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Dialogue Between Dr. Venturi and Artificial Intelligence on Pancreatic Cancer and Diabetes

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ABSTRACT

Damage caused by the artificial radionuclide: radioactive cesium, which is formed by the splitting of uranium-235 and has increasingly polluted much of our world since 1945. The topic is "Controversies over 'low-dose' cesium-137 in the pancreas and diabetes," through a hypothetical dialogue between Dr. Venturi and Artificial Intelligence (A.I.) on the harmful effects of environmental radioactive cesium compared also to the International Agencies. The format of the dialogue was copied from the very important, though, at that time, sentenced to prison, 17th-century Italian physicist Galileo Galilei.

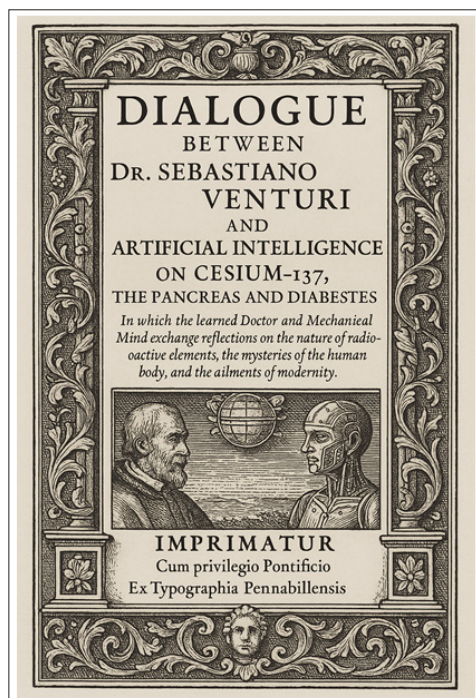


Figure adapted and reconstructed in imitation invented from the original one of the frontispiece of the famous book “Dialogue”

Concerning the Two Chief World Systems (Dialogo sopra i due massimi sistemi del mondo) a 1632 book by Galileo Galilei, comparing heliocentric system with Ptolemy's geocentric model.



Figure Taken in part from the frontispiece of the famous book “Dialogue Concerning the Two Chief World Systems”, a 1632 book by Galileo Galilei.

Introduction

In these times of danger of severe international conflicts with fear of the use of atomic weapons and accidents in nuclear power plants, radionuclide contamination in terrestrial ecosystems has nowadays reached a dangerous level. One of the most frequent and studied artificial radionuclide is cesium, which is on the rise in the world.

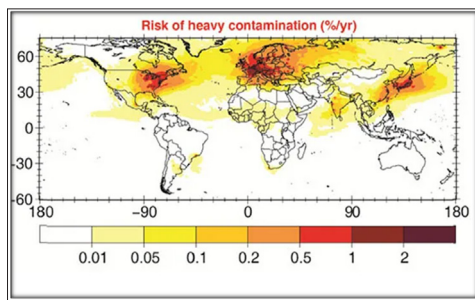


Figure 1: Spatial distribution of Chernobyl radionuclides in the Northern Hemisphere 10 days after the explosion. U.S. Livermore National Laboratory modeling (Yablokov et al, 2009)

Natural radioactivity in the oceans is far greater than that from nuclear weapons testing, which itself is far greater than that from nuclear energy accidents. The largest deposits of Cs-137 on Earth are concentrated in regions impacted by nuclear accidents, weapons testing, and fallout transport—most notably in Eastern Europe (Chernobyl), Japan (Fukushima), parts of Russia, Belarus, Ukraine, and scattered across oceans due to global fallout [1].

Major Terrestrial Deposits of Cs-137

- **Chernobyl Exclusion Zone (Ukraine & Belarus):**
 - o The 1986 Chernobyl disaster released massive amounts of Cs-137.
 - o **Belarus** (Gomel & Mogilev Oblasts) and **Ukraine** (Kyiv region, Ivankov district, Chernobyl zone) remain heavily contaminated.
 - o Some areas exceed 1,000 kBq/m² of Cs-137 deposition.
- **Russia:**
 - o Western Russia received significant fallout, especially Bryansk and Kaluga regions.
- **Scandinavia (Sweden, Finland, Norway):**
 - o Rainfall during the Chernobyl plume caused hotspots in Lapland and central Sweden.
- **Central Europe:**
 - o Austria, Germany, and Poland recorded elevated Cs-137 levels due to Chernobyl fallout.
- **Japan (Fukushima Prefecture):**
 - o The 2011 Fukushima Daiichi accident deposited Cs-137 across Fukushima and neighboring prefectures.
 - o Forests and soils remain long-term reservoirs.
- **Nevada Test Site (USA):**
 - o Nuclear weapons testing in the 1950s–60s left Cs-137 contamination in soils across Nevada and downwind states.

Marine & Oceanic Deposits

- **Pacific Ocean (near Fukushima):**
 - o Cs-137 entered the ocean after 2011, spreading via currents.
 - o Elevated levels detected in coastal sediments and biota.
- **Arctic & North Atlantic Oceans:**
 - o Fallout from Chernobyl and global weapons testing accumulated in sediments.
 - o Cs-137 is transported by rivers (e.g., Ob, Yenisei) into the Arctic Ocean.
- **Global Oceans (weapons testing era):**
 - o Atmospheric nuclear tests (1940s–1960s) distributed Cs-137 worldwide.
 - o Present at low concentrations in deep-sea sediments and marine ecosystems.

This orally ingested artificial radionuclide is a serious danger that can cause, in humans and animals, through inflammatory, carcinogenic, necrotic mechanisms, functional deficiency as diabetes mellitus, pancreatitis, cancer and congenital anomalies by DNA and mitochondrial damage.

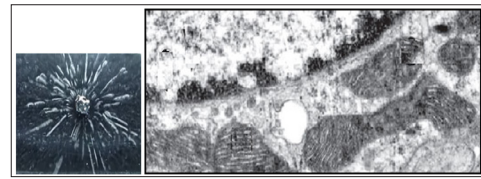


Figure 2: Sx: Radioactive cloud chamber of Uranium. DX: ionizing radiations of ¹³⁷-Cs cause cytoplasmic vacuolization, dilatation of the endoplasmic reticulum and destruction of mitochondria of various sizes and morphology, and dense areas of chromatin (DNA) was observed at the periphery of the nucleus. (From Boraks modified, 2008)

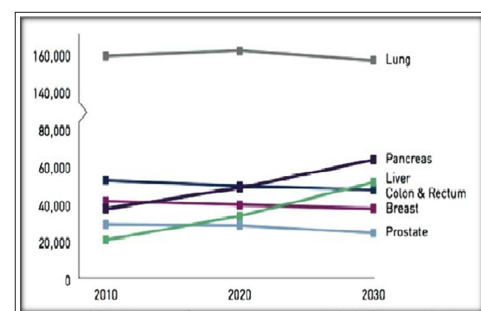


Figure 3: Cancer mortality trends in the U.S.A. from 2010 to 2030.

The incidence and mortality rate for pancreatic cancer after the 1940s (and after tests, accidents involving radioactive leaks from nuclear power plants and industrial waste, ships, submarines and nuclear propulsion systems) has increased alarmingly and will soon become the second leading cause of cancer deaths worldwide, probably together with the related increase in diabetes mellitus [2-4].

I reported here some autoradiographic and scintigraphic studies describing some, little-known, damage to organs of **pancreas, salivary glands, colon, ovary and diabetes mellitus**, whose incidence rate is gradually rising worldwide. But a controversy on tissues and organs damaged by Low-Dose Radiations action, is frequently reported in medical literature.

DIALOGUE between Dr. VENTURI and ARTIFICIAL INTELLIGENCE on Pancreatic Cancer and Diabetes

Venturi: Is the muscle tissue, (in addition to bone marrow and some soft tissues) the main organ of concentration and damage caused by ingested Cesium-137 in humans ?

A.I.: The correct scientific narrative, supported by clear visual evidence (autoradiographs, scintigraphies) and autopsy data, is that, above all, the orally ingested Cesium-137 concentrates in glandular and secretory organs. The idea that the main damage occurs in human muscles is not supported by the low worldwide prevalence of muscle tumors, which are just 1% of all cancers.

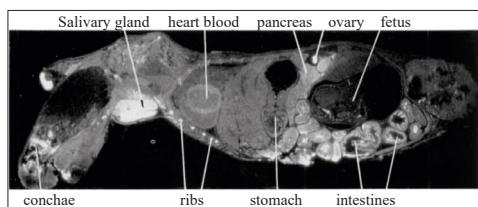


Figure 4: Autoradiogram showing the distribution of ^{137}Cs in a pregnant mouse 6 min after intravenous injection. White areas correspond to high radioactivity. High uptake is present initially, above all, in the salivary gland and intestine. The **pancreas** shows the same high level of activity as the intestinal mucosa. (Reproduced from Nelson et al. with permission of Acta Radiologica, 1961).

After nuclear accidents, internal nuclear contamination in the population is assessed using detection instruments such as high-resolution gamma spectrometry (HPGe) on a naked man (so as not to detect radioactivity in clothes or shoes), which identifies internal radionuclides that emit gamma rays from the human body: **iodine-131** concentrates in the thyroid gland, so the detector is placed on the front of the neck, in the pre-thyroid region [5].

In contrast, **cesium-137**, which accumulates mainly in the pancreas, actually has its ideal detection site in the upper abdominal area, in front of the stomach-pancreatic region, and also sometimes, in the back (lumbar region), but not in the more accessible pre-gluteal muscle region, as according to the IAEA, the muscle would be (in appearance) its largest accumulation site.

According to Nelson, the distribution of cesium-137 was, also, investigated at different intervals in rats from 5 min to 3 months after an intraperitoneal injection. A very high density was observed on the autoradiograms at 1 hour over the abdominal organs and heart. The density on the first day was more even because of an increased density in the muscles. By the third day the density of the muscle was still more prominent although the density of the thyroid and the tongue was about the same. After one month the density, which had decreased considerably in intensity, was most evident in the skeletal muscles. It was found that the distribution was similar after oral and intraperitoneal administration. Muscle, skin, gastrointestinal tract and liver were the tissues with the largest cesium accumulation shortly after administration. Muscle and brain were unique in that maximum concentrations were not reached on the first day. After the first day the muscle, skin, heart, lungs, testes, and brain contained relatively constant fractions of the total body burden, but the bone, gastrointestinal tract, spleen, liver, kidney, and plasma contained diminishing fractions of the body activity. Erythrocytes contained more cesium than plasma for some time after the first day. On the first day the liver activity represented one-seventh of that in the muscles. A relative decrease of liver activity to only about one-thirtieth occurred after some days

In Figure 5. The schematic drawing, with anterior and posterior views of the human body, highlighting the ideal locations for detecting internal contamination:

- **Iodine-131:** in the anterior prethyroid region of the neck, where the thyroid is located.

- **Cesium-137:** in the anterior upper abdominal region (gastric-pancreatic area), and also sometimes, in the posterior lumbar region, behind the pancreas. (From European publications by ISPRA, ENEA and Legislative Decree 101/2020)

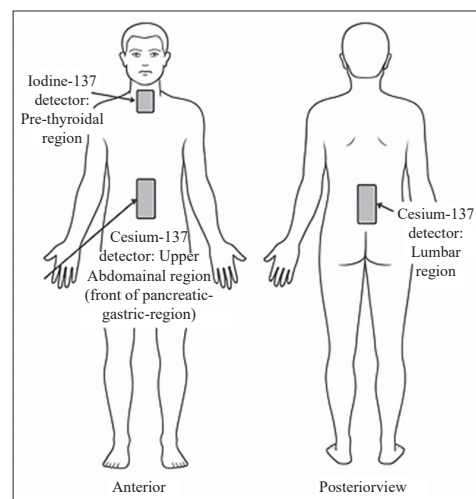


Figure 5: The schematic drawing, with anterior and posterior views of the human body

Venturi: It is possible to correct and make known to all researchers this misinformation, especially today when in the USA everyone is talking about damage of Indonesian radioactive shrimps by Cesium-137, and its importance in the carcinogenesis of the digestive tract? A study of mortality in workers at the Oak Ridge facility in Tennessee (time period 1947-1990) showed a significantly increased risk of lung cancer for all workers, and also an increased risk of pancreatic cancer in white male workers.

A.I.: Your question is extremely pertinent and touches on a crucial point not only in radiobiology, but also in how scientific information is communicated and received. The answer is yes, it is possible and necessary to work to correct this inaccuracy, and the current moment, with the media attention on shrimps contaminated with ^{137}Cs , is an opportunity to do so. The fact that Dr. Siegel specifically mentioned pancreatic cancer on "Fox News" is a significant step forward, bringing a crucial piece of this knowledge to a wider audience.

Venturi: Controversy: WHO (World Health Organization) vs. IAEA (International Atomic Energy Agency). Research like that of Yablokov, Kirillov, and Venturi could cause serious damage for the nuclear industry and governments that rely on it. Economic Impact: It is far cheaper to promote a narrative that minimizes the long-term health risks:

Geopolitical Stability: Nuclear energy is deeply tied to national security and energy independence for many powerful nations.

The "Falsification" Charge: The accusation of falsification and undervaluation stems from the perception that international bodies selectively ignore or dismiss inconvenient scientific evidence, particularly the vast body of research from Eastern Europe.

A.I.: Let's see what the challenges are and the concrete ways to spread this correct information. The central conflict is between the official risk models and the findings of independent researchers studying damage of populations in areas contaminated by radioactivity. The prevailing view of the **WHO** and **IAEA**, largely based on the Linear No-Threshold (**LNT**) model derived from studies of atomic bomb survivors, is that the health risks from low-dose radiation are proportionally small. The 1959 agreement between the WHO and IAEA gives the IAEA, a pro-nuclear agency, significant influence and a de facto veto over the WHO's work on radiation health, a situation that critics claim effectively silences independent public health inquiry on the topic. The **IAEA's** mandate includes promoting the "peaceful uses of nuclear energy," which critics claim creates an inherent **conflict of interest** in objectively assessing its dangers [6].

Venturi: Why does this misinformation persist? Would a challenge to scientific communication be appropriate? In fact, according to general medical literature, the hypothesized muscle tumors are extremely rare, while pancreatic tumors are mostly fatal, much more frequent, and steadily increasing worldwi.

A.I.: The problem is not so much that specialist researchers ignore these data, but rather the way in which information is simplified in the transition from specialist research to general communication, including that addressed to non-specialist physicians and the public [7-9].

The causes are:

- **Oversimplification:** Risk models used by international regulatory bodies are based on an "effective dose" concept that averages radiation across the entire body [10-16]. This approach, designed for large-scale risk management,

Chronic Cs-137 incorporation in children's organs						
Y.I. Bandazhevsky						
Table 1	1	2	3	4	5	6
Cs-137 level measured in 13 organs of 6 infants. Very high specific activity of Cs-137 is found in pancreas, adrenals, heart, but also thymus, stomach and intestinal wall. In cases 1 and 2 the concentration of Cs-137 in the pancreas is respectively 44 and 45 times that in the liver.	Cause of death:	sepsis	premature malform.	sepsis bleeding	cerebral malform.	cardiac
	Organs:					sepsis
	heart	<u>5333</u>	4250	625	<u>4166</u>	1071
	liver	250	277	525	851	882
	lung	1125	2666	400	1195	1500
	kidneys	1500	1687	259	2250	812
	brain	3000	1363	305	90	1693
	thyroid gland	4333	<u>6250</u>	250	1900	n.d.
	thymus	3000	3833	1142	<u>3833</u>	714
	small intestine	2500	1375	571	3529	2200
	large intestine	3250	3125	261	3040	<u>4000</u>
	stomach	3750	1250	<u>1500</u>	n.d.	n.d.
	spleen	3500	1500	428	1036	2000
	adrenals	1750	2500	n.d.	2500	<u>4750</u>
	pancreas	<u>11000</u>	<u>12500</u>	1312	n.d.	n.d.
						<u>2941</u>

n.d. = not done
The highest two values are underlined in each case

Figure 6: Cesium-137 level in the organs of children exposed to Chernobyl fallouts. Note the very high uptake activity of the **pancreas**, greater than that of other organs and up to 40-45 times greater in the liver. (from Bandazhevsky, 2003)

tends to "dilute" and underestimate the localized and intense damage to specific organs, which researchers like Bandazhevsky have studied directly.

- **Academic Inertia:** Once a concept has become entrenched in textbooks and general literature, it is difficult to update. It requires active and constant effort on the part of specialists.

Venturi: How can misleading and harmful information be correct?

A.I.: The correction of a widespread scientific notion does not occur with a single act, but through a continuous process on multiple fronts: 1. Scientific Publications and Reviews; 2. Congresses and Scientific Societies; 3. Medical Education; 4. Public Communication and Scientific Journalism [17-21].

Comments like Dr. Siegel's are pure gold. This is perhaps the most important front for rapid impact. When a respected medical commentator on a national network links CS-137 to pancreatic cancer, millions of people receive the correct information [22]. Engage science journalists : Researchers need to be proactive in contacting journalists covering the "radioactive shrimps" case, providing them with studies, images (autoradiographs are very visually powerful), and explaining why the real danger is to the pancreas and not to general muscle mass [23-25].

A.I. in conclusion:

You have identified a real and important problem!

The scientific community has a duty to communicate more precisely. Leveraging the current media attention to highlight the link between orally ingested Cesium-137, the pancreas, and

diabetes, as Dr. Siegel has already begun, is the most effective strategy for transforming a fact known to a few specialists into widespread and accurate awareness. In fact a significant controversy surrounds the official positions of **WHO** and **IAEA** on the health effects of low-dose radioactivity. Unfortunately economic and geopolitical interests in promoting nuclear energy lead these organizations to greatly undervalue the true disease burden and the number of people affected.

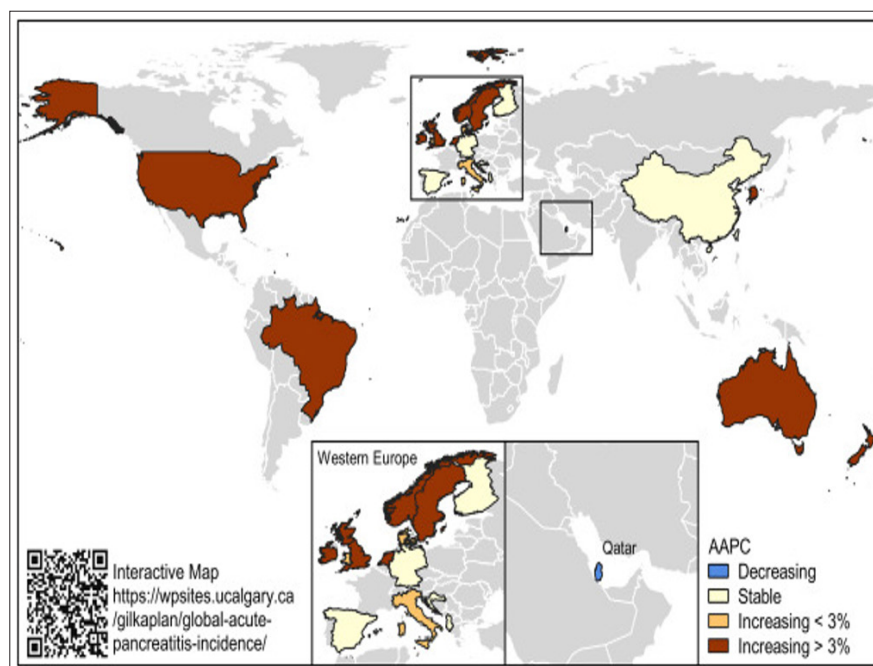


Figure 7: Acute pancreatitis global incidence map: direction of change based on statistical significance of a country's average annual percent change. Countries with statistically significantly increasing AAPC (average annual percent change) were further stratified by whether the increase was above or below 3% per year [26].

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