New epigenetic drug strategy to treat cancer

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Researchers have discovered that inhibiting CDK9, a DNA transcription regulator, reactivates genes that have been epigenetically silenced by cancer. Reactivation leads to restored tumor suppressor gene expression and enhanced anti-cancer immunity. It is the first time this particular kinase has been linked to gene silencing in mammals.

Jean-Pierre Issa, MD, Director of the Fels Institute for Cancer Research & Molecular Biology at the Lewis Katz School of Medicine at Temple University (LKSOM), led the research. The paper appears in the journal *Cell*.

It has been established that epigenetic mediators of gene silencing present new targets for cancer drugs. Hanghang Zhang, Ph.D., of the Fels Institute for Cancer Research & Molecular Biology at LKSOM, the first author on the report, performed a live cell drug screen with genetic confirmation to identify CDK9 as a target and to develop and test an effective inhibitor—MC180295. The new drug is highly selective, potentially avoiding the side effects associated with inhibiting the cell cycle. In the study it showed broad effectiveness against cancer both in vitro and in vivo. The drug was discovered in collaboration with investigators at the Moulder Center for Drug Discovery at the Temple University School of Pharmacy.

"In addition to reactivating tumor suppressor genes, CDK9 inhibition induces sensitivity to the immune checkpoint inhibitor α-PD-1 in vivo," said Issa. "It is an excellent target for epigenetic cancer therapy."