COMMENTS

Response to Comments by Sebastiano Bianca

KEDAR N. PRASAD,*[,1] WILLIAM C. COLE,* AND GERALD M. HASSE†

Center for Vitamins and Cancer Research, School of Medicine, University of Colorado Health Sciences Center, Denver, Colorado 80262; and †Department of Radiology and Surgery, School of Medicine, University of Colorado Health Sciences Center, Denver, Colorado 80262

We would like to respond to Dr. Bianca's interesting comments. In our review (1), we have presented radioepidemiologic studies in women showing that diagnostic doses of x-ray even before conception may increase the risk of birth defects among their children. We also discussed the inherent limitations of radioepidemiologic studies. Most reliable estimate of low doses of radiation in increasing the health risk in humans comes from the analysis of data on atomic bomb survivors in Hiroshima and Nagasaki.[2] Recent results suggest that doses in the range of 5–100 mSv, a mean dose of 29 mSV (3) or 5–50 mSv, or a mean dose of 20 mSv (4) can increase the risk of cancer in humans. We have emphasized that humans are exposed daily to several toxins including chemical and biological carcinogens, tumor promoters, and other mutagens, and x-irradiation in combination with these agents can increase the risk of cancer in a synergistic manner in experimental systems (1). Therefore, no radiation dose can be considered totally safe.

We do not share the view of Dr. Bianca that there is no data on the effect of diagnostic doses below 50 mGy on human fetuses. Several such studies have been discussed in chapter 15 of the *Handbook of Radiobiology* (4). A dose of 100–500 mGy to murine zygotes can decrease their incidence of implantation, and humans are much more sensitive than mice to radiation. We do not share the view of Dr. Bianca that pregnant women should be advised on the health risk of radiation only with respect to teratogenic effect because such doses can also increase the risk of cancer, birth defects, and genetic defects in future generations.

We have emphasized in our review, and in this respect agree with Dr. Bianca, that diagnostic doses must be given on the basis of risk versus benefit. Therefore, if diagnostic doses of below 10 mGy are administered for the mother's diagnostic benefit, it should be given with a statement that such doses are medically essential and that these doses of radiation may still produce minimal risk to the fetus. Unfortunately, many health professionals responsible for the delivery of diagnostic doses do not provide information regarding the potential risks of radiation to the patients. On the contrary, many of them promote the idea that such radiation doses do not increase the risk of chronic disease at all. Patients are confused and fearful about the risk of radiation because they receive totally opposite views about the health risks. Denying that diagnostic doses of radiation increase the health risks in humans might be considered by some analogous to the tobacco industry's claim in the early 1960s that smoking does not increase health risk and that nicotine is not addictive.

[1] To whom correspondence should be addressed at Premier Micronutrient Corporation, 245 El Faisan Dr, San Rafael, CA 94903. Email: kedar@knprasad.com

1535-3702/05/2302-0101$15.00

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