FACT (Facilitates chromatin transcription) complex as a marker and target of aggressive poorly differentiated cancers

**Background**

FACT (facilitates transcriptional complex) is involved in chromosome remodeling during transcription, replication, and DNA repair, and has been consistently shown to be a tightly regulated complex that is overexpressed in many human cancers. FACT is overexpressed in human cancer cells and is a marker for malignant transformation, as FACT inhibitors have been shown to suppress tumor growth and survival of aggressive cancers. FACT is a target for the development of new therapeutic agents for the treatment of cancer.

**Materials and methods**

We investigated the expression of FACT in normal and cancerous tissues from different origins (prostate, pancreas, colon, breast, lung, and brain) using qRT-PCR and Western blot analysis. FACT expression was found to be significantly higher in cancerous tissues compared to normal tissues. FACT expression was also found to be predictive of poor prognosis in patients with aggressive cancers.

**Conclusions**

FACT is an attractive target and marker of poorly differentiated cancers. FACT expression is an independent predictor of poor outcome in cancers of the prostate, pancreas, colon, breast, lung, and brain. FACT inhibitors have the potential to become a new class of anti-cancer agents.

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**References**

1. Garcia H, Alfya Safina, Daria Fleyshman, Catherine Burkhardt, Andrei Purmal, Jeffrey C Miecznikowski, Angela R. Omilian, Carl Morrison, Katerina V Guroya. FACT (facilitates chromatin transcription) complex as a marker and target of aggressive poorly differentiated cancers. Department of Cell Stress Biology, University of Texas Southwestern Medical Center, Dallas, TX, USA; Department of Pathology, Roswell Park Cancer Institute, Buffalo, NY, USA; Department of Biostatistics, SUNY Buffalo, NY, USA; Cleveland BioLabs, Inc, Buffalo, NY, USA; 15 INCURION, Inc, Moscow, Russia.

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**Summary**

FACT is an "accelerator" of malignant transformation

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**FACT dependent transcriptional programs**

- FACT-related transcriptional programs
- FACT inhibition
- FACT knockdown
- FACT silencing
- FACT-targeting therapies
- FACT inhibitors
- FACT antagonists
- FACT-activating therapies
- FACT stimulants

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**FACT expression in normal tissues**

- FACT expression in normal tissues
- FACT expression in malignant tissues
- FACT expression in aggressive tissues

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**FACT is a marker of normal and cancer stem cells**

- FACT expression in normal stem cells
- FACT expression in cancer stem cells
- FACT expression in aggressive stem cells

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**Conclusions**

- FACT is a marker of aggressive poorly differentiated tumors
- FACT is expressed at the highest levels in normal and cancer stem cells
- Targeting FACT is a promising anti-cancer strategy
- CB1037 is the first FACT inhibitor in clinical trials