Chromatin remodeling proteins: New insights in human malignancy and targeted cancer therapy

July 13 2016

Chromatin remodeling proteins (chromatin remodelers) are essential and powerful regulators for critical DNA-templated cellular processes, such as DNA replication, recombination, gene transcription/repression, and DNA damage repair. These molecular and genetic processes are important for a wide spectrum of cellular functions, including cell cycle, death, differentiation, pluripotency, and genome integrity. Recently, many scientific reports have shown that chromatin remodeling proteins could be promising new targets for the treatment of human malignancy.

"This is a hot and exciting research topic for cancer researchers, and our article provides an updated understanding on the functions and mechanisms of chromatin remodelers in human cancers," says Dr. Chun Zhang, the principle investigator of the Department of Nuclear Medicine of Beijing Chao-Yang Hospital and Capital Medical University of China.

Chromatin remodeling is an energy-driven process in which chromatin remodelers use the energy of ATP hydrolysis to change the nucleosome structure. In human cells, there are four chromatin remodeler families: SWI/SNF, INO80, ISWI and CHD family. Each family of chromatin remodelers has multiple protein members that form a variety of protein complexes. Each chromatin remodeler complex has unique function in regulating gene expression and DNA repair.

"Genes encoding chromatin remodeler proteins are the most frequently mutated genes in human cancer tissues, indicating their tumor suppressive functions and potential therapeutic usages for cancer treatment," says Dr. Pingyu Zhang from the Department of Gastroenterology, Hepatology and Nutrition at the University of Texas MD Anderson Cancer Center of USA, "We believe that chromatin remodelers will become therapeutic targets for cancer therapies in the future."

The report is published in the journal *Current Protein and Peptide Science*. Dr. Jie Lu (Key Laboratory of Radiopharmaceuticals, Ministry of Education, College of Chemistry, Beijing Normal University) is also involved in this study.

More information: Chun Zhang et al, The Roles of Chromatin Remodeling Proteins in Cancer, *Current Protein & Peptide Science* (2016). DOI: 10.2174/1389203717666160122120713

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