

Researchers reveal inner nuclear membrane protein as positive regulator in breast cancer metastasis

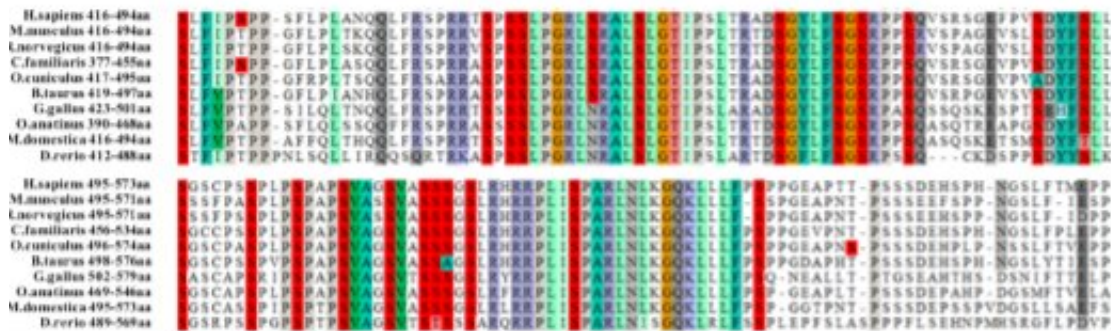
December 8 2021, by Liu Jia

a

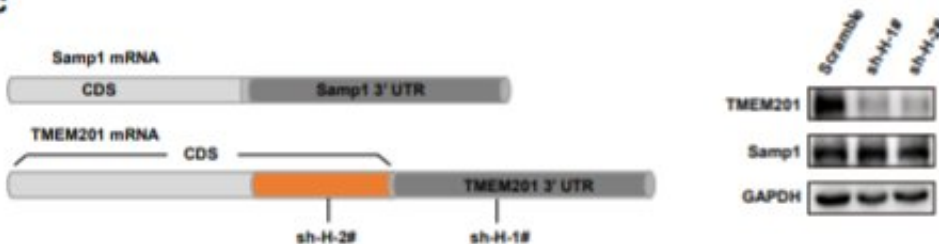
Name	Transcript ID	bp	Protein	Biotype	CCDS
TMEM201-201	ENST00000340305.9	3851	392aa	Protein coding	CCDS30579
TMEM201-202	ENST00000340381.10	3776	666aa	Protein coding	CCDS44055
TMEM201-203	ENST00000416541.5	3447	552aa	Protein coding	-
TMEM201-204	ENST00000508400.1	893	166aa	Nonsense mediated decay	-
TMEM201-205	ENST00000510900.1	554	No protein	Processed transcript	-



b



c



TMEM201 and Samp1 are different protein subtypes of TMEM201 gene. a.

Five transcripts of TMEM201 gene and the main difference of Samp1 and TMEM201 protein in primary sequence. b. The C terminal of TMEM201 protein is a highly conserved region and contains large amount of serine. c. shRNAs were designed to target TMEM201 mRNA with no effects on Samp1 mRNA. d and e. Mouse and Human TMEM201 shRNAs were designed to target TMEM201 mRNA with no effects on Samp1 mRNA. Credit: DOI: 10.1038/s41388-021-02098-5

The nuclear envelope (NE) is composed of the outer nuclear membrane (ONM) and the inner nuclear membrane (INM), which are separated by the perinuclear space and joined at nuclear pore complexes. INM proteins play crucial roles in cell cycle regulation, DNA repair, aging, and cell migration of tumor formation and progression. However, the specific INM proteins and INM protein-based mechanisms contributing to cancer aggressiveness remain to be investigated.

In a study published in *Oncogene*, a team of researchers led by Li Jia from Shanghai Institute of Materia Medica of the Chinese Academy of Sciences discovered a novel INM protein transmembrane protein 201 (TMEM201) promoting breast cancer metastasis.

In addition to classical functions of providing [physical strength](#) and stability to protect nucleus, INM proteins link to cancer pathogenesis.

In this study, the researchers found that TMEM201, a type III INM protein, was highly expressed and predicted poor breast cancer survival in invasive breast cancer. They then studied the increased expression of TMEM201 which promoted TGF β -mediated epithelial-to-mesenchymal transition (EMT) facilitating the migration, invasion, and survival properties of BC cells. Study showed that TMEM201 physically interacted with SMAD2/3 and was required for SMAD2/3 phosphorylation.

These results revealed the role of specific INM protein in metastasis of aggressive BC, and suggested a potential therapeutic strategy for the poor-prognosis disease.

This study not only reveals that INM protein TMEM201 acts as a positive regulator of TGF β signaling by interacting with SMAD2/3 in [breast cancer metastasis](#), but also broaden the understanding of INM protein involvement in cancer cell biology and oncology as a whole.

More information: Ya Kong et al, Inner nuclear membrane protein TMEM201 promotes breast cancer metastasis by positive regulating TGF β signaling, *Oncogene* (2021). [DOI: 10.1038/s41388-021-02098-5](https://doi.org/10.1038/s41388-021-02098-5)

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