Radiation effect on epigenetic modifiers may up metabolic risk

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(HealthDay)—Total body irradiation alters intracellular signaling and

epigenetic pathways regulating cell proliferation and differentiation of skeletal muscle and adipose progenitor cells, according to an experimental study published online Sept. 20 in *Diabetes*.

Vibe Nylander, from the Novo Nordisk Foundation Center for Basic Metabolic Research at the University of Copenhagen in Denmark, and colleagues treated C57Bl/6 mice with a single dose of irradiation and subjected them to a high-fat diet. Transcriptomic and epigenomic profiles of preadipocytes and skeletal muscle cells obtained from irradiated mice were created using RNA sequencing and reduced representation bisulfite sequencing.

The researchers found that there were alterations in glucose metabolism for mice subjected to total body irradiation; when challenged with a high-fat diet the mice showed marked hyperinsulinemia. In skeletal muscle and adipose progenitor cells collected from irradiated mice and differentiated in culture, insulin signaling was chronically disrupted. Substantial DNA methylation changes were revealed in epigenomic profiling of skeletal muscle and adipose progenitor cells from irradiated animals, notably for genes involved in cell cycle regulation, glucose/lipid metabolism, and epigenetic modifier expression.

"In conclusion, our results provide insight into mechanisms by which ionizing radiation affects skeletal muscle and adipose progenitor cells," the authors write. "We show that ionizing radiation alters epigenetic modifiers, remodels the epigenome of progenitor cells and impairs capacity to differentiate. Epigenetic factors may be involved in the long-term side effects of radiation, notably on metabolic health when used in cancer therapy."

More information: Full Text (subscription or payment may be required)