

Epigenetics could help researchers determine any risks associated with low-dose radiation

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There remains a lack of consensus amongst the medical and scientific communities about any cancer risk from low level radiation, particularly low-dose radiation delivered from computed tomography (CT) scans. However, the study of epigenetics may play a role in determining whether or not future trends of diseases can in fact be linked to utilization of CT, according to an article in the February issue of the *Journal of the American College of Radiology (JACR)*.

The term epigenetics refers to changes in the phenotype (appearance) or [gene expression](#) caused by mechanisms other than changes in the underlying DNA sequence. These changes may remain through cell divisions for the remainder of the cell's life and may also last for multiple generations.

"Radiation safety is, without a doubt, a large concern for practicing radiologists today," said Shella Farooki, MD, author of the article and radiologist and director of research for Columbus Radiology Corp in Columbus, OH. "However, the current focus does not account for the possibility of harm to future generations from radiation delivered today. I believe that it is equally, if not more important, to consider potential harm to the patient's offspring and their offspring's offspring," she said.

"The effects of ionizing radiation have been demonstrated in neighboring cells (non-targeted radiation), known as the bystander effect. In addition, ionizing radiation effects have been shown to span generations, resulting in heritable defects in mice. However, we need to

bridge the gap between understanding the epigenome functionality and [radiation exposure](#) before assuming anything," said Farooki.

"In 2008, the National Institutes of Health (NIH) announced that \$190 million had been earmarked for epigenetics research over the next five years," she said. In announcing the funding, government officials noted that epigenetics had the potential to explain mechanisms of aging, human development, and the origins of cancer, heart disease, mental illness, as well as other conditions.

"Epigenetics may ultimately turn out to have a greater role in health and disease and treatment of genetics itself; and given this knowledge, one wonders if future trends in diseases will be linked to today's utilization of CT," said Farooki.

"Clearly, long term epidemiological studies are needed to answer this question, but in the meantime, we are faced with the continued struggle of radiation risk versus benefit," she said.

Provided by American College of Radiology

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