

## 5 - 62 PIM1 Regulating Hypoxia-induced Resistance in Gliomas to Carbon Ion Irradiation

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Glioma is the most common malignant primary brain tumor with the poor prognosis and high mortality<sup>[1]</sup>. The majority of high-risk glioma patients are resistant to current treatment regimens. The hypoxic microenvironment in gliomas confers resistance to treatment and eventually shortens the survival time of patients<sup>[2]</sup>. Hypoxia is closely associated with radiotherapy resistance, but the underlying mechanisms remains to explore further.

Here, we aimed to explore the role of PIM1 kinases in hypoxia-induced radiation resistance. We discovered that mRNA expression of PIM1 was elevated under hypoxic condition in human glioma cells (Fig. 1(a)). In addition, we collected the gene expression profile and clinical information of glioma patients from TCGA and CGGA databases and found that PIM1 expression positively correlated with hypoxia-responsive genes in TCGA database (Fig. 1(b)). To further identify the correlation of PIM1 and hypoxia, we assessed the level of hypoxic gene signature in PIM1 high expression and low expression groups by GSEA. The result indicated that hypoxic gene signature was upregulated in high PIM1 expression group (Fig. 1(c)). PIM1-knockdown U87 cells showed an obvious decrease in colony formation after carbon-ion irradiation (Fig. 1(d) and 1(e)). It showed hypoxia-induced radiation resistance can be potentially regulated by adjusting PIM1 expression.

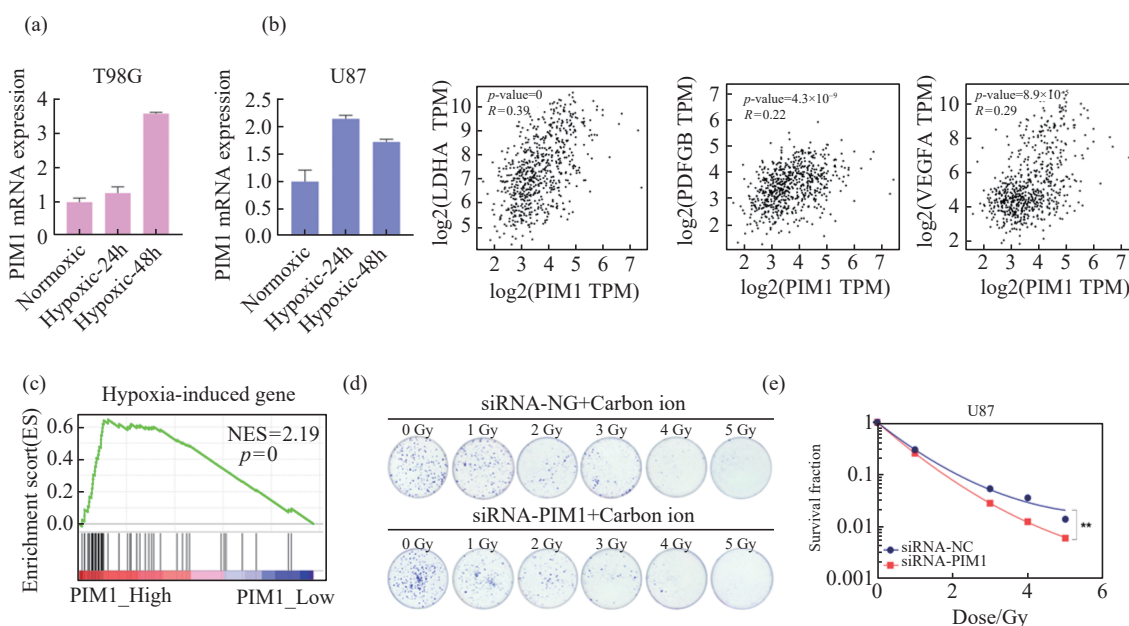


Fig. 1 (color online) PIM1 is highly expressed in hypoxic gliomas and induces resistance to radiotherapy.

In conclusion, PIM1, highly expressed in hypoxic gliomas, may potentially regulate the resistance to radiotherapy. Our study identifies a PIM1-mediated resistance mechanism under hypoxic condition and provides a promising strategy to overcome radiation resistance in gliomas.

### References

- [1] R. L. Siegel, K. D. Miller, N. S. Wagle, CA: A Cancer Journal for Clinicians, 73, 1(2023)17.
- [2] Z. Chen, F. Han, Y. Du, et al., Signal Transduction and Targeted Therapy 8, 1(2023)70.