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Protein associated with childhood cancer alters the structure of DNA, leading to cancer

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UNC scientists have demonstrated for the first time how a critical gene associated with a type of childhood cancer alters the way DNA is packaged in cells and leads to cancer. Their laboratory discovery could result in the development of a targeted therapy to treat Ewing Sarcoma, a malignant bone and soft tissue tumor of children and young adults.

Their findings are published in the Nov. 15, 2011 online edition of the journal Genome Research.

Genetic events in some sarcomas result in proteins that are composed of parts derived from different genes. How these fusion proteins cause cancer in some cell types, but not others, is not understood.

The UNC team describes how the fusion protein – EWS-FLI1 – binds to unexpected sites in the genome of cancer cells, resulting in changes in the structure of DNA. These changes alter the regulation of many genes, beginning the genetic steps to cancer.

Ian Davis, MD, PhD, assistant professor of pediatrics and genetics and study senior author, explains, “Fusion proteins present a unique treatment opportunity since they exist only in tumor cells and not in normal cells. We are moving closer to understanding how they work specifically in cancer cells. The next steps are to determine if or how this process can be derailed by a drug.”