

Researcher points to suppression of evidence on radiation effects by 1946 Nobel Laureate

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University of Massachusetts Amherst environmental toxicologist Edward Calabrese, whose career research shows that low doses of some chemicals and radiation are benign or even helpful, says he has uncovered evidence that one of the fathers of radiation genetics, Nobel Prize winner Hermann Muller, knowingly lied when he claimed in 1946 that there is no safe level of radiation exposure.

Calabrese's interpretation of this history is supported by letters and other materials he has retrieved, many from formerly classified files. He published key excerpts this month in [Archives of Toxicology and Environmental and Molecular Mutagenesis](#).

Muller was awarded the 1946 Nobel Prize in medicine for his discovery that X-rays induce [genetic mutations](#). This helped him call attention to his long-time concern over the dangers of atomic testing. Muller's intentions were good, Calabrese points out, but his decision not to mention key scientific evidence against his position has had a far-reaching impact on our approach to regulating radiation and [chemical exposure](#).

Calabrese uncovered correspondence from November 1946 between Muller and Curt Stern at the University of Rochester about a major experiment that had recently evaluated fruit fly germ cell mutations in Stern's laboratory. It failed to support the linear dose-response model at low exposure levels, but in Muller's speech in Oslo a few weeks later he insisted there was "no escape from the conclusion that there is no

threshold." To Calabrese, this amounts to deliberate concealment and he says Stern raised no objection.

Calabrese adds, "This isn't an [academic debate](#), it's really practical, because all of our rules about chemical and low-level radiation are based on the premises that Muller and the National Academy of Sciences' (NAS) committee adopted at that time. Now, after all these years, it's very hard when people have been frightened to death by this dogma to persuade them that we don't need to be scared by certain low-dose exposures."

Within a year after Muller and his group persuaded the NAS to accept the linear model for gonadal mutations, the practice was extrapolated to somatic cells and cancer. Twenty years later, NAS adopted the linear approach for chemicals. Soon thereafter, the U.S. Environmental Protection Agency announced it would use the linear model for risk assessment, Calabrese points out.

Some can accept that even the most distinguished scientists have human failings, he acknowledges. But his view is that "the regulatory research community needs to hear about this. The implications of my findings are that we should revisit our exposure regulations because our regulatory history is founded on a deception. We have seen literally hundreds of thousands of cleanup decisions based on a model that was fraudulently derived. I think we should probably have drastically different exposure standards today, and far less fear."

Calabrese believes, "The die was cast by Muller and regulations adopted since then have gone unchallenged. I think he got his beliefs and his science confused, and he couldn't admit that the science was unresolved. So he went ahead and expressed an opinion about how to handle the public health situation."

Geneticists in the 1950s came to embrace the "linear dose-response model" of risk because at the high exposures they tested, there was no level below which DNA damage did not occur. They felt medical doctors didn't grasp how significant were the dangers. As the smartest and brightest, Muller anticipated the risk of atmospheric atomic testing and became passionately committed to protecting society, Calabrese explains.

Muller and Curt Stern had done many of the key experiments. Muller himself served on the NAS's Biological Effects of Atomic Radiation (BEAR) committee, through which the linear dose-response approach to risk assessment became firmly entrenched. The two successfully suppressed last-minute evidence from the fruit fly experiment conducted in Stern's lab by postdoctoral researcher Ernst Caspari, and the rest is history, Calabrese says. It marked the "transformation of a threshold-guided [risk assessment](#) to one now centered on a linear dose-response."

"To me this all raises the question, what happens when a scientific field lies to the public, to federal agencies and the president? It's a very scary situation that the radiation genetics community in the 1950s assumed that something was correct without requiring the necessary documentation to support it," the UMass Amherst toxicologist says.

Stern's group published a paper in 1947 not long after Muller's Nobel Prize acceptance speech in which they tried to discredit their own study, further evidence of a deliberate cover-up, Calabrese says. "It's been hidden in the bowels of the Atomic Energy Commission for decades until I found it. They revised it to remove the one sentence suggesting this experiment might provide evidence for the threshold model."

"One could argue that Muller single-handedly undermined above-ground atomic testing, which is a good thing," Calabrese says. "But after uncovering this lie, I'm starting to contemplate what society would have

looked like if the regulatory community had felt free to use a threshold model. Members of that 1956 NAS BEAR committee didn't see the domino effect of their actions on our society. Muller's impact on the world of today is almost incalculable. He couldn't have imagined it. But we shouldn't have to live with it."

Provided by University of Massachusetts at Amherst

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