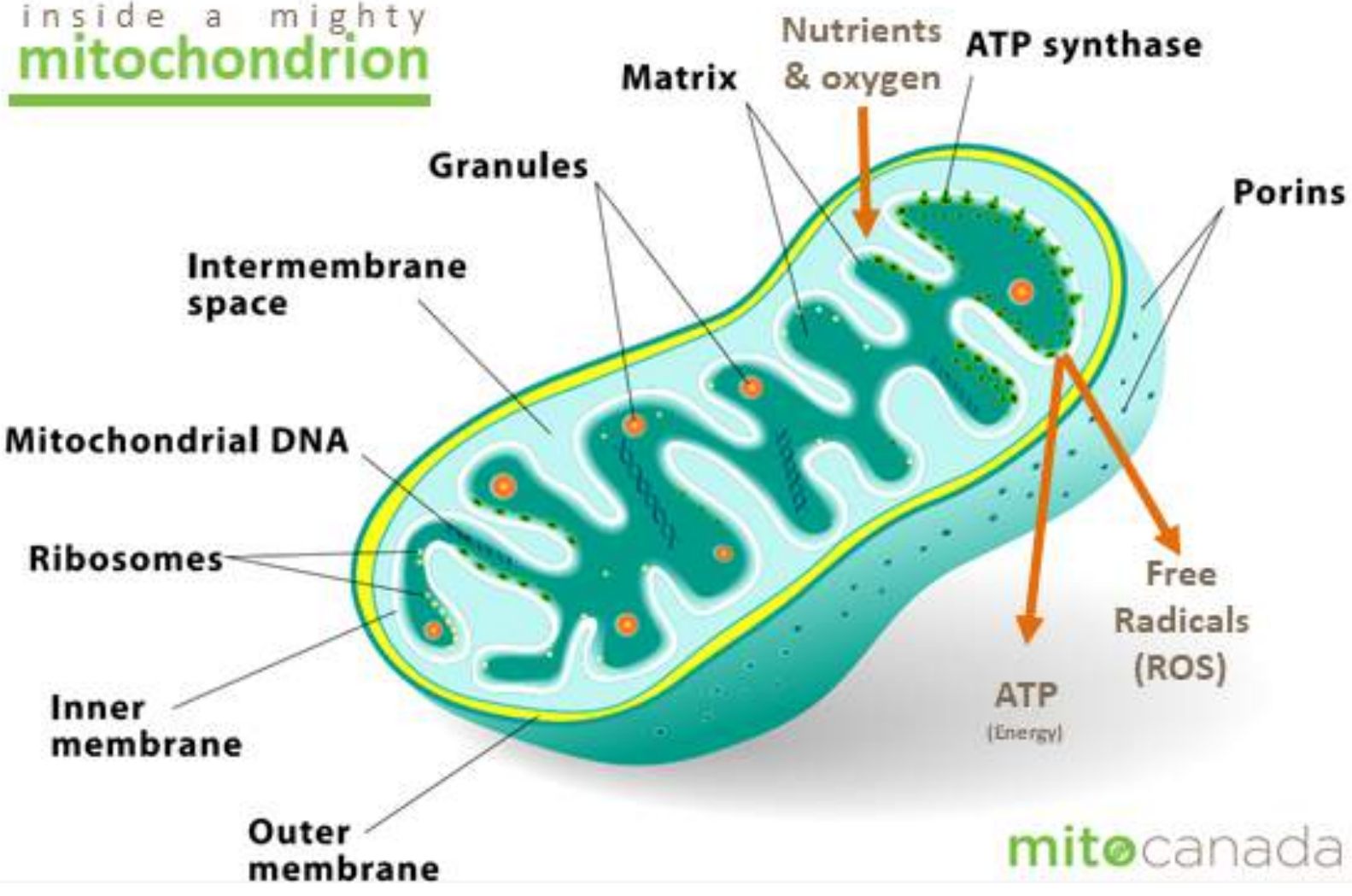

Návštěva PREZIDENTA REPUBLIKY
RADIUM PALACE - Jáchymov 13.9.2011
Václav Klaus
Návštěva PREZIDENTA REPUBLIKY
RADIUM PALACE - Jáchymov 13.1.2014
RADIUM PALACE
Miloš Zeman

低放射線ホルミシスとミトコンドリア

Low radiation hormesis and mitochondri



- The human body is made up of 37 trillion cells.
- Each cell has 5,000 to 10,000 mitochondria.
- **Mitochondria** are rod-shaped organelles that can be considered the power generators of the cell, converting oxygen and nutrients into adenosine triphosphate (ATP). ATP is the chemical energy "currency" of the cell that powers the cell's metabolic activities.
- Mitochondria produce energy by which life activity is maintained
- It is suspected that mitochondrial energy production requires stimulation by a small amount of radiation
- Cell Magazine has recently, published a paper about cell mitochondria activated by hormesis.


inside a mighty
mitochondrion
Nutrients
& oxygen
ATP synthase
Matrix
Granules
Porins
Intermembrane
space
Mitochondrial DNA
Ribosomes
Free
Radicals
(ROS)
ATP
(Energy)
Inner
membrane
Outer
membrane
mitocanada

ホルミシスを活用して健康長寿に

Take advantage of hormesis for healthy longevity

- Only by enhancing natural healing power can you gain true health
- Hormesis is the most effective way of enhancing natural healing
- it is a natural therapy and should be free of side effects
- It is time to prevent illness from now on
- If you become ill, it is better to use hormesis therapy to stimulate mitochondria as support for treatment

INSPIRED BY MY OWN EXPERIENCE AND THE SCIENTIFIC EVIDENCE AVAILABLE, I FOUNDED "MEDICAL HORMESIS KK" WHICH HAS CREATED A LINE OF HORMESIS INDUCING PRODUCTS THAT YOU CAN USE AT HOME, EVERY DAY, ACCORDING TO YOUR NEEDS.

ホルミシス メディカル マット プレミアム

Hormesis Medical Mat Premium

ホルミシス メディカル マットの特徴

Characteristics of Hormesis Medical Mat

- Medical level dose rate: 80 to 100 μSv / h.
- Especially developed to:

  Balance the autonomic nervous system
  Mental and physical relaxation, quality sleep
  Cell repair while sleeping

- Handmade by skilled artisans
- Handicraf finishing
- It can be used semi-permanently
- The half life of radium inside is 1,600 years

体験談 TESTIMONY

- Mr. MH from Hiroshima City, (born Showa 18, 76 years old) Used hormesis mat after surgery for cholangiocarcinoma. Good recovery, no recurrence of metastasis. The blood test showed no complications.
- Ms TY from Niigata Prefecture, (born Showa 36, 56 years old) “I was unable to go out due to weakened lung function by systemic scleroderma, collagen disease. Could not move without the oxygen cylinder. After using the mat for……my condition improved so much that I could travel to a hot spring”. *without the oxigen cylinder?????

体験談 TESTIMONY

- Mr. KM , Ota Ward, (born Showa 8, 86 years old)
  “I am Japanese dance teacher, my legs have weakened, and became hard to ascend and descend stairs. After usin using hormesis mat for…….months???, the energy is back, and stairs are not a problem anymore. Now I dance about 2 songs before going to bed every day”.

  Due to Meniere's disease, dizziness and headache were severe, but he overcome them completely.??????
- Ms. NS , Shinjuku Ward, (born Showa 11, 83 years old)
  “At night, I woke up about 5 times during sleep. After using the mat for……..??? I the problems disappeared and now I sleep well until morning. Sleeping badly found me very tired in the morning . Very bad for my work, at age 83, traveling around the country to spread the use of the traditional Japanese kimono”.

Additional Medical effects of trace radiation (Hormesis)

- ✓ Achieve Healthy Longevity
- ✓ Boost Immunity Protection
- ✓ Remedial of Allergic Reaction and Hypersensitivity
- ✓ Antioxidant
- ✓ Lower Blood Sugar Concentration
- ✓ Augment DNA Repair Capacity of the Cells
- ✓ Improve Brain Function
- ✓ Increase Fertility
- ✓ Enhance Wound Healing

Thank you very much for your attention