Tracing a Pediatric Cancer to Its Origins

Damon Runyon-Sohn Pediatric Cancer research using “lineage tracing” explains the rise of soft tissue cancer rhabdomyosarcoma.

May 7, 2026 By Damon Runyon Cancer Research Foundation

Rhabdomyosarcoma (RMS) is a cancer of the soft tissue that predominantly affects children. Under the microscope, these tumors resemble developing skeletal muscle, but they appear in parts of the body where skeletal muscle does not exist, such as the bladder and salivary gland. For years, this has raised two fundamental questions: what types of cells give rise to RMS, and why does this cancer mainly occur in children?

New research from former Damon Runyon-Sohn Pediatric Cancer Fellow Katherine E. Gadek, PhD, and her colleagues at St. Jude Children’s Research Hospital sheds light on this puzzle. Using advanced genetic “lineage tracing” techniques, the team has traced the origin of RMS to endothelial progenitor cells, the cells that give rise to the lining of blood vessels during early development.

Their results show only a specific subset of endothelial progenitor cells, present during a narrow window of embryonic development, have the ability to develop into RMS. Further, the cells capable of becoming cancerous share two critical features: the presence of cilia—tiny cellular structures that act like antennae—and an active Sonic Hedgehog signaling pathway, a molecular communication system that plays a major role in embryonic development. When these features are present, endothelial progenitor cells are vulnerable to tumorigenesis. Once development moves past this window, that vulnerability disappears.

These findings deepen scientists’ understanding of how normal developmental processes can go awry and lead to cancer in children. With a clearer picture of the origins of RMS, they are one step closer to developing better strategies to detect, prevent, and treat this lethal disease.

This research was published in Cell Reports.
