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Kids and Adults: What's the Difference?

BY ELIZABETH WHITTINGTON

The difference between childhood and adult cancers rarely comes down to simply age. Most tumors in children differ biologically from their adult counterparts, and are typically due to the type of cell from which the cancer originates.

In the weeks after fertilization, the embryo develops into layers: ectoderm, mesoderm, and endoderm. These layers lay the foundation for the development and maturation of tissues and organs in the body.

Adult cancers, such as lung, breast, and colorectal, typically develop from epithelial tissue (adenocarcinomas), which come from the ectoderm or endoderm. Epithelial cells make up the skin and lining of the internal organs and glands. Alternatively, childhood cancers, including sarcomas (cancers of the bone or muscle) and leukemias (blood cancers), develop from the mesoderm.

“Many childhood cancers form from primitive cells or embryonic cells you may find in developing fetuses and often deep in the body,” says Katherine Matthay, MD, division chief of pediatric hematology/oncology at the University of California, San Francisco. Childhood cancers develop either because of genetics or an event in early fetal development, whereas adult cancers typically result from an accumulation of mutations caused by external sources, such as smoking or sun overexposure.

Researchers believe biological differences may point to why childhood cancers are more responsive to chemotherapy, which is designed to target rapidly dividing cells. “Childhood cancers—leukemia, nervous system cancers—these cells proliferate very rapidly, and they also respond to chemotherapy in a more dramatic fashion,” says Dr. Matthay.

Epithelial cells are normally resilient because they are exposed to environmental influences, making them more resistant to treatment if they become cancerous. Vulnerable childhood cancer cells, however, are ideal targets for chemotherapy. Indeed, childhood cancer survivors are less likely to have a recurrence than adults, and the five-year survival rate for all cancers is higher (80 percent compared with 66 percent). “Even in acute lymphoblastic leukemia, it is much more curable in children than in adults,” says Dr. Matthay.

