

Protein 'chatter' linked to cancer activation

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Scientists have found the existence of cross-talk between human chromosome ends and the protein complexes central to the stability of the entire human genome, a "chat" that contributes to cancer development.

The research, published today in Nature Structural & Molecular Biology, sheds new light on the pathology of three related but non-curable cancerpredisposed human disorders: ataxia telangiectasia, ataxia telangiectasialike disorder, and Nijmegen breakage syndrome.

"The proteins whose deficiency is responsible for these three human disorders have the job of ensuring that chromosome ends are maintained and protected," says Xu-Dong Zhu, assistant professor of biology and the lead author on the study. "As we age, our chromosome ends become shorter. Individuals whose ends deteriorate faster are at a higher risk of developing cancer because short chromosome ends are a serious threat to the stability of our genome. When the genome becomes unstable, it puts our bodies at greater risk of cancer."

Zhu adds that patients with ataxia telangiectasia, ataxia telangiectasialike disorder, and Nijmegen breakage syndrome experience an accelerated rate of loss of DNA from chromosome ends. "We didn't know why this happens; now we have found that the communication link between these proteins and a protein crucial for maintenance of chromosome ends is either missing or nonfunctional in these patients."

Zhu further explains that lack of this cross talk in normal cells promotes



short chromosome ends and as a result promotes cancer formation. A key difference between cancer cells and normal cells is that the former maintain their chromosome ends and have the unlimited potential to grow. Disruption of this communication in cancer cells induces shortening of chromosome ends and may restrict their potential to grow.

Zhu says that the discovery will help researchers understand the onset and progression of these diseases as well as help them find a cure for cancer.

Source: McMaster University

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