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Enzyme key to 'sister act' that maintains genome stability

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Keeping the genome stable is a "sister act" of matched chromatids – the pairs of the double helix DNA molecule that exist during the chromosome duplication in the S phase of the cell cycle.

Maintaining the chromatids in their sister pairs rests with Eco1, a kind of enzyme known as an acetyltransferase. Now researchers at Baylor College of Medicine, in a collaboration of two laboratories, have shown that Eco1 and its human homologue maintain sister chromatid cohesion and thus genome stability through a chemical process called acetylation that affects Smc3, one of the key components of the cohesion protein complex. A report on their work appears in the current online issue of the journal *Molecular Cell*.

This activity is critical to maintaining the stability of the cell's genome and its survival, said Dr. Jun Qin, associate professor of biochemistry and molecular biology and molecular and cellular biology at BCM and a senior author of the report.

"If a cell lacks this acetyltransferase activity, it's dead," said Dr. Xuewen Pan, assistant professor of biochemistry and molecular biology and molecular and human genetics at BCM and also a senior author.

"This is critical for genome stability, cell growth and organism survival," said Qin.

"The collaboration in this work was important," he said. His laboratory

carried out the work in human cells, and Pan's did the work in yeast.

"We pooled the resources of our two laboratories and took advantage of the power of the genetics in yeast and the power of proteomics and cell biology in the human. If a single labor had worked on this project, we would not have as complete a story," Qin said.

Source: Baylor College of Medicine