DOWNLOAD PDF RADIATION AND HUMANKIND

Chapter 1 : Radiation and Humankind

The use of radiation has extended to various fields including medicine, agriculture, science and engineering, and atomic energy has come to comprise a significant portion of the electric power generated in several advanced countries.

Radioadaptive response and genomic instability: Thomas Hallmarks of radiation carcinogenesis: Chang 31 Overview of studies on atomic bomb survivors 37 The researches at Nagasaki University on atomic bomb survivors I. Bennett Epidemiological and molecular studies in global radio-contaminated areas 59 Current situation and future planning of molecular epidemiology of radiation health effects around Chernobyl and Semipalatinsk S. Yamashita 61 Risk of radiogenic malignant and benign thyroid diseases for the population of the Oryol oblast after the Chernobyl accident: Vlasov 67 Regularities of somatic gene mutagenesis in radiation-exposed individuals A. Zamulaeva 79 Overview of research and future prospects in radiation medicine based on the current health status in Belarus P. Bebeshko Medical monitoring results of survivors with acute radiation syndrome after Chernobyl disaster V. Gayiday Fallout exposure and health condition of the population in the Semipalatinsk region of Kazakhstan M. Teleuov Morphological investigation of thyroid and parathyroid glands of the population living around the Semipalatinsk Nuclear Test Site Yu. Alipov Comparative investigation of somatic gene mutagenesis and apoptosis in patients with benign, malignant tumors and healthy individuals I. Yamashita Modulation of radiosensitivity of thyroid cancer cells by inhibition of NF-nB signaling D. Yamashita Selective tyrosine kinase inhibitor, STI, inhibits growth of p53 mutant anaplastic thyroid cancer cells by inducing Sâ€”G2 transition arrest A. Morgan Development of photon microbeam irradiation system for radiobiology K. Boothman Cellular radiosensitivity and cell-type-specific activation of apoptosis signaling pathways F. Yajima Radiation sensitivity and mutation position of p53 K. Okumura Activation of mitogen-activated protein kinase pathway by extremely low-dose ionizing radiation K. Watanabe Radiation-induced genomic instability triggered by telomere dysfunction S. Watanabe High susceptibility to the induction of genetic instability by radiation in DNA repairdeficient cells A. Watanabe Radiation-induced delayed chromosomal instability caused by large deletion M. Watanabe A novel radiosensitizing therapy for anaplastic thyroid cancers A. Yamashita Heat stress and gap junctions N. Soga Developing a scientific basis for radiation risk estimates:

Chapter 2 : Eastern Illinois University :: Physics - Radiation Physics

Although scientists have only known about radiation since the s, they have developed a wide variety of uses for this natural force. Today, to benefit humankind, radiation is used in medicine, academics, and industry, as well as for generating electricity.

Shop workspaces Airlock, for pressurization and dust management Resource extraction equipment â€”initially for water and oxygen, later for a wider cross section of minerals, building materials, etc. Equipment for energy production and energy storage , some solar and perhaps nuclear as well Mars greenhouses feature in many colonization designs, especially for food production and other purposes Various technologies and devices for Mars are shown in the illustration of a Mars base Propellant production equipment , generally thought to be hydrogen and methane through the Sabatier reaction [63] for fuelâ€”with oxygen oxidizerâ€”for chemical rocket engines Fuels or other energy source for use with surface transportation. You would need to mine and refine all of these different materials, in a much more difficult environment than Earth". While these will eventually wear out, additional orbiters with communication relay capability are likely to be launched before any colonization expeditions are mounted. Real-time communication, such as telephone conversations or Internet Relay Chat , between Earth and Mars would be highly impractical due to the long time lags involved. NASA has found that direct communication can be blocked for about two weeks every synodic period , around the time of superior conjunction when the Sun is directly between Mars and Earth, [66] although the actual duration of the communications blackout varies from mission to mission depending on various factorsâ€”such as the amount of link margin designed into the communications system, and the minimum data rate that is acceptable from a mission standpoint. In reality most missions at Mars have had communications blackout periods of the order of a month. However, the size and power of the equipment needed for these distances make the L4 and L5 locations unrealistic for relay stations, and the inherent stability of these regions, although beneficial in terms of station-keeping, also attracts dust and asteroids, which could pose a risk. These are a special kind of orbit produced when continuous low-thrust propulsion, such as that produced from an ion engine or solar sail, modifies the natural trajectory of a spacecraft. Such an orbit would enable continuous communications during solar conjunction by allowing a relay spacecraft to "hover" above Mars, out of the orbital plane of the two planets. Robotic precursors[edit] Astronauts approach Viking 2 lander probe The path to a human colony could be prepared by robotic systems such as the Mars Exploration Rovers Spirit , Opportunity and Curiosity. These systems could help locate resources, such as ground water or ice, that would help a colony grow and thrive. The lifetimes of these systems would be measured in years and even decades, and as recent developments in commercial spaceflight have shown, it may be that these systems will involve private as well as government ownership. These robotic systems also have a reduced cost compared with early crewed operations, and have less political risk. Wired systems might lay the groundwork for early crewed landings and bases, by producing various consumables including fuel, oxidizers, water, and construction materials. Establishing power, communications, shelter, heating, and manufacturing basics can begin with robotic systems, if only as a prelude to crewed operations. The reduced gravity well of Mars and its position in the Solar System may facilitate Marsâ€”Earth trade and may provide an economic rationale for continued settlement of the planet. Given its size and resources, this might eventually be a place to grow food and produce equipment to mine the asteroid belt. A major economic problem is the enormous up-front investment required to establish the colony and perhaps also terraform the planet. Local resources can also be used in infrastructure construction. Iron in this form is more easily extracted than from the iron oxides that cover the planet. Another main inter-Martian trade good during early colonization could be manure. Solar power is a candidate for power for a Martian colony. But the thin atmosphere would allow almost all of that energy to reach the surface as compared to Earth, where the atmosphere absorbs roughly a quarter of the solar radiation. Sunlight on the surface of Mars would be much like a moderately cloudy day on Earth. Although there are no immediate prospects for the large amounts of money required for any space colonization to be available given traditional launch costs, [77] [full citation needed] there is some prospect of a radical

reduction to launch costs in the s, which would consequently lessen the cost of any efforts in that direction. If SpaceX is successful in developing the reusable technology, it would be expected to "have a major impact on the cost of access to space", and change the increasingly competitive market in space launch services. One example provided was offering a prize to the first organization to place humans on the Moon and sustain them for a fixed period before they return to Earth. Equatorial regions See also: It has been speculated that settlers could benefit from the shelter that these or similar structures could provide from radiation and micrometeoroids. Geothermal energy is also suspected in the equatorial regions. Earth based examples indicate that some should have lengthy passages offering complete protection from radiation and be relatively easy to seal using on-site materials, especially in small subsections. Planetary protection Robotic spacecraft to Mars are required to be sterilized, to have at most , spores on the exterior of the craftâ€”and more thoroughly sterilized if they contact "special regions" containing water, [84] [85] otherwise there is a risk of contaminating not only the life-detection experiments but possibly the planet itself. It is impossible to sterilize human missions to this level, as humans are host to typically a hundred trillion microorganisms of thousands of species of the human microbiome , and these cannot be removed while preserving the life of the human. Containment seems the only option, but it is a major challenge in the event of a hard landing i. NASA wants its crewmembers to treat each other like coworkers would in a professional environment. A pregnant member on a spacecraft is dangerous to all those aboard. The pregnant woman and child would most likely need additional nutrition from the rations aboard, as well as special treatment and care. It is still not fully known how the environment in a spacecraft would affect the development of a child aboard. It is known however that an unborn child in space would be more susceptible to solar radiation, which would likely have a negative effect on its cells and genetics. Since the planet Mars offers a challenging environment and dangerous obstacles for humans to overcome, the laws and culture on the planet will most likely be very different from those on Earth. Mars to Stay advocates recycling emergency return vehicles into permanent settlements as soon as initial explorers determine permanent habitation is possible. I think it is absolutely realistic. I think over the next 20 years, we will take literally hundreds of thousands of people to space and that will give us the financial resources to do even bigger things".

Chapter 3 : Radiation Effects on Humans | Effects of Nuclear Weapons | www.nxgvision.com

Humankind, USA TODAY. So Jennifer Cook, a radiation therapist at Greenville Health System's Cancer Institute, decided that the masks could at least be made to look like something fun. Maybe.

Anthropology , Human evolution , and Timeline of human evolution The genus Homo evolved and diverged from other hominins in Africa, after the human clade split from the chimpanzee lineage of the hominids great apes branch of the primates. Modern humans, defined as the species Homo sapiens or specifically to the single extant subspecies Homo sapiens sapiens, proceeded to colonize all the continents and larger islands, arriving in Eurasia ,â€"60, years ago, [19] [20] Australia around 40, years ago, the Americas around 15, years ago, and remote islands such as Hawaii, Easter Island , Madagascar , and New Zealand between the years and The gibbons family Hylobatidae and orangutans genus Pongo were the first groups to split from the line leading to the humans, then gorillas genus Gorilla followed by the chimpanzees genus Pan. The splitting date between human and chimpanzee lineages is placed around 4â€"8 million years ago during the late Miocene epoch. Each of these species has been argued to be a bipedal ancestor of later hominins, but all such claims are contested. It is also possible that any one of the three is an ancestor of another branch of African apes, or is an ancestor shared between hominins and other African Hominoidea apes. The question of the relation between these early fossil species and the hominin lineage is still to be resolved. More recently, however, in , stone tools , perhaps predating Homo habilis, have been discovered in northwestern Kenya that have been dated to 3. During the next million years a process of encephalization began, and with the arrival of Homo erectus in the fossil record, cranial capacity had doubled. Homo erectus were the first of the hominina to leave Africa, and these species spread through Africa, Asia, and Europe between 1. One population of H. It is believed that these species were the first to use fire and complex tools. The earliest transitional fossils between H. These descendants of African H. The earliest fossils of anatomically modern humans are from the Middle Paleolithic , about , years ago such as the Omo remains of Ethiopia and the fossils of Herto sometimes classified as Homo sapiens idaltu. The most significant of these adaptations are 1. The relationship between all these changes is the subject of ongoing debate. The earliest bipedal hominin is considered to be either Sahelanthropus [39] or Orrorin , with Ardipithecus , a full bipedal, [40] coming somewhat later. It is possible that bipedalism was favored because it freed up the hands for reaching and carrying food, because it saved energy during locomotion, because it enabled long distance running and hunting, or as a strategy for avoiding hyperthermia by reducing the surface exposed to direct sun. However, the differences between the structure of human brains and those of other apes may be even more significant than differences in size. The reduced degree of sexual dimorphism is primarily visible in the reduction of the male canine tooth relative to other ape species except gibbons. Another important physiological change related to sexuality in humans was the evolution of hidden estrus. Humans are the only ape in which the female is fertile year round, and in which no special signals of fertility are produced by the body such as genital swelling during estrus. These changes taken together have been interpreted as a result of an increased emphasis on pair bonding as a possible solution to the requirement for increased parental investment due to the prolonged infancy of offspring. Archaic human admixture with modern humans , Early human migrations , Multiregional origin of modern humans , Prehistoric autopsy , and Recent African origin of modern humans By the beginning of the Upper Paleolithic period 50, BP , full behavioral modernity , including language , music and other cultural universals had developed. Since , evidence for gene flow between archaic and modern humans during the period of roughly , to 30, years ago has been discovered. This includes modern human admixture in Neanderthals, Neanderthal admixture in modern humans, [53] [54] Denisova hominin admixture in Melanesians [55] as well as repeated admixture from unnamed archaic humans to Sub-Saharan African populations.

Chapter 4 : Uniformed Services University

She spends 20 hours creating handmade masks for her smallest patients. It's this personal touch that gives each child a big dose of bravery.

Effects of Nuclear Weapons Radiation Effects on Humans Certain body parts are more specifically affected by exposure to different types of radiation sources. Several factors are involved in determining the potential health effects of exposure to radiation. The size of the dose amount of energy deposited in the body The ability of the radiation to harm human tissue Which organs are affected The most important factor is the amount of the dose - the amount of energy actually deposited in your body. The more energy absorbed by cells, the greater the biological damage. Health physicists refer to the amount of energy absorbed by the body as the radiation dose. The absorbed dose, the amount of energy absorbed per gram of body tissue, is usually measured in units called rads. Another unit of radation is the rem, or roentgen equivalent in man. To convert rads to rems, the number of rads is multiplied by a number that reflects the potential for damage caused by a type of radiation. For beta, gamma and X-ray radiation, this number is generally one. For some neutrons, protons, or alpha particles, the number is twenty. Hair The losing of hair quickly and in clumps occurs with radiation exposure at rems or higher. Like the heart, radiation kills nerve cells and small blood vessels, and can cause seizures and immediate death. Thyroid The certain body parts are more specifically affected by exposure to different types of radiation sources. The thyroid gland is susceptible to radioactive iodine. In sufficient amounts, radioactive iodine can destroy all or part of the thyroid. By taking potassium iodide can reduce the effects of exposure. This is often refered to as mild radiation sickness. Early symptoms of radiation sickness mimic those of flu and may go unnoticed unless a blood count is done. According to data from Hiroshima and Nagaski, show that symptoms may persist for up to 10 years and may also have an increased long-term risk for leukemia and lymphoma. For more information, visit Radiation Effects Research Foundation. Heart Intense exposure to radioactive material at 1, to 5, rems would do immediate damage to small blood vessels and probably cause heart failure and death directly. Gastrointestinal Tract Radiation damage to the intestinal tract lining will cause nausea, bloody vomiting and diarrhea. The radiation will begin to destroy the cells in the body that divide rapidly. Reproductive Tract Because reproductive tract cells divide rapidly, these areas of the body can be damaged at rem levels as low as Long-term, some radiation sickness victims will become sterile.

Chapter 5 : Radiation Experiments On Humans: When And Why It Happened

Radiation and www.nxgvision.com by Y Shibata, S Yamashita, M Watanabe and M Tomonage, pp , (Elsevier Science B.V., Amsterdam, The Netherlands), â,¬ ISBN

Helping establish the new "global cooperative" movement of humankind. This article provides further analysis of the private forecast images from Norway that show significantly higher levels of radioactive fallout than the public images ever showed. Specifically, we will look at a number of forecast images covering both Europe and Australasia, which images provide further evidence that the public forecasts from the Norwegian Institute for Air Research are completely inaccurate. Based on all the data that is currently available, the conclusion at this stage is that the obscured private images do in fact show the accurate and real forecast levels for radioactive fallout. Incredible deception is constantly taking place relative to the terrible and ongoing nuclear catastrophe that the whole world is currently witnessing. Based on this fact alone it is very important that we all stay highly alert and attentive to the situation. With three reactors in an uncontrolled state of meltdown, this crisis could become much, much worse at any moment. Thus, it is certainly in all of our best interests to take as many precautions now as we are able, such that we are as prepared as possible for whatever might happen next. For the same time May 7, Thus, the levels on the various private forecast images correlate perfectly with statements made in April by some European monitoring agencies, which said that the USA is seeing times the levels of radioactive fallout that is being seen in Europe [2]. Given that the levels on the US west coast are stated to be ten-fold those measured by European agencies, we should be seeing clouds of xenon that are purple verging on dark blue according to the scale on the left image over at least some amount of Europe, yet the public forecast clearly shows no xenon east of the Atlantic Ocean! So, the levels in this public forecast do not at all represent an accurate depiction of radioactive fallout around the world, given the known facts and data that has been collected globally these past two months now. Let us look at some further comparisons that confirm this conclusion. Again, the public image at left shows almost no cesium whatsoever beyond the region immediately around Japan. Again, the levels shown by this private forecast for cesium over Europe correlate with the levels shown by the private forecasts for north America around the same date. In both the public and private images the visible shapes and patterns of the air currents are the same this is consistently seen in numerous comparisons [3] [4] , which shows that both image sets must have been based on the same forecast data for air flow around the world. However, it seems that the scale was set extremely high for the public images, leaving only a few faint wisps of purple for iodine and cesium and areas of blue for xenon over the north American continent. Then, the numerical scale on the public images must have been replaced with a false scale showing levels at least times lower than the actual. Meanwhile, the private forecasts at right show the following levels of iodine for the same exact times: Apr 18 at Now, here are some facts to help us approximate the expected iodine levels for the same period of time: With these facts we can approximate the expected levels of airborne radioactive iodine, based on the actual measurements of cesium recorded by various testing stations throughout Europe. Again, this approximation is being based on the actual levels of cesium that were measured by direct high volume air sampling. This expected range correlates extremely well with the private forecasts while not correlating at all with the public forecasts. This friend often listens to the radio in the background for a number of hours a day, so he hears a stream of the latest news coming in from around the world. However, he told me that there was never another mention of radioactivity being detected in Australia in any news story he has heard since, which clearly suggests that the story was permanently pulled. Within days of me hearing this interesting news from my friend, a small number of forecast images appeared about one week ago now in the private folder of the Norwegian server that do in fact show radioactive fallout over Australasia. So, let us take a look at two forecast images for this region. The next comparison is from exactly 23 days later on May 11 and once again the public forecast shows no detectable levels of xenon anywhere near Indonesia, Papua New Guinea, or Australia. So, these private forecasts for Australasia directly correlate with the news report heard by my friend that there have been traces of radioactive xenon detected in Darwin. Once again, this evidence leads to the conclusion that the private forecasts are accurate and the public

forecasts are not at all accurate. Five of these images appeared over two days ago, with a single image appearing yesterday and no new images today as yet. After seeing an average of 90 additional images appear in this folder every day during the six days inclusive from May 10â€”15 Norwegian time it is curious that they have suddenly stopped. At this stage it is not known why the frequency of images appearing in this folder has changed. Perhaps whomever is running the software creating these forecasts is simply pausing in their radioactive fallout analysis for now. Or perhaps they have realised that a number of news stories around the Internet have reported on the existence of this folder during the past week, such that they have stopped any additional forecast images from appearing there. However, it would seem likely that access to the folder itself would have also been blocked in that case, which it has not been. Thus, it remains to be seen if any further forecasts do appear in this obscure folder again. Now is the Time for Humankind to Act! Given the dire urgency of the situation with regards to the multiple nuclear reactor meltdowns that are ongoing, now is evidently the time for humankind to take universal and powerful action relative to this crisis. We must collectively work to quickly bring an end to the entire nuclear era, starting with the permanent shutdown of all nuclear reactors on Earth and progressing rapidly to complete global nuclear disarmament. The incredible level of risk with nuclear technology is simply not worth it. There are many, many ways to generate electricity more efficiently than boiling water with a slow-burning and sometimes out-of-control nuclear bomb which is an accurate description of the way that any and every nuclear power station operates. Those many other ways of generating electricity do not have the potential for killing billions of people and possibly even all life on Earth. So, let us all be part of the global movement to end the nuclear era now. Please pass on this critical information about the ongoing nuclear catastrophe that is continuing to worsen by the day and the massive deception taking place globally relative to the incredible seriousness of the situation which deception is immediately proven by the stunning media blackout relative to what is certainly the worst industrial disaster in human history. May all collectively respond to this terrible crisis with great urgency, such that a new paradigm for human affairs can be born out of this currently dark moment. It is time for us to get together and resolve this situation as a cooperative global community.

Chapter 6 : Benefits and Risks of Radiation

Radiation and Humankind. Proceedings of the First Nagasaki Symposium of the International Consortium for Medical Care of Hibakushu and Radiation Life Science.

August 20, by Nicoletta Lanese, University of California, San Francisco New research suggests that female mice may have innate protection against this deep space hazard. But once astronauts blast past the International Space Station, they become exposed to one of the many dangers of deep space: But scientists can simulate the extraterrestrial hazard in mice. Now, new NASA-funded research from UC San Francisco suggests that female space travelers may perhaps fare better than males in the face of cosmic radiation: Understanding what makes these cells more resistant could be key to pinpointing specific treatments. This celestial hazard is known as galactic cosmic radiation â€" high energy protons and charged nuclei that mainly come from outside our solar system and even from other galaxies. These particles can whiz straight through the hull of a spaceship, as well as any human housed inside, potentially causing serious health problems. As humankind launches into deep space, it is essential that scientists understand how galactic cosmic radiation could impact future long-haul astronauts of both sexes â€" especially considering over forty percent of the most recent class of astronauts is female. Prior studies of mice exposed to simplified simulations of isolated components of space radiation â€"such as protons or nuclei of helium, oxygen, titanium or silicon atoms â€" found that exposure to these highly-charged particles induces short- and long-term cognitive decline. But these studies were primarily conducted with male rodents. By simply including both sexes in their study, the researchers learned that female mice are protected from the cognitive problems induced by space radiation in male mice. Exposing mice to a mixture of particles better simulates conditions astronauts will experience in deep space. Irradiated males interacted significantly less with other mice, had difficulty recognizing familiar mice and objects, and showed greater aversion to exploring open, well-lit spaces. But irradiated females behaved as if they had not encountered radiation at all. Behavioral changes in the irradiated males corresponded to physical alterations in their brains. Most notably, microglia â€" resident immune cells of the brain and spinal cord â€" became very active following radiation. The boosted activity was measured in the hippocampus, a brain structure integral to learning and memory. Corresponding with the observed microglial activation, the researchers found that the number of synaptic connections in the male hippocampus fell significantly. Landing docks for the excitatory neurotransmitter glutamate, which are known as AMPA receptors, were also greatly depleted in the hippocampus. Again, these changes were only seen in irradiated male mice â€" females were completely spared. Mechanism Hints at Potential Solution Microglia have both a "resting" and "active" state, and the active state often ignites inflammation in the surrounding tissue. Research suggests that female mice have more resting microglia than males, and in response to trauma, these microglia induce significantly less inflammation. Instead, female microglia appear to promote neuroprotective effects. In that study, the researchers exposed the mice to a single highly-charged ion, then eliminated nearly all of their microglia using a drug that blocks a signal vital to microglial survival. After two weeks, the mice were taken off the drug, and their microglia levels naturally rebounded. Months later, the animals were tested and were found to be protected from radiation-induced cognitive deficits. The research demonstrated that by resetting the immune system early on after radiation exposure it is possible to prevent long-term deficits. Eventually, this research could lead to viable protective treatments for astronauts on the Mars voyage.

Chapter 7 : Publication : Radiation and Humankind

Backgrounder on Biological Effects of Radiation Printable Version. Radiation is all around us. It is in our environment and has been since the Earth was formed.

Chapter 8 : Colonization of Mars - Wikipedia

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Chapter 9 : Female mice are immune to cognitive damage from space radiation

In its consideration of the effects of radiation on humankind and the environment, the Fourth Committee (Special Political and Decolonization) today unanimously approved a draft resolution in.