Medical Xpress

Researchers find powerful predictor of bone cancer prognosis

January 7 2010

(PhysOrg.com) -- Scientists at the University of Toronto and The Hospital for Sick Children (SickKids) have discovered a powerful new tool that can help predict the prognosis for patients with bone cancer and help doctors more accurately determine how aggressively they need to treat specific patients. They found that the presence of a specific type of genetic mutation found in the tumours results in poorer outcomes for patients with osteosarcoma - the most common bone cancer in children and adolescents. The study is published in the current issue of *Cancer Research*.

The research team analyzed tumour DNA from osteosarcoma patients and found a novel region called osteo3q13.31, which contains three genes that were previously not known to be involved in the disease. They used the presence or absence of a mutation in these genes - known as an osteo3q13.31 deletion - as an indicator to predict the disease outcome in osteosarcoma. They studied 49 patients and found that a deletion resulted in poorer outcomes.

"This marker is an incredibly powerful tool. If the deletion is present, this suggests that the patient would need more aggressive therapy than if it is absent," says principal investigator Dr. David Malkin, Paediatric Oncologist and Senior Scientist at SickKids, and Professor in the Department of Paediatrics at the University of Toronto. "Hopefully, we would be able to avoid over treating patients who don't need the most aggressive therapy, while ensuring that we aren't under treating those who do."

The advent of high-resolution technologies allowed the scientists to look at regions of DNA with much more clarity. The scientists used a high-resolution tool called single-nucleotide polymorphism (SNP) array to look at copy number alteration (CNA). CNA is a genetic phenomenon that occurs when some regions of the DNA are duplicated or deleted. Normally genes are present in two copies, with one copy inherited from each parent. CNAs are often found in osteosarcoma.

Every year, there are about 300 new cases of osteosarcoma in Canada, most of which occur in adolescents and young adults. The survival rate of about 65 per cent has not changed in about two decades. While the first step is to use the new marker as a prognostic tool, Malkin says it may eventually be used as a therapeutic target, ultimately leading to improved survival rates for osteosarcoma. Down the road, the marker may also be able to help determine prognosis in tissue cancers including carcinomas and sarcomas, he explains.

Provided by University of Toronto