



Mechanistic Study of Glycosylated RNA-Neuron Interactions in Small Cell Lung Cancer Brain Metastasis

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IASLC 2026 World
Conference on Lung Cancer

SEPTEMBER 12 - 15, 2026
SEOUL, REPUBLIC OF KOREA

INTRODUCTION

- SCLC frequently metastasizes to the brain and is associated with poor prognosis.
- Glycosylated RNA (glycoRNA) is an emerging cell-surface molecule involved in intercellular communication and immune regulation.
- We investigated whether a glycoRNA–csRBP–HS–neuron axis contributes to SCLC brain metastasis.

METHODS



Discovery: Spatial multi-omics and glycoRNA-seq identified brain metastasis-associated glycoRNAs.



Mechanism: ARPLA, RNA pull-down, RIP-qPCR, BBB and neuron co-culture models were used for mechanistic validation.



Function: Mitochondrial transfer, cell migration and brain metastatic burden were evaluated in vitro and in vivo.



Therapy: TM ± PD-1/PD-L1 blockade was assessed in organoid and murine models.

DISCUSSION AND CONCLUSION

Actionable Take Away Message

- tRNA-Gly-TCC promotes SCLC brain metastasis.
- The glycoRNA–hnRNP-U–HS–neuron axis facilitates mitochondrial transfer and immune evasion.
- GlycoRNA targeting may enhance PD-1/PD-L1 blockade.

Future Direction for Research

- Validate this pathway and therapeutic strategy in larger clinical cohorts.

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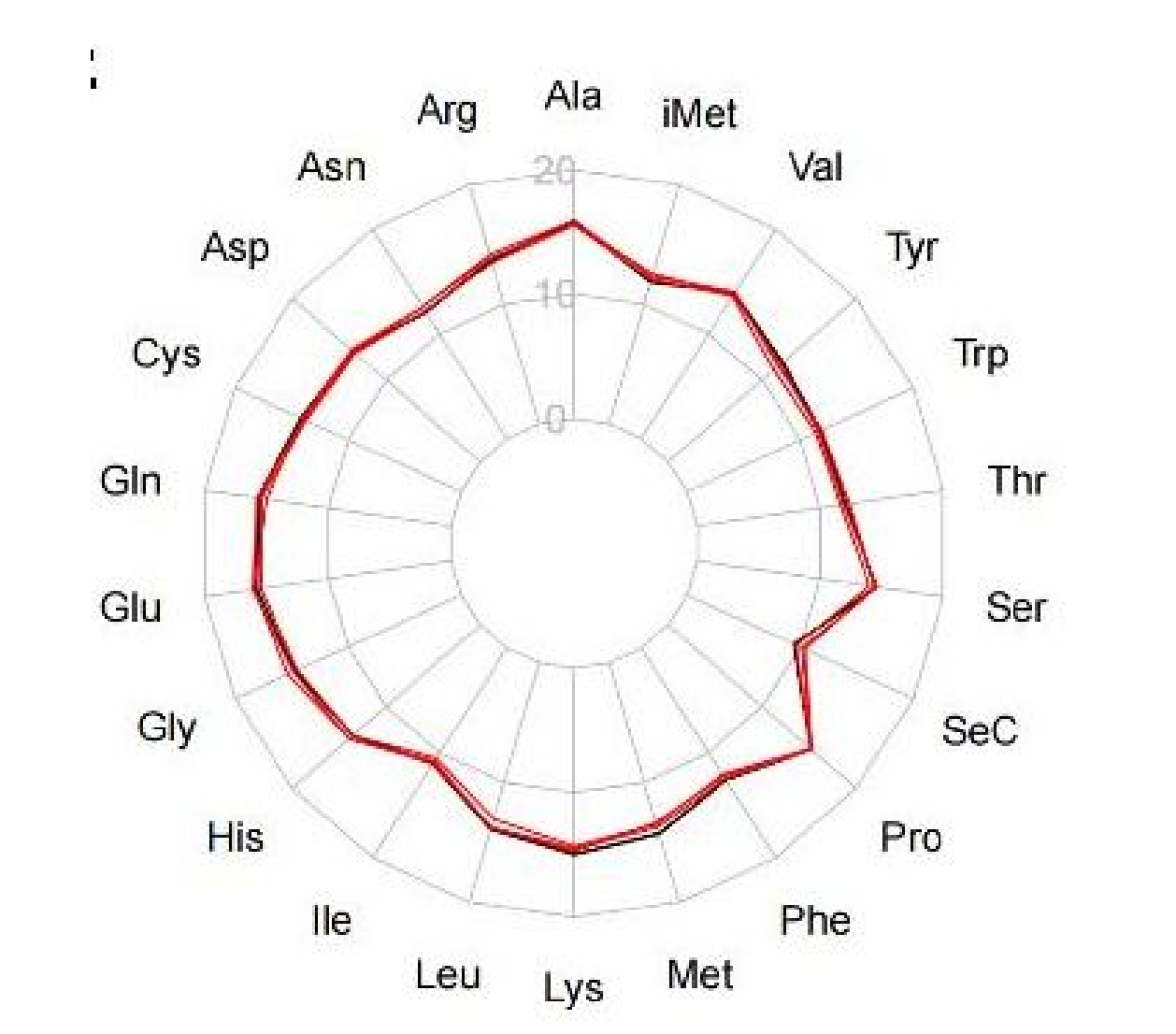
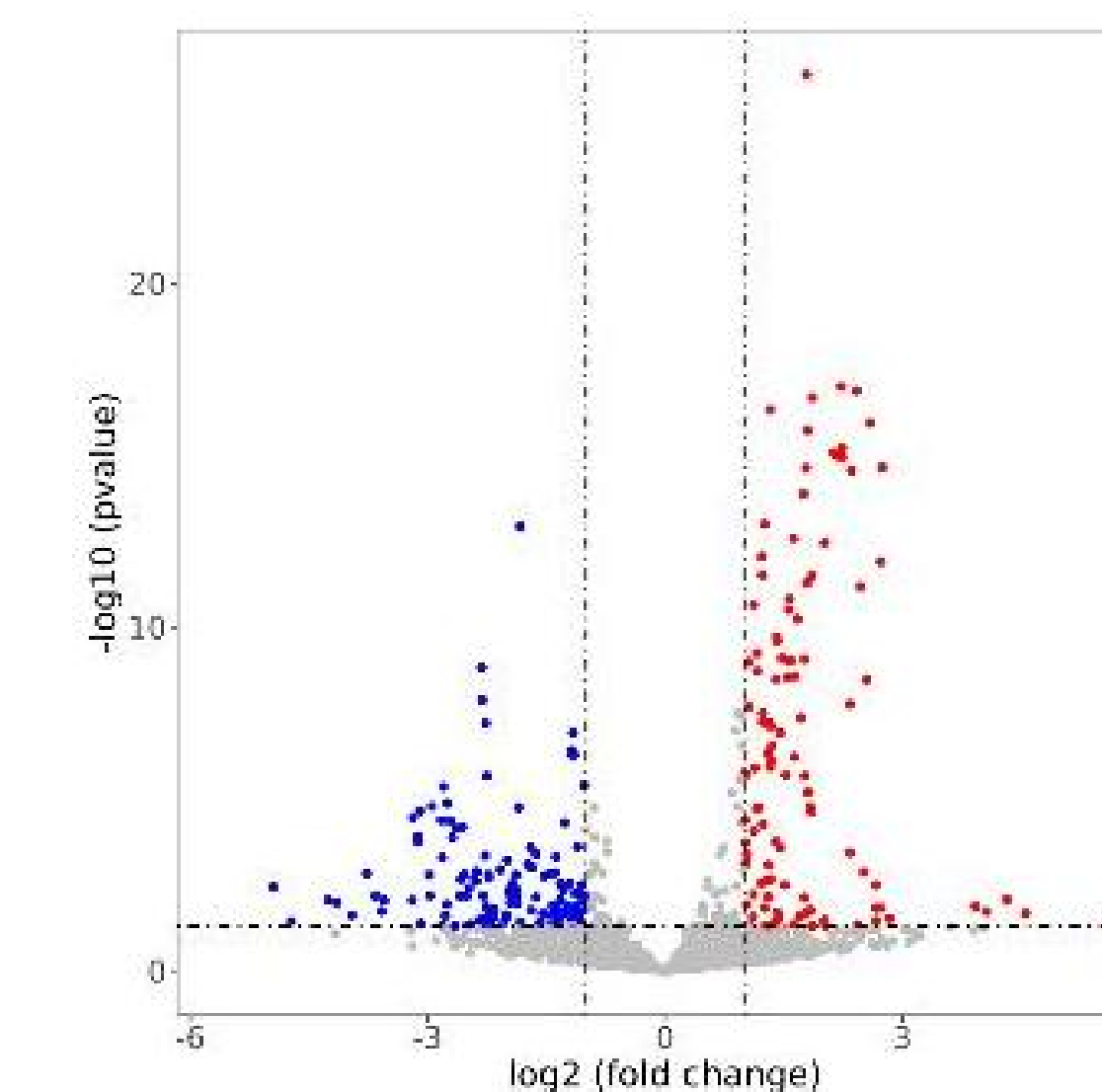
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No artificial intelligence (AI) tools were used in the development of this presentation..

RESULTS

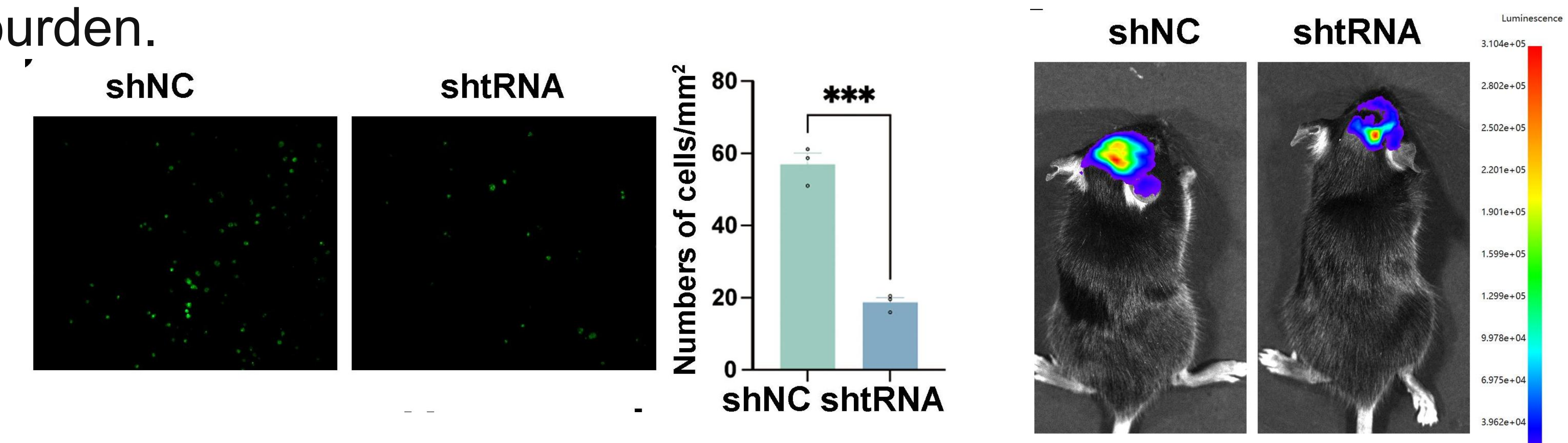
1 | Identification of glycoRNA

GlycoRNA-seq identified glycosylated tRNA-Gly-TCC as a key candidate associated with SCLC brain metastasis.



2 | Functional validation

tRNA-Gly-TCC knockdown reduced BBB penetration and brain metastatic burden.



3 | Therapeutic relevance

High glycometabolic activity was associated with poor prognosis, while TM combined with immunotherapy showed enhanced anti-metastatic activity.

