Genetics Could Help ID Childhood Cancer Survivors at Risk for New Malignancies

Researchers analyzed how a combination of cancer treatments and inherited mutations in DNA-repair genes predicted new cancers.

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Analyzing the combination of treatments that childhood cancer survivors received for their malignancies as well as inherited mutations in their DNA-repair genes can help predict their risk for new cancer diagnoses.

The authors of the study that reached this finding, which was published in the Journal of Clinical Oncology, conducted sequencing of the whole genomes of 4,402 survivors of childhood cancer who participated in the St. Jude Lifetime Cohort.

The scientists analyzed inherited mutations in 127 specific genes pertaining to six major DNA repair pathways. Then they cross-referenced these findings with the cumulative doses of chemotherapy and radiation therapy that the survivors received for their cancer treatment per medical records.

Four hundred ninety-five (11.2%) of the survivors developed a subsequent cancer.

The investigators identified 538 inherited genetic mutations in 98 DNA repair genes in 508 (11.5%) of the survivors. These genetic mutations, both on their own and when considered along with childhood cancer treatment, could predict an increased risk of various malignancies, including breast cancer, sarcoma and thyroid cancer.

“These findings have the potential to facilitate identification of high-risk survivors who may benefit from genetic counseling and/or testing of [DNA repair genes], which may further inform personalized cancer surveillance and prevention strategies,” the study authors concluded.

“These data truly reflect how inherited mutations in DNA-repair genes and cancer therapy can have a combined effect, increasing significantly the risk of developing another cancer later in life,” co–senior author Yutaka Yasui, PhD, of St. Jude Epidemiology and Cancer Control, said in a press release.

To read a press release about the study, click here.

To read the study abstract, click here.

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