Cuproptosis

- A novel cuproptosis-associated LncRNA model predicting prognostic and immunotherapy response for glioma
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Cuproptosis-associated LncRNA model

Cuproptosis is a copper-dependent and regulated non-apoptotic death mode.

• Cuproptosis activates oxidative stress and inhibits the ubiquitin-proteasome system to induce cell death.

• Cuproptosis plays an important role in cardiovascular diseases.

Cell death, except for cuproptosis, in gliomas has been extensively studied, providing novel targets for immunotherapy by reshaping the tumor immune microenvironment through multiple mechanisms. This study aimed to explore the effect of cuproptosis on the immune microenvironment and its predictive power in prognosis and immunotherapy response.

Methods: Eight glioma cohorts were included in this study. We employed the unsupervised clustering algorithm to identify novel cuproptosis clusters and described their immune microenvironmental characteristics, mutation landscape, and altered signaling pathways. We verified the correlation among FDX1, SLC31A1, and macrophage infiltration in 56 glioma tissues. Next, based on multicenter cohorts and 10 machine learning algorithms, we constructed an artificial intelligence-driven cuproptosis-related signature named CuproScore.

Results: Our findings suggested that glioma patients with high levels of cuproptosis had a worse prognosis owing to immunosuppression caused by unique immune escape mechanisms. Meanwhile, we experimentally validated the positive association between cuproptosis and macrophages and its tumor-promoting mechanism in vitro. Furthermore, our CuproScore exhibited powerful and robust prognostic predictive ability. It was also capable of predicting response to immunotherapy and chemotherapy drug sensitivity.

Conclusions: Cuproptosis facilitates immune activation but promotes immune escape. The CuproScore could predict prognosis and immunotherapy response in gliomas [1].

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Feng S, Zhang Y, Zhu H, Jian Z, Zeng Z, Ye Y, Li Y, Smerin D, Zhang X, Zou N, Gu L, Xiong X. Cuproptosis facilitates immune activation but promotes immune escape, and a machine learning-based cuproptosis-related signature is identified for predicting prognosis and immunotherapy response of gliomas. CNS Neurosci Ther. 2023 Jul 28. doi: 10.1111/cns.14380. Epub ahead of print. PMID: 37515314.