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Jade family PHD finger 3 (JADE3) increases cancer stem cell-like properties and tumorigenicity in colon cancer

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**Abstract**

Jade family PHD finger 3 (JADE3) plays a role in inducing histone acetylation during transcription, and is involved in the progression of several human cancers; however, its role in colon cancer remains unclear. Herein, we found that JADE3 was markedly upregulated in colon cancer tissues and significantly correlated with cancer progression, and predicted shorter patient survival. Further, JADE3 was expressed much higher in colon cancer cell lines that are enriched with a stem-like signature. Overexpression of JADE3 increased, while silencing JADE3 reduced cancer stem cell-like traits in colon cancer cells *in vitro* and *in vivo*. Importantly, silencing of JADE3 strongly impaired the tumor initiating capacity of colon cancer cells *in vivo*. Furthermore, JADE3 interacted with the promoters of colon stem cell marker LGR5 and activated its transcription, by increasing the occupancy of p300 acetyltransferase and histone acetylation on the promoters. Finally, we found that JADE3 expression was substantially induced by Wnt/ $\beta$ -catenin signaling. These findings suggest an oncogenic role of JADE3 by regulating cancer stem cell-like traits in the colon cancer, and therefore JADE3 might be a potential therapeutic target for the treatment of colon cancer.

**Keywords:** JADE3; colon cancer; cancer stem cells; tumorigenesis; LGR5

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